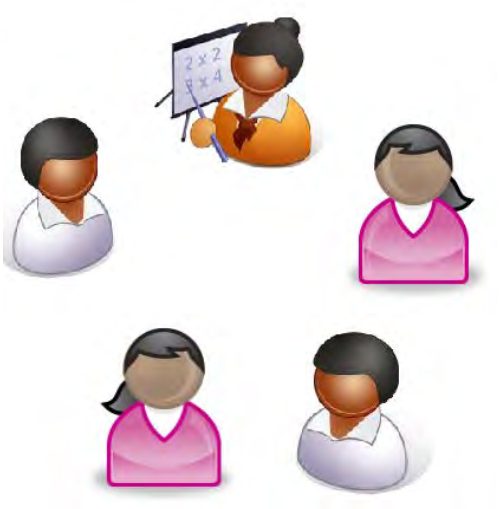
COVER FORM

Applicant:	**University of North Texas**
Address:	**1155 Union Circle, #305250**
City/State/Zip:	**Denton, TX 76203-5017**
Applicant Contact (Director):	**Dr. M. Jean Keller**
Phone Number:	**940-565-3427**
Fax Number:	**940-565-4904**
E-Mail Address:	**Jean.Keller@unt.edu**
Applicant Contact (Co-Director):	**Dr. Mary Harris**
Phone Number:	**940-565-4327**
Fax Number:	**940-565-4952**
E-Mail Address:	**Mary.Harris@unt.edu**
Authorized Signature:	
Printed Name and Title:	**Kristi Lemmon, Director of Sponsored Projects**
Date:	

Applicant Certification	
Authorized Signature:	
Printed Name and Title:	**Kristi Lemmon, Director of Sponsored Projects**
Date:	

Academic Vertical Alignment Training And Renewal



University of North Texas

Dr. M. Jean Keller, Project Director
Dr. Mary Harris, Associate Director
University of North Texas
1155 Union Circle, #310769
Denton, TX 76203-5017
Phone: 940-565-3427
Fax: 940-565-4904
Jean.Keller@unt.edu

TABLE OF CONTENTS

Transmittal Letter 4

Abstract 5

Narrative 6

Statement of Need 6

Project Design 8

Management Plan 21

Key Personnel 22

Evaluation Plan 22

Adequacy of Resources 34

Statement of Impact 34

Budget 36

Attachment A: Plan of Action 39

Attachment B: Curriculum Vitae 71

Attachment C: Letters of Commitment 79

Attachment D: Examples of Reference Course Profiles 96

Transmittal Letter

DATE: May 20, 2011

TO: Priscilla Martinez, Project Director

FROM: University of North Texas

SUBJECT: 2011-2013 Vertical Alignment Training Grant

This proposal is in reference to THECB 2011-2013 Vertical Alignment Training Grant. The University of North Texas accepts full acceptance of the terms and conditions described in this Request for Applications. The application enclosed is binding and valid at the discretion of THECB. We understand this proposal is good for ninety days.

Eligible Region to be served: State wide Texas – Up to 12 regional vertical alignment trainings will be offered

Partners/Collaborators:

- Dallas ISD
- Fort Worth ISD
- Hudson ISD
- Lufkin ISD
- Nacogdoches ISD
- Wooden ISD
- Region 7 Education Service Center
- Region 10 Education Service Center
- Region XI Education Service Center
- ESC Core (State) Group
- Tarrant County College District
- Dallas County Community College District
- Collin College
- Angelina College
- Brookhaven Early College High School
- Texas Woman's University
- Stephen F. Austin University
- Fort Worth Chamber of Commerce
- North Texas Community College Consortium
- North Texas Regional P-16 Council
- National Institute for the Study of Transfer Students

Contact: Kristi Lemmon, Director of Sponsored Projects
1155 Union Circle, #305250
Denton, TX 76203-5017
940-565-3940 Kristi.Lemmon@unt.edu

If further questions arise, the following may be contacted: Jean Keller
1155 Union Circle, #310769
Denton, TX 76203-5017
940-565-3427 Jean.Keller@unt.edu

Abstract

Many public high school graduates who attend two- or four-year institutions of higher education enter without an understanding of specific and necessary elements of the requisite discipline; thus, they require remediation which may lead to dropping out. AVATAR (Academic Vertical Alignment Training And Renewal) is a three-step model designed to create a strong, sustained, and influential training process for vertical and horizontal curriculum alignment that is interconnected between secondary and postsecondary education and supports seamless and successful transition and completion for all students preparing for higher education and careers. The curriculum alignment process and training will promote academic rigor, student success, and reduction of developmental education. AVATAR will be designed to prepare faculty and administrators to create faculty work groups to conduct horizontal and vertical alignment of curriculum among lower division course sections and between lower division course sequences in higher education and vertical alignment of curriculum between secondary and postsecondary course sequences. AVATAR builds on two strong statewide networks that are in place and are well positioned to implement vertical alignment training within their regions – local and state P-16 Councils and Education Service Centers. AVATAR is a process that can be scaled and used with various disciplines.

Narrative
AVATAR (Academic Vertical Alignment Training And Renewal)

Statement of Need

Many public high school graduates who attend two- and/or four-year institutions of higher education enter without a deep understanding of specific and necessary elements of the requisite discipline; thus, they require remediation which may lead to dropping out. The national college readiness gap demonstrates that approximately 75% of nonselective two-year college students and nearly 50% of students enrolled in regional, less selective four-year colleges require remediation (SREB, 2010). Approximately 90% of Texas students (FY 2005-2007) who passed Algebra II in high school took a developmental education math course at a two-year institution. Approximately 60% of Texas high school graduates who passed Algebra II started in developmental math at four-year colleges (THECB, 2008). In 2008, the Texas College and Career Readiness standards (CCRS) were adopted. The state of Texas administered Algebra I end of course (EOC) exams in 2009-2010 and the results indicated 57% of over 78,000 tested met the standard and 11% demonstrated commended performance. For biology and chemistry EOC exams, the 2010 results yielded 57% and 46% mean correct responses on the exams respectively. While sound alignment has been exhibited between the CCRS and the Texas Essential Knowledge and Skills (TEKS), there is a gap in students' performances and readiness to successfully complete college academic work. Additionally, all Texas high school graduates who pass the EOC exams in college Algebra II and English III will be eligible for credit bearing courses at most Texas public higher education institutions which supports the need for sound vertical alignment of course curricula.

In a study of 38 high schools, the following surfaced as essential to creating a college going and college readied culture: creating an aligned core academic program; implementing mandatory college-focused

courses; creating assignments and grading policies with college practices; and building partnerships with postsecondary institutions (Conley, 2009). Vertical/horizontal alignment processes and training programs are needed to create a college-going and readied culture.

A recent study entitled, *Early Indicators of Future College Success for Dallas Independent School District (ISD) Graduates 1998-2009*, found a very strong relationship between rigorous secondary academic achievement and future college success. While 44% of these 75,033 Dallas high school graduates enrolled in college, only 15% completed a two- or four-year degree (Conley, 2010). These findings lead to the need for the development of a strong curriculum alignment process that can be scaled, outcomes measured, and sustained between secondary and postsecondary core courses as well as communications between faculty and administrators in these institutions to ensure student success in postsecondary education, to reduce the need for developmental education, and to achieve the state's goals of "Closing the Gaps." The THECB is completing its work on *Revising the State Core Curriculum: A Focus on 21st Century Competencies* which creates and opportunity to further explore core curriculum courses and to promote a renewal of vertical and horizontal alignment of the curriculum.

The North Texas Regional P-16 Council has been conducting curriculum alignment workshops for the past three years as part of its Professional Development Committee's goals. The workshops have focused on CCRS mathematics and science as well as the cross disciplinary standards. A total of 12 workshops have been hosted and participants' evaluations, which include both secondary and postsecondary educators, including those associated with career and technical programs, have indicated faculty need a deeper understanding of what each other are doing related to content, pedagogy, expectations, and assessments. In each of the workshops one of the strongest areas of success was the

opportunity for discipline educators to meet and discuss the common goals of student success and to share reference course materials articulating the expectations of postsecondary coursework.

The north Texas region (Dallas and Fort Worth) is one of the most diverse in the state and at the same time, it mirrors the entire diversity of Texas. The region has some of largest and smallest population bases for school districts; it has large numbers of diverse postsecondary institutions; it has some of wealthiest and poorest citizens; and its ethnicity and racial composition is highly diverse. The University of North Texas is well positioned to create a vertical alignment training process and to develop and deliver this training across the state based on its partnerships and close affiliation with the North Texas Regional P-16 Council, strong relationships with Educational Service Centers 10 and XI, experience in delivering curriculum alignment workshops, and working relationship with the Stephen F. Austin University STEPS – System Texas Educator Preparation Site, and desire to further develop its own vertical and horizontal alignment processes.

An avatar is a visible manifestation of an abstract idea or training concept. Curriculum alignment invites, in this proposed model, a multi-level community to create a visible plan for realization of individual student goals and aspirations. Implementation of the AVATAR (Academic Vertical Alignment Training And Renewal) model requires participation of a team approach with a high level of commitment.

Project Design

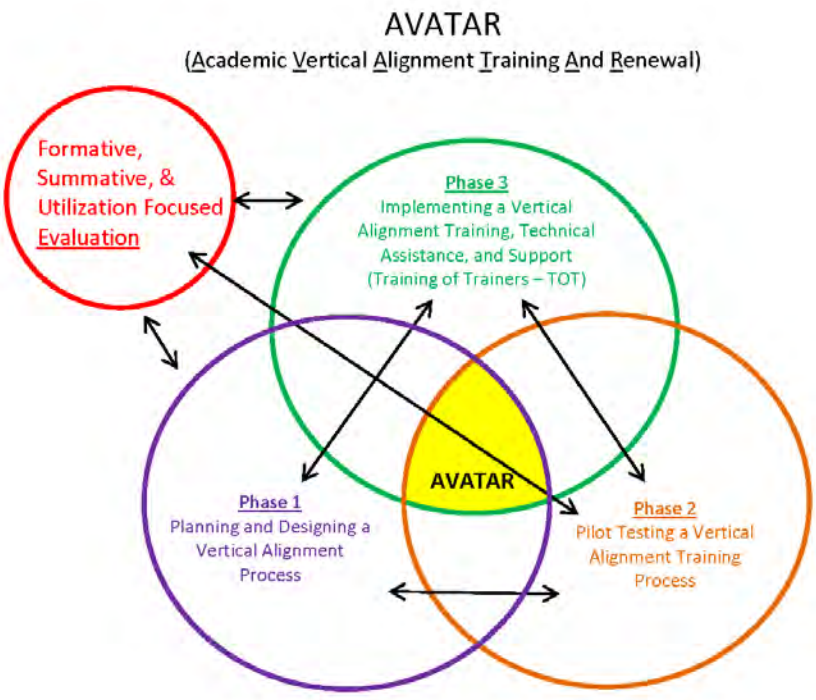
AVATAR (Academic Vertical Alignment Training And Renewal) is designed to create a strong, sustained, and influential training process for vertical and horizontal curriculum alignment that is interconnected between secondary and postsecondary education and supports seamless and successful transition and

completion for all students preparing for higher education and careers. The curriculum alignment process will highlight both vertical and horizontal alignment and the correlated training will be compelling and sustainable. AVATAR will be designed to prepare faculty and administrators to create faculty work groups to conduct horizontal and vertical alignment of curriculum among lower division course sections and between lower division course sequences in higher education and vertical alignment of curriculum between secondary and postsecondary course sequences. The AVATAR project will build on the Systemic Teacher Educator Preparation Site (STEPS) model, Texas Pathways Project methods, other state and national curriculum alignment processes, methods and lessons learned; CCRS validation study findings, and the reference course profiles (RCPs). Additionally, this model builds on two strong, statewide networks that are in place and are well positioned to implement a model for vertical alignment within their regions - local and state recognized P-16 Councils (40) and Educational Service Center (20). AVATAR is a process that can be scaled and used with various disciplines.

AVATAR includes three phases. Phase 1 is continuous over the life of the project and involves a comprehensive literature review of state and national best practices, models, and lessons learned from curriculum alignment projects, especially those undertaken by the Texas Higher Education Coordinating Board (THECB); the actual design of a vertical alignment process to be used in AVATAR; its implementation in a pilot format; the evaluation of the short term goals of the pilot; and the revision of the AVATAR model as it unfolds in Phase 2. Phase 2 involves three Texas based partnerships engaged in pilot testing the AVATAR model of curriculum alignment and the creation of the training component of vertical alignment. Phase 3 involves the 20 regional Education Service Centers and the 40 P-16 Councils and their respective partnerships from across Texas in a training of the trainers process. The selected teams (up to 12) will be provided access to the AVATAR process and its resources for involving

partnerships in curriculum alignment, follow-up support, and technical assistance from the AVATAR Planning and Oversight Committee, the Pilot Team Leaders, content experts, and project staff. Phase 3 begins with a conference planned for August 2012 with technical assistance and support continuing through the end of the project, August 2013. The vertical alignment training phase (3) will build on established relationships, formed in P-16 councils, between education service centers, school districts, two- and four-year institutions of higher education, and possibly regional workforce and community organizations committed to student access and success in careers and college. In order to build capacity, AVATAR will use a training of trainers format and each team that is trained commits to conducting at least one (1) vertical alignment process in their respective region. Up to twelve (12) teams will be trained and supported in AVATAR. A visual representation of the AVATAR model is displayed in Figure 1.

Figure 1: AVATAR Model



In Phases 1 and 2 of the AVATAR project, the designing of the vertical alignment process and training will engage multiple partnerships and a strong Planning and Oversignt Committee. Each major partner is listed in Figure 2 below.

Figure 2: Confirmed Collaborators of AVATAR

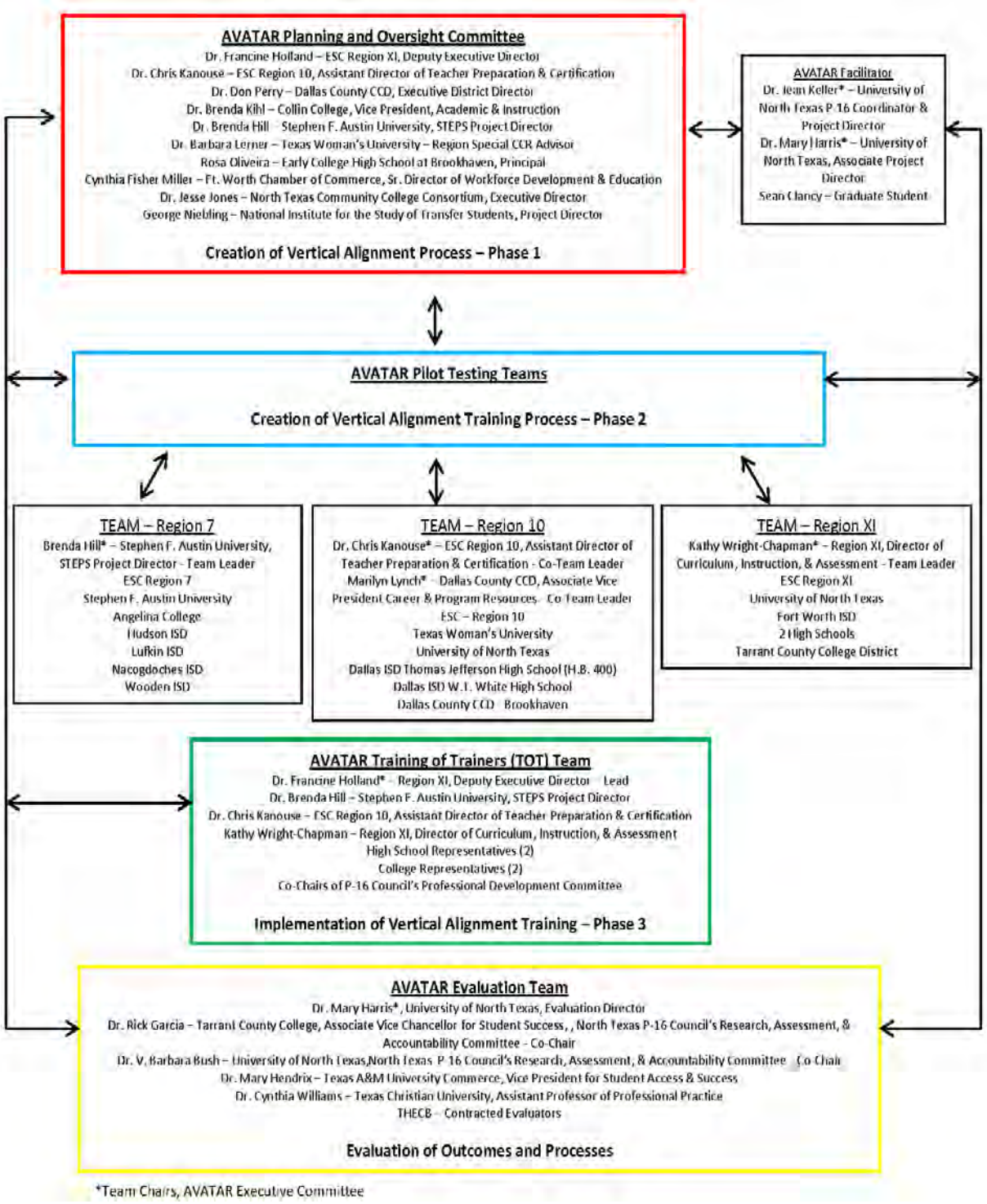
High Schools	Education Service Centers	2 Year Institutions of Higher Education	4 Year Institutions of Higher Education	Critical Friends
Dallas ISD Thomas Jefferson HS W.T. White HS Fort Worth ISD* Hudson ISD Lufkin ISD Nacogdoches ISD Wooden ISD STEP Project	Region 7 Region 10 Region XI ESC Core (State) Group	Tarrant County College District Dallas County Community College District Collin College Angelina College	University of North Texas Texas Woman's University Stephen F. Austin University	Fort Worth Chamber of Commerce North Texas Community College Consortium National Institute for the Study of Transfer Students North Texas Regional P-16 Council Brookhaven Early College High School

*District will select high schoools at time of project award.

The AVATAR project will refine the roles and responsibilities of each partner as the vertical alignment and training processes are developed and pilot curriculum alignment activites are implemented. Sample partnership agreements are included in the Plan of Action (Attachment A) for high schools, Education Service Centers, and institutions of higher education. Critical friends will support the vertical alignment processes to assure college and career readiness and student success are central foci of the project.

Highlighted in Figure 3 is a graphic illustration of the partners' roles and responsiblities along with an overview of the work flow of Phase 1 - to create the vertical alignment process; Phase 2 – to design the training component; and Phase 3 - to deliver the training and technical support; and to evaluate the process and the outcomes of AVATAR.

Figure 3: Roles and Responsibilities of AVATAR Collaborating Partners



Goals and Objectives

The overall goal of AVATAR (Academic Vertical Alignment Training And Renewal) is to create a curriculum alignment training process and program that empowers regional partnerships to take curricular action to close achievement gaps for students including those from groups underrepresented in higher education and to reduce student's time in developmental education. The focus of the AVATAR pilot testing teams is on the STEM disciplines, with an overlay of the English language arts and an infusion of the cross disciplinary CCRS that support students' accessibility and readiness for STEM careers from certificate programs to successful completion of lower-division college core courses leading to professional courses. The STEM area was selected based on the project's time frame and resources, as well as these areas are in the greatest need for Texas student performance improvement and workforce demand. The following goals and objectives will shape the measurement tools that will be applied to the AVATAR project. Detailed objectives are listed in the Action Plan (see Attachment A.)

A. AVATAR Phase 1 - Planning and Designing a Vertical Alignment Process. During Phase 1 (August 2011 – December 2011), the AVATAR Planning and Oversight committee and Pilot Testing team leaders will plan and design the vertical and horizontal curriculum alignment process and training process; finalize assessment and evaluation protocol; build relationships; define pilot testing of the curriculum alignment process in mathematics and chemistry courses and sequences with English and language arts and cross disciplinary standards infused; and refine a cost-effective and sustainable model for training, technical assistance, and follow up with up to 12 regional partnerships to improve student retention and success in secondary and postsecondary education institutions.

B. AVATAR Phase 2 - Pilot Testing Vertical Alignment Training. During Phase 2 (January 2012 – May 2012), AVATAR will increase the capacity of three regional partnerships, that are endorsed by their appropriate P-16 councils and Education Service Centers, to plan, deliver, and sustain collaboration for curriculum alignment, assessment, and continuous improvement of STEM core courses (mathematics and chemistry) and related curricula (English language arts and cross disciplinary) leading to *Closing the Gap* goals and reducing the need for developmental education in their respective region. These three regional partnerships will represent three diverse Texas Education Agency regions. From each region, at least six high school and at least four college and university faculty will be involved. These pilot programs will allow the AVATAR model to be tested and refined prior to conducting statewide vertical alignment training.

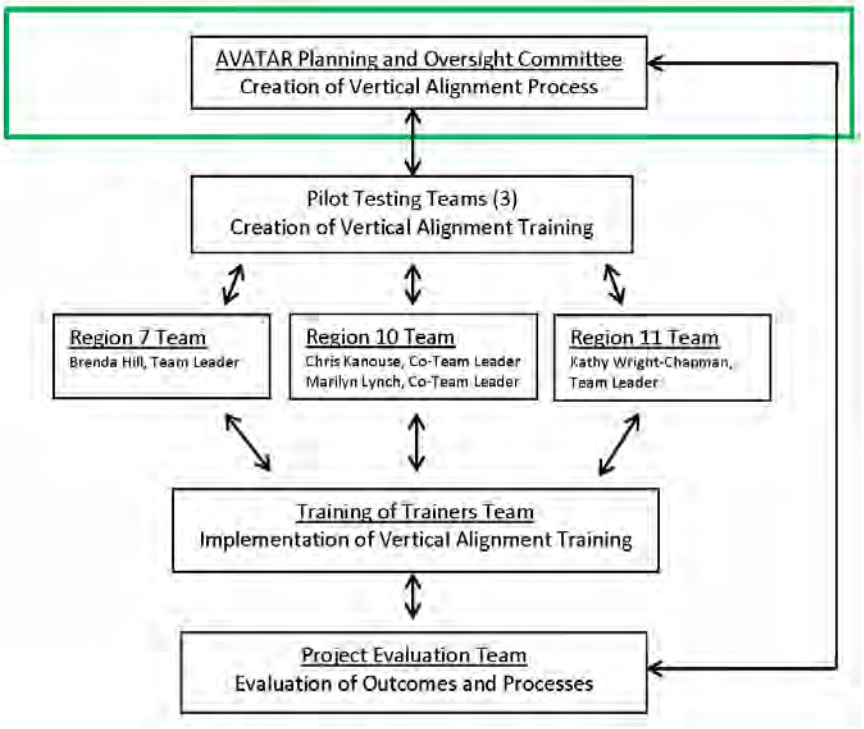
C. AVATAR - Phase 3 - Implementing AVATAR Model Through a Statewide Training of Trainers (TOT) Process with Technical Assistance and Follow Up. Based on phases 1 and 2 of this project a training and technical assistance process for vertical and horizontal curriculum alignment will be created and disseminated using the 40 identified state P-16 councils and the 20 Education Service Centers using a TOT process. Those partners engaged in the training must commit to implementing at least one (1) vertical alignment process in their service area within one month

Plan of Action Summary for Phases 1, 2, and 3

Actions to be taken to achieve these goals are explained in detail in Attachment A, Plan of Action. A summary of major action sets is presented below.

Phase 1: Planning and Development of Vertical Alignment Process

Figure 4: AVATAR (Academic Vertical Alignment Training and Renewal



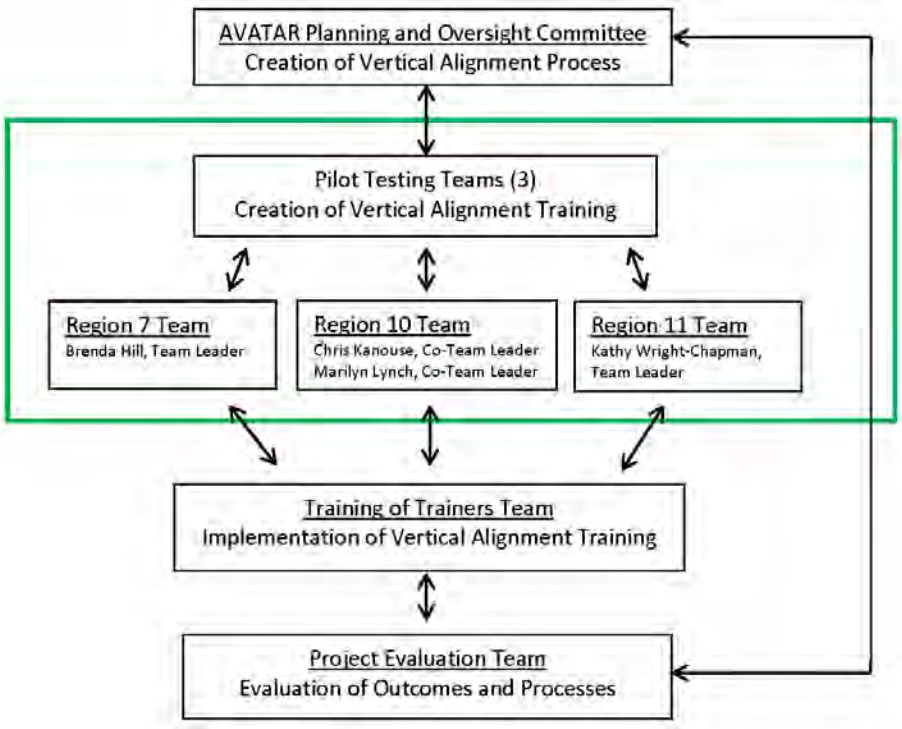
The initial work of Phase 1, development of the vertical alignment process, will be accomplished by the Planning and Oversight Committee with support from the AVATAR project staff. In this description, "model" refers to a schematic mapping of people, activities, interactions, resources, and assessments that occur over time to reach the stated goals.

The planning partnership includes the University of North Texas, ESC Regions 7, 10, and XI, Early College High School at Brookhaven, the Dallas County Community College District, Collin College, Stephen F. Austin University, Texas Woman's University, North Texas Community College Consortium, National Institute for the Study of Transfer Students, and the Fort Worth Chamber of Commerce. The THECB has invested in activities to support vertical alignment. These programs will be reviewed and used as a foundation for the development of AVATAR.

In Phase 1, the Planning and Oversight members will agree on the details of the AVATAR model after reviewing existing models and programs which include Texas Two-Step, STEPS, North Texas Regional P-16 Council vertical alignment projects, Texas Pathways Project, Early College High Schools, Gap Analysis Reporting, Accountability dialogues, Critical friends, ESC Region 10 and XI tools and resources, STARR High School Curriculum Updates, and Reference Course Profiles. As indicated in Attachment A, many of the existing programs focus more on the task of curriculum alignment with its focus on curricular goals and objectives than on relating learning objectives to assignments and assessments, creating a climate for collaboration, developing systems to sustain aligned curriculum, or maintaining dialogue with the community about college and career readiness and how it is accomplished and measured.

Phase2: Creating AVATAR Vertical Alignment Training Process Through Pilot Testing

Figure 5: AVATAR (Academic Vertical Alignment Training and Renewal)



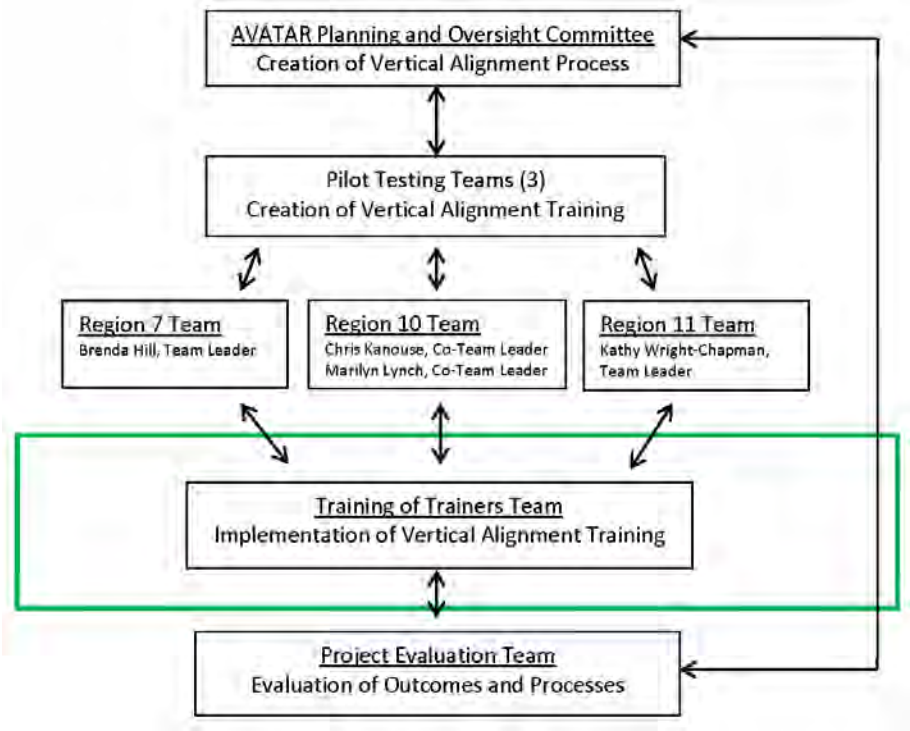
The process for pilot testing will follow the Stephen F. Austin University STEPS program with modifications. The intent of the pilots are to create a model of training which can be replicated and sustained. The curriculum alignment training will focus on the fostering cross level dialogues to enhance communication, awareness, and understanding between and among secondary and postsecondary faculty and administrators.

The three pilot sites offer unique perspectives. Region 7 is rural with single district high schools, and a single two- and four-year IHE. This STEPS project has been in place since 2009 and can share lessons learned and successes. Regions 10 and XI (Dallas, Tarrant, Denton, and Collin counties) are urban with school districts that have multiple high schools, multi campus two-year IHEs, and a wide variety of four-year institutions. The service area for the North Texas Regional P-16 council is ESC Regions 10 and XI.

Partnerships for Phase 2 are identified in this proposal as the Region 7 team, the Region 10 team, and the Region 11 team. Team leaders are: Region 7 – Brenda Hill, Stephen F. Austin University STEPS Project Director; Region 10 – Chris Kanouse, ESC Region 10, Assistant Director, and Marilyn Lynch, Dallas County Community College District Associate Vice President of Career and Program Resources; and Region 11 – Kathy Wright-Chapman, Region XI Director of Curriculum, Instruction, & Assessment. The team leaders will design and implement the mathematics and chemistry curriculum alignment processes with secondary and postsecondary faculty and administrators.

Phase 3: Implementing AVATAR Training of Trainers

Figure 6: AVATAR (Academic Alignment Training and Renewal)



The vertical alignment process designed in Phase 1 and the pilot testing of it and the associated training in Phase 2 will be refined and implemented in Phase 3. Dr. Francine Holland, Deputy Executive Director of Education Service Center Region XI, will serve as the team leader for the Training of Trainers (TOT) with AVATAR facilitator, Dr. Jean Keller's support. The TOT team will include Dr. Brenda Hill – Stephen F. Austin University, STEPS Project Director; Dr. Chris Kanouse – ESC Region 10, Assistant Director of Teacher Preparation & Certification; Kathy Wright-Chapman – Region XI, Director of Curriculum, Instruction, & Assessment; High School Representatives (2); College Representatives (2); Co-Chairs of P-16 Council's Professional Development Committee; Dr. Barbara Lerner – Texas Woman's University –

Regional Special CCRS Advisor; and Dr. Jesse Jones – North Texas Community College Consortium, Executive Director.

The 40 P-16 Councils and 20 ESCs will be invited to form vertical alignment training partnerships. Up to 12 partnerships will be selected and receive AVATAR training. The regional partners will sign partnership agreements 60 days prior to Phase 2.

In Phase 3, the project will hold a training of trainers conference to present the AVATAR model to up to 12 state wide regional partnerships from P-16 Councils and ESCs.

Technical Assistance: AVATAR will provide technical assistance through its project website in the form of overviews of its model and curriculum components and access to evaluation tools and resources developed through this project and/or availability through project partners. Phase 2 pilot regional partnerships will serve as the first users and refiners of these resources. In addition, Phase 2 participants will have access to follow-up and technical assistance that includes participation in moderated discussion groups by role, at least monthly contact from the team leader, and face to face or online training from peer coaches for Phase 3 participants. Training as coaches for later participants will have the impact of requiring Phase 2 participants to reflect on and synthesize learning from the experiences to be shared with others. Phase 3 participants will have access to the project website and to technical support described for Phase 2, including access to role-alike coaches through the end of the project. AVATAR project staff will be available for technical assistance through email, telephone, and if needed, face to face meetings. If needs for additional training or key concerns cross several sites, webinars will be designed to address them.

Sample Reference Course Profiles: Several sample reference course profiles have been prepared as part of the development of this proposal (See Attachment D). These profiles will be continuously developed. The common course numbers for courses that will be highlighted in the pilot are:

Chemistry	CHEM 1111, Laboratory Sequence for General Chemistry I;
	CHEM 1112, General Chemistry for Science Majors I;
	CHEM 1311, Laboratory Sequence for General Chemistry II;
	CHEM 1312, General Chemistry for Science Majors II.
Mathematics	MATH 1314, College Algebra

Management Plan

Project personnel will include a 35% project director, a 10% associate director, and 100% of a 50% graduate assistant. The director will bear primary responsibility for communication with THECB and with project partners. The director will be responsible for the organization of meetings of the Planning and Oversight Committee members, the Pilot Testing leaders, and Training of Trainer teams, as well as for interaction with content consultants. The associate director is responsible for project evaluation and student performance data analyses. The Evaluation Team will be convened by the associate director and she will serve as primary contact for the THECB external evaluators. The associate director will oversee development of project evaluation tools. The directors will be assisted by a graduate assistant in carrying out all of the tasks associated with AVATAR.

The director, associate director, and team chairs will serve as an executive committee for the AVATAR project. The executive committee will meet every other month face to face or by telephone to assure

the activities of the project are being accomplished, quality being maintained, and the stated project outcomes are being achieved.

Phases 1, 2, and 3 Timeline

August 2011 – December 2011	Phase 1	Development of Vertical Alignment Process
January 2012 – May 2012	Phase 2	Development of Training Component for Vertical Alignment (pilots remain active throughout project)
June 2012 – August 2013	Phase 3	Deliver up to twelve (12) workshops across the State of Texas using a Training of Trainers (TOT) format

Timeline of Activities: Dates for implementation of the major phases of the project are indicated in the goals and objectives. A more detailed timeline for project activities follows.

Key Personnel

Dr. Jean Keller will serve as the project director. Dr. Keller has over 25 years in higher education as an administrator and faculty and serves as Co-Chair of the North Texas Regional P-16 Council. Her work with the Council has involved curriculum alignment work.

Dr. Mary Harris will serve as the associate director. Dr. Harris has over 30 years as an educator and administrator in secondary and postsecondary education. Her background is in curriculum, instruction, and evaluation. She serves as Co-Chair of the North Texas Regional P-16 Council. See Attachment B for qualifications of all project staff.

Additional key personnel are noted in the various teams and committees. Their experience and backgrounds are extensive and comprehensive.

Members of the various teams and committees have been identified and are listed below with their titles and respective organizations. The majority have been affiliated with the North Texas Regional P-16 Council and their commitment to the AVATAR project as demonstrated in Attachment C.

Phase 1

Planning and Oversight Committee

Dr. Francine Holland, Deputy Executive Director, ESC Region XI

Dr. Chris Kanouse, Assistant Director of Teacher Preparation & Certification, ESC Region 10

Dr. Mary Harris, Professor of Teacher Education & Administration, University of North Texas

Dr. Don Perry, Executive District Director, Dallas County Community College District

Dr. Brenda Kihl, Vice President for Academic & Instruction, Collin College

Dr. Brenda Hill, STEPS Project Director, Stephen F. Austin University

Dr. Barbara Lerner, Region Special CCRS Advisor, Texas Woman's University

Rosa Oliveira, Principal, Early College High School at Brookhaven

Cynthia Fisher Miller, Director of Workforce Development & Education, Ft Worth Chamber of Commerce

Dr. Jesse Jones, Executive Director, North Texas Community College Consortium

George Neibling, Project Director, National Institute for the Study of Transfer Students

Dr. Jean Keller, P-16 Coordinator and Professor, University of North Texas

Phase 2

Pilot Testing Teams

Region 7 Team

Dr. Brenda Hill, STEPS Project Director, Stephen F. Austin University, Team Leader

ESC Region 7

Angelina College – 2 Faculty Content Experts

Hudson ISD – 2 Faculty Content Experts

Lufkin ISD – 2 Faculty Content Experts

Nacogdoches ISD – 2 Faculty Content Experts

Wooden ISD – 1 Faculty Content Expert

Region 10 Team

Dr. Chris Kanouse, Assistant Director of Teacher Preparation & Certification, ESC Region 10, Co-Team Leader

Dr. Marilyn Lynch, Associate Vice President Career & Program Resources, Dallas County Community College District, Co-Team Leader

Texas Woman's University – 1 Faculty Content Expert in Mathematics

University of North Texas – 1 Faculty Content Expert in Mathematics

Dallas ISD Thomas Jefferson High School (H.B. 400) – 2 Faculty Content Experts in Mathematics

Dallas ISD W.T. White High School – 2 Faculty Content Experts in Mathematics

Brookhaven College – Dallas County Community College District – 2 Faculty Content Experts in Mathematics

Region 11 Team

Kathy Wright-Chapman, Director of Curriculum, Instruction & Assessment, ESC Region XI, Team Leader

University of North Texas – 1 Faculty Content Expert in Chemistry

Fort Worth ISD Administration – 1 Faculty Content Expert in Chemistry

2 High Schools – 4 Faculty Content Experts in Chemistry

Tarrant County College District – 2 Faculty Content Experts in Chemistry

Phase 3

Training of Trainers Team

Dr. Francine Holland, Deputy Executive Director, ESC Region XI

Dr. Brenda Hill, STEPS Project Director, Stephen F. Austin University

Dr. Chris Kanouse, Assistant Director of Teacher Preparation & Certification, ESC Region 10

Kathy Wright-Chapman, Director of Curriculum, Instruction & Assessment, ESC Region XI

High School Representatives – 2 Faculty Content Experts in Mathematics and Chemistry

College Representatives – 2 Faculty Content Experts in Mathematics and Chemistry

Co-Chairs of P-16 Council's Professional Development Committee – 2

Dr. Jesse Jones, Executive Director, North Texas Community College Consortium

Dr. Barbara Lerner, Region Special CCR Advisor, Texas Woman's University

Evaluation Team

Dr. Mary Harris, Professor of Teacher Education & Administration, University of North Texas, Co-Chair, North Texas Regional P-16 Council

Dr. Rick Garcia, Associate Vice Chancellor for Student Success, Tarrant County College,

Dr. V. Barbara Bush, Associate Professor, University of North Texas, North Texas P-16 Council's Research, Assessment, & Accountability Committee Co-Chair

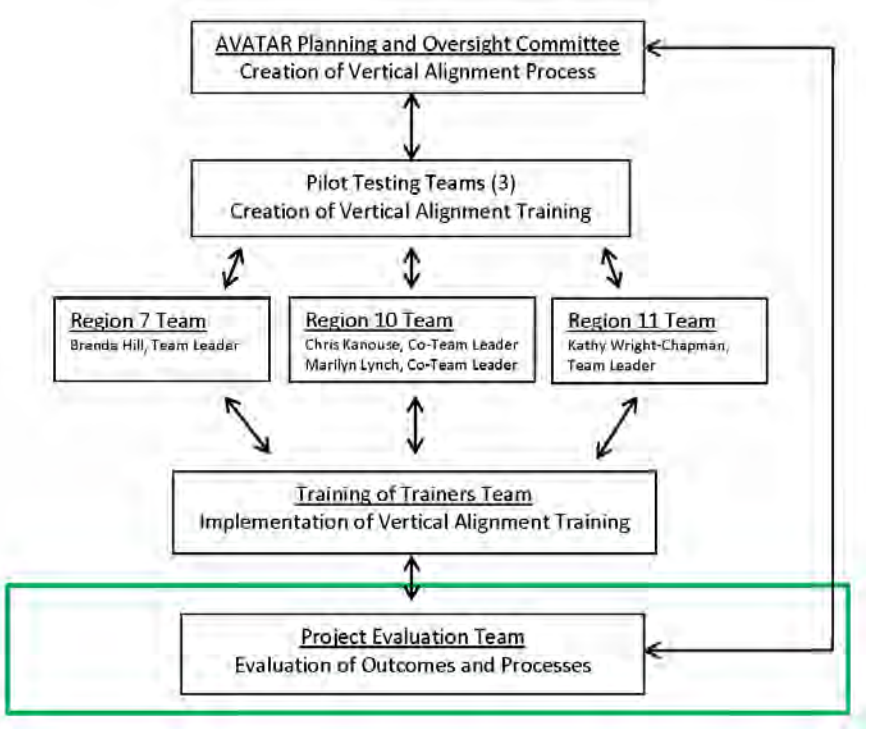
Dr. Mary Hendrix, Vice President for Student Access & Success, Texas A&M University Commerce

Dr. Cynthia Williams, Assistant Professor of Professional Practice, Texas Christian University

THECB – Contracted Evaluators

Evaluation Plan

Figure 7: AVATAR (Academic Alignment Training and Renewal)



The AVATAR process and training is engulfed in formative and summative evaluation processes in order to create the most effective and efficient vertical alignment model, as is exhibited in Figure 7. This

comprehensive evaluation design is embedded in the AVATAR model with a utilization focus and a qualitative perspective.

Utilization-Focused Evaluation begins with the premise that evaluations should be judged by their utility and actual use; therefore, evaluators should facilitate the evaluation process and design any evaluation with careful consideration of how everything that is done, from beginning to end, will affect use. Use concerns how real people in the real world apply evaluation findings and experience the evaluation process. Therefore, the focus in utilization-focused evaluation is on intended use by intended users.

Utilization-focused evaluation is a process for helping primary intended users select the most appropriate content, model, methods, theory, and uses for their particular situation. Situational responsiveness guides the interactive process between evaluator and primary intended users. A psychology of use undergirds and informs utilization-focused evaluation; intended users are more likely to use evaluations if they understand and feel ownership of the evaluation process and findings; they are more likely to understand and feel ownership if they have been actively involved; by actively involving primary intended users, the evaluator is training users in use, preparing the groundwork for use, and reinforcing the intended utility of the evaluation every step along the way. Participants will learn key factors in doing useful evaluations; common barriers to use, and how to overcome those barriers; implications of focusing an evaluation on intended use by intended users; options for evaluation design and methods based on situational responsiveness, adaptability, and creativity; and ways of building evaluation into the programming process to increase use.

The overall goal of the AVATAR evaluation process is to provide formative, summative, and utilization-focused assessment of a curriculum alignment training program that empowers Regional Partnerships to take curricular action to close achievement gaps for students including those from groups underrepresented in higher education and to reduce students' time in developmental education. This goal functions at two levels, in that evaluation must be conducted for the training and follow-up program to be developed for Regional Partnerships and also for the AVATAR-motivated activity of any single partnership. Measures of impact on students during the life of the project is limited. Participants' perceptions and buy-in to the vertical alignment process will be assessed.

D.1. Project AVATAR will solicit feedback from pilot test participants for improvement of its Curriculum alignment processes, training, and follow-up technical support.

D.2 Project AVATAR will collect and analyze relevant baseline and continuing performance, retention, and developmental education data from schools and institutions of higher education participating in the project.

D.3 The project will collaborate with THECB in an external, summative evaluation.

The project objectives that pertain to evaluation to the work of a Regional Partnership in horizontal and vertical curriculum alignment as part of Phases 2 and 3 are:

D.4 High school partners will institute systems for collecting, by subgroup, section, and learning objective, state test results and college readiness indicators of students in relevant STEM classes and for sharing them with partners.

D.5 Higher education partners will institute systems for collecting by section and learning object final examination or assignment results for relevant STEM classes and for sharing them with partners.

D.6 Regional Partners will develop and implement methods for tracking retention and college success data for students from participating high schools into public technical and two-year colleges and from them into public four-year institutions.

D.7 Regional Partnerships will develop and implement methods for surveying workforce partners about the career readiness of graduates.

D.8 Regional Partnerships will develop and implement systems that enable accountability dialogues through their local or regional P-16 Councils.

D.9 Regional Partnerships participants will document their extent of implementation, satisfaction with, and perception of the cost effectiveness and potential impact of curricular alignment goals.

The table below starts with this goal, which is primarily focused on project evaluation and evaluation details related to goals A, B, and C and their related objectives stated in the Plan of Action. Elaboration of the activities, outputs, expected outcomes, measures or indicators of success, persons from or about whom data are collected, and methods of data collection offers a picture of the major internal evaluation of the project, which are as follows.

1. Partnership agreements for Planning and Regional Partnerships will specify deliverables, baseline data, continuing data collection systems, and accountability dialogue to be provided by these groups and means for documenting submission or details of completion.
2. Focus groups of Oversight Team members will ascertain their perception of congruence of the programs designed with the criteria stated in the project proposal.
3. Leaders of Regional Partnerships will be interviewed about perceptions of project success.

4. Surveys of Phase 2 and 3 Regional Partnership participants will focus on their perceptions of the quality of training and follow-up technical assistance and, for Phase 2, on evidences of their development of capacity through this project, to include their coaching of Phase 3 participants.
5. Minutes will be kept of Pilot Test Leader feedback to the Oversight Team about the curriculum, training, and follow-up processes.
6. Project staff and designated liaisons will keep logs about technical assistance rendered in Phases 2 and 3.
7. Surveys will be developed during Phase 1 for use with employers in Phases 2 and 3.
8. The project will collaborate with THECB in conducting an external evaluation.

The Planning and Oversight Committee and the associate project director, Dr. Mary Harris, will monitor and evaluate the work in Phases 1, 2, and 3 along with the AVATAR evaluation team, comprised of members from the North Texas Regional P-16 Council representing a wide cross-section of highly qualified members of the Research, Assessment, and Accountability Committee. This committee has agreed to include the evaluation of AVATAR in its strategic plan and program of work for 2011-2012. The following members, V. Barbara Bush, University of North Texas, Co-Chair; Rick Garcia, Tarrant County College District, Co-Chair; Mary Hendrix Texas A&M University-Commerce; Marilyn Jones, United Way of Tarrant County; Sandy Maddox, ESC Region 10; Danielle Mazzeo, United Way of Metropolitan Dallas; Rusty Reeves, UNT Health Science Center at fort Worth; and Cynthia Williams, Texas Christian University, will work in collaboration with the THECB evaluators in collecting and analyzing data. Additionally, Dr. Changkuan Xu, who has worked with the North Texas Regional P-16 Council in analyzing the gap analysis for five years, will ensure all FERPA standards are adhered to and best practices are used in reporting the findings.

Project Evaluation Plan Table

Project Goal:

D. Provide formative, summative, and utilization-focused evaluation of a curriculum alignment training program that empowers Regional Partnerships to take curricular action to close achievement gaps for students including those from underrepresented groups and to reduce student time in developmental education.

Activities/ Strategies	Outputs	Expected Outcomes	Measure/ Indicators of Success	Persons from or about whom data are collected	Methods of data collection
Formative project evaluation.	Quantitative data Qualitative data	Satisfaction with project & suggestions	Participant offer suggestions for improvement that increase satisfaction in later iterations	Partnership participants Partnership leaders	Survey Interviews
Summative project evaluation-internal	Quantitative student indicators	Systems of local data collection inform curriculum work	Indicators improve over time	High school and college students	Compile AEIS / THECB data.
Summative project evaluation-external	External evaluation data	THECB measures are addressed	Improvement over time on THECB measures	Unknown	Unknown
Formative Regional Partnership evaluation	Student performance data Graduate workforce data	Systems in place for regular data collection	Improvement over time on student indicator measures and perception of career readiness	High school and college students in pipeline Selected employers	Assessment results Tracking of pipeline students Survey
Summative Regional Partnership evaluation.	Accountability dialogues Participant feedback	Regional Partners discuss their collective performance with respect to CCRS	Agreements are made across partners for improvement of CCRS	Regional Partnership students Regional Partnership Participants	Compilation of assessment & other local data Survey

Project Goal:

A. Design a training and follow-up program to support horizontal and vertical alignment of curriculum across regional high school and college partnerships that will focus on the STEM disciplines, be based on Texas CCRS, and employ aspects of the Texas accountability systems for data collection and analysis

Activities/ Strategies	Outputs	Expected Outcomes	Measure/ Indicators of Success	Persons from or about whom data are collected	Methods of data collection
Engage LEA and IHE leaders in partnerships	Collaborative cultures in LEA, ISD, and Regional Partnerships	Regional Partnerships are motivated to do work	Enthusiasm is high for continued partnership	LEA and IHE academic leaders & participants	Interviews Surveys
Clear specification of data for collection by Regional Partnerships	Partnership Agreements include clear direction for data systems	Participating institutions collect specified data	They cite the value of the data collection for improvement student progress	Regional Partnership leaders	Partnership Agreements
Curriculum alignment processes designed	The curriculum alignment processes developed meet design criteria	Strong agreement of designers that criteria are met	User participants also perceive that criteria are met (See other goals for measures)	Oversight planning team and Pilot test team leaders	Focus groups
Training for curriculum alignment partnerships designed	The training for curriculum alignment partnerships meets design criteria	Strong agreement of designers that criteria are met	User participants also perceive that criteria are met (See other goals for measures)	Oversight planning team and Pilot test team leaders	Focus groups
Follow-up technical assistance designed	The follow-up technical assistance plan meets design criteria	Strong agreement of designers that criteria are met	User participants also perceive that criteria are met (See other goals for measures)	Oversight planning team and Pilot test team leaders	Focus groups

Project Goal:

B. Pilot test and evaluate the program designed in Phase 1 with attention to its meeting the requirements of the THECB for statewide implementation in closing achievement gaps in STEM education. The Regional Partnerships will represent three different Texas Education Agency regions, and each will involve at least 8 high school and at least 4 college/university faculty. Assuming students per faculty member per year, 1,440 students would be affected for each partnership (4,320 for 3 partnerships); however horizontal alignment will spread impact to all students in affected courses over time.

Activities/ Strategies	Outputs	Expected Outcomes	Measure/ Indicators of Success	Persons from or about whom data are collected	Methods of data collection
Pilot tests meet stated participant criteria	Stated numbers of participants are retained	Stated numbers of participants deliver CRPs	Participants remain involved with work of project	Regional Partnership leaders & participants	Partnership Agreements Deliverables Surveys
Pilot tests further develop training model	Pilot test participants contribute to project development	Improvements to the model and its delivery are recognized by Oversight Team	A culture of continuous improvement is embraced by the project	Pilot test participants	Team leader input to Oversight Team Surveys
Pilot test team engagement in informed horizontal and vertical alignment	Efficiency and rigor of mutual curriculum is increased	Participants cite examples of efficiency and rigor in deliverables	Student data over times confirms improved efficiency and rigor of curriculum	Pilot test participants	RCPs Data system implementation Surveys
Pilot test team development of expertise in collaborative curriculum work	Pilot test participants coach Phase 3 participants	Examples of coaching are logged in project records	Phase 3 participants cite value of coaching	Pilot test participants	Records of technical assistance in Phase 3
Accountability dialogues	Accountability dialogues sponsored at least annually by P-16 Council	Regional partners discuss collective performance with respect to CCRS	Agreements are made across partners for improvement of CCRS	Regional Partnership students	Compilation of assessment & other local data

Project Goal:

C. Training of trainers conference will be designed and held in September 2012 to facilitate vertical and horizontal curriculum alignment and continued articulation using the Avatar Model by up to 12 Regional Partnerships that include those in regions of greatest need. In the first year, 12 faculty and 1440 students will be impacted by each partnership with cumulative impact.

Activities/ Strategies	Outputs	Expected Outcomes	Measure/ Indicators of Success	Persons from or about whom data are collected	Methods of data collection
Training of Trainers conference	Regional Partnerships with resources for Phase 3 implementation participate	Up to 12 partnerships participate that include high need regions	More than 12 regional partnerships apply to participate	Conference participants	Partnership Agreements Surveys
Follow-up technical assistance to participants	Technical assistance will serve needs of users	Users will rate technical assistance helpful and timely	Users view technical assistance and instrumental in successful implementation	Phase 3 participants Project staff/ participants assigned to Phase 3 support	Technical assistance logs Surveys
Evaluation of Phase 3 accomplishments	Phase 3 work serves the needs of users	Phase 3 work is perceived as worthwhile	Phase 3 work receives funding for continuation and expansion.	Phase 3 participants Project staff/ participants assigned to Phase 3 support	Technical assistance logs Surveys

Adequacy of Resources

The extensive partnerships involved in AVATAR demonstrate a high level of commitment to the design of a vertical alignment process based on lessons learned from various alignment projects undertaken by THECB and institutions across the state and beyond; to develop a training component of vertical alignment; and to deliver up to 12 training workshops across the state. The three phases of this project and corresponding budget adequately support the attainment of project goals to create vertical alignment efforts to promote students' success in careers and college and to reduce the amount of developmental education that students take in two- and four year institutions of higher education.

The training of trainers process is an innovative design to deliver up to 12 statewide vertical alignment workshops employing the AVATAR model and empowering the teams of P-16 council and ESC partners to conduct vertical alignment in their regions. This is a cost-effective process utilizing the P-16 councils and regional ESCs.

Statement of Impact

According to the national college readiness gaps, Texas students' performances on End of Course Exams, and frequency in developmental education in two- and four-year institutions of higher education (IHE), it is expected all efforts in curriculum alignment, support for academic rigor, alignment of student expectations, course assessments, course resource materials, and dialogue between secondary and postsecondary faculty will support students' career and college readiness, reduce the amount of needed developmental education in IHE, and enhance faculty's teaching and students' learning.

While the project time period is rather brief, it is believed both qualitative and quantitative data will be obtained to support the *Closing the Gaps by 2015*. The AVATAR project is created to reach approximately 100 faculty and administrators in secondary education; 75 administrators and faculty in postsecondary education; 25 leaders in ESCs; and 35,200 students over the life of the project, based on faculty teaching 40 students in each class and delivery of at least three courses per semester.

If the AVATAR model is promoted and sustained by the ESC and P-16 councils in their regions, it is believed that more students will be career and college readied and more students will transition between systems of higher education smoothly.

Faculty, administrators, and partners involved in AVATAR will be encouraged to share their experiences and students' performances at educational programs, and in printed materials, sponsored by the North Texas Community College Consortium and the National Institute for the Study of Transfer Students.

PROGRAM BUDGET
Phase 1

I. RFP Budget Line Item	II. Item Description	III. Purpose and Explanation	IV. Percent of Time on Project	V. Amount
11.7.1	Project Director, Co-Director	To facilitate the design of the vertical alignment process	30%	23,281.00
11.7.2	Other Professional Staff	Half Time Graduate Student to coordinate literature review, coordinate all planning committee meetings, and compile meeting minutes	100%	5,500.00
11.7.3	Support Staff			
11.7.4	Fringe Benefits	Project Coordinator & Graduate Student		7,164.00
11.7.5	Travel	Planning meetings and arranging workshop sites		1,025.00
11.7.6	Professional, Consultant or Other Fees	ESC Region XI to create training materials		2,500.00
11.7.7	Faculty or Partner Incentives (if applicable)	Content Expert and Curriculum Specialist design of Process Evaluation		21,960.00
11.7.8	Other Direct Costs	Planning meetings & training sessions including food and non-alcoholic beverages		2,000.00
		Total ALL Program Costs (Equals total of 11.7.1 through 11.7.8 above)		63,430.00
	Cost Sharing from Applicant (if applicable)	Salary & Fringe Benefits: Assoc. Dir., Dr. Mary Harris (10% of 4.5 months = $6883.48) Project Director – Dr. Jean Keller (5% of 4.5 months = $4,094.75)		10,978.23
		Proposal Amount (Equals ALL Program Costs LESS Cost Sharing)		63,430.00 Phase I

PROGRAM BUDGET
Phase 2

I. RFP Budget Line Item	II. Item Description	III. Purpose and Explanation	IV. Percent of Time on Project	V. Amount
11.7.1	Project Director, Co-Director	To facilitate the design of the vertical alignment process	30%	23,282.00
11.7.2	Other Professional Staff	Half Time Graduate Student to coordinate three pilot projects and assist team leaders	100%	6,500.00
11.7.3	Support Staff			
11.7.4	Fringe Benefits	Project Coordinator & Graduate Student		7,165.00
11.7.5	Travel	Travel to curriculum alignment training for three regional teams with monthly meetings		2,075.00
11.7.6	Professional, Consultant or Other Fees	ESC Region XI to conduct training for pilot projects		2,500.00
11.7.7	Faculty or Partner Incentives (if applicable)	Content Experts, Pilot Project Team Leader & Evaluators		43,040.00
11.7.8	Other Direct Costs	Planning meetings & training sessions including food and non-alcoholic beverages		2,875.00
		Total ALL Program Costs (Equals total of 11.7.1 through 11.7.8 above)		87,437.00
	Cost Sharing from Applicant (if applicable)	Salary & Fringe Benefits: Assoc. Dir., Dr. Mary Harris (10% of 4.5 months = $6883.48) Project Director – Dr. Jean Keller (5% of 4.5 months = $4,094.75		10,978.23
		Proposal Amount (Equals ALL Program Costs LESS Cost Sharing)		87,437.00 Phase 2 Phases 1+2=$150,867

PROGRAM BUDGET
Phase 3

I. RFP Budget Line Item	II. Item Description	III. Purpose and Explanation	IV. Percent of Time on Project	V. Amount
11.7.1	Project Director, Co-Director	To facilitate the implementation of training; oversee evaluation	30%	47,960.00
11.7.2	Other Professional Staff	Graduate Student to arrange logistics for implementation of workshops	100%	12,360.00
11.7.3	Support Staff			
11.7.4	Fringe Benefits	Project Coordinator & Graduate Student		14,572.00
11.7.5	Travel	Travel to pilot programs, technical assistance, & support of up to 12 regional programs		3,490.00
11.7.6	Professional, Consultant or Other Fees	ESC Region XI to implement training of trainers sessions and supply all resource materials		8,500.00
11.7.7	Faculty or Partner Incentives (if applicable)	Trainers, Content Experts, & Evaluator		27,000.00
11.7.8	Other Direct Costs	Training sessions, oversight meetings (including food and non-alcoholic beverages) support for up to 12 regional teams ($2,700 each)		35,250.00
		Total ALL Program Costs (Equals total of 11.7.1 through 11.7.8 above)		149,132.00
	Cost Sharing from Applicant (if applicable)	Salary & Fringe Benefits: Assoc. Dir., Dr. Mary Harris (10% of 9 months = $14,178.19) Project Director – Dr. Jean Keller (5% of 9 months = $8,429.66)		22,607.85
		Proposal Amount (Equals ALL Program Costs LESS Cost Sharing)		149,132.00 Phase 3 Phases 1+2+3= $299,999

ATTACHMENT A: PLAN OF ACTION

The overall goal of AVATAR (Academic Vertical Alignment Training And Renewal) is to create a curriculum alignment process and training program that empowers regional partnerships to take curricular action to close achievement gaps for students including those from groups underrepresented in higher education and to reduce students time in developmental education. The focus of the AVATAR pilot testing teams is on the STEM disciplines, with an overlay of the English language arts and an infusion of the cross disciplinary CCRS that make students accessible and readied for STEM careers from certificate programs to successful completion of lower-division college core courses leading to professional courses. The STEM area was selected based on the project's time frame and resources, as well as these areas are in the greatest need for Texas student performance improvement and workforce demand. The following goals and objectives will shape the measurement tools that will be applied to the AVATAR project.

A. AVATAR Phase 1 - Planning and Designing a Vertical Alignment Process. During Phase 1 (August 2011 – December 2011), the AVATAR Planning and Oversight committee and team leaders, in at least three retreat sessions, will plan and design the vertical and horizontal curriculum alignment process and training process; finalize assessment and evaluation protocol; build relationships; define pilot testing of the curriculum alignment process in mathematics and chemistry courses and sequences with English and language arts and cross disciplinary standards infused; and refine a cost-effective and sustainable model for training, technical assistance, and follow up with up to 12 regional partnerships to improve student retention and success in secondary and postsecondary education institutions.

A.1 A vertical alignment process will be created by December 31, 2011 based on the integration of proven and promising practices, building linkages among the educational systems, and establishing clear accountability for student success and transition.

A.2 A model will include the need for secondary and postsecondary leadership and commitment. Vertical and horizontal curriculum alignment between secondary and postsecondary is a culture shift and strong leadership and commitment from the institutions will be required for success. This aspect will be incorporated into the partnership agreement (see Exhibits 1, 2, and 3). Individual agreements will be constructed for faculty content experts, pilot team leaders, and role-alike coaches. These individual agreements will clearly indicate deliverables, expectations, and compensation.

Exhibit 1: Sample Partnership Agreement For School Districts

Partnership Agreement
For School Districts

_____*(high school)*_____ agrees to be part of the AVATAR (Academic Vertical Alignment Training And Renewal) project beginning on August 1, 2011 to August 31, 2013 as a key player in exploring and creating curriculum alignment processes and training in _____*(discipline)*_____ with its _____*two-year*_____ and _____*four-year*_____ institutions of higher education (IHE).

_____*(high school)*_____ agrees to support _____*(name – curriculum director or department chair and faculty members)*_____ in working with AVATAR as it creates curriculum alignment processes and training. _____*(high school)*_____ will actively participate in all planning meetings; host curriculum alignment meetings with partners to discuss standards, rigorous student learning outcomes, motivational instructional strategies, measurable student expectations, and course resource materials; and will provide weekly reports to the _____*(high school principal)*_____ and _____*(district office contact)* regarding the AVATAR project and progress being made to design and implement curriculum aligned courses between high school and two- and four-year IHE.

By signing this agreement, we commit ourselves to the goals of strong curriculum alignment leading to rigorous academic preparation of students to insure their success sin college and careers, and to reduce the amount of time needed in developmental education in IHE.

_____*(high school discipline coordinator or department chair)*_____ agrees to collect and provide AVATAR requested data of students and faculty performance in accordance with all data collection and reporting requirements. Individual student data by name of student will not be collected.

It is agreeable faculty will receive compensation for their support of AVATAR after school work hours.

_____
AVATAR Project Director

_____
Superintendent

_____
High School Principal

_____
Date

Exhibit 2: Sample Partnership Agreement for Institutions of Higher Education

Partnership Agreement
For Institution of Higher Education

_____*(two- or four year IHE)*_____ agrees to be part of the AVATAR (Academic Vertical Alignment Training And Renewal) project beginning on August 1, 2011 to August 31, 2013 as a key player in exploring and creating curriculum alignment processes and training in _____*(discipline)*_____ with _____*(high schools)*__.

_____*(two- or four year IHE)*_____ agrees to support ____*(name – program coordinator or department chair and faculty members)*_ in working with AVATAR as it creates curriculum alignment processes and training. _____*(two- or four year IHE)*_____ will actively participate in all planning meetings; host curriculum alignment meetings with partners to discuss standards, rigorous student learning outcomes, motivational instructional strategies, measurable student expectations, and course resource materials; and will provide weekly reports to the _____*(academic dean or vice president)*_____ regarding the AVATAR project.

By signing this agreement, we commit ourselves to the goals of strong curriculum alignment leading to rigorous academic preparation of students to insure their success sin college and careers, and to reduce the amount of time needed in developmental education in IHE.

_____*(name – program coordinator or department chair)*____ agrees to collect and provide AVATAR requested data of students and faculty performance in accordance with all data collection and reporting requirements. Individual student data by name of student will not be collected.

It is agreeable faculty will receive compensation for their support of AVATAR after work hours.

_____
AVATAR Project Director

_____
Academic Dean or Vice President

_____
Date

Exhibit 3: Sample Partnership Agreement for Education Service Centers

Partnership Agreement
For Education Service Center

_____*(ESC Region)*_____ agrees to be part of the AVATAR (Academic Vertical Alignment Training And Renewal) project beginning on August 1, 2011 to August 31, 2013 as a key player in exploring and creating curriculum alignment processes and training in various academic disciplines with its ___*(high school)*_ and ___*two-year*_____ and ___*four-year*_____ institutions of higher education (IHE).

_____*(ESC Region)*_____ agrees to support ____*(name of ESC Staff)*____ in working with AVATAR as it creates curriculum alignment processes and training. ____*(ESC Region)*_____ will actively participate in all planning meetings; host curriculum alignment meetings with partners to discuss standards, rigorous student learning outcomes, motivational instructional strategies, measurable student expectations, and course resource materials; and will provide weekly reports to the ____ _____*(ESC Deputy Director)*___ regarding the AVATAR project and progress being made to design and implement curriculum aligned courses between high school and two- and four-year IHE.

By signing this agreement, we commit ourselves to the goals of strong curriculum alignment leading to rigorous academic preparation of students to insure their success in college and careers, and to reduce the amount of time needed in developmental education in IHE.

_____*(ESC Deputy Director)*___ agrees to support the evaluation processes, data collection of students' and faculty performances requested by AVATAR.

_____
AVATAR Project Director

_____
ESC Deputy Director

_____
Date

A.3 A model will need to demonstrate a sense of urgency to increase student academic success and completion and to reduce developmental education in two- and four-year institutions of higher education. This aspect will be woven into the outcome and process measures.

A.4 A model will need to have the ability to scale to the regions needs and serve as an agent for change. These aspects will be designed into the vertical alignment training process.

A.5 A model will require a commitment to data driven and evidence based practices and using data to make informative decisions about curriculum alignment, developmental education, and student success. These components will be required to participate in the training workshop and built into the partnership agreements.

B. AVATAR Phase 2 - Pilot Testing Vertical Alignment Training. During Phase 2 (January 2012 – May 2012), AVATAR will increase the capacity of three regional partnerships, that are endorsed by their appropriate P-16 councils and Education Service Centers, to plan, deliver, and sustain collaboration for curriculum alignment, assessment, and continuous improvement of STEM core courses (mathematics and chemistry) and related curricula (English language arts and cross disciplinary) leading to *Closing the Gap* goals and reducing the need for developmental education in their respective region. These pilot programs will allow the AVATAR model to be tested and refined prior to conducting statewide vertical alignment training.

B.1 Roles and common understandings for administrators and faculty at all education levels in curriculum support and assessment will be created and evaluated to determine their readiness and capacity to develop and sustain curricular collaboration. The understanding that curriculum is a living document designed for creativity and differentiated instruction among faculty and students will be foundational. These underlying principles and understandings will be designed into the vertical alignment training.

B.2 Participants involved with the pilot training process, in diverse roles, will understand the value of AVATAR for students' success and the need for a cost-effective vertical alignment training process across public education institutions. The pilot testing team leaders will assess this understanding, at each meeting.

B.3 Participants involved in the pilot testing will articulate rigorous expectations for students that improve readiness for college as articulated by the Texas College and Career Readiness Standards (CCRS) STEM areas, including the cross disciplinary standards and English language arts through the design of reference course profiles, curriculum alignment templates (see Figure 1), and related instructional materials, with emphasis on technology.

Figure 1: Curriculum Alignment Template

Curriculum Alignment Template

Course:	
Student Learning Outcome:	

Essential Questions	Content	Skills/Indicator	Assessments	Activities	Resources

B.4 Horizontal and vertical alignment will apply to comparable courses, course sequences, and entry or exit assessments offered by pilot test partners. The unpacking of standards (TEKS and CCRS) will allow partners to learn about students' learning and faculty's instructional approaches. This

process is designed to create a bridge from the standards, learning outcomes, and reference course profiles to be shared between and among partners.

B.5 Regional partnership participants will: 1) cite examples of changes to curriculum and assessments that improve local programs, contribute to development of reference course profiles (including access to online links, rubrics, resources, sample lesson and projects, etc.), and lead to students' abilities to transition successfully across and between secondary and postsecondary educational institutions without the need for developmental education; and 2) position themselves to advise role-alike peers.

B.6 Regional partnerships will report about the project and related collaborative accomplishments to local or regional P-16 Councils as a measure of accountability.

The curriculum alignment training process will include components for academic leaders at the superintendent and/or associate provost levels, curriculum coordinators, deans, and department heads; and content faculty. The training will involve face to face meetings of participants that may be supplemented with online training and interactions; working in small groups; and working with evaluators on the collection or examination of data. The work of the three teams will be interactive in that the data collected by one group may inform the work of others and that regular patterns will be established for sharing of cross-institutional data and reference course profiles. The rounds of curriculum alignment training activities specified by the project will outlive the cycle of this proposed grant since the interaction required to sustain an aligned curriculum across and within institutional is continuous.

C. AVATAR - Phase 3 - Implementing AVATAR Model Through a Statewide Training of Trainers (TOT) Process with Technical Assistance and Follow Up. Based on phases 1 and 2 of this project a training and technical assistance process for vertical and horizontal curriculum alignment will be created and disseminated using the 40 identified state P-16 councils and the 20 Education Service Centers using a TOT process. Those partners engaged in the training must commit to implementing at least one (1) vertical alignment process in their service area within one month after receiving training.

C.1 All 40 state identified P-16 councils and all 20 regional Education Service Centers (see Figures 2 and 3) will be invited in November 2011 to form regional partnerships (must include an ESC, school district, and a two-year and a four-year higher education institution) for vertical/horizontal curriculum alignment training and submit a proposal to participate in the AVATAR training, technical assistance, and follow up program. Up to 12 regional partnerships will be selected, based on their ability and readiness to create and sustain leadership and commitment to curriculum alignment; to scale and sustain AVATAR in the region; to commit to data driven and evidence based practice; and to use data to make informed decisions related to curriculum alignment, student success, and reductions in developmental education at two- and four-year higher education institutions by March 2012. The invitation process will include areas of high need identified by THECB.

Figure 2: P-16 Councils

P-16 Regional Councils (40)

Region	P-16 Regional Councils	Institution/ Organization	Lead Contact	E-mail Address	Phone	Address	Website
Northwest	**Abilene Regional P-16 Council***	Cisco College	Abbie Randolph	abbie.randolph@cisco.edu	(325) 794-4463	717 E. Industrial Blvd. Abilene, TX 79602	
Central	Bastrop P-16 Partnership	Bastrop ISD	Betty Richardson	brichardson@bastrop.isd.tenet.edu	(512) 321-2292	906 Farm Street Bastrop, TX 78602	
Central	Blinn College P-16 Regional Council (Brenham)	Blinn College	Dr. Valschkia Dabney	val.dabney@blinn.edu	(979) 830-4163	902 College Avenue Brenham, TX 77833	http://www.blinn.edu/p16/index.htm
Central	Centroplex P-20 Regional Council (Killeen)*	Central Texas College	William Alexander Brandie Cleaver	bill.alexander@ctcd.edu; bcleaver@ctcd.edu	(254)526-1402; 254-526-1784	P.O. Box 1800 Killeen, TX 76540-1800	
South	**Coastal Bend Partners for College and Career Readiness (Corpus Christi)**	Citizens for Educational Excellence 501 c(3)	Janet Cunningham	jcunningham@edexcellence.org	(361)813-9946	P.O. Box 261125 Corpus Christi, TX 78426	http://p16.tamucc.edu/
South	**Council for Educational Excellence (Laredo)***	Texas A&M International University	Concepcion Hickey	chickey@tamiu.edu	(956)326-2134	5201 University Blvd., Cowart Hall 206 Laredo, TX 78041	
South	Crossroads Area P-16 Council (Victoria)	Victoria College	Larry Garrett	larry.garrett@victoriacollege.edu	361.582.2519	2200 E. Red River Victoria, TX 77901	
Southeast	**Deep East Texas P-16 Council (Nacogdoches)***	Stephen F. Austin State University	Dr. Mary Nelle Brunson	mbrunson@sfasu.edu	(936) 468-2707	P.O. Box 13024 Nacogdoches, TX 75962	
Central	**E3 Alliance [Education Equals Economics]- (Austin)***	E3 Alliance 501 c(3)	Susan Dawson	sdawson@e3alliance.org	(512) 223-7240	5930 Middle Fiskville Rd. #507 Austin, TX 78752	www.e3alliance.org
Gulf Coast	East Harris, Liberty and Chambers Council (Baytown)	Lee College	Donnetta Suchon	dsuchon@lee.edu	281-425-6400	PO Box 818 Baytown, TX 77522-0818	
Upper East	**East Texas Regional College Readiness Improvement Council (Marshall)**	Panola College TSTC-Marshall	Dr. Andrew Fisher April Graham	afisher@panola.edu; april.graham@marshall.tstc.edu	903-693-2070 903-923-3393	P.O. Box 1269 Marshall, TX 75671	www.etcrc.org
Upper Rio Grande	**El Paso Collaborative for Academic Excellence**	The University of Texas at El Paso	Dr. Susana Navarro	navarro@utep.edu	(915) 747-5778	500 W. University Avenue Education Bldg. #413 El Paso, TX 79968	
Gulf Coast	Fort Bend County P-16 Council	Wharton County Junior College	Betty McCrohan	bettym@wcjc.edu	(979) 532-6400	Administration Building A-113 911 Boling Highway Wharton, TX 77488	
Gulf Coast	Galveston Regional P-16 Council	Texas A&M University at Galveston	Dr. Donna Lang	langd@tamug.edu	(409) 740-4941	P.O. Box 1675 Galveston, TX 77553	www.tamug.edu/p-16
Gulf Coast	**All Kids Alliance: Cradle to Career***	University of Houston	Dr. Robert Wimpelberg Donna Scott	rwimpelberg@uh.edu; ds@dsscott.com	(713) 743-5001 (713)741-4054	College of Education 4800 Calhoun Houston, TX 77204-5028	http://www.allkidsalliance.com/
South	**Lower Rio Grande P-16 Council (Harlingen)***	TSTC Harlingen	Pat Bubb	Pat.bubb@harlingen.tstc.edu	(956) 364-4600	TSTC Tech Prep Building 1902 North Loop 499 Harlingen, TX 78550-3697	http://www.techcreepgv.com
Gulf Coast	Monument P-16 Council (Houston)	San Jacinto College North Campus	Dr. Allatia Harris	allatia.harris@sjcd.edu	281-459-7100	5800 Uvalde Road Houston, TX 77049	
Upper East	Northeast Texas Local P-16 Council	Northeast Texas Community College	Dr. Brad Johnson	bjohnson@ntcc.edu	(903) 434-8102	PO BOX 1307 Mt. Pleasant, TX 75456	http://www.reg8.net/default.aspx?name=p16ntc
Metroplex	**North Texas Regional P-16 Council (Denton)***	The University of North Texas	Dr. Jean Keller	jean.keller@unt.edu	(940) 565-3427	1155 Union Circle #305250 Denton, TX 76203-5017	www.coe.unt.edu/ntp16
Gulf Coast	P-16 East Houston Council	East End Chamber of Commerce	Diane Lipton	Diane@eecoc.org	713-926-3305	550 Gulfgate Center Mall Houston, TX 77087-3022	www.eecoc.org
Gulf Coast	**P-16 West Houston Council**	University of Houston Downtown	Dr. Zachary R. Hodges Dr. Richard Alo Sangeeta Gad	zachary.hodges@hccs.edu alor@uhd.edu gads@uhd.edu	(713) 718-5721 (713) 221-8207 (713)221-8432	One Main St. Houston, TX 77002	
South	**P16Plus Council of Greater Bexar County (San Antonio)***	P16Plus Council of Greater Bexar County 501 c(3)	Judy McCormick Philip Grossmann	mccormickj@zhi.com grossmannp@zhi.com	(210)258-2267 (210) 258-2672	310 S. St. Mary's St., Suite 2400 San Antonio, TX 78205	
High Plains	P-16 Council Texas Panhandle (Amarillo/Canyon)*	West Texas A&M University	Dr. Russell Lowery-Hart	rhart@wtamu.edu	(806) 651-2931	Box 60997 Canyon, TX 79016-0001	www.panhandle2020.org/p16.html
Northwest	Region 9 P-16 Council (Wichita Falls)*	Midwestern State University	Deborah Cornelius	deborah.cornelius@mwsu.edu	(940) 397-4313; 940-397-4496	3410 Taft Blvd Wichita Falls, TX 76308	www.region9p16.org
Gulf Coast	Sam Houston State University P-16 Council (Huntsville)	Sam Houston State University	Janet L. Williams	jlw001@shsu.edu; shsup16@shsu.edu	936-294-4322 or 2228	Box 2335 Huntsville, TX 77341-2335	

P-16 Regional Councils (40)

Region	P-16 Regional Councils	Institution/ Organization	Lead Contact	E-mail Address	Phone	Address	Website
West	San Angelo P-16+ Education Partnership*	Howard College	LeAnne Byrd	lbyrd@howardcollege.edu	(325) 481-8300 x221	9601 N US HWY 87 San Angelo, TX 76905	www.sanangelop16.org
Central	San Marcos SOAR (Seeking Opportunities Achieving Results) P-16 Council	Texas State University	Dr. Michelle Pope	mpope@txstate.edu	(512) 245-9336	601 University Drive San Marcos, TX 78666	http://www.soarsanmarcos.com/
High Plains	**South Plains Closing the Gaps P-20 Council (Lubbock)***	Texas Tech University	Janis Ramirez	janie.ramirez@ttu.edu	(806) 742-1998, x459	College of Education PO Box 41071 Lubbock, TX 79409-1071	www.ClosingTheGaps.org
Southeast	**Southeast Texas P-16 Council (Beaumont)***	Southeast Texas P-16 Council 501 c(3)	Steve Buser	steve.buser@lamar.edu	(409) 880-7639	P.O. Box 10008 Beaumont, TX 77710	http://setx216.org
Metroplex	**Southern Dallas County P-16 Council**	The University of North Texas at Dallas	Dr. Jean Keller Gloria Bahamon	jean.keller@unt.edu Gloria.bahamon@unt.edu	(940) 565-3427 (972)780-3638	1155 Union Circle #305250 Denton, TX 76203-5017	
Upper East	Texarkana P-16 Council	Texas A&M Texarkana	Maya Edwards	maya.edwards@tamut.edu	(903) 223-3039	PO Box 5518 Texarkana, TX 75505-5518	
Metroplex	The University of Texas at Arlington Metroplex P-16 Council*	The University of Texas at Arlington	Dr. Jeanne Gerlach Dr. Luis Rosado Dr. Carla Amaro-Jiménez	gerlach@uta.edu; rosado@uta.edu; amaro@uta.edu	(817) 272-2591	Box 19227 701 Planetarium Way, Hammond Hall 5th floor Arlington, TX 76019	
Upper East	**Tyler Area P-16 Council**	University of Texas at Tyler	Kristen Baldwin Dr. William Geiger Dr. Michael Odell	kbaldwin.tylerp16@gmail.com wgeiger@uttyler.edu modell@uttyler.edu	(903) 570-3171 (903) 566-7081 (903) 566-7149	3900 University Blvd Tyler, TX 75799	
Metroplex	University Crossroads P-16 Council (Dallas)	Dallas ISD	Dr. Liliana Valadez	lvaladez@dallasisd.org	(972) 925-5520	3700 Ross Avenue, Box 152 Dallas, TX 75204	
South	**Upper Rio Grande Valley P-16 Council (Edinburg)***	The University of Texas-Pan American	Dr. Ana Maria Rodriguez Lisa Prieto Petra Lopez-Vaquera	amrodriguez@utpa.edu; lisaprieto@utpa.edu; lopezvaqpi@utpa.edu	(956) 316-7919 (956) 381-2526 (956) 292-7530	1201 W. University Drive Edinburg, TX 78589	http://p16.schoolwires.net
South	UTB/TSC Lower Rio Grande Valley P-16 Council (Brownsville)*	The University of Texas at Brownsville	Dr. Stephen Rosales	Stephen.rosales@utb.edu	(956) 882-5730	College of Education 80 Fort Brown Brownsville, TX 78550	http://www.utb.edu/typa/coe/Pages/P16Projects.aspx
South	Uvalde-Middle Rio Grande Region P-16 Council	Sul Ross State University, Rio Grande College	Dr. Joel E. Vela	jvela@sulross.edu	(830) 279-3035	2623 Garner Field Road Uvalde, TX 78801	
Northwest	West Central Texas Rural P-16 Council (Cisco)	Cisco College	Amy Dodson	amy.dodson@cjc.edu	(754) 442-5120	101 College Heights Cisco, TX 76437	
West	**West Texas P-16 Council (Odessa)***	The University of Texas of the Permian Basin	Jo Lynn Jones Dr. Roy Hurst	jones_j@utpb.edu hurst_r@utpb.edu	(432) 552-2165 (432) 552-2132	4901 E. University Odessa, TX 79762	www.texasp-16.com
Metroplex	Western Metroplex P-16 Council (Weatherford)*	Weatherford College	Kathy Bassham	kbassham@wc.edu	(817) 598-6214 (817) 598-6294	225 College Park Drive Weatherford, TX 76086	

BOLD	FY 2011 THECB funded P-16 Councils (16)
*	Recognized P-16 Councils in Texas Regional P-16 Councils Network

Figure 3: Regional Education Service Centers

Executive Directors
Regional Education Service Centers

Mr. Jack C. Damron Education Service Center Region 1 1900 West Schunior Edinburg, TX 78541-2234 *(956) 984-6000* Fax: (956) 984-7655	**Dr. Linda Villarreal** Education Service Center Region 2 209 North Water Street Corpus Christi, TX 78401-2599 *(361) 561-8400* *FAX: (361) 883-3442*	**Dr. Julius D. Cano** Education Service Center Region 3 1905 Leary Lane Victoria, TX 77901-2899 *(361) 573-0731* *FAX: (361) 576-4804*
Dr. William L. McKinney Education Service Center Region 4 7145 West Tidwell Houston, TX 77092-2096 *(713) 462-7708* *FAX: (713) 744-6514*	**Dr. Danny Lovett** Education Service Center Region 5 2295 Delaware Street Beaumont, TX 77703-4299 *(409) 838-5555* *FAX: (409) 833-9755*	**Mr. Thomas Poe** Education Service Center Region 6 3332 Montgomery Road Huntsville, TX 77340-6499 *(936) 435-8400* *Fax: (936) 295-1447*
Mrs. Elizabeth Abernethy Education Service Center Region 7 1909 N. Longview Street Kilgore, TX 75662-6827 *(903) 988-6700* *FAX: (903) 988-6708*	**Dr. Ray Glynn** Education Service Center Region 8 P. O. Box 1894 Mt. Pleasant, TX 75456-1894 Location: 2230 N. Edwards, 75455 *(903) 572-8551* *FAX: (903) 575-2611*	**Ms. Anne Poplin** Education Service Center Region 9 301 Loop 11 Wichita Falls, TX 76306-3706 *(940) 322-6928* *FAX: (940) 767-3836*
Mr. Wilburn O. "Buddy" Echols, Jr. Education Service Center Region 10 400 E. Spring Valley Road Richardson, TX. 75081-5101 *(972) 348-1700* *FAX: (972) 231-3642*	**Mr. Richard Ownby** Education Service Center Region 11 3001 North Freeway Fort Worth, TX 76106-6596 *(817) 740-3600* *FAX: (817) 740-7600*	**Dr. Jerry Maze** Education Service Center Region 12 P. O. Box 23409 Waco, TX 76702-3409 Location: 2101 W. Loop 340, 76712 *(254) 297-1212* *FAX: (254) 666-0823*
Dr. Terry Smith Education Service Center Region 13 5701 Springdale Road Austin, TX 78723-3675 *(512) 919-5313* *FAX: (512) 919-5374*	**Mr. Ronnie Kincaid** Education Service Center Region 14 1850 Highway 351 Abilene, TX 79601-4750 *(325) 675-8600* *FAX: (325) 675-8659*	**Mr. Scot Goen** Education Service Center Region 15 P. O. Box 5199 San Angelo, TX 76902-5199 Location: 612 South Irene St., 76903 *(325) 658-6571* *FAX: (325) 658-6571*
Mr. John Bass Education Service Center Region 16 5800 Bell Street Amarillo, TX 79109-6230 *(806) 677-5000* *FAX: (806) 677-5001*	**Dr. Kyle Wargo** Education Service Center Region 17 1111 West Loop 289 Lubbock, TX 79416-5029 *(806) 792-4000* *FAX: (806) 792-1523*	**Mr. John Thomas** Education Service Center Region 18 P. O. Box 60580 Midland, TX 79711-0580 Location: 2811 LaForce Blvd., 79711 *(432) 563-2380* *FAX: (432) 567-3290*
Dr. James R. Vasquez Education Service Center Region 19 P. O. Box 971127 El Paso, TX 79997-1127 Location: 6611 Boeing Drive, 79925 *(915) 780-1919* *FAX: (915) 780-6537*	**Dr. Ronald L. Beard** Education Service Center Region 20 1314 Hines Avenue San Antonio, TX 78208-1899 *(210) 370-5200* *FAX: (210) 370-5750*	

C.2 Host a training of trainers (TOT) conference for up to 12 selected AVATAR regional teams. Every effort will be made to secure teams in regions with the greatest needs for student success. The three AVATAR pilot teams will be included in the training to ensure their sustainability and to guide the newly formed partnerships. The TOT conference will be held in June 2012.

Figure 4: Tentative Training of Trainers Conference Agenda

8:00 – 8:30 am	Welcome and Introductions
8:30 – 9:00 am	Understanding the Need for Curriculum Alignment as an Element of Student Success and Reduction of Developmental Education
9:00 – 10:00 am	Understanding and Committing to AVATAR
10:15 – 12:00	Overview of AVATAR Pilot Projects – Why, Who, How, When, and Where?
12:00 – 1:30 pm	Lunch and Pilot Team Leaders' Reflections of Lessons Learned and Resource Sharing
1:30 – 3:00 pm	Working in Regional Teams with Support from AVATAR Planning and Oversight Committee
3:15 – 4:00 pm	Team Reports and Sharing
4:00 – 5:00 pm	Sharing Next Steps and AVATAR Materials and Wrap Up

C.3 Technical assistance will be provided to each AVATAR regional team by email, telephone calls, webinars, website, and if needed, face to face visits. Technical assistance will be provided for any aspect of the design, implementation, and evaluation of AVATAR (between March 2012 when the team selection takes place, and August 2013, when the project is completed). The technical assistance will be designed to empower the teams to work together; to analyze their own systems; model and learn from other systems of curriculum alignment, using AVATAR as a foundation; and to sustain their effort so that data can be compiled to reflect their effort toward students' academic success and reductions in developmental education.

C4. Follow up will include every other month conference calls (August 2012 – August 2013) with reports from each AVATAR team leader and posting of progress from each AVATAR team on a website. Follow up will focus on cultivating and strengthening systems, partnerships, and leadership to support innovation, communication, and adoption of curriculum alignment. Resources, pathways, data, lessons learned, and student and faculty successes found by the regional teams to cultivate vertical/horizontal curriculum alignment between and among secondary and postsecondary educational institutions will be posted on the website and available to all. Each partnership will be showcased on the website during the project period.

C.5 Each AVATAR partnership will create a sustainability plan to further and sustain their vertical alignment work beyond the project.

D. Evaluating AVATAR Process and Student Success. This aspect of AVATAR will enable participating regional partnerships to demonstrate increased efficiency and capacity for formative and summative evaluation through specification of data to be collected and shared through gap analysis reporting. Efforts will be placed on utilization focused evaluation related to the needs and goals identified by the regional partnerships and the THECB.

D.1. Project AVATAR will solicit feedback from pilot test participants for improvement of its Curriculum alignment processes, training, and follow-up technical support.

D.2 Project AVATAR will collect and analyze relevant baseline and continuing performance, retention, and developmental education data from schools and institutions of higher education participating in the project.

D.3 The project will collaborate with THECB in an external, summative evaluation.

D.4 High school partners will institute systems for collecting, by subgroup, section, and learning objective, state test results and college readiness indicators of students in relevant STEM classes and for sharing them with partners.

D.5 Higher education partners will institute systems for collecting by section and learning object final examination or assignment results for relevant STEM classes and for sharing them with partners.

D.6 Regional Partners will develop and implement methods for tracking retention and college success data for students from participating high schools into public technical and two-year colleges and from them into public four-year institutions.

D.7 Regional Partnerships will develop and implement methods for surveying workforce partners about the career readiness of graduates.

D.8 Regional Partnerships will develop and implement systems that enable accountability dialogues through their local or regional P-16 Councils.

D.9 Regional Partnerships participants will document their extent of implementation, satisfaction with, and perception of the cost effectiveness and potential impact of curricular alignment goals.

Means for evaluation of project goals and objectives is further developed as part of the Evaluation Plan.

Figure 5: AVATAR Project Outcomes, Dates, and Deliverables

Project Outcome	Date	Deliverables
1) Vertical Alignment Process	August 2011 December 2011 (on-going refinement)	1) AVATAR Vertical Alignment Process a. THECB and other models reviewed and used as deemed appropriate b. Partnership agreements will focus on "Institutional Leadership and Commitment" 2) Data driven and evidence based practices for curriculum alignment related to student success and reduction of developmental education
2) Vertical Alignment Training Process	January 2012 – May 2012 (on-going refinement)	1) AVATAR Vertical Alignment Training Process a. Three (3) diverse pilot projects implemented in ESC Regions 7, 10, and XI b. Faculty and administrators engagement and input regarding process and training, level of commitment c. Reference course materials developed and shared on the website, including syllabi, expectation rubrics, and learning d. Faculty's evaluation of enhanced teaching e. Student's grades at the end of the course f. Teams report findings to P-16 Council at least twice per year
3) Implementation of Training with up to 12 partnerships	August 2012 - August 2013	1) Recruit and identify partners November 2011 – March 2012. Partners in the greatest need areas will be provided support and encouragement to apply. 2) AVATAR Training of Trainers workshop conducted by August 2012. 3) Every other month conference calls to support partners and offer additional training and resource sharing.

Timeline of Activities: Dates for implementation of the major phases of the project are indicated in the goals and objectives. A more detailed timeline for project activities follows.

Figure 6: Project AVATAR Timeline

Date	Phase 1 Activities	Phase 2 Activities	Phase 3 Activities	Deliverables
July 2011	Set Dates for Planning & Oversight Committee meetings for entire project Set Dates for Executive Committee meetings	Discuss Partnership Agreements		Timeline finalized
August 2011	Employ project staff Literature Review Evaluation team meeting Executive Committee meeting	Identify administrators and faculty members who will be involved with the pilot testing		THECB and other models reviewed and used as deemed appropriate
September 2011	Hold first planning meeting Literature Review continues	Secure all partnership agreements Collect student data and student work for Regional Partnership Participants	Invite the formation of new Regional Partnerships	Partnership agreements will focus on "Institutional Leadership and Commitment" and are completed
October 2011	Hold planning meeting Executive Committee meeting	Convene Pilot Team Leaders		Data driven and evidence based practices for curriculum alignment related to student success and reduction of developmental education measurement tool developed
November 2011	Retreat Literature Review continues Evaluation team meeting			
December 2011	Hold planning team meeting and adopt AVATAR vertical alignment process Executive Committee meeting	Pilot Team Leaders finalize pilot project	Training Regional Partnership agreements signed	AVATAR Vertical Alignment Process designed Project report to Council
January 2012		Kick off regional pilot partnership meetings		1) AVATAR Vertical Alignment Training Process is created a. Three (3) diverse pilot projects implemented in ESC Regions 7, 10, and XI b. Faculty and administrators engagement and input regarding process and training, level of commitment
February 2012	Evaluation team meeting Executive Committee meeting	Monthly Pilot Partnership meeting		
March 2012		Monthly Pilot Partnership meeting Pilot Team Leaders meeting to review work and draft training process	Regional Council & ESC Training Partnerships selected	
April 2012	Executive Committee meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	Training Team Pilot Team Leaders Retreat to design TOT program	

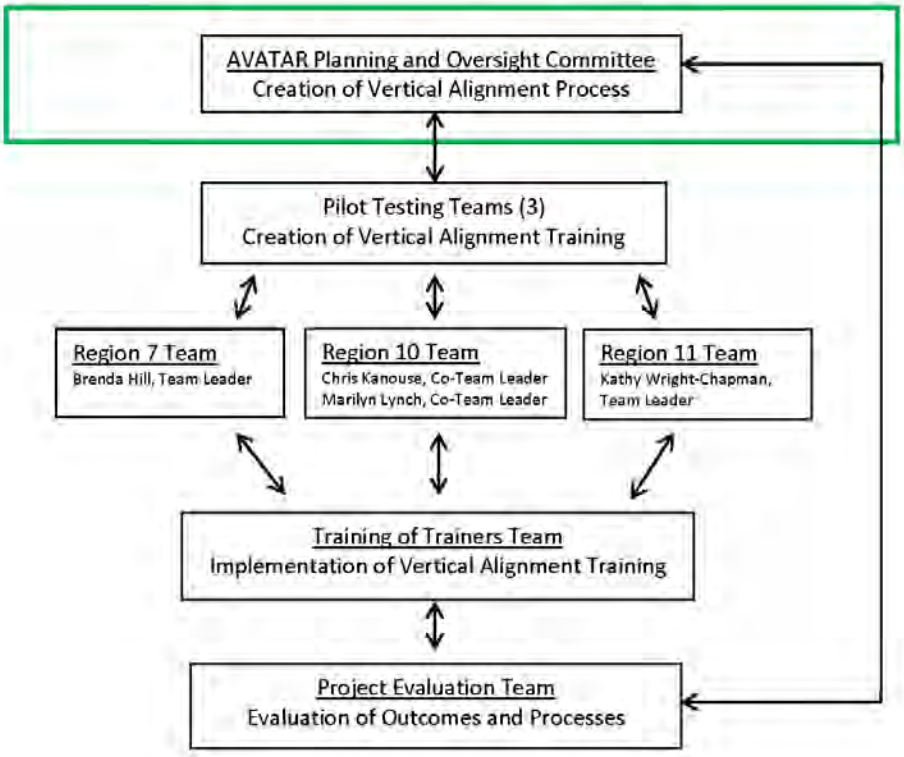
May 2012	Planning & Oversight Committee to adopt AVATAR Training Process Evaluation team meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting		c. Reference course materials developed and shared on the website, including syllabi, expectation rubrics, and learning d. Faculty's evaluation of enhanced teaching e. Student's grades at the end of the course f. Teams report findings to P-16 Council at least twice per year
June 2012	Executive Committee meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	TOT meeting to design Training Conference	Project report to Council Executive Committee
July 2012		Monthly Pilot Partnership meeting Pilot Team Leader meeting		
August 2012	Evaluation team meeting Executive Committee meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	TOT Conference conducted	1) Recruit and identify partners November 2011 – March 2012. Partners in the greatest need areas will be provided support and encouragement to apply. 2) AVATAR Training of Trainers workshop conducted by August 2012. 3) Every other month conference calls to support partners and offer additional training and resource sharing.
September 2012		Monthly Pilot Partnership meeting Pilot Team Leader meeting		
October 2012	Executive Committee meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	TA & Support for regional partnership	
November 2012	Evaluation team meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	TOT Evaluation completed TA & Support for regional partnership	
December 2012	Executive Committee meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	TA & Support for regional partnership	
January 2013		Monthly Pilot Partnership meeting Pilot Team Leader meeting	TA & Support for regional partnership	

February 2013	Evaluation team meeting Executive Committee meeting	Monthly Pilot Partnership meeting Pilot Team Leader meeting	TA & Support for regional partnership	
March 2013		Pilot Evaluation	TA & Support for regional partnership	Draft pilot evaluation completed
April 2013		Monthly Pilot Partnership meeting Pilot Team Leader meeting	TA & Support for regional partnership	
May 2013	Evaluation team meeting Executive Committee meeting		TA & Support for regional partnership Conference call with regional partnerships	Evaluation by team members completed
June 2013	Evaluation Committee presents results to Planning & Oversight Committee		TA & Support for regional partnership	
July 2013	Executive Committee meeting		TA & Support for regional partnership	Project report completed
August 2013			TA & Support for regional partnership	Project presentation to Council

The AVATAR project design is described below for each phase.

Phase 1 - Planning and Development of Vertical Alignment Process

Figure 7: AVATAR (Academic Vertical Alignment Training and Renewal)



The initial work of Phase 1, development of the vertical alignment process, will be accomplished by the Planning and Oversight Committee with support from the AVATAR project staff. In this description, "model" refers to a schematic mapping of people, activities, interactions, resources, and assessments that occur over time to reach the stated goals. "Program" refers to a sequence of learning and project development activities for one group of participants such as: 1) high school and college faculty; 2) school district curriculum coordinators and IHE department or program chairs; or 3) school district and IHE CEO leadership.

A. Agree on the AVATAR model.

Goals and parameters of AVATAR have been agreed to through conversations by the Planning and Oversight Committee. The model will provide high school, two- and four-year institutions of higher education (IHE) and Education Service Center (ESC) participants a means to engage in vertical/horizontal curriculum alignment with outcomes of improving student success in core courses and reducing developmental education.

1. The chief academic officer or CEO of each of the partnerships will provide visible commitment to collaborative, cross-level alignment and to horizontal alignment as important tools for assuring college and career readiness without remediation.
2. AVATAR will focus on curriculum in the STEM disciplines and the English language arts that support them with reference to the cross disciplinary CCRSs.
3. AVATAR will develop the capacity of curriculum leaders (department chairs, coordinators, etc.) to promote horizontal alignment of requisite courses and to incorporate vertical alignment into curriculum design and evaluation.
4. AVATAR will use Reference Course Profiles and a curriculum alignment template as a communication and curriculum planning tools to improve academic rigor, instruction, and learning.
5. Regional and local gap analysis reporting, using a common format, will facilitate sharing of data collected by the model related to student performance.
6. Regional and local P-16 councils will facilitate gap analysis reporting and accountability dialogue among AVATAR partners and a wider community interested in student success and cost-effective models to ensure the students' success.

B. Review existing models and programs.

The THECB has invested in activities to support vertical alignment. These programs will be reviewed and used as a foundation for the development of AVATAR. The following programs will be incorporated as appropriate into AVATAR.

1. Texas Two-Step (Technology Working Opportunities through Seamless Transitions and Educational Partnerships). The mission of this program is to facilitate the graduation of students from a four –year university by removing transition barriers between community colleges and the university. It also addressed the basic elements of "*Closing the Gaps"* and seeks to broaden the participation of all students, particularly underrepresented groups, in higher education and the preparation of these students for the workforce.
2. STEPS (Systemic Texas Educator Preparation Site). The inclusion of Stephen F. Austin State University as a partner will assure adherence to this model. The purpose of this project is to create high school, community college and university models that demonstrate ways to systematically address the College Career Readiness Standards in order that these standards serve as an integral component of focus throughout the high school and the educator preparation sites. The key aspects of this project that will support the AVATAR project are: a framework for implantation of CCRS; assessment tools to gauge a school's readiness and progress toward implementing CCRS; video case studies that can be shares; and a framework for a model network of partners.
3. North Texas Regional P-16 Council vertical alignment projects. With resources from THECB, the council has sponsored series of 12 vertical alignment workshops for high school, community college, and university faculty in chemistry, physics, and mathematics over a three year period. These continuing sessions call for the modification of local course syllabi to align with the Texas CCRS and sharing of major assignments and textbooks. Workshops were led by participants in state-wide faculty collaboratives. More recent workshops included information about the CCRS validation study and its analysis of the

standards in relationship to workforce expectations and the TEKS. Partners who have participated in these workshops are also included in the AVATAR project - Dallas ISD, Fort Worth ISD, Region X, Dallas County Community College District, Collin College, Fort Worth Chamber of Commerce, North Texas Community College Consortium, University of North Texas, and Texas Woman's University.

4. Texas Pathways Project. The Pathways project is a local partnership between secondary and postsecondary institutions that is designed to improve curriculum alignment between high school and postsecondary institutions. The Texas Pathways projects have three main components. The first component is a large scale data collection and research effort. The second component is comprised of the local vertical alignment teams who will review the data reports. Once the teams have discovered the reasons for misalignment, the teams are charged with the task of creating interventions to solve the misalignments. The third component is evaluation. The local vertical alignment teams are monitored to ensure they are achieving their goals and are supported by the regional coordinator and data experts. This model creates an endless loop of data report generation, intervention creation, execution, and evaluation.

   AVATAR will take from the Pathways model a more deliberate approach to the systematic collection, sharing, and analysis of data than has occurred in other vertical alignment projects. Study of local projects, especially those facilitated by the Houston Regional P-16 Councils for details of data use and also for cost-effective means for providing technical support, will be completed as part of the AVATAR model development process.

5. Early College High Schools. The University of North Texas, with support from the North Texas Regional P-16 Council, served as an intermediary for three early college high schools, all in partnership with the Dallas County Community College district with Dallas ISD for two of the schools and with Carrollton Farmers Branch ISD for the third. Establishment of these early college high schools, now in their fifth or

third year of operation, required intensive cross-institutional curriculum alignment similar to what is required in this project.

6. Gap Analysis Reporting**.** The North Texas Regional P-16 Council is known for its annual regional gap analysis reporting that includes selected common data from local school districts and IHEs. The council has collected data since 2000 and has reached a point where it can explore trend data. Using this strength of the council to inform vertical alignment efforts is an innovation of this project.
7. Accountability dialogues. This process developed by WestEd has been used by the teacher education program at the University of North Texas to create a demand for data from its employer community of school districts. This accountability mechanism is compatible with the need for sharing of data and gap analysis reporting among partners in the AVATAR mode. Its focus is on a shared approach to school and student success.
8. Critical Friends. According to Wikipedia, "A critical friend is a trusted person who asks provocative questions, provides data to be examined through another lens, and offers critiques of work after taking time to understand the context and the desired outcomes. The friend is an advocate for the success of that work." Currently used in many professional learning community projects, critical friendship is a way to engage businesses, industries, and related professional and community groups in the work where alignment of curriculum is clearly related to college and career readiness in the STEM disciplines. The AVATAR Planning & Oversight Committee will include several critical friends who are often key players within P-16 councils.
9. Education Service Centers (ESC) Region 10 and XI Tools and Resources. Numerous resources related to vertical/horizontal alignment of courses and programs with the focus on student success have been created and will be used in the design and implementation of AVATAR. These tools offer critical

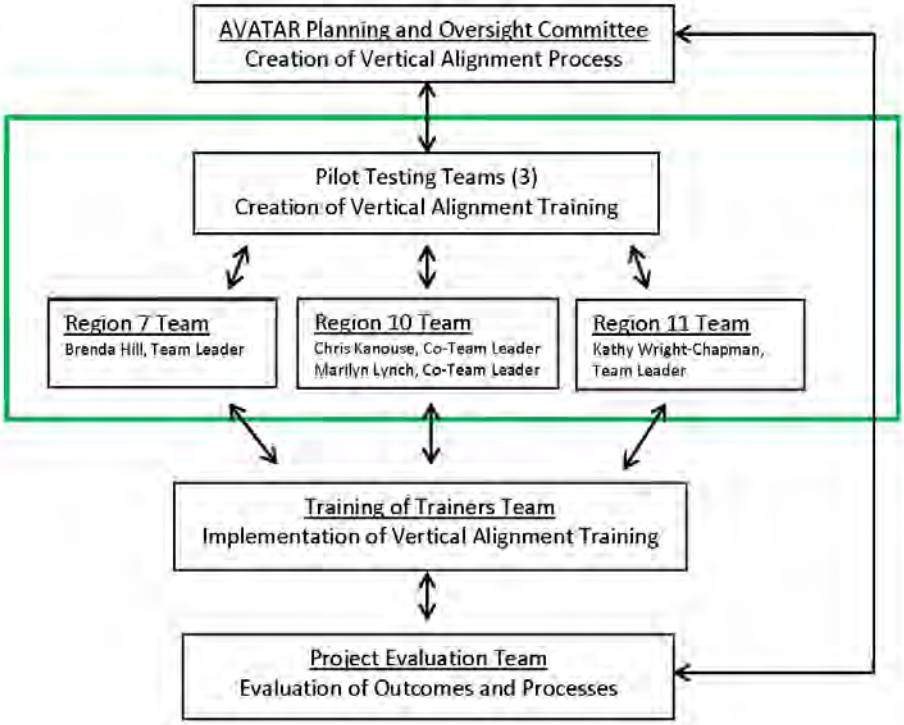
questions to be asked, sample curriculum charts, and suggestions for evaluating the status of alignment efforts.

10. STARR High School Curriculum Updates. These online curriculum workshops are available as part of the professional development offerings of the regional ESCs. AVATAR will build on the conceptual and delivery formats of these workshops to help faculty, at all levels, review and renew their curricular savvy for efficient and effective curriculum alignment efforts.
11. Reference Course Profiles (RPC). Working from a model provided in the RFP, several RPC in mathematics and chemistry were developed for inclusion in this proposal (See appendix D.). Experience with development of RPCs at this stage suggests that they are best developed for local use by partnerships with shared ownership and investment building on national and state-wide examples of excellence. Key areas to consider at the local level have been common language and understanding of the language between secondary and postsecondary educational institutions; teamwork that crosses barriers between and among departments, educational units, faculty and administrators once a common goal of success for the same students has been agreed upon; creating a culture and infrastructure of interdependence in order to transfer and disseminate course materials, approaches, and practices; and willingness to use technology to effectively improve students academic success and reduce their time in developmental education.

Partnerships will explore textbooks and textbook reference materials and exams together. Examples such as Sapling Learning http://www.saplinglearning.com/ will be shared and explored since both postsecondary and secondary institutions are finding them helpful related to student learning.

Phase 2: Creating AVATAR Vertical Alignment Training Process Through Pilot Testing

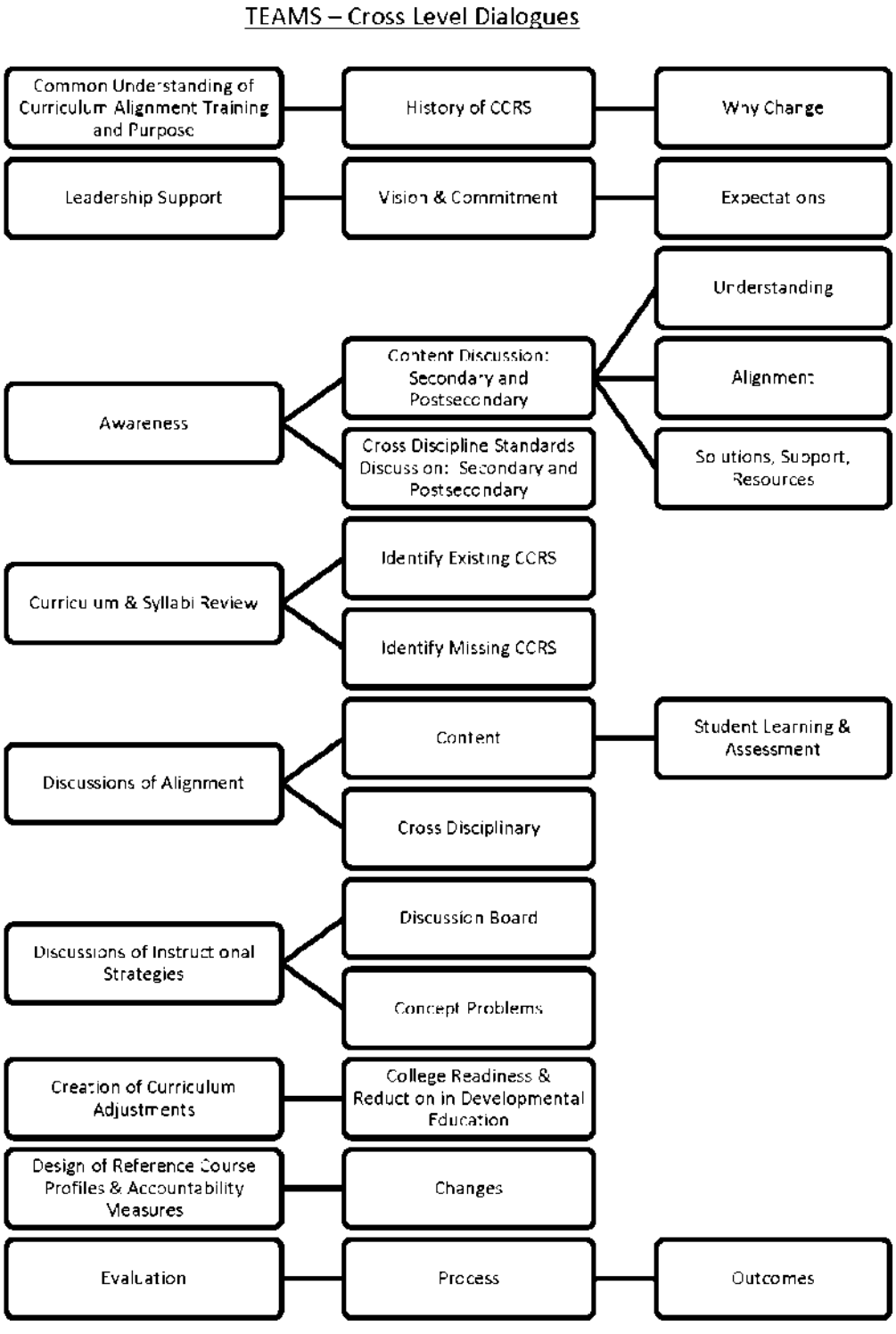
Figure 8: AVATAR (Academic Vertical Alignment Training and Renewal)



The process for pilot testing will follow the Stephen F. Austin University STEPS program with modifications. The intent of the pilots are to create a model of training to be replicated and sustained. The curriculum alignment training will focus on the fostering cross level dialogues to enhance communication, awareness, and understanding (see Figure 9).

The three pilot sites offer unique perspectives. Region 7 is rural with single district high schools, and a single two- and four-year IHE. This STEPS project has been in place since 2009 and can share lessons learned and successes. Regions 10 and XI are urban with school districts that have multiple high schools, multi campus two-year IHEs, and a wide variety of four-year institutions. The service area for the North Texas Regional P-16 council is ESC Regions 10 and XI.

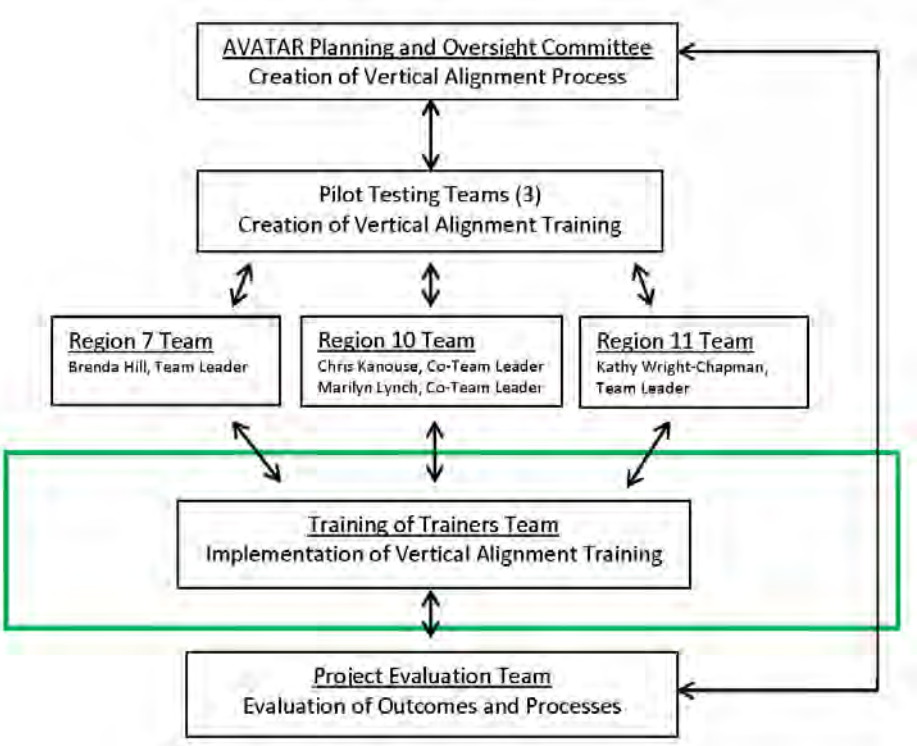
Figure 9: AVATAR Pilot Testing of Vertical Alignment Training



Modified from Stephen F. Austin State University, STEPS

Phase 3: Implementing AVATAR Training of Trainers

Figure 10: AVATAR (Academic Vertical Alignment Training and Renewal)



The vertical alignment process designed in Phase 1 and the pilot testing of it and the associated training in Phase 2 will be refined and implemented in Phase 3. Dr. Francine Holland, Deputy Executive Director of Education Service Center Region XI, will serve as the team leader for the Training of Trainers with AVATAR facilitator, Dr. Jean Keller's support. The TOT team will include Dr. Brenda Hill – Stephen F. Austin University, STEPS Project Director; Dr. Chris Kanouse – ESC Region 10, Assistant Director of Teacher Preparation & Certification; Kathy Wright-Chapman – Region XI, Director of Curriculum, Instruction, & Assessment; High School Representatives (2); College Representatives (2); Co-Chairs of P-16 Council's Professional Development Committee; Dr. Barbara Lerner – Texas Woman's University – Region Special CCRS Advisor; and Dr. Jesse Jones – North Texas Community College Consortium, Executive Director.

This highly qualified team will prepare all training materials, resources, and support for the up to 12 regional teams selected to participate in AVATAR training. A Chinese saying states, "Give a man a fish, he eats for a day. Teach a man to fish, he east for a life time." The AVATAR project is designed to education a region team composed of representatives from Education Service Centers, high schools, 2- and 4- year institutions of higher education (IHE) in the vertical alignment process and training process in order for them to education others in their region. This design is proposed due to its ability to build capacity and replicate itself over time, and to be sustained.

All 20 ESCs and 40 state identified P-16 councils would be needed to form partnerships of ESC, school districts (high schools), 2- and 4-year IHE, and if desired business and community representatives to learn how to train regional partners in implementing and sustaining vertical curriculum alignment to improve student success in secondary and postsecondary; to reduce developmental education; and to improve teaching and learning at all educational levels. Every effort will be made in the AVATAR model to empower faculty to promote academic rigor and student success.

A selection process, with input from the THECB, will include up to 12 region partnership who will agree to implement at least one (1) vertical alignment team in the region. The partnership's readiness will be evaluated through their response to questions about partnership rationale; established relationships; leadership skills in collaboratives; creating directions for curriculum alignment; expertise, and creativity in content area and commitment to cross disciplinary standards; and commitment to accountability of student success measures; and partnerships ability to sustain and replicate vertical alignment training.

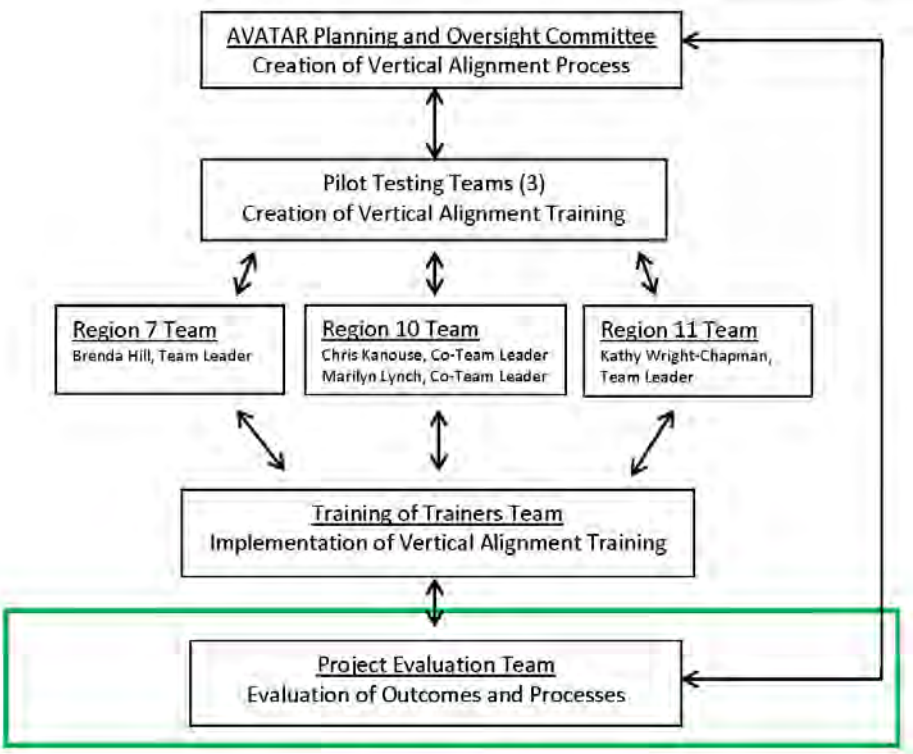
Figure 11: AVATAR Criteria for Vertical Alignment Training

Adapted from Stephen F. Austin STEPS

The North Texas Regional P-16 Council has a professional development committee co-chaired by Dr. Barbara Lerner, Region Special CCRS Advisor at Texas Woman's University, and Dr. Jesse Jones, Executive Director of the North Texas Community College Consortium, and they have put into their 2011-2012 committee strategies plan and program of work to support the AVATAR Implementation of Training for vertical alignment.

Evaluating the AVATAR Outcomes and Processes

Figure 12: AVATAR (Academic Vertical Alignment Training and Renewal)



The AVATAR process and training is engulfed in formative and summative evaluation processes in order to create the most effective and efficient vertical alignment model, as is exhibited in Figure 9. This comprehensive evaluation design is embedded in the AVATAR model with a utilization focus and a qualitative perspective.

Utilization-Focused Evaluation begins with the premise that evaluations should be judged by their utility and actual use; therefore, evaluators should facilitate the evaluation process and design any evaluation with careful consideration of how everything that is done, from beginning to end, will affect use. Use concerns how real people in the real world apply evaluation findings and experience the evaluation process. Therefore, the focus in utilization-focused evaluation is on intended use by intended users.

Utilization-focused evaluation is a process for helping primary intended users select the most appropriate content, model, methods, theory, and uses for their particular situation. Situational responsiveness guides the interactive process between evaluator and primary intended users. A psychology of use undergirds and informs utilization-focused evaluation; intended users are more likely to use evaluations if they understand and feel ownership of the evaluation process and findings; they are more likely to understand and feel ownership if they've been actively involved; by actively involving primary intended users, the evaluator is training users in use, preparing the groundwork for use, and reinforcing the intended utility of the evaluation every step along the way. Participants will learn key factors in doing useful evaluations; common barriers to use, and how to overcome those barriers; implications of focusing an evaluation on intended use by intended users; options for evaluation design and methods based on situational responsiveness, adaptability, and creativity; and ways of building evaluation into the programming process to increase use.

The Planning and Oversight Committee will monitor the work in Phases 1, 2, and 3 and the AVATAR evaluation team, comprised of members form the North Texas Regional P-16 Council representing a wide cross-section of highly qualified members of the Research, Assessment, and Accountability Committee. The committee has agreed to include the evaluation of AVATAR in the strategic plan and program of work for 2011-2012. The following members, V. Barbara Bush, University of North Texas Co-chair; Rick Garcia, Tarrant County College District Co-chair; Mary Hendrix, Texas A&M University-Commerce; Marilyn Jones, United Way of Tarrant County; Sandy Maddox, ESC Region 10, Danielle Mazzeo, United Way of Metropolitan Dallas; Rusty Reeves, UNT Health Science Center at Fort Worth; and Cynthia Williams, Texas Christian University, will work in collaboration with the THECB evaluators in collecting and analyzing data. Additionally, Dr. Changkuan XU, who has worked with the North Texas Regional P-16 Council in analyzing the gap analysis for five years, will ensure all FERPA standards are adhered to and best practices are used in reporting the findings.

Attachment B: Curriculum Vitae

M. Jean Keller
1155 Union Circle - #310769, Denton, TX 76203
(940) 565-3427; FAX (940) 565-4904
Jean.Keller@unt.edu

EDUCATION

Institution: University of Georgia; Ed.D.
Institution: Florida State University; MS, BS

FELLOWSHIP/TRAINING PROGRAMS

Governor's Executive Development, L.B. Johnson School of Public Affairs, university of Texas at Austin, 2002

PROFESSIONAL EXPERIENCE

University of North Texas, Denton, Texas
P-16 Coordinator (August 2008 – Present)
Interim Vice Chancellor for Academic Excellence and Student Affairs (August 2008 – January 2011)

University of North Texas, Department of Kinesiology, Health Promotion, and Recreation, Denton, Texas
Professor (August, 1992 – Present)
Associate Professor (August, 1989 – July, 1992)

University of North Texas, College of Education, Denton, Texas
Dean (August, 1997 – August, 2008)
Associate Dean of Academic Affairs (September, 1993 – July, 1997)

University of Georgia, Department of Recreation and Leisure Services, Athens, Georgia
Department Head (September 1984 – July, 1989)

Recent Honors
Outstanding Professional, Texas Association of Colleges for Teacher Education, 2008.
Outstanding Research Contributions, National Therapeutic Recreation Society, 2005.
Fellow, Academy of Leisure Sciences, 2004.
National Service to youth Award, Boys & Girls Clubs of America, 2002.
J.B. Nash Scholar, American Alliance for Health, Physical Education, Recreation & Dance, 2001.

Recent Contracts and Grants
Keller, M.J., "Southern Dallas County p-16 Council." The Texas Higher Education Coordinating Board, 2010-2011. $25,000

Keller, J., "Regional P-16 College and Career Readiness Marketing Projects Grant." The Texas Higher Education Coordinating Board, 2010-2011. $50,000

Harris, M. & Keller, M.J., “North Texas P-16 Regional Council Enhancement Grant.” The Texas Higher Education Coordinating Board, 2007-2008. $50,000

Mary McDonnell Harris
Meadows Chair for Excellence in Education, Regents Professor
Teacher Education and Administration
University of North Texas mary.harris@unt.edu
1155 Union Circle #310740 940 565-4327
Denton, Texas 76201 http://faculty.unt.edu

Area of Expertise: Teacher Education and Professional Development, Interdisciplinary Curriculum, Performance Assessment

A . Professional Preparation

Institution	Major	Degree	Year
Goucher College	English, magna cum laude	B. A.	1967
Shippensburg University	Elementary Education	M. Ed.	1969
University of Pittsburgh	Language Communication Education	Ph.D.	1974

B. Appointments

Begin/End Year	Place of Employment	Rank/Job Title
2000	University of North Texas Denton, TX	Meadows Chair for Excellence in Education and Regents Professor, Teacher Education and Administration; Co director, Teach North Texas (2008-present); Interim Associate Dean for Teacher Education (2008-09)
1986-1999	University of North Dakota Grand Forks, ND	Dean, College of Education and Human Development, and Professor, Department of Teaching and Learning
1979-1986	Kansas State University Manhattan, KS	Head, Department of Curriculum and Instruction
1983-1986		Professor, Curriculum and Instruction
1979-1983		Associate Professor, Curriculum and Instruction
1974-1979		Assistant Professor, Curriculum and Instruction
1970-1972	Vernridge Elementary School, Pittsburgh, PA	Second grade teacher
1969-1970	Penn Elementary School Carlisle, PA	Fourth grade teacher
1968	Carlisle Junior High School Carlisle, PA	Eighth grade English teacher
1967	East Hills Junior High School, Bethlehem, PA	Ninth grade English teacher

C. **Recent Publications**

Harris, M. M., Willis, R. C., & Tucker, T. (March, 2011). Undergraduate students studying college going cultures in urban high schools. *National Forum of Multicultural Issues Journal, 8(2), 21-28.*

Harrell, P. E., Harris, M.M., & Jackson, J. K. (2009). An examination of teacher quality variables associated with passing state content tests. *Journal of the National Association for Alternative Certification, 4(2)*, 18-39.

Harris, M. M. (2009). Standard 8: Teacher education profession. In R. McBee, S. Odell, & R. Houston (Eds.), *Standards for Teacher Educators: Establishing a Vision for the Profession,* 107-112. Rowman & Littlefield.

Harrell, P.E. & Harris, M. M. (2006). Teacher preparation without boundaries: A two-year study of an online certification program. *Journal of Technology and Teacher Education*, *14* (4), 755-774.

Harris M. M. and van Tassell, F. (2005. June). The professional development school as learning organization. *European Journal of Teacher Education, 28* (2), 179-194.

Harris, M. M. and Miller, J. R. (2005, June). Needed: Reincarnation of National Defense Education Act of 1958. *Journal of Science Education and Technology, 14* (2), 157-171.

Harris, M. M., Holdman, L., Clark, R., & Harris, T. R. (2005, Winter). Rural teachers in Project Launch. *The Rural Educator*. *26* (2), 23-32.

D. Synergistic Activities

Harris, M. M., Jacobson, A. L., Trotti, J.A. (November, 2009). Parent Teacher Education Connection revised to align with 2007 National PTA Standards through grants from Kansas Parent Information Resource Center and Cambridge Strategies. The curriculum, originally developed through a grant from USDOE, won 2007 award for Best Practices in Use of Technology of AACTE.

Co-director, Teach North Texas (TNT), with John Quintanilla since 2007. In the role we administer an undergraduate teacher education program for secondary mathematics and science teacher candidates, manage grants from several sources, and build capacity for sustaining TNT.

Currently a member of the Unit Accreditation Board of the National Council for Accreditation of Teacher Education (NCATE) and UNT NCATE co-coordinator, I am involved with accountability and program approval for teacher education, including the approval of TNT by NMSA and NSTA.

I served from 2002 to 2008 as convener and am a staff member of the North Texas Regional P-16 Council, a network of regional service centers, school districts, community colleges, universities, non-profits, and businesses committed to closing achievement gaps in the DFW metropolitan area.

Implemented and studied sustained induction programs for beginning teachers with the Grand Forks Public Schools, ND; the Bismarck-Mandan Area Teacher Center in south central ND; and 10 rural North Dakota communities through Prairie Teachers, funded by the Bush Foundation.

E. Collaborators and Other Affiliations

- **Collaborators & Co-editors**
  Larry Abraham (University of Texas), Amber Brown (University of Texas at Arlington), Pamela Harrell (University of North Texas), Rick Ginsberg (University of Kansas), Linda Holdman (University of North Dakota), Bob Houston (University of Houston), Arminta Jacobson (University of North Texas), Marilyn Snyder (North Dakota State Historical Society)
- **Graduate Advisor**
  Harry W. Sartain, University of Pittsburgh (retired)
- **Dissertation Advisees Completed**

Judy Trotti (University of Mary Hardin Baylor), Carol Revelle (University of North Texas), Jacqueline Wilcox (University of Dubuque), Judith Davison-Jenkins (St. Cloud State University), Claudia Tomanek (Bismarck Public Schools, retired), Carolyn Brauner (Valley City State University), Cheryl Pankow (Ridgewater College), Landace Logan-Wayman (Emporia State University), Tamara Roberts (Fayetteville State University), Dona Coleman (Friends University), Alsylvia Smith (Albany State University), Riller Vaughn Bennett (Chicago Public Schools)

Sean Patrick Clancy
5339 Lewis Street, Dallas, TX 75206
214.799.6595
seanpatrickclancy@gmail.com

Education: University of North Texas, Denton, Texas
Masters of Science
Major: Recreation and Leisure
Concentration: Active Lifestyle Marketing

Western Carolina University, Cullowhee, North Carolina
Bachelor of Science, College of Business, August 2005
Major: Sport Management
Concentration: Marketing & Sales

PROFESSIONAL EXPERIENCE

DFWRUNS, Dallas, TX
Director of Corporate Recess, September 2010 to present
Develop, market, and sell corporate training programs. Establish business relationships leading to participation in road races & corporate training programs. Create successful marketing campaign around social runs. Continue to initiate innovating activation opportunities for clients.

Dallas Cowboys, Dallas, TX
Suite Attendant, September 2010 to present
Facilitate presentation of menu items to reflect theme of the game. Organize game day atmosphere to represent Texas hospitality. Uphold the Pillars of excellence to provide a unique in-stadium experience.

Kansas City Chiefs, Kansas City, MO
Ticket Sales Representative, June 2009 to March 2010
Sales department finished 4th in season and group sales for 2009 season. Sold and managed large company accounts (Boulevard Brewing, Sprint, and Cintas). Established clients through cold calling, virtual marketing, stadium tours and appointments. Acted proactively to create cutting edge opportunities for new business/clients. Generated largest revenue during in stadium seat upgrade campaign.

Kansas City Wizards (Sporting KC), Kansas City, KS
Stadium Operations, May 2009 to March 2010
Assisted in converting the Kansas City T-Bone baseball stadium into the Wizards soccer arena. Interacted with fans while passing out promotional items and gate give-a-ways. Responsible for the Wizards complete breakdown during game day.

Atlanta Braves, Atlanta, GA
Account Executive, January 2009 to June 2009
Handled existing accounts in order to meet renewal goals while up selling. Aggressively made cold calls to secure sales and referrals. Balanced client expectations, department responsibilities, and other circumstances during home games. Coordinated sales tables at community events to promote the team's services.

B.A.T. Team, February 2007 to January 2009
Organized and supervised activities such as: Speed Pitch, Batting Cage, and other fan friendly games. Promoted the Braves organization in an attempt to boost ticket sales and increase marketing reach. Communicated upcoming promotions, Turner Field amenities, and current events.

Georgia Force, Flowery Branch, GA
Senior Account Manager, August 2007 to December 2008
Totaled 140,000 of new sales and 40,000 of renewal sales revenue in one season. Developed a marketing campaign used on print, virtual and marquee boards. Serviced season ticket accounts while undertaking a new group sales role. Managed game day group sales inventory and facilitated game day experience for the fans. Worked with ticket sales staff to develop programs designed to increase sales. Managed relationships with civic groups and media partners. Assisted in the development of community based brand extension programs.

Walgreens, Buford, GA
Assistant Store Manager, February 2006 to January 2007
Analyzed daily operations to ensure financial and operational objectives were met. Organized employee's tasks to comply with results of identified trends. Communicated information regarding trends, financial reports, and store issues to employees and store manager. Resolved customer concerns in manner that retained customer loyalty while in line with company policies.

Tulane University, New Orleans, LA
Promotions Assistant, May 2005 to August 2005
Developed a in game marketing plan for women's fall sports. Implemented on-campus promotional activities to increase student awareness/participation. Supervised student workers' execution of promotional activities per marketing plan. Assisted with the production of ESPN's Super regional. Created innovative mascot activities to enhance spectator enjoyment.

Attachment C: Letters of Commitment

REGION 10
EDUCATION SERVICE CENTER

May 2, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller,

The Region 10 Education Service Center, a nonprofit organization in Richardson, Texas, provides professional development and technical assistance to 80 school districts/34 charter schools in 8 counties of North Texas. This regional area of the state serves urban, suburban, and rural school districts/charters and includes a student population of greater than 650,000 served by over 53,000 educators.

Region 10 ESC commits to support the University of North Texas' grant application for the **Texas Higher Education Coordinating Board 2011-2013 Vertical Alignment Training.** Grant funding will support the regional mathematics and science educational needs by:

- Providing secondary and postsecondary vertically aligned course curriculum,
- Ensuring college readiness instruction at the secondary level,
- Closing the instructional gap between secondary and postsecondary coursework, and
- Creating postsecondary access for students to enter a career pathway.

The project proposal is appropriate and timely in both enhancing student success in higher education and decreasing the need for developmental education.

Region 10 ESC has a successful record of delivering cost-effective, research-based staff development, as well as ongoing school district support across the region. Region 10 ESC will participate in the development and delivery of a pilot vertical/horizontal alignment process, support the creation of training components, and deliver Training of Trainers to secondary and postsecondary faculty.

The expertise and experience of ESC staff, and the long-term relationship with school districts/charters will contribute to Region 10 ESC's capacity to support grant activities and take project successes to scale in the region. As part of the statewide system of Education Service Centers, Region 10 ESC is positioned to assist with a statewide scale-up model with the 20 ESCs. Oversight of the Region 10 ESC support and activities will be provided by Region 10 ESC Deputy Executive Director, Dr. Sandy Maddox.

Sincerely,

Sandy Maddox, Ph.D.
Deputy Executive Director

400 E. Spring Valley Road • Richardson, TX 75081-5101
972-348-1700 • FAX 972-231-3642 • www.region10.org

Education Service Center
REGION XI

Richard Ownby
Executive Director

April 29, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller,

The Education Service Center Region XI, a nonprofit organization in Fort Worth, Texas, provides professional development and technical assistance to 77 school districts/31 charter schools in 10 counties of North Texas. This regional area of the state serves urban, suburban, and rural school districts/charters and includes a student population of greater than 500,000 served by over 60,000 educators.

ESC Region XI commits to support the University of North Texas' grant application for the **Texas Higher Education Coordinating Board 2011-2013 Vertical Alignment Training.** Grant funding will support the regional mathematics and science educational needs by:

- Providing secondary and postsecondary vertically aligned course curriculum,
- Ensuring college readiness instruction at the secondary level,
- Closing the instructional gap between secondary and postsecondary coursework, and
- Creating postsecondary access for students to enter a career pathway.

The project proposal is appropriate and timely in both enhancing student success in higher education and decreasing the need for developmental education.

ESC Region XI has a successful record of delivering cost-effective, research-based staff development, as well as ongoing school district support across the region. ESC Region XI will participate in the development and delivery of a pilot vertical/horizontal alignment process, support the creation of training components, and deliver Training of Trainers to secondary and postsecondary faculty.

The expertise and experience of ESC staff, and the long-term relationship with school districts/charters will contribute to ESC Region XI's capacity to support grant activities and take project successes to scale in the region. As part of the statewide system of Education Service Centers, ESC Region XI is positioned to assist with a statewide scale-up model with the 20 ESCs. Oversight of the ESC Region XI support and activities will be provided by ESC Region XI Deputy Executive Director, Dr. Francine Holland.

Please keep us informed of the progress of your proposed grant. If we can be of assistance to you, please contact my office.

Sincerely,

Francine Holland, Ph.D.
Deputy Executive Director
Instructional Services Division

3001 North Freeway • Fort Worth, Texas 76106 • (817) 740-3600 • Fax (817) 740-7600 • www.esc11.net

Region III Education Service Center
1905 Leary Lane • Victoria, Texas 77901-2899 • (361) 573-0731

Dr. Julius D.
Executive Director

May 5, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller:

The Education Service Center Core Group is comprised of administrators representing the twenty ESCs in Texas. We work collaboratively to support the education system of children across the state. We meet monthly and work with the Texas Education Agency, The Higher Education Coordinating Board, the system of ESCs, and other entities to provide information and training to educators throughout Texas.

I serve as the chairperson of the ESC Core Group. The group commits to support the University of North Texas' grant application for the Texas Higher Education Coordinating Board 2011-2012 Vertical Alignment Training. We understand the grant funding will support the regional mathematics and science educational needs through vertically aligned course curriculum, college readiness instruction, closing the instructional gap between secondary and postsecondary coursework, and creating student access to career pathways.

As a potential partner in the dissemination of information and training to school districts and charters throughout the state, the twenty ESCs believe it is critical to support these necessary grant activities.

Thank you for allowing the ESC Core Group to be a part of this grant. If we can be of further assistance, please do not hesitate to contact me.

Sincerely,

Charlotte A. Baker

Charlotte A. Baker
Deputy Executive Director
Programs and Services
ESC Core Group Chairperson

Melody A. Johnson, Ph.D.
Superintendent
Fort Worth Independent School District
100 N. University Dr., Ste. 150, Fort Worth, Texas 76107
Office: 817.814.1900 Fax: 817.814.1903
www.fwisd.org

Fort Worth
INDEPENDENT SCHOOL DISTRICT

May 6, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller:

The Fort Worth Independent School District (FWISD) is pleased to commit our support for the University of North Texas' grant application for the **Texas Higher Education Coordinating Board 2011-2013 Vertical Alignment Training.** FWISD is the sixth-largest public school district in the state, serving approximately 80,000 students with 10,000 employees in an ethnically diverse, urban, high-poverty setting. District demographics reveal students are 75% economically disadvantaged, nearly 30% limited English proficient, 25% African American, 60% Hispanic, and 13% White. With over 700,000 residents, Fort Worth continues to grow, cited in 2009 as the 17th largest city in the United States. *(CNN)*

The FWISD is committed to participating in the planning and development processes to achieve the primary outcomes of the project including FWISD involvement in:

- Identification of key staff to actively participate in the Partnership for Project Development and Delivery (PPDD) grant advisory meetings tasked with establishing training design and identification of data collection needs, commission curriculum components and partnership roles and responsibilities.
- Identification of teachers and district leadership as part of a working team to design and develop project vertical alignment modules in the areas of Algebra II, Chemistry and related postsecondary mathematics and science courses.
- Identification of staff who will be part of a working team to develop and deliver vertical alignment statewide Training of Trainers (ToT) vertical alignment process model pilot programs.

The expertise and experience of FWISD staff, and the long-term relationships with the partners to this project, will contribute to capacity to support grant activities and take project successes to scale. The project proposal is appropriate and timely in both enhancing student success in higher education and decreasing the need for developmental education.

We are committed to the success of the project and look forward to working with you, project staff, and participating teachers. Please keep us informed of the progress of your proposed grant. If we can be of assistance to you, please contact my office.

Sincerely,

Melody A. Johnson, Ph.D.
Superintendent

Brookhaven College
DALLAS COUNTY COMMUNITY COLLEGE DISTRICT

Dedicated to Student Success

May 12, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller,

Brookhaven College, a member of the Dallas County Community College District, provides quality educational programs serving the needs of more than 13,000 credit students residing in predominantly Dallas and surrounding counties. Two Dallas Independent School District high schools are located in the College's service area—Thomas Jefferson High School (HB 400 designated) and W.T. White High School. The College maintains an excellent partnership with both of these DISD schools and provides a variety of outreach services and instructional program support to students and faculty in all four grade levels.

Brookhaven College commits to support the University of North Texas' grant application for the **Texas Higher Education Coordinating Board 2011-2013 Vertical AlignmentTraining.** Grant funding will support mathematics and science educational needs by:

- Providing secondary and postsecondary vertically-aligned course curriculum,
- Ensuring college readiness instruction at the secondary level,
- Closing the instructional gap between secondary and postsecondary coursework, and
- Creating postsecondary access for students to enter a career pathway.

The project proposal is appropriate and timely in both enhancing student success for students enrolling in college algebra and introductory chemistry at Brookhaven College as well as other colleges and universities and decreasing the need for developmental education.

Brookhaven College has been involved with the Texas Higher Education Coordinating Board's college and career readiness standards initiative since its inception, and several Brookhaven faculty were among those submitting course syllabi for the initial phase of the project. As its CCRS special advisor, I have actively participated in regional and state-level meetings and related activities. In January 2010, the College hosted an all-day staff development event with Thomas Jefferson High School focused on these readiness standards and creating bridges between TJHS faculty and Brookhaven College faculty in a variety of disciplines. I also serve on the TJHS high school redesign advisory committee as its primary postsecondary representative, and our executive dean of the Brookhaven College School of the Arts serves on the W.T. White high school redesign advisory committee. Involvement in these advisory groups creates opportunities for collaboration and enhances our partnerships with these two important DISD schools.

As a participant in the grant, Brookhaven College will provide chemistry professor, Dr. Claire Bambrough, to serve on the chemistry vertical alignment team. The College has also secured a commitment from Thomas Jefferson High School to provide a high school chemistry teacher to serve at the secondary level. Although not confirmed at this time, we are hopeful that an additional chemistry teacher from W.T. White High School will be able to join the vertical alignment team as well. To further confirm Brookhaven College's commitment to participation, our executive dean of science and mathematics, Doris Rousey, and our vice president of academic affairs and student success, Rodger Bennett, are committed to the vertical alignment proposed in the grant and have agreed to support Brookhaven's role.

Sincerely,

Marilyn K. Lynch
Associate Vice President
Career and Program Resources

Cc Richard McCrary, Interim President
Rodger Bennett, Vice President, Academic Affairs & Student Success
Doris Rousey, Executive Dean, Science & Mathematics
Claire Bambrough, Professor of Chemistry
Ed Conger, Principal, Thomas Jefferson High School
Anita Hardwick, Principal, W.T. White High School

Tarrant County College District

1500 Houston Street • Fort Worth, Texas 76102-6524 • 817-515-5201 • Fax 817-515-5450

ERMA C. JOHNSON HADLEY
CHANCELLOR

May 9, 2011

Ms. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller

Tarrant County College District (TCCD) is a comprehensive public community college accredited by the Southern Association of Colleges and Schools Commission on Colleges to award the Associate degree. TCCD's central administrative offices are located in downtown Fort Worth, Texas, with its five campuses serving the communities of Fort Worth, Arlington, Hurst, and surrounding suburban municipalities. TCCD is currently the seventh largest postsecondary educational institution in Texas, enrolling more than 70,600 credit students and more than 28,000 continuing education students annually. TCCD is honored to accept the invitation to serve as a partner college in the University of North Texas' application for ***THECB 2011-2013 Vertical Alignment Training*** funding. TCCD is especially supportive of this project's proposed educational outcomes: (1) enhance the success of students in high schools and prepare them to transition to institutions of higher education to support future careers and decrease the need for developmental education; (2) ensure that the content preparation is well aligned so that students can enroll and succeed in postsecondary education at all levels; and (3) support the THECB's participation and success goals in "Closing the Gaps." These outcomes are closely aligned with the direct student success emphasis of TCCD's own ***Vision 2015 Strategic Plan***.

Tarrant County College District commits its support to the University of North Texas' proposed ***Vertical Alignment Training*** project by working with the partnering public school districts, TEA Educational Service Centers, and other college and university partners to perform the following functions:

- Identify key staff to actively participate in the **Partnership for Project Development and Delivery (PPDD)** grant advisory meetings (September 2011-August 31, 2013) to establish training design, identify data collection needs, commission curriculum components, and define partnership roles/responsibilities;
- Identify instructional faculty and staff to serve on a working team to design and develop project vertical alignment modules in the areas of Algebra II, Chemistry, and related postsecondary mathematics and science courses;
- Identify instructional faculty and staff to serve on the working team to develop and deliver project vertical alignment statewide Training of Trainers (TOT) with at least 5 ESCs, 2 P-16 Councils, and 3 pilot sites.

Tarrant County College District has long-term demonstrated success in procuring and managing state- and federally funded projects to support student success and related professional development initiatives, especially in STEM-related fields. Furthermore, the expertise of TCCD's faculty and instructional program staff in collaborating with ISD and university partners to develop and align curriculum pathways for greater student success will be a strong asset to this proposed partnership.

We are excited about this collaborative venture and look forward to favorable review and funding of UNT's proposed project.

Sincerely

Erma C. Johnson Hadley

STEPHEN F. AUSTIN STATE UNIVERSITY
James I. Perkins College of Education
P.O. Box 13023, SFA Station • Nacogdoches, Texas 75962-3023
Phone (936) 468-2901 • Fax (936) 468-1475

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller,

Stephen F. Austin State University's Perkins College of Education prepares teachers, principals, and superintendents that serve campuses and districts throughout this great state and nation. Because of such, we continuously pursue involvement in best practices for college and career readiness that enhance student success. As a recipient of the 2010-2011 Texas Higher Education Coordinating Board's *Design & Pilot of Framework & Tools for CCRS/Texas Educator Preparation Demonstration Sites (STEPS,* Systemic Teacher Educator Preparation Site) we are committed to research and develop processes that others can employ. Specifically, STEPS works to create high school, community college, and university models that demonstrate ways to systemically address the College Career Readiness Standards (CCRS) in order that these standards serve as an integral component of focus throughout the high school and the educator preparation sites. This grant focuses on math and science partnering with four secondary rural high schools (Hudson, Lufkin, Nacogdoches, and Woden), Stephen F. Austin State University, and Angelina College.

The STEPS partnership is pleased to support the University of North Texas' grant application for the **Texas Higher Education Coordinating Board 2011-2013 Vertical Alignment Training** by committing to:

- Share developed processes from the STEPS grant work regarding alignment
- Share 'lessons learned' regarding its year of work
- Participate in designing alignment processes
- Participate in Phase II of the pilot
- Provide the STEPS grant director to serve as a Advisory Council member.

Our prior experiences will contribute to support the grant activities and take the project success to scale throughout the state. Oversight of Stephen F. Austin State University's support and activities will be provided by Mrs. Brenda Hill, Director of the STEPS grant.

We consider this opportunity to collaborate with the University of North Texas a as a viable option to extend our current work.

Sincerely,

Judy A. Abbott, Ph.D
Dean and Professor
James I. Perkins College of Education
Stephen F. Austin State University

www.sfasu.edu

NCATE
The Standard of Excellence in Teacher Preparation

Fort Worth CHAMBER

May 6, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller:

The Fort Worth Chamber of Commerce, a nonprofit organization, promotes the interest of its approximately 2200 members by assuming a leadership role in making Fort Worth an excellent place in which to live, work, and do business. The Chamber works regionally and collaboratively with other Chambers, Workforce Boards and numerous education partners in the P-16 continuum on collaborative projects to increase the connectivity of the segments of the education/workforce "pipeline". Our goal is to enhance economic growth and a continued quality human resource supply through education, program development and community partnership efforts. A strong P-16 educational system in the North Texas region is essential to its economic survival and excellent quality of life. Trained, skilled, educated individuals maximize productivity for businesses, help attract new businesses and retain existing businesses, and contribute to personal career success and economic self-sufficiency.

The Fort Worth Chamber of Commerce supports the University of North Texas' grant application for the Texas Higher Education Coordinating Board 2011-2013 Vertical Alignment Training. We believe this training will enhance the success of students in high schools and prepare them to transition to institutions of higher education to support future careers and decrease the need for developmental education. The math and science focus of this effort will enhance and leverage existing regional workforce development collaborations. The North Texas region has identified four major high-growth, high-wage industry clusters: Aerospace, Healthcare, Logistics and Semiconductor and Technology. All of these industries are math/science intensive and vital to the North Texas economy. Since 2002, leading businesses in these industries have worked together with Chambers of Commerce and Workforce Boards to project their future workforce needs and to create partnerships with the P-16 education system to build capacity to meet these needs. The Vertical Alignment Training directly addresses the need to build capacity by facilitating horizontal and vertical curriculum alignment between high school and college mathematics and science courses and sequences.

FORT WORTH CHAMBER OF COMMERCE
777 Taylor Street, Suite 900 ★ Fort Worth, Texas 76102-4997
817-336-2491 ★ Fax 817-877-1031 ★ www.FortWorthChamber.com

Fort Worth CHAMBER

Since 2004, the Fort Worth Chamber has been an active community partner in the Texas Higher Education Coordinating Board's "Closing the Gaps" campaign. We employ staff to engage and connect leaders in the employer community with P-16 education to increase student access and success in multiple pathways to college and careers. We provide technical assistance and support to GO Centers in the Fort Worth ISD and other school districts, and in community and faith-based locations. More than 37,000 students have utilized the GO Centers in the Fort Worth ISD alone since 2008, averaging 7400 students annually. Our participation in the North Texas Regional P-16 Council, particularly in the areas of communications and networking, coupled with Chamber online communication vehicles such as our *Workforce Development and Education E-Newsletter* will help us spread the word about the availability of training workshops, showcase success stories, and articulate the relationship of the training process to improved preparation of students for post-secondary education and entry into the workforce.

The value proposition for Fort Worth Chamber support of the vertical alignment training is not social responsibility or good corporate citizenship. It is pure economic development. There is no greater challenge to our nation's future prosperity and global competitiveness than to prepare more students to meet increasing demands for math and science expertise. Our global competitiveness and economic survival are at stake if we do not successfully solve the workforce supply and demand equation. The Fort Worth Chamber supports UNT's application for the 2011-2013 Vertical Alignment Training Grant as a vehicle to address this challenge.

Please call on me or Cynthia Fisher Miller, Senior Director of Workforce Development and Education, if you need any additional information.

Sincerely,

Bill Thornton
President and CEO

FORT WORTH CHAMBER OF COMMERCE
777 Taylor Street, Suite 1200 ★ Fort Worth, Texas 76102-4997
817 336 2491 ★ Fax 817 877 4037 ★ www.FortWorthChamber.com

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Academic Outreach
P-16 Initiatives
Office of Academic Affairs
P.O. Box 425011, Denton, TX 76204-5011
940-898-2739 FAX 940-898-3001

M. Jean Keller, Ph.D.
Professor, College of Education
Coordinator, North Texas Regional P-16 Council
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

May 17, 2011

Dear Dr. Keller:

Texas Woman's University (TWU) supports the proposal of the University of North Texas on behalf of the North Texas Regional P-16 Council to the Texas Higher Education Coordinating Board Vertical Alignment Training competition. My involvement with the North Texas Regional P-16 Council is both as a member of its executive committee for the past 10 years and as College Readiness Special Advisor to the Metroplex Region. These roles have provided numerous opportunities to collaborate with the Council in planning and delivery of training.

Housed at the University of North Texas, the North Texas Regional P-16 Council credibly represents its members from the public school, community college, university, non-profit, and business sectors in work to promote college and career readiness. The Council exhibits good will and collaboration among its members, commitment to use of data in curriculum work, and a history of sponsorship of workshops and conferences. Through regular and worthwhile meetings of both the full Council and its standing committees, the Council is able to command action on its agenda on surprisingly short notice. Commitment to the use of data is exemplified by the Council's gap analysis reporting that predates the expectation of THECB for this kind of work. A strength of the North Texas Regional P-16 Council proposal is its incorporation of student data into all phases of the planned training and follow-up technical support. Also, the Council has experience in the design and delivery of vertical alignment workshops, some delivered collaboratively with TWU. It has sponsored series of sessions for faculty in chemistry, mathematics, and physics in Dallas and Tarrant Counties and has collaborated with TWU, Collin County Community College District, and feeder school districts in similar work in Collin County. Also, the Council organized in 2007 and 2008 regional conferences on best practices in college readiness that involved local P-16 councils and numerous member entities in planning and as participants.

TWU commits to the project described in the proposal my time as Director of Academic Outreach, member of the North Texas Regional P-16 Council Executive Committee, and College Readiness Special Advisor for the regional to service on the project Training Committee. I will work to assure that the plan for training and technical support that is developed addresses the needs of partnerships across Texas. Toward this end, TWU is committed to participation in one of the pilot partnerships as described in the proposal. We will work with the Brookhaven College, the Dallas County Community College District, the Dallas ISD, and others to pilot the vertical alignment tools and processes developed through the project and to provide feedback to the Steering Committee and project staff. The TWU Department of Chemistry has made the commitment to support its faculty as participants in vertical alignment work and to incorporate results into its curriculum.

The rapidly changing population of North Texas schools and institutions of higher education calls for rapid and thoughtful response from K-16 education to demands for college and career readiness. The North Texas Regional P-16 Council offers an effective and cost-effective plan for training partnerships in our region and across Texas to enable horizontal and vertical curriculum alignment to support student success without remediation. The Council is also committed to seek funding for this project beyond what is available through the THECB competition. The Council is extraordinarily well positioned to meet this call, and I urge the THECB to select this proposal.

Yours truly,

Barbara Lerner

Barbara D'Auria Lerner, Ph.D.
Director of Academic Outreach
Texas Woman's University

National Institute For The Study Of
Transfer Students

May 23, 2011

M. Jean Keller, Ph.D.
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller,

The National Institute for the Study of Transfer Students was founded in 2003 out of a recognized need to better understand the college transfer process and support research in the field of transfer student services. Today, the NISTS is the sole national organization focused exclusively on these areas and supports the enhancement of transfer student services and development of effective policies and practices throughout the country.

The National Institute for the Study of Transfer Students commits to support the University of North Texas' grant application for the **Texas Higher Education Coordinating Board 2011-2013 Vertical Alignment Training.** Grant funding will support the regional mathematics and science educational needs by:

- Providing secondary and postsecondary vertically aligned course curriculum,
- Ensuring college readiness instruction at the secondary level,
- Closing the instructional gap between secondary and postsecondary coursework, and
- Creating postsecondary access for students to enter a career pathway.

The project proposal is particularly appropriate and timely in both enhancing student success in higher education and decreasing the need for developmental education as the number of students who transfer during the collegiate experience e continues to rise. Further, the current research and practice focus of the NISTS in the creation of pathways for STEM transfer student success creates a particular interest for us.

The National Institute for the Study of Transfer Students has a successful record of supporting, creating and disseminating research in the field of transfer student success and the policies and practices which support those activities on the local, regional, state, and national levels. The National Institute for the study of Transfer Students will exercise our proven pathways of research and best practice dissemination in support of the Vertical Alignment Training project.

Please keep us informed of the progress of your proposed grant. If we can be of assistance to you, please contact our office.

Sincerely,

George Nicoling
Assistant Director
National Institute for the Study of Transfer Students

1155 Union Circle #305358, Denton, TX 76203-5017 ▪ 940.565.4909 (phone) ▪ 940.369.8858 (fax)
transferinstitute@unt.edu ▪ http://www.transferinstitute.unt.edu
Hosted by the University of North Texas

UNIVERSITY OF
NORTH TEXAS
DISCOVER THE POWER OF IDEAS

OFFICE OF THE PROVOST AND VICE PRESIDENT FOR ACADEMIC AFFAIRS

May 23, 2011

M. Jean Keller, Ph.D.
Professor, College of Education
Coordinator, North Texas Regional P-16 Council
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller:

This is to support the proposal of the University of North Texas (UNT), as organizer of the North Texas Regional P-16 Council, to the Texas Higher Education Coordinating Board in response to its call for proposals for Vertical Alignment Training. UNT has a long history of support both for the work of the North Texas Regional P-16 Council and for curriculum and support initiatives on behalf of students, and especially of transfer students. As the largest university receiver of transfer students in the state, we value collaboration with community colleges and high schools to ease the transitions of students and to assure their academic success without remediation. As home to the North Texas Regional P-16 Council since its founding in 2001, UNT will support its work with multi-institutional partnerships in the North Central region and across Texas to promote vertical and horizontal curriculum alignment.

UNT will support the proposed Vertical Alignment Training through its continued sponsorship of the North Texas Regional P-16 Council. This includes our commitment of the time of you and of Dr. Mary Harris as leaders of the Council and its work with member organizations. Beyond your current involvement in committees of the council, we understand that the work of the project will include selection and supervision of the project director and other staff and service on the Steering Committee. UNT will provide part time salary for an administrative assistant to support the work of the council, including this project, and will commit to additional graduate student support to work with the annual gap analysis report. UNT will, through the College of Education, provide working space for Council staff, including the project director to be employed at least 30% through the grant.

In addition, UNT will gladly become involved in pilot testing the interactive curriculum development processes to be developed through this project. We are excited about the potential of this alignment work to help students learn at deeper levels through their studies in lower division STEM courses. This is consistent with UNT's commitment to undergraduate students to focus on empowering them to achieve their academic goals. As Vice Provost for Educational Innovation, my responsibilities include organization of general education curriculum that offers students every opportunity to advance academically. UNT will support the involvement of faculty who teach lower division mathematics and science courses in vertical alignment training and facilitate changes in the curriculum that promote alignment with feeder institutions consistent with the Texas Colleges and Career Readiness Standards.

1155 Union Circle # 311190 Denton, Texas 76203-5017 TEL 940.565.2550 FAX 940.565.4438 www.vpaa.unt.edu

UNT is proud to support your leadership for the highly successful North Texas Regional P-16 Council and this proposal to provide statewide leadership for vertical curriculum alignment across the levels of Texas education.

Sincerely,

Celia Williamson, Ph.D.
Vice Provost for Educational Innovation
University of North Texas

1155 Union Circle # 311190 Denton, Texas 76203-5017 TEL 940.565.2550 FAX 940.565.4438 www.vpaa.unt.edu

NORTH TEXAS COMMUNITY COLLEGE CONSORTIUM

COMMUNICATING • COOPERATING • COLLABORATING

May 24, 2011

Dr. M. Jean Keller
Professor and North Texas Regional P-16 Council Coordinator
University of North Texas
1155 Union Circle #310769
Denton, TX 76203-5017

Dear Dr. Keller:

The North Texas Community College Consortium supports your proposal for a 2011-2013 Vertical Alignment Training Grant. As a regional professional development Consortium with 25 community colleges and the University of North Texas as members, we will be happy to play a collaborative role in achieving the goals, objectives, and strategies set forth in the proposal.

And I will be happy to serve on both the Planning and Oversight Committee during Phase 1 and the Training of Trainers Committee during Phase 3 of this project.

For your AVATAR proposal, NTCCC provides an existing organization and network to enhance and sustain partnerships, collaboration, communication, and professional development.

Through existing annual Consortium conferences and workshops as well as special vertical alignment events, the Consortium can assist in providing opportunities

- to develop and strengthen faculty-faculty and advisor-advisor linkages among universities, community colleges, and ISDs;
- to provide joint faculty development opportunities and multiple venues for vertical/horizontal alignment activities and training;
- to provide information updates; and
- to disseminate materials and models as these are developed.

We look forward to "communicating, cooperating, and collaborating" (our motto) with you and our other partners in this endeavor.

Sincerely,

Jesse Jones

Jesse Jones, Ph.D.
President

COLLEGE MEMBERS:
Brookhaven
Cedar Valley
Cisco
Collin County
Eastfield
El Centro
Grayson County
Hill
Kilgore
LeCroy Center
Mountain View
Navarro
North Central Texas
North Lake
Panola
Paris
Priest Institute
Richland
Tarrant County
Texas State Technical Marshall
Trinity Valley
Tulsa
Tyler
Vernon
Weatherford
UNIVERSITY AFFILIATE:
University of North Texas

Jesse Jones
President

University of North Texas • 1155 Union Circle #310800 • Denton, Texas 76203-5017 • Telephone (940) 565-4035
TTY 940-369-8652 • Fax (940) 369-7389 • e-mail: jjones@unt.edu • www.unt.edu/ntccc

Attachment D: Examples of Reference Course Profiles

Reference Course Profile: MATH 1314 College Algebra

Study of quadrics; polynomial, rational, logarithmic, and exponential function; systems of equations; progressions; sequences and series; and matrices and determinants. (*From the course description appearing in the Fall 2010 Lower Division Academic course Guide Manual (ACGM). http://www.thecb.state.tx.us/aar/undergraduateed/workforceed/acgm.htm)*

UNT Catalog Description for *MATH 1100 (MATH 1314) Algebra*

Designed to build technical proficiency in algebra for students who will need strong algebra skills in a higher level mathematics course. Study of polynomial, radical, rational, logarithmic, and exponential functions with applications; building functions from data; systems of equations. Note that Math 1100 does not satisfy the mathematics component of the core curriculum. Students who feel they acquired solid algebra skills in high school are strongly encouraged to take the mathematics placement exam to begin in a higher-level mathematics course. A grade of C or better in MATH 1100 is required when MATH 1100 is a prerequisite for other mathematics courses.

Prerequisites and Prior Knowledge

A. Prior to enrolling in this course, students must satisfy Texas Success Initiative (TSI) requirements set by the institution as described in Coordinating board rule (Texas Administrative code, Chapter 4, Subchapter C).
B. Two years of high school algebra (Algebra I and Algebra II), one year of geometry and consent of department.

In addition, students should possess the following college and Career Readiness Standards skills. Only the specific standards and performance expectations pertinent to this course are listed on the following pages.

Mathematics College and Career Readiness Standards

- **Numeric Reasoning**

I. Number representation
II. Number operations
C. Number sense and number concepts

- **Algebraic Reasoning**

A. Expressions and equations
B. Manipulating expressions
C. Solving equations, inequalities, and systems of equations

- **Geometric Reasoning**

A. Figures and their properties
B. Connections between geometry and other mathematical content strands

- **Measurement Reasoning**

A. Measurement involving physical and natural attributes
B. Systems of measurement

C. Measurement involving geometry and algebra

A. Functions
A. Recognition and representation of functions
B. Analysis of functions
C. Model real world situations with functions

B. Problem Solving and Reasoning
A. Mathematical problem solving
B. Logical reasoning
C. Real world problem solving

C. Communication and Representation
A. Language, terms, and symbols of mathematics
B. Interpretation of mathematical work
C. Presentation and representation of mathematical work

D. Connections
A. Connections among the strands of mathematics
B. Connections of mathematics to nature, real world situations, and everyday life

Cross-Disciplinary Standards

VII. Key Cognitive Skills
I. Intellectual curiosity
II. Reasoning
III. Problem solving
IV. Academic behaviors
V. Work habits
VI. Academic integrity

VIII. **Foundational Skills**
A. Reading across the curriculum
D. Use of data
E. Technology

Course Objectives*

- Use algebra to solve real world problems
- Represent and evaluate basic mathematical information symbolically and graphically
- Use a graphing calculator to enhance mathematical thinking an understanding and to solve mathematical problems and judge the reasonableness of the results.
- Interpret mathematical models such as formulas and graphs

Textbook and Course Material

Required: MyMathLab (MML) access, MML is an online course delivery platform that also includes the entire textbook digitally.
Recommended: Ratti, J.S. and McWaters, Marcus. *College Algebra, 2nd Edition*. Addison Wesley, Pearson Publisher, 2011

Methods of Instruction

1. Course content is delivered through traditional lecture presentations
2. Students are expected to spend sufficient time out of class reading the textbook, previewing and reviewing lecture content and learning concepts and skills while completing online homework assignments and online quizzes
3. Students are expected to access regularly access MyMathLab, the online course platform to work on course assignments

Assignments and Assessments

1. Online homework – 15%
    - Homework assignments are designed to reinforce concepts presented in lecture. The multiple attempts give students the opportunity to become proficient in each problem type. Students will have two to three online homework assignments per week.
    - Almost every problem on each homework assignment has accompanying help resources. Students are given sufficient number of attempts per problem type (algorithmic generations) to allow a 100% on each assignment.

2. Online quizzes – 15%
   Online quizzes are in a format very similar to in-class exams. They consist of both multiple-choice questions and input response questions. Students are given three complete attempts per quiz, no help sources provided. The quizzes are intended to help students become aware of the concepts they have mastered and concepts they still need to address. Students have a quiz every other week.

3. Exams – 45%, 15% each
   There will be three in-class exams consisting of multiple-choice questions and detailed response questions. Successive exams are not necessarily comprehensive, but are cumulative, i.e., students are expected to retain proficiency of earlier content to apply to new concepts.

4. Final Exam – 25%
   The final exam is a departmental exam and is administered at the same time for all MATH1100 students.

Schedule

Week	M	W	F
1	No Class	Introductions, Linear Equations	Quadratic Equations
2	Complex Numbers, Quadratic Equations in the Complex Number System	Radical Equations, Equations in Quadratic Form; Factorable Equations	Solving Inequalities; Equations & Inequalities Involving Absolute value
3	Problem Solving: Interest, Mixture, Uniform Motion and Constant Rate Job Applications	The Distance and Midpoint Formulas	Graphs of Equations in 2 Variables; Intercepts; Symmetry
4	Lines	Circles	Variation
5	Functions	The Graph of a Function	Properties of functions
6	Review for Exam 1	**Exam 1, Topics through last week**	Library of Functions, Piecewise-Defined Functions; Graphing Techniques Transformations
7	Mathematical Models: Building Functions	Linear Functions and Their Properties	Building Linear Functions from Data
8	Quadratic Functions and Their Properties	Quadratic Models; Building Quadratic Functions from Data	Inequalities Involving Quadratic Functions
9	Review for Exam 2	**Exam 2, Topics from Exam 1 through last week**	Polynomial Functions and Models
10	Polynomial and Rational Inequalities	The Real Zeros of a Polynomial Function	Complex Zeros, Fundamental Theorem of Algebra
11	Composite Functions	One-to-one Functions; Inverse Functions	Exponential Functions
12	Logarithmic Functions	Properties of Logarithms	Logarithmic and Exponential Equations
13	Logarithmic and Exponential Equations	Exponential Growth and Decay Models; Newton's Law; Logistic Growth and Decay Models	Building Exponential, Logarithmic and Logistic Models from Data
14	Review for Exam 3	**Exam 3, Topics from Exam 2 through last week**	Systems of Linear Equations: Substitution and Elimination; Systems of Nonlinear Equations
15	Systems of Inequalities	Review for Final Exam	
16	***Final Exam***		

Sample Class Policies and Expectations Items

Academic Dishonesty

Cheating on final exams, on in-class tests, or on quizzes is a serious breach of academic standards and will be punished severely and generally result in a student failing the course. All work done on in-class exams and quizzes must represent only the student's own work, unless otherwise stated in the directions.

Attendance Policy

Class attendance is mandatory. Missing any portion of class may be counted as an absence. Students may be administratively dropped from the course with a grade of WF for excessive absences. Six or more absences constitute excessive absences. My email may NOT be used in lieu of attendance. Students are responsible for all information given in class, regardless of his/her attendance. This includes knowing exam dates and homework assignments. If you miss a class, it is your responsibility to learn of all the important stuff you missed. Exchange contact information with several members of your class; so that you will have multiple sources contact in case of a personal emergency.

Classroom Etiquette

Appropriate behavior is expected of all students taking this course. Arrive to class promptly and do not leave until the scheduled ending time of the class. If you must arrive late or leave early, please do so as discreetly as possible and take a seat near the door. Turn off all non-medical electronic devices such as pagers, cell phones, laptops, etc. Take off the headphones. Do not read newspaper or work on unrelated assignments during class. I prefer that you not eat during class.

Grading Policy

Grades Evaluation		Grade Assignment
Online Homework:	15%	A: [90%,)
Online Quizzes	15%	B: [80%, 90%)
In-class Exams	45% (15% each)	C: [70%, 80%)
Final Exam	25%	D: [60%, 70%)
Total Percentage	**100%**	F: [0%, 60%)

Student grade is determined solely by his/her performance on the evaluation criteria. Expect no extra credit or bonus assignments. Grades are not wages. They are not intended to reflect how hard you've worked or the goodness of your intentions. They are intended to reflect your competency of the course content as you have demonstrated them on the evaluation criteria.

Homework

The MyMathLab (MML) online homework assignments for the entire term are already set; due dates and times are explicitly stated in MyMathLab. You have five (5) attempts per problem-type for each online problem in MML. Using the "Help Me Solve It" feature uses one attempt. Use the attempts carefully so that you can earn a 100% on each assignment. **NO LATE HOMEWORK** will be accepted for any reason whatsoever. A grade of zero will be assigned to any homework assignment not completed online and submitted by the due date and time. Specifically, due dates will NOT be extended for any reason. **NO EXCEPTIONS.** If you are prone to circumstances that affect your ability to complete assignments as due, work ahead. Technical difficulty, including

loss of internet access, is not an excuse for not completing assigned work.

You will have the opportunity to complete four (4) make-up homework assignments during pre-finals week. If you do not complete a homework assignment by the due date during the semester or do not perform as well as you would've liked, you will have the opportunity to replace up to four of those grades by successfully completing Make-up homework assignments. The MML homework assignments are worth 15% of the course grade.

Make-up Exam Policy

NO MAKE-UP EXAMS WILL BE GIVEN. An exam may be taken **prior** to the scheduled date. I request a week's notice for this accommodation via email. In the event of a schedule conflict with a university function, dental/physician's appointment, wedding, formal, or whatever, the **student must take the test early**. If a student does not take a scheduled exam, a zero will be recorded for that exam and a notice may be sent through the registrar's office.

There are three in-class exams. If your final exam score is higher than one of your in-class exam scores, then that in-class exam grade will be replaced with final exam grade. If you miss an in-class exam, a zero will be recorded for that exam grade and your final exam score will replace that one zero. If you receive a zero for cheating on an exam, the final exam score will NOT replace that zero.

Recommended Keys to Success/Expectations

Students who are successful in math spend a great deal of time and honest effort outside of class along with punctual attendance. Students who are successful come to each class on time and stay the entire class. You are responsible for everything that happens in class. You should come to each lecture and come prepared. Students who are successful spend an hour (or two) after each lecture with a classmate reviewing the lesson and working on homework problems. They meet with a study group several times per week, attend SI sessions and use the Math Lab. Successful students work on the assignments consistently every day, instead of waiting until the last minute. They read their textbooks regularly and make learning notes.

Math is not a spectator sport. You will not learn mathematics from watching the instructor or friends display ideas and solve problems. You must try the problems, finish problems, ask questions, correct your mistakes, and put concepts in your own words, and practice, practice, practice!! An increase in effort usually results in increases in success.

Statement regarding use of email and attendance

1. Email may not be used in lieu of attendance. It is primarily for emergencies. YOU MUST ATTEND class to obtain course-related information.
2. YOU are responsible for attending the required class meetings as stated in the course schedule guide.

Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Center for Student Rights and Responsibilities to consider whether the student's conduct violated the Code of Student Conduct. The university's expectations for student conduct apply to all instructional forums, including

university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at www. #####.###.

Sample List of Student Resources

- The UNT Math Tutor Lab, open over 60 hours per week, go to: www.#####.###. The Lab is staffed with well-qualified undergraduate math majors and math graduate students. In this Lab, students register at the sign-in computer and will receive help on a first-come, first serve basis. The students receive targeted help on specific homework problems. A purpose of the Lab is help students get "un-stuck," so that students can continue with their homework assignments.

- The University Learning Center, at www.####.###. You will find times for Supplemental Instruction Leader sessions; free volunteer peer tutors, seminars for time-management, test-preparation, note-taking, etc.,

- The online 24/7 math assistance site available through the Learning Center

- The online course delivery platform: includes videos, PowerPoint presentations, interactive problem assistance, call center for live tutor help, animations, video podcasts, etc.,
  1) The videos are either of mini section lectures, presented by current instructors of the course or a detailed worked out explanation of a particular problem.
  2) This platform has a feature called "help me solve it," which requires students to complete intermediary steps in the process of receiving instructions. Some of the guided interaction requires students to answer questions about definitions and theorems to ensure that students understand the concepts applied.
  3) PPT presentations are instructional and intended to supplement and/or complement lecture and textbook readings. Some of the animations are interactive, some are passive. The animations are a different media presentation of concepts and applications.
  4) The call center is available 5pm – midnight and is staffed with live instructors who will talk students through up to three textbook exercise problems per day.
  5) The video podcasts are designed to provide on-the-go portable instruction for the student population who are wirelessly connected through their smartphones and for students with portable music/video delivery devices. The intent with the video podcasts is to deliver math content through a means where today's digital native students are most comfortable.

- My office hours; TA office hours

Supplementary Documents

Please see attached documents

- *List of content specific learning objectives with corresponding textbook exercise problem numbers.
- Previously administered Exam 1
- Previously administered Exam 2
- Previously administered Exam 3
- Previously administered common final

Math 1100: Alegbra
Course Content by Objectives

List of specific content objectives and corresponding textbook problem number.

Chapter 1: Equations and Inequalities

- Linear Equations

Solve a Linear Equation: 19, 27, 31, 65
Solve Equations that Lead to Linear Equations: 37, 41, 43, 49, 51, 57
Solve Applied Problems Involving Linear Equations: 73, 81, 85, 89, 95

- Quadratic Equations

Solve a Quadratic Equation by Factoring: 13, 17, 23, 25
Know How to Complete a Square: 39
Solve a Quadratic Equation by Completing the Square: 43, 45,
Solve a Quadratic Equation Using the Quadratic Formula: 67, 77, 93, 95, 97
Solve Applied Problems Involving Quadratic Equations: 101, 112, 121

- Complex Numbers: Quadratic Equations in the Complex Number System:

Add, Subtract, Multiply and Divide Complex Numbers: 13, 19, 25, 27, 35, 41, 45, 49
Solve Quadratic Equations in the Complex Number System: 53, 59, 73, 79, 83, 85

- Radical Equations: Equations in Quadratic Form; Factorable Equations

Solve Radical Equations: 7, 19, 29, 31, 35, 99
Solve Equations Quadratic in Form: 51, 65, 93
Solve Equations by Factoring: 79, 85, 87

- Solving Inequalities

Use Interval Notation: 11, 23, 31, 37
Use Properties of Inequalities: 21, 39, 41, 45
Solve Inequalities: 53, 65, 83, 99, 103
Solve Combined Inequalities: 73, 91, 113

- Equations and Inequalities Involving Absolute Value

Solve Equations Involving Absolute Value: 9, 13, 19, 25, 27, 29, 31, 33, 91
Solve Inequalities Involving Absolute Value: 39, 43, 49, 53, 55, 59, 65, 73, 89

- Problems Solving

Translate Verbal Descriptions into Mathematical Expressions: 11, 15
Solve Interest Problems: 17, 19
Solve Mixture problems, 21, 41
Solve Uniform Motion Problems: 27, 53
Solve Constant Rate Job Problems: 33, 49

Chapter 2: Graphs

2.1 The Distance and Midpoint Formulas
Use the Distance Formula: 11, 15, 19, 29, 45,
Use the Midpoint Formula: 35, 39, 49, 51, 65

2.2 Graphs of Equations in Two Variables; Intercepts; Symmetry
Graphs Equations by Plotting Points: 11, 21, 25, 77
Find Intercepts from a Graph: 39, 43, 49
Find Intercepts from an Equation: Example 5, 59
Test an Equation for Symmetry wrt *x*-axis, *y*-axis and the Origin: 29, 53, 59, 69, 79
Know How to Graph Key Equations: 73

2.3 Lines
Calculate and Interpret the Slope of a Line: 11, 17
Graph Lines Given a Point and the Slope:23
Find the Equation of a Vertical Line: 55
Use the Point-Slope Form of Line; Identify Horizontal Lines: 57
Find the Equation of a Line Given Two Points: 49, 53
Write the Equation of a Line in Slope-Intercept Form: 37, 45, 51, 109
Identify the Slope and *y*-intercept of a Line from Its Equation: 71, 77
Graph Lines Written in General Form Using Intercepts: 91
Find Equations of Parallel Lines: 59
Find Equations of Perpendicular Lines: 65, 105
Applications: 115, 119

2.4 Circles
Write the Standard Form of the Equation of a Circle: 7, 41
Work with and graph the Equation of a Circle in General and Standard Form: 13, 19, 23, 27, 33, 43
Applications: 49, 57

2.5 Variation
Construct a Model Using Direct Variation: 5, 9, 21, 25
Construct a Model Using Inverse Variation: 31
Construct a Model Using Joint or Combined Variation: 13, 17, 39, 41, 43

Chapter 3 Functions and Their Graphs

3.1 Functions
Determine Whether a Relation Represents a Function: 15, 19, 29, 33
Find the Value of a Function: 39, 45, 81, 85, 91
Find the Domain of a Function: 51, 57, 87
Form the Sum, Difference, Product and Quotient of Functions: 61, 71, 73, 77, 101

3.2 The Graph of a Function
Identify the Graph of a Function: 25, 39

Obtain Information from or about the Graph of a Function: 9, 13, 15, 21, 31, 33, 35, 43

3.3 Properties of Functions
Determine Even and Odd functions from a Graph:
Identify Even and Odd Functions from the Equation: 33, 35, 39
Use a Graph to Determine Where a Function is Increasing, Decreasing or Constant, Even or Odd: 11, 12, 15, 21, 27
Use a Graph to Locate Local Maxima and Local Minima: 17, 19, 29
Use a GC to Approximate Local Extrema and Determine Where a Function is Increasing or Decreasing: 45
Find the Average Rate of Change of a Function: 53, 59
Applications and Extension: 63, 67, 77

3.4 Library of Functions; Piecewise-defined Functions
Graph the Functions Listed in the Library of Functions: 9, 11, 13, 15, 23
Graph Piecewise-defined Functions: 25, 29, 39, 43, 55, 59

3.5 Graphing Techniques: Transformations
Graph Functions Using Vertical and Horizontal Shifts: 19, 35, 39, 81
Graph Functions using Reflections about the *x*- and *y*-axis: 7, 15, 27, 57, 65, 69, 73, 91
Graph Functions Using Compressions and Stretches: 11, 25, 33, 41, 43, 63,

3.6 Mathematical Models: Building Functions
Build and Analyze Functions: 1, 7, 11, 21, 23

Chapter 4: Linear and Quadratic Functions
4.1 Linear Functions and Their Properties
Graph Linear Functions: 13
Use Average Rate of Change to Identify Linear Functions: 21
Determine Whether a Linear Function is Increasing, Decreasing or Constant:
Work with Applications of Linear Functions: 29, 33, 35, 39, 41, 47, 51

4.2 Building Linear Functions from Data
Draw and Interpret Scatter Diagrams: 3, 5, 7, 17
Distinguish between Linear and Nonlinear Relations: Example 2
Use a GC to Find the Line of Best Fit: 9, 19, 21

4.3 Quadratic Functions and Their Properties
Graph a Quadratic Function using Transformations: 13, 17, 27, 33, 53
Identify the Vertex and Axis of Symmetry of a Quadratic Function: 67
Graph a Quadratic Function Using its Vertex, Axis, and Intercepts: 35, 43, 47, 77
Find the Maximum and Minimum Value of a Quadratic Function: 61, 85

4.4 Quadratic models; Building Quadratic Functions from Data
Solve Applied Problems Involving Quadratic Functions: 3, 7, 9, 13, 17

Use a GC to Find the Quadratic function of Best Fit: 11, 27, 29

4.5 Inequalities Involving Quadratic Functions
Solve Inequalities Involving Quadratic Functions:
Easy: 3, 9, 13
Medium: 5, 21, 23, 31
Applications Involving Quadratic Functions: 33, 37

Chapter 5: Polynomial and Rational Functions:
5.1 Polynomial Functions and Models
Identify Polynomial Functions and Their Degree: 11, 15, 17
Graph Polynomial Functions using Transformations: 23, 29, 35
Identify the Real Zeros of a Polynomial Function and Their Multiplicity: 37, 43, 57, 59
Analyze the Graph of a Polynomial Function: 45, 53, 61, 77, 89, 101

5.4 Polynomial and Rational Inequalities
The Domain of a Rational Function (from 5.2): 13, 19, 21
Solve Polynomial Inequalities: 5, 13, 17, 49
Solve Rational Inequalities: 21, 29, 41, 45, 51

5.5 The Real Zeros of a Polynomial Function
Use the Remainder and Factor Theorem: 11, 19, 105
Use Descartes' Rule of Signs: 21, 27
Use the Rational Zeros Theorem: 33, 33,
Find the Real Zeros of a Polynomial Function: 45, 53, 69, 111
Use the Theorem for Bounds on Zeros: 81, 87
Use the Intermediate Value Theorem: 89, 91, 105
Solve Polynomial Equations: 109

5.6 Complex Zeros; Fundamental Theorem of Algebra
Use the Conjugate Pairs Theorem: 7, 13
Find a Polynomial Function with Specified Zeros: 17
Find the Complex Zeros of a Polynomial: 23, 33, 39

Chapter 6: Exponential and Logarithmic Functions
6.1 Composite Functions
Form a Composite Function: 7, 11, 17
Find the Domain of a Composite Function: 21, 27, 33, 35, 41
Decompose a Composite Function: 53, 57
Extension: 63
Application: 73

6.2 One-to-One Functions: Inverse Functions
Determine Whether a Function is One-to-One: 9, 13, 17, 19
Determine the Inverse of a Function: 23, 27

Obtain the Graph of the Inverse Function from the Graph of the Function: 41, 43, 73
Find the Inverse of a Function Defined by an Equation; 49, 57, 63, 83, 91
Extension: 77

6.3 Exponential Functions
Evaluate Exponential Functions: 11, 21
Graph Exponential Functions: 29, 35, 37, 43, 89
Define the Number *e*: 51
Solve Exponential Equations: 59, 67, 75, 81, 85,

6.4 Logarithmic Functions
Change Exponential Expressions to Logarithmic Expressions and Vice Versa: 9, 17
Evaluate Logarithmic Expressions: 25, 55
Determine the Domain of a Logarithmic Function: 39, 45
Graph Logarithmic Functions: 57, 59, 69, 71, 79
Solve Logarithmic Equations: 87, 99, 109, 111, 127, 133

6.5 Properties of Logarithms
Work with Properties of Logarithms: 9, 13, 17, 29
Write a Logarithmic Expression as a Sum or Difference of Logarithms: 33, 45, 49
Write a Logarithmic Expression as a Single Logarithm: 51, 55, 61, 83, 89
Use the Change of Base Formula to Evaluate Logarithms: 65, 69, 73, +6.5

6.6 Logarithmic and Exponential Equations
Solve Logarithmic Equations: 7, 13, 21, 31, 81
Solve Exponential Equations: 35, 45, 53, 57, 75, 85
Solve Logarithmic and Exponential Equations using a GC: 63, 93, 97

6.7 Compound Interest
Determine the Future Value of a Lump Sum of Money: 3, 11, 53, 59, 69
Calculate Effective Rates of Return: 25, 27, 51
Determine the Present Value of a Lump Sum of Money: 13, 21, 65
Determine the Rate of Interest or Time Required to Double a Lump Sum of Money: 31, 35

6.8 Exponential Growth and Decay Models
Equations Involving the Law of Uninhibited Growth: 1, 11
Equations Involving the Law of Decay: 3, 19, 21
Use Newton's Law of Cooling: 13
Use Logistic Models: 23, 27

6.9 Building Exponential, Logarithmic and Logistic Models from Data
Use a GC to Fit an Exponential Function to Data: 1, 3, 5
Use a GC to Fit a Logarithmic Function to Data: 7
Use a GC to Fin a Logistic Function to Data: 9

Chapter 8: Systems of Equations and Inequalities

8.1 Systems of Linear Equations

Solve a System by Substitution: 9, 57, 63
Solve a System by Elimination: 19, 35, 39
Identify Inconsistent Systems Containing Two Variables: 21,
Express the Solution of a System of Dependent Equations Containing Two Variables: 29
Solve a System Containing Three Variables: 43, 69

8.6 Systems of Nonlinear Equations

Solve a System of Nonlinear Equations by Substitution: 13, 15, 29, 47, 59, 69, 71, 77, 87
Solve a System of Nonlinear Equations by Elimination: 49,

8.7 Systems of Inequalities

Graph an Inequality: 13, 15, 17
Graph a System of Inequalities: 23, 29, 37, 43, 45, 53, 61

Math 1100/
Sample Exam 1

Name: _____
Last, **First**

READ INSTRUCTIONS CAREFULLY BEFORE YOU PROCEED WITH EXAM

- No caps or hats.
- Approved calculator only. No stored information or extra programs.
- It is a part of the exam to be able to work your own calculator.
- Do not share any material during an exam. This includes your calculator, extra paper, pencil and eraser.
- No notes or other aides.

Mark all of your answer choices on your actual test. The scantron forms will NOT be returned to you.

Part I	7	× _____ =	_____/84
Part II		14 =	_____/10
		15 =	_____/10
		Total =	_____/100

Part I – Multiple Choice: Problems 1 - 13 are multiple-choice. Problems 2 – 13 are worth 7 points each.

- Even though this section is multiple-choice, you are expected to **show all work clearly and neatly as necessary**.
- I reserve the right to check the work of any/all problems from this section and adjust the grade accordingly.
- Clearly mark your answer choice on your scantron form.
- Be careful when you transfer your answers because the answers on your scantron are considered your final answers.
- Make sure all erasures on the scantron are complete.

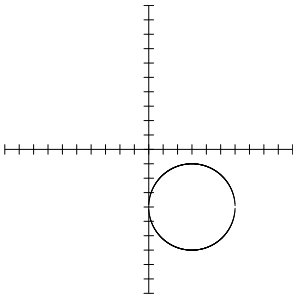
Part II – Detailed Response: Work problems 14 and 15 in complete and thorough detail. Correct answers without supporting work receive NO credit.

Before you proceed with the exam, PRINT your name (as it appears on the official university roster) on your scantron sheet. No name, no credit.

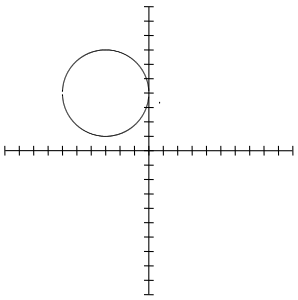
1a. You have test version **A**. Please bubble in the letter **A** for the answer to question #1 on your scantron.

2a. Find the radius and the coordinates of the center for the circle $(x+3)^2+(y-4)^2=9$ and select the correct sketch.

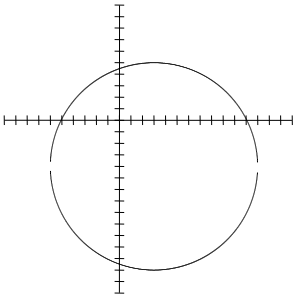
a) $(3,-4)$; r = 3



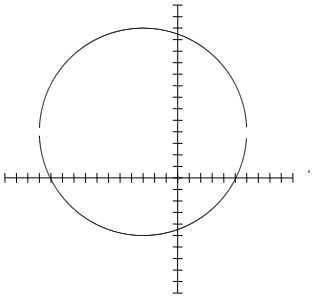
b) $(-3,4)$; r = 3



c) $(3,-4)$; r = 9



d) $(-3,4)$; r = 9



e) None of these

3a. Solve the following linear equation: $4-5(t-3)+8t=15+6(1-2t)$.

a) $t=-\frac{2}{9}$

b) $t=\frac{2}{15}$

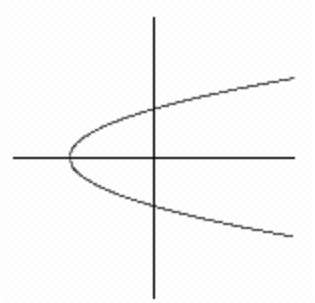
c) $t=\frac{2}{5}$

d) $t=\frac{2}{5}$

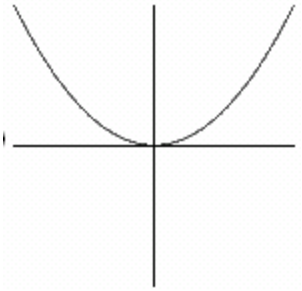
e) None of these

4a. Determine which of the following graphs displays symmetry with respect to the *x*-axis.

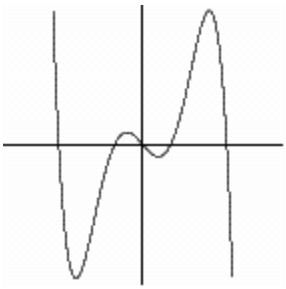
a)



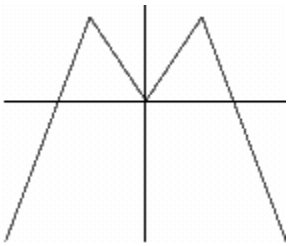
b)



c)



d)



e) None of these

5a. Solve the equation $\frac{1}{x-2}+\frac{3}{x+3}=\frac{4}{x^2+x-6}$ for *x*.

a) $x=2,-3$

b) $x=\frac{1}{4}$

c) $x=-\frac{5}{4}$

d) $x=\frac{7}{4}$

e) None of these

6a. Solve the equation $(x-2)(x+1)=4$ for x.

a) $x=2,\ -1$

b) $x=-3,\ -2$

c) $x=3,\ -2$

d) $x=3,\ 6$

e) None of these

7a. Find all real solutions of $x^4+3x^2-4=0$.

a) $x=\pm 1$

b) $x=\pm 1,\ \pm 2i$

c) $x=-4,\ 1$

d) $\pm 1,\ \pm 2$

e) None of these

8a. Find the imaginary part of the product of $(-3+2i)(7-i)$.

a) $17i$

b) $-11i$

c) $2i$

d) $-17i$

e) None of these

9a. Simplify i^{107}.

a) 1

b) i

c) $-i$

d) -1

e) None of these

10a. Lana and Joe share a paper route. It takes Lana 60 minutes to deliver all the papers, whereas it takes Joe 70 minutes. How many minutes does it take them when they work together?

a) 48 minutes

b) 65 minutes

c) 43.3 minutes

d) 32.3 minutes

e) None of these

11a. What are the critical numbers of inequality $x^3 - 4x^2 + 3x \geq 0$?

a) $0, -1, 3$

b) 0

c) $0, 1, 3$

d) $0, -3, -1$

e) None of these

12a. Find the slope of the line through the points $(5, 1)$ and $(-2, 3)$.

a) $-\frac{7}{4}$

b) $-\frac{2}{3}$

c) $-\frac{4}{7}$

d) $-\frac{2}{7}$

e) None of these

13a. Suppose $f(x) = x^2 - 3x$. Find and simplify $\frac{f(a+h) - f(a)}{h}$, assume that $h \neq 0$.

a) $2a + h^2 - 3h$

b) $2a + h - 3$

c) 1

d) $2a + h + 3$

e) None of these

Part II – Detailed Response: ***Show ALL work clearly and neatly to receive credit.*** Your work must directly and strongly support your final answer to receive credit. NO CREDIT will be given for correct answers with incorrect or insufficient supporting work. Each problem is worth 10 points.

14. Solve the equation: $2t + \sqrt{2-t} = 1$ for t.

15. Find the equation of the line (in slope-intercept form) that is parallel to $y = -7x + 1$ that goes through the point $(3, -2)$.

Sample Math Final Common Exam Questions

1. Which of the following is an equation of the line through the points $(2,1)$ and $(-3,4)$?

   A.) $-x+2y-11=0$ B.) $3x+5y+1=0$ C.) $2x+y-1=0$
   D.) $x-y-1=0$ E.) $3x+5y-11=0$

2. Find the equation of the line perpendicular to $x=-7$ that passes through the point $(-6,1)$.

   A.) $y=1$ B.) $x=1$ C.) $y=-6$ D.) $y=-7$ E.) $x=-6$

3. Which of the answers below is equivalent to $\sqrt{-10}\sqrt{-5}$?

   A.) $\sqrt{50}$ B.) $5\sqrt{-2}$ C.) $5\sqrt{2}$ D.) $(i\sqrt{10})(i\sqrt{5})$ E.) 50

4. Which of the answers below gives the correct solution to $x^2+5x=10$?

   A.) $x=\dfrac{-5\pm i\sqrt{15}}{2}$ B.) $x=10,5$ C.) $x=-5\pm\sqrt{35}$
   D.) $x=\dfrac{-5\pm\sqrt{65}}{2}$ E.) $x=-5\pm\sqrt{10}$

5. Which of the following is the solution of $\dfrac{1}{x-2}\leq\dfrac{1}{x^2-4}$?

   A.) $(-\infty,-2)\cup[-1,2)$ B.) $(-\infty,-1]$ C.) $(-2,-1]$
   D.) $[-1,\infty)$ E.) $(-2,-1]\cup(2,\infty)$

6. Evaluate $f(a+h)-f(a)$ if $f(x)=x^2-4$.

   A.) h^2 B.) $2ah+h^2$ C.) $2ah+h^2-8$
   D.) $ah+h^2$ E.) h

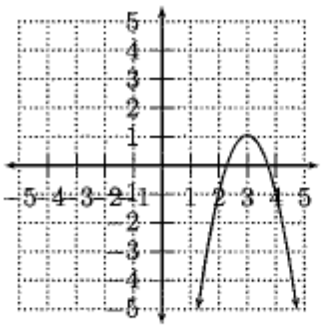
7. Which of the following is equivalent to $a^c=b$?

   A.) $\log_a b=c$ B.) $\log_c a=b$ C.) $\log_c b=a$
   D.) $\log_a c=b$ E.) $\log_b a=c$

8. Which of the following could not be a rational zero of $P(x)=24x^{17}-6x^{10}+5x^2-9$ according to the Rational Zeros Theorem?

   A.) $1/6$ B.) $-1/4$ C.) 9 D.) $-3/8$ E.) $2/3$

Use the graph below to answer questions 9.



9. The graph above is of the form $y = a(x-b)^2 + c$. Find a, b and c.

A.) $a = 2, b = 3, c = -1$ B.) $a = -2, b = 3, c = 1$
C.) $a = -2, b = -3, c = -1$ D.) $a = -1, b = 3, c = 1$
E.) $a = -1, b = -3, c = 1$

10. Find the domain of $g(x) = \log_5(2x + 7)$.

A.) $(0, \infty)$ B.) $(7/2, \infty)$ C.) $(-7/2, \infty)$
D.) $(-\infty, 0) \cup (0, \infty)$ E.) $(-7/2, 0) \cup (0, \infty)$

Use the graphs below to answer question 11.

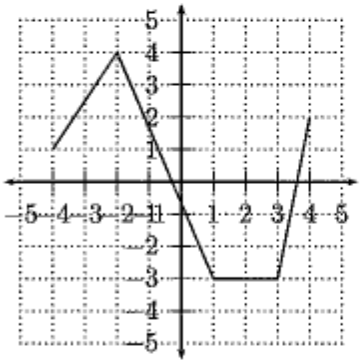


Figure 31.9: $y = f(x)$

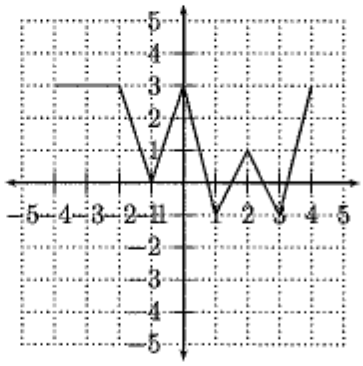


Figure 31.10: $y = g(x)$

11. Find $(fg)(1)$.

A.) 4 B.) 3 C.) -1 D.) 2 E.) -3

12. Solve $\ln(x) - \ln(x-4) = 5$ for x.

A.) 5 B.) $\frac{4e^5}{e^5-1}$ C.) 5, 1 D.) $4 + \frac{\ln(3)-1}{5}$ E.) e^5

13. Which of the following correctly describes the end behavior of $P(x) = -x^5 + 4x^4 - x^3 + 5$?

A.) As $x \to -\infty, y \to -\infty$
As $x \to \infty, y \to -\infty$

B.) As $x \to -\infty, y \to -\infty$
As $x \to \infty, y \to \infty$

C.) As $x \to -\infty, y \to \infty$
As $x \to \infty, y \to -\infty$

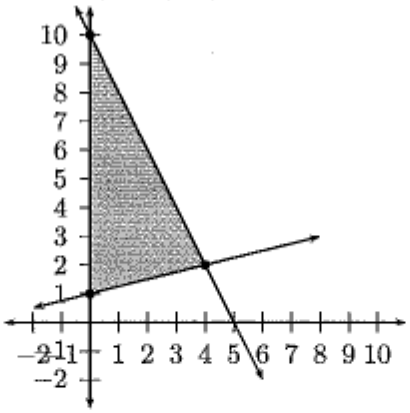
D.) As $x \to -\infty, y \to \infty$
As $x \to \infty, y \to \infty$

E.) None of the above.

14. If $x+2$ is a factor of $f(x) = x^3 - 4x^2 + kx - 6$, then what would the value of k have to be?

A.) 0 B.) -15 C.) -2 D.) 30 E.) 2

15. The graph below represents the solution of which of the following system of inequalities?



A.) $\begin{cases} y \geq x+1 \\ y \leq x-10 \\ x \geq 0 \\ y \geq 0 \end{cases}$

B.) $\begin{cases} y \leq \frac{1}{4}x+1 \\ y \geq -2x+10 \\ x \geq 0 \\ y \geq 0 \end{cases}$

C.) $\begin{cases} y \geq \frac{1}{4}x+1 \\ y \leq -2x+10 \\ x \geq 0 \\ y \geq 0 \end{cases}$

D.) $\begin{cases} y \geq \frac{1}{4}x+1 \\ y \geq -2x+10 \\ x \geq 0 \\ y \geq 0 \end{cases}$

E.) $\begin{cases} y > \frac{1}{4}x+1 \\ y < -2x+10 \\ x \geq 0 \\ y \geq 0 \end{cases}$

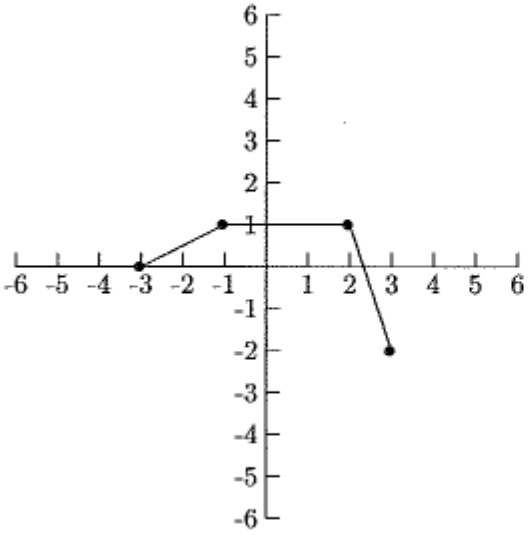
Show all work on the remaining problems in the space provided to receive credit.

16. Sarah sells a fruit juice that she makes by mixing together fruit juice concentrate and water. She wants her mixture to contain 15 liters of 20% strength juice. How much of the fruit juice concentrate will she need if the concentrate contains 80% juice?

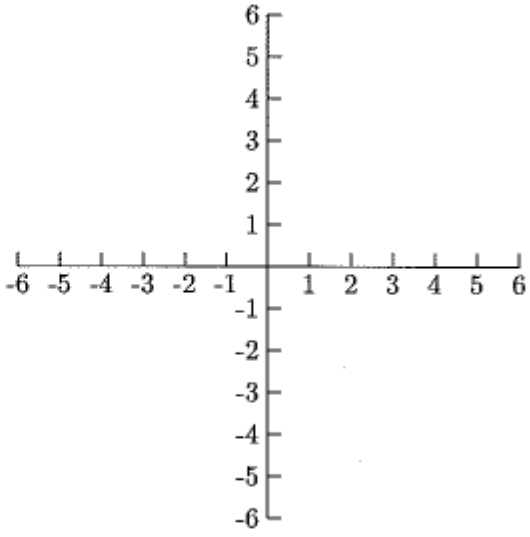
17. Alicia is saving for retirement and she wants to know how long it will take her to have \$1,000,000 saved. In the equation below, n represents the number of years that it will take for Alicia to save \$1,000,000 if she saves \$12,000 per year and earns 9% interest compounded annually.
Find n (rounded up to the nearest whole number).

$$1000000 = 12000\left(\frac{1.09^n - 1}{.09}\right)$$

18. Use the graph of $y = g(x)$ below to sketch the graph of $y = 2g(-x) + 3$ on the provided set of axes.



$y = g(x)$



$y = 2g(-x) + 3$

19. Use the function $f(x)$ given below to answer the questions that follow.

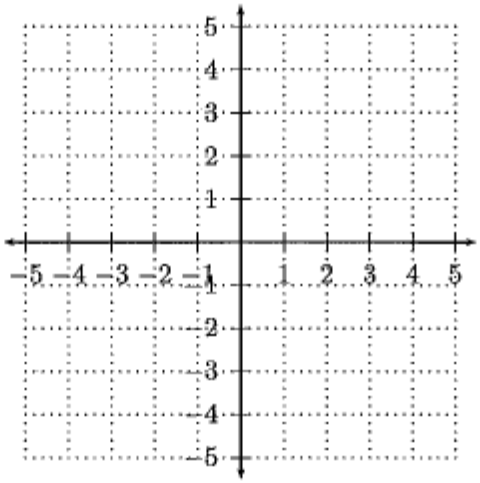
$$f(x) = \begin{cases} x+3 & \text{if } x \leq -1 \\ 3 & \text{if } -1 < x < 3 \\ -(x-4)^3 & \text{if } 3 \leq x \leq 5 \end{cases}$$

(a) $f(-2) =$ _____.

(b) $f(0) =$ _____.

(c) $f(f(5)) =$ _____.

(d) Sketch the graph of $y = f(x)$ on the axes provided below.



Course Profile for Chemistry 1410

CHEM 1410: General Chemistry for Science Majors

Prerequisite: MATH 1100 or equivalent.
Concurrent enrollment in MATH 1650 (or above) is encouraged

CHEM 1410 is the first in a two-course survey of general chemistry concepts. The second course that completes this sequence is CHEM 1420. (CHEM 1430 laboratory should be taken concurrently with CHEM 1410 lecture, and CHEM 1440 laboratory should be taken concurrently with CHEM 1420 lecture.)

UNT Catalog Descriptions for the first courses:
CHEM 1410 (CHEM 1311). General Chemistry for Science Majors. Fundamental concepts, states of matter, periodic table, structure and bonding, stoichiometry, oxidation and reduction, solutions, and compounds of representative elements.

CHEM 1430 (CHEM 1111). Laboratory Sequence for General Chemistry. Laboratory techniques, weighing, errors and significant figures, identification and purification of substances, and elementary quantitative analysis.

Prior to enrolling in this course, students must satisfy Texas Success Initiative (TSI) requirements set by the institution as described in Coordinating Board rule (Texas Administrative Code, Chapter 4, Subchapter C).

Sample prerequisite knowledge expected prior to enrollment in CHEM 1410:
MATH 1100: Algebra. Quadratic equations; systems involving quadratics; variation, ratio and proportion; progressions; the binomial theorem; inequalities; complex numbers; theory of equations; determinants; partial fractions; exponentials and logarithms. Prerequisite(s): two years of high school algebra and one year of geometry, and consent of department. A grade of C or better in MATH 1100 is required when MATH 1100 is a prerequisite for other mathematics courses.

MATH 1610. Functions, Graphs and Applications. Preparatory course for calculus: algebra and graphs of functions; properties and graphs of polynomials and rational functions; graphs and applications of exponential and logarithmic functions; applications of trigonometric functions and graphs; sequences, series and their applications.

MATH 1650 (MATH 2312 or MATH 2412). Pre-Calculus. 5 hours. Preparatory course for calculus: trigonometric functions, their graphs and applications; sequences and series; exponential and logarithmic functions and their graphs; graphs of polynomial and rational functions; general discussion of functions and their properties. MATH 1650 covers approximately the same material as MATH 1600 and MATH 1610 together.

Course Objectives

(1) Upon successful completion of Chem I, students will demonstrate their ability to adhere to the rules of significant digits and express answers in both decimal and scientific notations.
(2) Upon successful completion of Chem I, students will demonstrate their ability to understand the underlying concepts associated with the early and modern atomic theories and their applications to the periodic table and basic chemical reactions along with how elements combine to form different structures.
(3) Upon successful completion of Chem I, students will demonstrate their ability to name elements and compounds, understand the connections between a balanced chemical equation and mass/molar quantities, and the importance of chemistry as the central science.
(4) Upon successful completion of Chem I, students will demonstrate their ability to solve problems related to the concepts of density, heat, stoichiometric relationships, gas laws, and solubility.

Suggested textbook*: Moore, Stanitski, and Jurs: Chemistry: The Molecular Science, Third Ed. (There is also the option of purchasing the iBook from Thomson Learning. For Windows using Internet Explorer (IE 6.0):

*Textbooks are for reference. Any complete general chemistry textbook published within the past 5 years is acceptable.

Student Learning Objectives: General Chemistry
(based on topics listed by the ACS Exams Institute)

1. Students will be able to apply measurements, scientific notation and significant figure rules to all algorithmic-based problems.
2. Students will be able to perform all types of elementary conversions.
3. Students will be able to identify and describe matter and subatomic particles of isotopes.
4. Students will be able to write and be able to determine chemical/empirical formulas for most inorganic compounds and select groups of organic compounds.
5. Students will be able to name most inorganic compounds and select groups of organic compounds.
6. Students will be able to balance chemical equations and identify the major types of chemical reactions.
7. Students will be able to solve basic stoichiometry problems.
8. Students will be able to identify oxidation numbers of all atoms in common compounds.
9. Students will be able to identify the components contributing to the chemistry (solubility, acids/bases, etc.) of most compounds.
10. Students will be able to determine concentrations of various solutions considering molarity and molality with stoichiometric relationships.
11. Students will be able to solve thermochemical equations.
12. Students will be able to write electron configurations and understand basic quantum number rules.
13. Students will be able to differentiate between ionic and covalent bonding and know the identifying factors of each.
14. Students will be able to explain the periodic trends including, but not limited to, atomic radius, ionization energy, electron affinity, and electronegativity
15. Students will be able to draw Lewis structures, including isomers, resonance, and determine formal charges.
16. Students will be able to apply VSEPR theory to determine the electronic and molecular topology of simple compounds.
17. Student will be able to solve gas laws and gas stoichiometry problems.
18. Student will be able to describe common physical and chemical properties of solids, liquids, and gases.

19. Students will assess the concepts of intermolecular forces and how these forces affect structure and function of molecules.

Sample Methods of Instruction

Grade Allocation

Keep all returned assignments in case there is any discrepancy regarding your final course grade! Your average is based on the number of points you receive out of the total possible points. Possible points will be obtained from your homework, exams, and other exercises when deemed appropriate.
Your letter grade in this course will be based on the following scale:
A = 90 – 100%; B = 80 – 89%; C = 70 – 79%; D = 60 –69%; F < 60%.

Approximate percentages:
Homework (4 electronic assignments corresponding to the 4 unit exams): 15%
Quizzes (10 Blackboard quizzes over lecture material given during recitations): 20%
Exams (4 unit exams given during lecture): 40%
Cumulative Final Exam: 25%

If you miss an exam, your grade on your final exam will replace the missing grade!

Failure to turn in completed assignments by the due date and time will result in a zero for the missing grade.

Class Policies

1. You should enroll in both lecture (with recitation) and a lab (with lecture). CHEM 1430.00x (Lab Lecture) + CHEM 1430.3xx (Lab) are separate courses form CHEM 1410.00x + CHEM 1410.2x1. Students receive separate grades for the two courses. Dropping either course does NOT automatically drop a student from the other course.
2. Calculators are permitted for use in class and on exams. Calculators may never be shared during an exam.
3. By University regulations, a grade of "I" cannot be given as a substitute for a failing grade in a course.
4. There are no "extra credit" assignments given to an individual that are not available to the entire class.
5. Attend class—lectures and recitations, labs and lecture for labs. You are responsible for all information presented in class regardless of your attendance. Some of the information discussed in class is not in your textbook and you are still very much responsible for this information! No make-up work is provided. If you fail to attend an exam (regardless of excuse), the same percentage as your final exam grade will be calculated in its place.

Study Groups

You are strongly encouraged to form study groups. Practicing the language of chemistry by "talking" chemistry with others is a very easy and painless way to help you understand the concepts covered in this course.

POLICY STATEMENTS

ADA COMPLIANCE: In cooperation with the Office of Disability Accommodation (ODA) reasonable accommodations for qualified students with registered disabilities will be made. If applicable, please present your request, with written verification from the ODA, prior to the first exam.

SCHOLASTIC DISHONESTY: The University expects every student to maintain a high standard of individual integrity for work done. Scholastic dishonesty is a serious offense, which includes, but is not limited to, cheating on a test or other class work, plagiarism (the appropriation of another's work and the unauthorized incorporation of that work in one's own work), and collusion (the unauthorized collaboration with another person in preparing college work offered of credit). In cases of scholastic dishonesty, the faculty member responsible for the class may initiate disciplinary proceedings against the student. In *this* class all UNT procedures will be followed and the necessary paperwork will be filed with the Dean of Students. In the case of an infraction, a penalty will be recommended by the professor of this course to the Dean of Students, who may impose an additional university penalty.

DISCLAIMER: The professor of this course reserves the right to alter at any time any of the information presented on this syllabus at her discretion. If you are not in class, you may miss important information that directly affects your grade in this course!

Grades are not wages. They are not intended to reflect how hard you worked or how good your intentions were. They are intended to reflect your mastery of the material relative to this class, other classes (elsewhere and else-when), and to reflect what I believe you ought to have achieved to attain a particular grade.

General Chemistry I SLO #	Online Assign-ments	Textbook Readings	Texas CCRSs CHEMISTRY	
Lecture Topics (4 Weeks)				
1.1 Matter SLO 18		1.4-1.8	A. Matter and its properties 1. Know that physical and chemical properties can be used to describe and classify matter. 2. Recognize and classify pure substances (elements, compounds) and mixtures. I. Properties and behavior of gases, liquids, and solids 1. Understand the behavior of matter in its various states: solid, liquid, gas.	
	Supporting CCRSs		PHYSICS A. Matter 2. Understand states of matter and their characteristic. 4. Understand the concept of density. CROSS-DISCIPLINARY THEMES Classification 1. Understand that scientists categorize things according to similarities and differences.	
1.2 History SLO 14 SLO 18		1.9-1.12	C. Periodic table 1. Know the organization of the periodic table.	
	Supporting CCRSs		ENVIRONMENTAL SCIENCE SCIENCE, TECHNOLOGY, and SOCIETY C. History of science 1. Understand the historical development of major theories in science. 2. Recognize the role of people in important contributions to scientific knowledge.	
1.3 Atomic Structure	Quiz 1	2.1-2.2, 2.5-2.6, 2.9	B. Atomic structure 1. Summarize the development of atomic theory. Understand that models of the atom are used to help us understand the properties of elements and compounds.	

SLO 3 SLO 13 SLO 18			
	Supporting CCRSs		SCIENTIFIC WAYS OF KNOWING AND LEARNING Current scientific technology 1. Demonstrate literacy in computer use. CROSS-DISCIPLINARY THEMES Matter/states of matter 1. Know modern theories of atomic structure. 2. Understand the typical states of matter (solid, liquid, gas) and phase changes among these.
1.4 Significant Figures SLO 1 SLO 2		2.4	
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10).
1.5 Dimensional Analysis SLO 1 SLO 2	Quiz 2	1.4, 2.3	
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms.

			FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). PHYSICS A. Matter 4. Understand the concept of density.
1.6 Nomenclature SLO 5 SLO 8		3.1-3.3	F. Chemical nomenclature 1. Know formulas for ionic compounds. 2. Know formulas for molecular compounds.
	Supporting CCRSs		SCIENTIFIC WAYS OF KNOWING AND LEARNING E. Effective communication of scientific information 2. Use essential vocabulary of the discipline being studied.
1.7 Hydrocarbons SLO 5	Quiz 3 HW 1 due	3.4-3.6	J. Basic structure and function of biological molecules: proteins, carbohydrates, lipids, nucleic acids 1. Understand the major categories of biological molecules: proteins, carbohydrates, lipids, and nucleic acids.
Exam 1			
Lecture Topics (4 Weeks)			
2.1 Moles and Percentage Composition SLO 1,SLO 2 SLO 4,SLO 5		2.7-2.8, 3.8-3.11, 4.7	G. The mole and stoichiometry 1. Understand the mole concept.
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS

			D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement 1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution. 4. Justify the solution. 5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics 1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing.
2.2 Balancing Equations SLO 5 SLO 6 SLO 8	Quiz 4	4.1-4.4	E. Chemical reactions 1. Classify chemical reactions by type. Describe the evidence that a chemical reaction has occurred.
	Supporting CCRSs		CROSS-DISCIPLINARY THEMES Measurements and models 1. Use models to make predictions.
2.3 Stoichiometry SLO 1,SLO 2 SLO 5,SLO 6 SLO 7		4.5-4.6	G. The mole and stoichiometry 1. Understand the mole concept. 2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield.
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties.

			2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement 1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution. 4. Justify the solution. 5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics 1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing.
2.4 Reactions SLO 5	Quiz 5	5.1-5.5	E. Chemical reactions 1. Classify chemical reactions by type. Describe the evidence that a chemical

SLO 6 SLO 8 SLO 9			reaction has occurred. 2. Describe the properties of acids and bases, and identify the products of a neutralization reaction. 3. Understand oxidation-reduction reactions.
	Supporting CCRSs		CROSS-DISCIPLINARY THEMES Measurements and models 1. Use models to make predictions. 2. Use scale to relate models and structures. 3. Demonstrate familiarity with length scales from sub-atomic particles through macroscopic objects.
2.5 Solutions SLO 1 SLO 2 SLO 5 SLO 7 SLO 9 SLO 10		3.7, 5.6-5.8	I. Properties and behavior of gases, liquids, and solids 1. Understand the behavior of matter in its various states: solid, liquid, gas. 2. Understand properties of solutions. 5. Know properties of liquids and solids.
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement 1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution. 4. Justify the solution.

			5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics 1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing.
2.6 Thermochemistry SLO 1,SLO 2 SLO 6,SLO 7 SLO 11, SLO 19	Quiz 6	6.1-6.10	H. Thermochemistry 1. Understand the Law of Conservation of Energy and processes of heat transfer. 2. Understand energy changes and chemical reactions.
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement

			1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution. 4. Justify the solution. 5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics 1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing. PHYSICS Mechanical Energy 1. Understand potential and kinetic energy. 2. Understand conservation of energy. PHYSICS Thermodynamics 1. Understand the gain and loss of heat energy in matter. 2. Understand the basic laws of thermodynamics. ENVIRONMENTAL SCIENCE Energy 1. Understand energy transformations. 2. Know the various sources of energy for humans and other biological systems. CROSS-DISCIPLINARY THEMES Energy (thermodynamics, kinetic, potential, and energy transfers) 1. Understand the Laws of Thermodynamics. 2. Know the processes of energy transfer.
2.7 Review	HW 2 due			
Exam 2				
Lecture Topics (3 Weeks)				
3.1 Quantum SLO 12		7.1-7.5		
	Supporting CCRSs		PHYSICS Oscillations and waves 3. Understand wave terminology: wavelength, period, frequency, amplitude.	

			CROSS-DISCIPLINARY THEMES Matter/states of matter 1. Know modern theories of atomic structure.	
3.2 Electron Configuration SLO 12 SLO 14 SLO 15 SLO 16	Quiz 7	7.6-7.13	C. Periodic table 1. Know the organization of the periodic table. 2. Recognize the trends in physical and chemical properties as one moves across a period or vertically through a group.	
	Supporting CCRSs		CROSS-DISCIPLINARY THEMES Measurements and models 1. Use models to make predictions. 2. Use scale to relate models and structures.	
3.3 Bonding SLO 5 SLO 12 SLO 13 SLO 15		8.1, 8.3-8.7	D. Chemical bonding 1. Characterize ionic bonds, metallic bonds, and covalent bonds. Describe the properties of metals and ionic and covalent compounds. F. Chemical nomenclature 1. Know formulas for ionic compounds. 2. Know formulas for molecular compounds. I. Properties and behavior of gases, liquids, and solids 7. Describe intermolecular forces.	
	Supporting CCRSs			
3.4 Lewis Structures SLO 5 SLO 8 SLO 12 SLO 13 SLO 15 SLO 16	Quiz 8	8.2, 8.8-8.10, 9.1-9.2	J. Basic structure and function of biological molecules: proteins, carbohydrates, lipids, nucleic acids 1. Understand the major categories of biological molecules: proteins, carbohydrates, lipids, and nucleic acids.	
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS C. Understand relationships among geometry, algebra, and trigonometry 4. Understand basic geometric principles. CROSS-DISCIPLINARY THEMES Classification 1. Understand that scientists categorize things according to similarities and differences.	
3.5 Hydridization SLO 12 SLO 15 SLO 16	Quiz 9 HW 3 due	9.3-9.6		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS C. Understand relationships among geometry, algebra, and trigonometry 4. Understand basic geometric principles.
Exam 3				
Lecture Topics (3 Weeks)				
4.1 Gases SLO 1,SLO 2 SLO 17 SLO 18 SLO 19		10.2-10.7	I. Properties and behavior of gases, liquids, and solids 1. Understand the behavior of matter in its various states: solid, liquid, gas. 3. Understand principles of ideal gas behavior and kinetic molecular theory.	

	Supporting CCRSs	FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS C. Understand relationships among geometry, algebra, and trigonometry 2. Understand that a curve drawn on a defined set of axes is fully equivalent to a set of algebraic equations. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement 1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution. 4. Justify the solution. 5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics

			1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing.
4.2 Partial Pressure SLO 1,SLO 2 SLO 17 SLO 18 SLO 19	Quiz 10	10.8-10.9	I. Properties and behavior of gases, liquids, and solids 4. Apply the concept of partial pressures in a mixture of gases.
	Supporting CCRSs		FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10). MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement 1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution.

			4. Justify the solution. 5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics 1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing.
4.3 Phases and Changes SLO 10 SLO 18 SLO 19		11.1-11.6	I. Properties and behavior of gases, liquids, and solids 6. Understand the effect of vapor pressure on changes in state; explain heating curves and phase diagrams. 7. Describe intermolecular forces.
	Supporting CCRSs		
4.4 Heat Curves SLO 1 SLO 2 SLO 18 SLO 19	Quiz 11	11.7-11.9	I. Properties and behavior of gases, liquids, and solids 5. Know properties of liquids and solids. 6. Understand the effect of vapor pressure on changes in state; explain heating curves and phase diagrams.
			FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Basic mathematics conventions 1. Understand the real number system and its properties. 2. Use exponents and scientific notation. 3. Understand ratios, proportions, percentages, and decimal fractions, and translate from any form to any other. 4. Use proportional reasoning to solve problems. 5. Simplify algebraic expressions. 6. Estimate results to evaluate whether a calculated result is reasonable. 7. Use calculators, spreadsheets, computers, etc., in data analysis. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS Mathematics as a symbolic language 1. Carry out formal operations using standard algebraic symbols and formulae. 2. Represent natural events, processes, and relationships with algebraic expressions and algorithms. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATICS D. Scientific problem solving 1. Use dimensional analysis in problem solving. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems. 2. Use appropriate significant digits. 3. Understand and use logarithmic notation (base 10).

			MATHEMATICS STANDARDS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. Systems of measurement 1. Convert from one measurement system to another. 2. Convert within a single measurement system. Problem Solving and Reasoning Mathematical problem solving 1. Analyze given information. 2. Formulate a plan or strategy. 3. Determine a solution. 4. Justify the solution. 5. Evaluate the problem solving process. Real world problem solving 1. Formulate a solution to a real world situation based on the solution to a mathematical problem. 2. Use a function to model a real-world situation. Communication and Representation Language, terms, and symbols of mathematics 1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. 2. Use mathematical language to represent and communicate the mathematical concepts in a problem. 3. Use mathematics as a language for reasoning, problem solving, making connections, and generalizing. PHYSICS Thermodynamics 1. Understand the gain and loss of heat energy in matter.	
4.5 Applications	HW 4 due			
Exam 4				
Review (1 week)				
Final Exam				

General Chemistry I Lab	Experiments	Texas CCRSs Chemistry	Supporting CCRSs
Lecture Topics (recitation)			
Week 2: Discuss Laboratory Safety Rules and Lecture on Experiment 1	Laboratory Safety Rules		SCIENTIFIC WAYS OF KNOWING AND LEARNING Collaborative and safe working practices 1. Collaborate on joint projects. 2. Understand and apply safe procedures in the laboratory and field, including chemical, electrical, and fire safety and safe handling of live or preserved organisms.

			3. Demonstrate skill in the safe use of a wide variety of apparatuses, equipment, techniques, and procedures. SCIENTIFIC WAYS OF KNOWING AND LEARNING Current scientific technology 1. Demonstrate literacy in computer use. 2. Use computer models, applications and simulations. 3. Demonstrate appropriate use of a wide variety of apparatuses, equipment, techniques, and procedures for collecting quantitative and qualitative data. SCIENTIFIC WAYS OF KNOWING AND LEARNING E. Effective communication of scientific information 1. Use several modes of expression to describe or characterize natural patterns and phenomena. These modes of expression include narrative, numerical, graphical, pictorial, symbolic, and kinesthetic. 2. Use essential vocabulary of the discipline being studied. MATHEMATICS Interpretation of mathematical work 1. Model and interpret mathematical ideas and concepts using multiple representations. 2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
Week 3: Lecture on Experiments 2 and 3	<u>Experiment 1A</u>: Statistical Analysis on Different Types of Pennies <u>Experiment 1B</u>: Statistical analysis of the Density of CocaCola versus Diet Coke	A. Matter and its properties 1. Know that physical and chemical properties can be used to describe and classify matter. 2. Recognize and classify pure substances (elements, compounds) and mixtures.	MATHEMATICS E. Scientific application of probability and statistics 1. Understand descriptive statistics. MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. PHYSICS A. Matter 1. Demonstrate familiarity with length scales from sub-atomic particles through macroscopic objects. 2. Understand states of matter and their characteristics. 3. Understand the concepts of mass and inertia. 4. Understand the concept of density. 5. Understand the concepts of gravitational force and weight. CROSS-DISCIPLINARY THEMES Classification 1. Understand that scientists categorize things according to similarities and differences. FOUNDATION SKILLS: SCIENTIFIC

			APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 4: Review Experiment 3 and Lecture on Experiment 4	Experiment 2: Physical and Chemical Properties of Liquid Compounds	A. Matter and its properties 1. Know that physical and chemical properties can be used to describe and classify matter. 2. Recognize and classify pure substances (elements, compounds) and mixtures.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. CROSS-DISCIPLINARY THEMES Classification 1. Understand that scientists categorize things according to similarities and differences.
Week 5: Review Experiment 4 and Lecture on Experiment 5	Experiment 3A: Determination of Simple Empirical Formula and Waters of Hydration Experiment 3B: Determination of Simple Empirical Formula—Comparison of Red and Black Copper oxide Formulas	G. The mole and stoichiometry 1. Understand the mole concept. 2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured.
Week 6: No lecture	Experiment 4: Determination of the Molar Mass of a Volatile Liquid	G. The mole and stoichiometry 1. Understand the mole concept. 2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield. I. Properties and behavior of gases, liquids, and solids 1. Understand the behavior of matter in its various states: solid, liquid, gas. 2. Understand properties of solutions. 5. Know properties of liquids and solids.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 7: Lecture on Experiments 6	Experiment 5: Preparation of Alum	A. Matter and its properties 1. Know that physical and chemical properties can be used to describe and classify	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes

and 7		matter. 2. Recognize and classify pure substances (elements, compounds) and mixtures. D. Chemical bonding 1. Characterize ionic bonds, metallic bonds, and covalent bonds. Describe the properties of metals and ionic and covalent compounds.	1. Select or use the appropriate type of unit for the attribute being measured. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 8: No lecture	Experiment 6: Densities of Solids—Identification of Unknown Materials and Density Determinations through Linear Regression Analysis		MATHEMATICS E. Scientific application of probability and statistics 1. Understand descriptive statistics. MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. PHYSICS A. Matter 2. Understand states of matter and their characteristics. 4. Understand the concept of density. CROSS-DISCIPLINARY THEMES Classification 1. Understand that scientists categorize things according to similarities and differences. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 9: Lecture on Experiment 8	Experiment 7: Gas Law—Verification of Boyle's Law, Charles' Law and Avogadro's Law	I. Properties and behavior of gases, liquids, and solids 1. Understand the behavior of matter in its various states: solid, liquid, gas. 2. Understand properties of solutions. 3. Understand principles of ideal gas behavior and kinetic molecular theory. 4. Apply the concept of partial pressures in a mixture of gases. 5. Know properties of liquids and solids.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 10: Review Experiment 8 and Lecture on Experiment 9	Experiment 8: Determination of Cooling Curves for Pure Substances and	I. Properties and behavior of gases, liquids, and solids 1. Understand the behavior of matter in its various states: solid, liquid, gas. 5. Know properties of liquids	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured.

	Mixtures	and solids. 6. Understand the effect of vapor pressure on changes in state; explain heating curves and phase diagrams. H. Thermochemistry 1. Understand the Law of Conservation of Energy and processes of heat transfer. 2. Understand energy changes and chemical reactions.	FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 11: Lecture on Experiment 10	Experiment 9: Determination of Molar Mass by Freezing Point Depression	G. The mole and stoichiometry 1. Understand the mole concept. 2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield. H. Thermochemistry 1. Understand the Law of Conservation of Energy and processes of heat transfer. 2. Understand energy changes and chemical reactions.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 12: Lecture on Experiment 11	Experiment 10: Introduction to Calorimetry—Determination of Specific Heats of Solids and Liquids, and Enthalpy of Fusion of Water	G. The mole and stoichiometry 1. Understand the mole concept. 2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield. H. Thermochemistry 1. Understand the Law of Conservation of Energy and processes of heat transfer. 2. Understand energy changes and chemical reactions.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. PHYSICS Thermodynamics 1. Understand the gain and loss of heat energy in matter. 2. Understand the basic laws of thermodynamics. ENVIRONMENTAL SCIENCE Energy 1. Understand energy transformations. 2. Know the various sources of energy for humans and other biological systems. CROSS-DISCIPLINARY THEMES Energy (thermodynamics, kinetic, potential, and energy transfers) 1. Understand the Laws of Thermodynamics. 2. Know the processes of energy transfer. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.

Week 13: Lecture on Experiment 12	Experiment 11A: Calorimetry II—Determination of Heat of Chemical Reactions and Heat of Dissolution Experiment 11B: Calorimetry III—Determination of Heats of Hydration Based on Hess's Law	G. The mole and stoichiometry 1. Understand the mole concept. 2. Understand molar relationships in reactions, stoichiometric calculations, and percent yield. H. Thermochemistry 1. Understand the Law of Conservation of Energy and processes of heat transfer. 2. Understand energy changes and chemical reactions.	MATHEMATICS Measurement Reasoning Measurement involving physical and natural attributes 1. Select or use the appropriate type of unit for the attribute being measured. PHYSICS Thermodynamics 1. Understand the gain and loss of heat energy in matter. 2. Understand the basic laws of thermodynamics. ENVIRONMENTAL SCIENCE Energy 1. Understand energy transformations. 2. Know the various sources of energy for humans and other biological system CROSS-DISCIPLINARY THEMES Energy (thermodynamics, kinetic, potential, and energy transfers) 1. Understand the Laws of Thermodynamics. 2. Know the processes of energy transfer. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.
Week 14: No lecture	Experiment 12: Introduction to Organic Chemistry—Synthesis of Aspirin and Organic Esters	J. Basic structure and function of biological molecules: proteins, carbohydrates, lipids, nucleic acids 1. Understand the major categories of biological molecules: proteins, carbohydrates, lipids, and nucleic acids.	CROSS-DISCIPLINARY THEMES Classification 1. Understand that scientists categorize things according to similarities and differences. FOUNDATION SKILLS: SCIENTIFIC APPLICATIONS OF MATHEMATIC F. Scientific measurement 1. Select and use appropriate Standard International (SI) units and prefixes to express measurements for real-world problems.

Laboratory reports must be turned in within one week of when the laboratory experiment is completed. The last laboratory report must be turned in to the TA no later than 5:00 pm on the last day of classes.

Office Hours: By appointment only. Please email any questions and I will do my best to respond as quickly as possible.

Textbook: Modern General Chemistry Laboratory: Incorporating Computer-Oriented Data Acquisition and Evaluation Approach into the Student Laboratory Experiment; Author – William Acree, Eagle Image Publishing.

General Chemistry for Science Majors

CHEM 1420

This is the second of two-course sequence in General Chemistry. Topics include thermodynamics, reaction rates, equilibrium, electrochemistry, organic chemistry, polymers, radioactivity and nuclear reactions.

Prerequisites and Prior Knowledge

- Successful completion of CHEM 1410 or CHEM 1413, or consent of the department

In addition, students should have the following College and Career Readiness Standards skills. Only the specific standards and performance expectations pertinent to the course are listed on the following pages.

Science College and Career Readiness Standards

I. Nature of Science: Scientific Ways of Learning and Thinking
   A. Cognitive skills in science
   B. Scientific inquiry
   C. Collaborative and safe working practices
   D. Current scientific technology
   E. Effective communication of scientific information

II. Foundation Skills: Scientific Applications of Mathematics
   A. Basic mathematics conventions
   B. Mathematics as a symbolic language
   C. Understand relationships among geometry, algebra, and trigonometry
   D. Scientific problem solving
   E. Scientific application of probability and statistics
   F. Scientific measurement

III. Foundation Skills: Scientific Applications of Communication
   A. Scientific writing
   B. Scientific reading
   C. Research skills/information literacy

IV. Science, Technology, and Society
   A. Interactions between innovations and science
   B. Social ethics
   C. History of science

V. Cross-Disciplinary Themes
   A. Matter/States of matter
   B. Energy (thermodynamics, kinetic, potential, energy transfers)
   C. Change over time/equilibrium
   D. Classification
   E. Measurements and models

VI. Chemistry
- A. Matter and its properties
- B. Atomic structure
- C. Periodic table
- D. Chemical bonding
- E. Chemical reactions
- F. Chemical nomenclature
- G. The mole and stoichiometry
- H. Thermochemistry
- I. Properties and behavior of gases, liquids, and solids

Mathematics College and Career Readiness Standards

I. Numeric Reasoning
II. Algebraic Reasoning
IV. Measurement Reasoning
V. Probabilistic Reasoning
VI. Statistical Reasoning
VII. Functions
VIII. Problem Solving and Reasoning

Cross-Disciplinary Standards

I. Key Cognitive Skills
- A. Intellectual curiosity
- B. Reasoning
- C. Problem solving
- D. Academic behaviors
- E. Work habits
- F. Academic integrity

II. Foundational Skills
- A. Reading across the curriculum
- B. Writing across the curriculum
- C. Research across the curriculum
- D. Use of data
- E. Technology

Course Objectives and CCRS Correlation

(The CCRS below are in addition to the ones listed above.)

Upon successful completion of CHEM 1420, students should be able to:

Weekly Topic	Objective(s)	Chemistry CCRS	Cross-Disciplinary Science CCRS
Chapter 12: Chemical Kinetics: Rates of Reaction	• Determine the order of a chemical reaction and calculate the rate constant from initial rate data • Write reaction mechanisms consistent with the rate law expression for a reaction.	E. Chemical Reactions 6. Understand chemical kinetics	C. Change over time/Equilibrium 1. Recognize patterns of change. E. Measurements and Models 1. Use models to make predictions.
Chapter 12: Chemical Kinetics: Rates of Reaction Chapter 13: Chemical Equilibria	A. *Kinetics* • Write reaction mechanisms consistent with the rate law expression for a reaction. B. *Equilibrium* • Apply Le Chatelier's Principle to chemical systems at equilibrium.	E. Chemical Reactions 4. Understand chemical equilibrium 6. Understand chemical kinetics	C. Change over time/Equilibrium 1. Recognize patterns of change. E. Measurements and Models 1. Use models to make predictions.
Chapter 13: Chemical Equilibria	• Perform equilibrium constant calculations for chemical reactions involving gases.	E. Chemical Reactions 4. Understand chemical equilibrium	C. Change over time/Equilibrium 1. Recognize patterns of change.
Chapter 14: The Chemistry of Solutes and Solutions	• Perform equilibrium constant calculations for chemical reactions involving gases and for chemical reactions occurring in solution. • Apply Le Chatelier's Principle to chemical systems at equilibrium. • Calculate molar and molal concentrations of chemicals in various solutions and mixtures, and work stoichiometric problems using afore-mentioned concentrations.	E. Chemical Reactions 4. Understand chemical equilibrium	C. Change over time/Equilibrium 1. Recognize patterns of change.
Chapter 14: The Chemistry of Solutes and Solutions	• Perform equilibrium constant calculations for chemical reactions involving gases and for chemical reactions occurring in solution. • Apply Le Chatelier's Principle to chemical systems at equilibrium. • Calculate molar and molal concentrations of chemicals in various solutions and mixtures, and work	E. Chemical Reactions 4. Understand chemical equilibrium	C. Change over time/Equilibrium 1. Recognize patterns of change.

	stoichiometric problems using afore-mentioned concentrations.		
Begin Chapter 15: Acids & Bases (up to 15.4)	• Solve basic stoichiometry problems involving acid-base chemical reactions. • Construct pH titration curves for the titration of both monoprotic and polyprotic weak acids.	E. Chemical Reactions 2. Describe the properties of acids and bases and identify the products of a neutralization reaction. 4. Understand chemical equilibrium	
Chapter 15: Acids & Bases (finish chapter)	• Construct pH titration curves for the titration of both monoprotic and polyprotic weak acids. • Calculate the pH of solutions containing weak acids, weak bases, and salts of weak acids or bases.	E. Chemical Reactions 2. Describe the properties of acids and bases and identify the products of a neutralization reaction. 4. Understand chemical equilibrium	
Chapter 16: Additional Aqueous Equilibria	Solve numerical problems pertaining to the solubility of ionic salts in water.	E. Chemical Reactions 4. Understand chemical equilibrium I. Properties and behavior of gases, liquids, and solids 2. Understand properties of solutions.	
Chapter 16: Additional Aqueous Equilbria	Solve numerical problems pertaining to the solubility of ionic salts in water.	E. Chemical Reactions 4. Understand chemical equilibrium I. Properties and behavior of gases, liquids, and solids 2. Understand properties of solutions.	
Chapter 17: Chemical Thermodynamics	Solve thermochemical problems.	E. Chemical Reactions 5. Understand energy changes in chemical reactions. H. Thermochemistry 2. Understand energy changes and chemical reactions.	B. Energy (thermodynamics, kinetic, potential, energy transfers) 1. Understand the Laws of Thermodynamics 2. Know the processes of energy transfer.
Chapter 17: Chemical Thermodynamics	• Calculate the equilibrium constant based on	E. Chemical Reactions 5. Understand energy	B. Energy (thermodynamics, kinetic, potential, energy

	thermodynamic data. • Apply the laws of thermodynamics to determine whether or not a chemical reaction is spontaneous under a given set of experimental conditions.	changes in chemical reactions. H. Thermochemistry 2. Understand energy changes and chemical reactions.	transfers) 1. Understand the Laws of Thermodynamics 2. Know the processes of energy transfer.
Chapter 18: Electrochemistry and its Applications (through 18.2)	• Determine oxidation numbers of atoms in common compounds. • Balance oxidation-reduction equations using both the method of half-reactions and method of oxidation numbers.	E. Chemical Reactions 3. Understand oxidation-reduction reactions	
Chapter 18: Electrochemistry – finish chapter	• Balance oxidation-reduction equations using both the method of half-reactions and method of oxidation numbers. • Compute the potential of an electrochemical cell using standard reduction potentials.	E. Chemical Reactions 3. Understand oxidation-reduction reactions	B. Energy (thermodynamics, kinetic, potential, energy transfers) 2. Know the processes of energy transfer.
Chapter 19: Nuclear Chemistry	• Identify types of radioactive decay, compare their properties, and write equations representing the decay process. • Describe transmutation reactions. • Explain the concept of half-life for a radioisotope. • Using the rate law for radioactive decay, determine either the amount of radioisotope left, the half-life, or the original amount of radioisotope. • Compare/contrast nuclear fusion and fission.	K. Nuclear chemistry 1. Understand nuclear decay	B. Energy (thermodynamics, kinetic, potential, energy transfers) 1. Understand the Laws of Thermodynamics 2. Know the processes of energy transfer.

Textbook and Materials

Moore, Staniski, Jurs. (2008) *Principles of Chemistry*. New York: Thomson Brooks/Cole.

Methods of Instruction

1. Lecture/Lecture with Discussion – 75%
    a. Lecture is defined as a method of instruction in which the instructor has full responsibility for presenting material orally and visually.

b. Lectures will take place in the form of informal lectures, in which active student participation, such as questioning and answering, will be included.
c. Students will be expected to come to class ready to contribute to the class discussion.
d. Students will be expected to listen and respond appropriately to each other's comments.

2. Recitation – 25%
    a. Recitation is defined as a method of instruction in which students work in groups to discuss pertinent issues in chemistry and solve problems related to the current lectures for the week.
    b. Students take turns facilitating small group discussions during recitation time.
    c. Students are expected to attend recitation and are expected to be prepared with appropriate problem solving tools on hand.
    d. Students are expected to work together as a team to answer questions or solve problems posed by the instructor.

Assignments and Assessments

1. Exams – 67%
    a. There will be five (5) exams that consist of multiple choice questions, short answer questions, and problems.
2. Final Exam – 33%
    a. There will be a comprehensive final exam.
3. Homework
    a. Homework is suggested and does not count toward your grade.

Schedule

Week	Topics	Assignments and Assessments
1	Chapter 12: Chemical Kinetics: Rates of Reaction	HW: Chapter 12 #9-11, 17-24, 34-38, 49, 52, 53, 63-66, 73, 74
2	Chapter 12: Chemical Kinetics: Rates of Reaction Chapter 13: Chemical Equilibria	HW: Chapter 13 #11-17, 20-23, 26-34, 35-37, 42-44, 48-53, 65-67
3	Chapter 13: Chemical Equilibria	Exam over Chapters 12 & 13
4	Chapter 14: The Chemistry of Solutes and Solutions	HW: Chapter 14 #5-14, 38-44, 53-62
5	Chapter 14: The Chemistry of Solutes and Solutions	
6	Begin Chapter 15: Acids & Bases (up to 15.4)	Exam over Chapters 14 and 15 (through 15.4)
7	Chapter 15: Acids & Bases (finish chapter)	HW: Chapter 15 #1-7, 14-23, 31-35, 41, 42, 47-50, 53-58, 67-69
8	Chapter 16: Additional Aqueous Equilibria	HW: Chapter 16 #2, 3, 5-7, 22-24, 28, 31, 32, 36,

		44-46, 47, 51-56, 60, 61
9	Chapter 16: Additional Aqueous Equilbria	Exam over Chapter 15 and 16
10	Chapter 17: Chemical Thermodynamics	HW: Chapter 17 #6-14, 18, 22, 23, 27-31, 35, 37, 40, 49-52, 64, 65, 68, 78-80, 93
11	Chapter 17: Chemical Thermodynamics	
12	Chapter 18: Electrochemistry and its Applications (through 18.2)	Exam over Chapter 17 and 18 (through 18.2)
13	Chapter 18: Electrochemistry – finish chapter	HW: Chapter 18 #6, 7, 10, 11, 14-17, 24, 28-30, 36-38, 43-46, 49, 52-58
14	Chapter 19: Nuclear Chemistry	HW: Chapter 19 #11-14, 18-21, 25-31, 43, 55, 56, 61 Exam over Chapters 18 & 19
15	Pre-Finals Week: Review for Final Exam	
16	Final Exam	Final comprehensive exam

Class Policies and Expectations

Attendance
All students are expected to attend every class and every recitation. If you have to miss class, you do not need to notify the instructor of the absence, but you are responsible for the material that is covered in the class lecture and during the recitation. Should a student miss a lecture or recitation class, it is the student's responsibility to get the lecture notes from other students.

Grading Policy

Your grade is determined entirely by your performance on the regular 100-point examinations and a 200-point comprehensive final exam. There will be no extra credit assignments, reports, papers, etc. THERE ARE NO MAKEUP EXAMINATIONS SO IT IS IMPORTANT THAT ONE SHOW UP ON TIME FOR EVERY ONE OF THE REGULAR EXAMINATIONS. You will be allowed to drop the lowest of the five 100-point examinations. Should you miss one of the 100-point examinations, for whatever reason, you will receive a grade of zero for the missed examination. Remember that you are allowed to drop the lowest examination score and the missed examination can then serve as your one dropped examination. **The 200-point comprehensive final exam grade will not be dropped.**

What happens if you miss a second examination? Then your score on the final examination (pro-rated to a 100-point scale) will then be used as the score for the second missed examination. **There are no makeup examinations.**

Should you have a question concerning the way that your examination was graded, or if you think that there was an error in calculating the exam score, then it is your responsibility to bring the matter to the attention of the Instructor in timely fashion. Except for the last 100 point exam, students have two weeks from when the examination was passed back to the class to bring up grading errors or other such concerns. On the last 100 point examination students have until the day of their Final Examination to bring up grading concerns.

It is your responsibility to check your examination for grading errors, and to make sure that the score was correctly calculated.

Grades will be based upon the best four of five 100-point regular examinations and 200-point comprehensive final examination. Points will be assigned as follows:

Best four 100-point regular examinations	400 Points
200-Point Comprehensive final examination	200 Points

Letter grades will be based upon the following grading scale:

90 – 100 % of the total points	540 – 600 Points	Grade = A
80 – 89 % of the total points	480 – 539 Points	Grade = B
70 – 79 % of the total points	420 – 479 Points	Grade = C
60 – 69 % of the total points	360 – 419 Points	Grade = D
Below 60 %	0 – 360 Points	Grade = F

The University does have very strict rules concerning "Incomplete" grade. The incomplete grade is given only during the last one-fourth of a term/semester, and only if a student: (1) gives notice to the instructor of being required to participate in active military service: or (2) is passing the course and has justifiable reason why the work cannot be completed on schedule. Grades of incomplete are not to be used as a substitute for "F". The rules governing "Incomplete" are explained in greater detail in the UNT Undergraduate Catalog.

Test Policy

It is important to show up on time for the examination. The only time that one has to work the examination is the allotted class time. No examinations will be passed out once the first student has completed the examination and left the classroom. Cell phones and cell phone calculators are not to be used during the examination.

Accommodation for Disability (Section 504)

The Chemistry Department believes in reasonably accommodating individuals with disabilities and complies with university policy established under Section 504 of the *Rehabilitation Act of 1973* and the *Americans with Disabilities Act (1990)* to provide for equal access and opportunity. Please communicate with your professor at the beginning of the semester as to your specific needs so that the appropriate arrangements/accommodations can be made.

Academic Integrity

In accordance with University policy, academic dishonesty and cheating will not be tolerated. The term "cheating" includes, but is not limited to:

(a) Use of any unauthorized assistance taking quizzes, tests or examinations.
(b) Acquisition, without permission, of tests, notes or other academic belonging to a faculty member or staff member of the University.
(c) Any other act designed to give a student an unfair advantage.

Academic dishonesty and cheating is not appropriate and are grounds for dismissal from the course with an "F" and the students will be referred to the appropriate University official.

Disruption of Class
Disruption of classes is forbidden by the Student Code of Conduct and will result in dismissal of the student from the classroom. Disruption of classes includes, but is not limited to: horseplay, chatting socially, noisy or other offensive behavior that is disturbing to fellow classmates, and operation of cell phones.

List of Student Resources

- The textbook's web page is an excellent resource and can be found at
- Tutoring is available every day from 8:00 a.m. to 5:00 p.m. at the Chemistry Resource Center (CRC) in room 232. Chemistry graduate students provide both individual and small group help with various topics in chemistry.
- Office hours are a valuable resource to get one-on-one help with your instructor.
    - The instructor holds office hours in Chemistry____ at X time on Y day.
- Students who qualify for specific accommodations under the Americans with Disabilities Act (ADA) should notify the instructor the first week of class. It is the student's responsibility to provide the necessary documentation to the Special Populations Coordinator in Student Services.

Supplementary Documents

The supplementary documents are hyperlinked within the weekly schedule.

Laboratory Sequence for General Chemistry

CHEM 1440

This is the second of two-course laboratory sequence for general chemistry. Topics include quantitative, gravimetric and volumetric analyses; coordination compounds.

Prerequisites and Prior Knowledge

- Successful completion of CHEM 1430. Corequisite(s): CHEM 1420 or CHEM 1422 or CHEM 1423.

In addition, students should have the following College and Career Readiness Standards skills. Only the specific standards and performance expectations pertinent to the course are listed on the following pages.

Science College and Career Readiness Standards

VII. Nature of Science: Scientific Ways of Learning and Thinking
- A. Cognitive skills in science
- B. Scientific inquiry
- C. Collaborative and safe working practices
- D. Current scientific technology
- E. Effective communication of scientific information

VIII. Foundation Skills: Scientific Applications of Mathematics
- A. Basic mathematics conventions
- B. Mathematics as a symbolic language
- C. Understand relationships among geometry, algebra, and trigonometry
- D. Scientific problem solving
- E. Scientific application of probability and statistics
- F. Scientific measurement

IX. Foundation Skills: Scientific Applications of Communication
- A. Scientific writing
- B. Scientific reading
- C. Research skills/information literacy

X. Science, Technology, and Society
- A. Interactions between innovations and science
- B. Social ethics

XI. Cross-Disciplinary Themes
- A. Matter/States of matter
- B. Energy (thermodynamics, kinetic, potential, energy transfers)
- C. Change over time/equilibrium
- D. Classification
- E. Measurements and models

XII. Chemistry
- A. Matter and its properties
- B. Atomic structure
- C. Periodic table
- D. Chemical bonding

E. Chemical reactions
F. Chemical nomenclature
G. The mole and stoichiometry
H. Thermochemistry
I. Properties and behavior of gases, liquids, and solids

Mathematics College and Career Readiness Standards

III. Numeric Reasoning
IV. Algebraic Reasoning
IV. Measurement Reasoning
V. Probabilistic Reasoning
VI. Statistical Reasoning
VII. Functions
VIII. Problem Solving and Reasoning

Cross-Disciplinary Standards

III. Key Cognitive Skills
A. Intellectual curiosity
B. Reasoning
C. Problem solving
D. Academic behaviors
E. Work habits
F. Academic integrity

IV. Foundational Skills
A. Reading across the curriculum
B. Writing across the curriculum
C. Research across the curriculum
D. Use of data
E. Technology

Course Objectives

Upon successful completion of CHEM 1440, students should be able to:

1) Experimentally determine the order of a reaction and rate constant based on differential rate form expression.
2) Analyze the concentration of various solutions using titration to an end point (as shown by an indicator) as a volumetric form of analysis.
3) Experimentally determine acid-dissociation constant for a weak acid using titration curves.
4) Identify an unknown weak acid based on measuring the dissociation constant and molar mass of the acid.
5) Determine the pH of various household chemicals and of buffer solutions.
6) Experimentally verify Beer's Law.
7) Determine the molar absorption constant of a dye.
8) Experimentally determine the order and rate constant of a reaction based on the integral rate form expression using spectrometric methods.
9) Experimentally determine an equilibrium constant for complex formation using spectrometric methods.
10) Determine the solubility product for an ionic salt using pH and titration.
11) Standardize a solution using volumetric methods.
12) Build an electrochemical cell.
13) Experimentally verify the Nernst equation

Textbook:

Acree, W. E. Jr. (2005). *Modern General Chemistry Laboratory: Incorporating Computer-Oriented Data Acquisition and Evaluation Approach into the Student Laboratory Experiment*. Denton, TX: Eagle Image Publishing.

Required Materials:
Chemical safety glasses or chemical splash goggles that meet ANSI standards must be purchased before the first lab. You can purchase them at the university bookstore or through AXE, the Chemistry honor society.

Methods of Instruction

1. Laboratory Work – 75%
   e. Laboratory work is defined as a method of instruction in which students use appropriate tools and instrumentation to experimentally determine results. This work can be either open ended in nature (unknown outcomes) or closed in nature (pre-determined outcomes).
   f. Laboratory work is accomplished by the students under the guidance and supervision of laboratory instructors.
   g. Students will be expected to come to lab ready to participate in the laboratory work and to follow all safety rules.
   h. Students will be expected to listen and respond appropriately to each other's comments.
2. Laboratory Lecture – 25%
   i. Laboratory lecture is defined as pre-laboratory explanation of upcoming lab experiments that the students will accomplish that week.
   j. Lab instructors conduct lab lectures. Pertinent topics include theory behind the experiments, safety issues, and demonstration of new lab techniques.
   k. Students are expected to attend recitation and are expected to listen and implement instructions in the laboratory.

Assignments and Assessments

1. Laboratory Reports – 67%
   A. There are 11 lab reports that must include complete and accurately recorded data, appropriate graphs, all calculations, answers to analysis questions, and essay-style conclusions.

2. Safety – 10%
   B. The laboratory instructor will assess how well each student performs lab experiments safely. This will be assessed each lab period.

SCHEDULE

Week	Recitation Topic	Lab Experiment	Assignment Due
1	Safety Exp 13: *Chemical Kinetics I – Determination of the Order of Reaction and Rate Constant Based on Differential Rate Form Expression*	None Check in	
2	Exp 14: *Introduction to Acid-Base Chemistry – Determination of Acetic Acid in Vinegar* Exp 15: *Introduction to pH – Titration of Acetic acid in Vinegar and Phosphoric Acid in Coca Cola*	Experiment 13	
3	Exp 15 review Exp 16: *Determination of Acetic Acid in Vinegar by*	Experiment 14	Experiment 13 lab report

	use of pH Titration Curve		
4	Exp 16 review Exp 17: *Determination of pK_a and Molar Mass of an Unknown Acid*	Experiment 15	Experiment 14 lab report
5		Experiment 16	Exp 15 lab report
6	Exp 18: *Acids & Bases in Common Household Products and pH Measurements for Carefully Prepared Buffered Solutions* Exp 19: *Introduction to Spectrometry – Verification of Beer's Law*	Experiment 17	Exp 16 lab report
7		Experiment 18	Exp 17 lab report
8	Exp 19 review Exp 20: *Chemical Kinetics II – Determination of the Order of Reaction and Rate Constant Based on Integral Rate Form Expression*	Experiment 19	Exp 18 lab report
9	Exp 20 review Exp 21: *Spectrophotometric Determination of an Equilibrium Constant for Complex Formation*	Experiment 20	Exp 19 lab report
10	Exp 22: *Molar Solubility and Determination of Solubility Product*	Experiment 21	Exp 20 lab report
11	Exp 23: *Redox Titration – Standardization of Potassium Permanganate*	Experiment 22	Exp 21 lab report
12	Exp 25: *Electrochemistry – Verification of the Nernst Equation*	Experiment 23	Exp 22 lab report
13	Exp 25 review	Experiment 25	Exp 23 lab report
14	None	None	Exp 25 lab report

SAFETY:
Texas state law and University policy require eye protection in the form of chemical safety glasses or chemical safety goggles for ALL persons in academic chemistry laboratories. This will be strictly enforced. **PERSISTENT OFFENDERS WILL BE DROPPED WITH "WF."**

Contact lenses can be worn in lab, HOWEVER, there is great potential for corrosive and/or volatile chemicals to get underneath the lenses and cause damage before the contact lenses can be removed. Proper wearing of chemical safety goggles prevents most issues with contact lenses.

Open-toe shoes (flip-flops, sandals, strappy heels, ballet flats), **bare feet**, and **chewing gum** are not permitted in lab. Failure to comply will result in removal from the lab area until the issue is taken care of.

Good clothing which might be damaged should not be worn. Report all accidents to your TA at once. Read and follow the safety rules inside the cover of the textbook and in Chapter 2 of the textbook.

All students are responsible for their own actions in the laboratory and for the results of their actions. If you break any glassware or allow glassware with cracks to be heated, you will pay for their replacement.

MAKE-UP LABS:

There are no make up laboratories. If you miss a lab due to one of the following five reasons it will be excused. Otherwise, a missed laboratory will result in a zero for that experiment.

Acceptable reasons for missing an experiment are:
1. Illness (with physician's note)
2. Death of a close family member or friend
3. Religious holiday (preplanned and cleared with instructor in advance)
4. An official University activity (preplanned and cleared with instructor in advance)
5. Cancellation of classes by the University

Turn in the documentation for the missed laboratory to the Teaching Assistant.

GRADING POLICY:
Your grade will be determined entirely by your performance in the laboratory (completed laboratory reports and instructor assessment of safe laboratory practices). This semester 12 laboratory experiments will be performed. The 230 total points in the laboratory are broken down as follows:

Best 11 of 12 Laboratory experiments	Points Possible = 11 x 20	= 220
Assessment of Safe Laboratory Practices	Points Possible	= 10
Total:		= 230

Letter grades will be based upon the following grading scale:

90 – 100 % of the total points	Grade = A
80 – 89 % of the total points	Grade = B
70 – 79 % of the total points	Grade = C
60 – 69 % of the total points	Grade = D
Below 60 %	Grade = F

For individuals with a single excused absence, the total possible points in the laboratory will be adjusted appropriately to reflect the one excused absence. **For students with more than one excused absence, please see the Instructor in charge to see if any of the missed work can be made up.**

Accommodation for Disability (Section 504)
The Chemistry Department believes in reasonably accommodating individuals with disabilities and complies with university policy established under Section 504 of the *Rehabilitation Act of 1973* and the *Americans with Disabilities Act (1990)* to provide for equal access and opportunity. Please communicate with your professor as to you specific needs so that the appropriate arrangements/accommodations can be made.

Chemistry I
Sample Exam 1

Remember: No work, no credit!

1. Chemistry is the study of _____.

2. Select the physical properties from the list below by placing an X in the preceding blank.

_____ Malleability	_____ Ferments
_____ Explosive	_____ Odor
_____ Rusting	_____ Color

3. Identify the following as element (E), compound (C), homogenous mixture (S), heterogeneous mixture (M).

_____ gasoline	_____ granite	_____ iron
_____ caffeine	_____ water	_____ brass
_____ air	_____ sulfur	_____ TNT

4. Convert 12.6 ft to m. Put your answer in decimal notation. (1 in. = 2.54 cm; 1 ft = 12 in.)

5. Identify the number of significant figures in the following measurements.

_____ 1300 tons	_____ 80. lb
_____ 4004 mm	_____ 2.2300×10^{23} amu
_____ 1202 kg	_____ 8.0860 mL
_____ 000546 kg	_____ 4.5600 g
_____ 5 beakers	_____ 4.67×10^{-2} mol

6. A solid metal sphere has a volume of 8.2 ft^3. The mass of the sphere is 355 lb. Find the density of the metal sphere in grams per cubic centimeter. Put your answer in scientific notation.

7. Densities of gases are usually measured in grams per liter. Calculate the mass (in grams) of air given a volume 42.5 L, and a density equal to 1.1837 g/L.

8. Perform the following operations, and put your answer in scientific notation.

   100. g - 25.5 g = _____

   170. g / (6.98 x 10^{-2} L) = _____

   54.6 g / 9.0 mol = _____

   1.0456 cm x 10.0 cm x 2.5 cm = _____

   7.45 x 10^{-1} + 9.56 x 10^{3} = _____

9. Who is known as the father of chemistry?
   A. Dalton
   B. Lavoisier
   C. Democritus
   D. Rutherford

10. Which element below does not exist?
   A. Cl
   B. Fl
   C. Tl
   D. Md

11. Identify the incorrect aspect of Dalton's atomic theory.
   A. All matter is composed of atoms, which are indivisible.
   B. All atoms of different elements are different.
   C. Atoms combine in small whole number ratios to form compounds of constant composition.
   D. Under ordinary laboratory conditions, it is impossible to change the type of atom.

12. What discovery led to a revision of Dalton's atomic theory?
   A. neutron
   B. electron
   C. hydrogen
   D. X-rays

13. What discovery led to the altering of Dalton's atomic theory that stated, all atoms of the same element are the same?
   A. electron
   B. proton
   C. isotopes
   D. allotropes

14. Circle the correct choice of each of the following:
The nucleus exists (inside or outside) the atom. The nucleus was found to be composed of two kinds of particles collectively called (protons, electrons, or nucleons). Protons have a charge of (+1, -1, or 0); electrons have a charge of (+1, -1 or 0). In an atom the number of protons (exceeds or is the same as) the number of electrons. The mass of the electron is (more, less, or the same) as the mass of the proton.

15. Complete the table.

Element	Nuclear Symbol	Atomic number	Mass number	Number of protons	Number of electrons	Number of neutrons	Charge
carbon			12		6		
	$^{40}_{19}K$	19				21	1+
				17	18	18	

16. Calculate the mass in grams (molar mass) for 1.98×10^{-4} mol of Cu_2O.

17. Calculate the number of molecules (mx) for 1.98×10^{-4} mol of Cu_2O. Put your answer in scientific notation. ($1 \text{ mol} = 6.022 \times 10^{23}$ mx)

18. Would you need a truck to transport 4.0×10^{25} formula units of $Ca(NO_3)_2$? Support your answer, by solving for how many pounds of calcium nitrate you have. ($453.6 \text{ g} = 1 \text{ lb}$; $1 \text{ mol} = 6.022 \times 10^{23}$ formula units) *[Yes, I know that you've not seen the use of the term formula unit, but the beauty of using" railroad tracks" is that you can work the problem any way!]*

19. In four moles of $Ca(NO_3)_2$ how many moles of nitrogen are there? _____

20. In one molecule of $Ca(NO_3)_2$ how many atoms of O are there? _____

Chemistry 1
Sample Exam 2

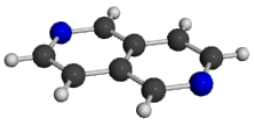
1. Name the following:
   a. S_2F_{10} _____
   b. NO _____
   c. NH_3 _____
   d. ClO^- _____
   e. HSO_4^- _____
   f. CN^- _____
   g. Ag_3PO_4 _____
   h. CoI_3 _____
   i. HNO_3 _____
   j. H_3PO_4 _____

2. Give the formula for the following:
   a. carbonic acid _____
   b. sulfite ion _____
   c. hydrogen sulfide _____
   d. silver nitrite _____
   e. nickel(II) carbonate _____
   f. sodium hydroxide _____
   g. hydroiodic acid _____
   h. sulfuric acid _____
   i. vanadium(V) fluoride _____
   j. hydrogen hydroxide _____

3. Identify the strong acids from questions 1 and 2:_____, _____, _____

4. Identify the weak bases from questions 1 and 2: _____, _____

5. What are the molecular and empirical formulae of the following?
   Carbon = black
   Hydrogen = white



   Nitrogen = grey
   Molecular: _____ Empirical: _____

6. What is the common charge of each of the following?
   Atom of Na: _____ Ion of Ca: _____ Ion of Br: _____

7. The formula of potassium sulfide is _____.
   Name the cation: _____
   Name the anion: _____
   Number of ions total: _____
   Molar mass: _____

8. Name $Cu_2Cr_2O_7$. _____
   Which of the following describes the compound $Cu_2Cr_2O_7$?
   Check all answers that apply.
   ___ The compound would conduct electricity if molten.
   ___ The compound would be expected to have a relatively low melting point.
   ___ The compound is molecular.
   ___ If the compound dissolved in water it would be a strong electrolyte.
   ___ The compound is ionic.

9. Perform a percentage composition for xenon trioxide.

10. A compound is found to contain 15.94% boron and 84.06% fluorine by weight. What is the empirical formula?

11. Write the thermochemical equation for the combustion of nonane by including energy (E).

12. The balanced chemical equations and identify the type of redox reaction:
    a. calcium hydroxide and hydrochloric acid

       Type of reaction: _____

    b. hydrogen gas and iodine combine to make a compound

       Type of reaction: _____

13. What amount of moles does 4.00 g of sulfur hexafluoride represent?

14. For the following reaction, there is an excess of carbon dioxide allowed to react with 15.5 grams of potassium hydroxide. How many moles of potassium carbonate are formed?
carbon dioxide(*g*) + potassium hydroxide(*aq*) → potassium carbonate (*aq*) + water (*l*)

15. Write the net ionic equations for the following:
ammonium carbonate reacts with copper(II) nitrate.

Give the formula of the compound above that does not conduct electricity. _____

16. Given the following $Pb^{2+} + Hg \rightarrow Pb + Hg^{2+}$ use oxidation numbers to identify:
element oxidized _____ reducing agent _____
element reduced _____ oxidizing agent _____

17. Given the standard enthalpy changes for the following two reactions:

$$Zn(s) + Cl_2(g) \rightarrow ZnCl_2(s) \quad \Delta H^o_{rxn} = -415.0 \text{ kJ}$$
$$Pb(s) + Cl_2(g) \rightarrow PbCl_2(s) \quad \Delta H^o_{rxn} = -359.4 \text{ kJ}$$

What is the standard enthalpy change for the reaction?

$$Zn(s) + PbCl_2(s) \rightarrow ZnCl_2(s) + Pb(s) \quad \Delta H^o_{rxn} = \_\_\_\_\_$$

Is this reaction endothermic? _____ (Yes or No, choose one!)

18. Using standard heats of formation, calculate the standard enthalpy change for the following reaction. The following heats of formation are in kJ/mol.

$$H_2S(g) + 2H_2O(l) \rightarrow 3H_2(g) + SO_2(g)$$
$$-20.6 \quad -285.8 \quad 0 \quad -296.8$$

Is this reaction endothermic? _____ (Yes or No, choose one!)

19. The following thermochemical equation is for the reaction of methane(*g*) with water(*g*) to form hydrogen(*g*) and carbon monoxide(*g*).

$$CH_4(g) + H_2O(g) \rightarrow 3H_2(g) + CO(g) \qquad \Delta H_{rxn} = +206 \text{ kJ}$$

When 6.42 grams of $CH_4(g)$ react with excess $H_2O(g)$ how many kJ of energy is absorbed?

20. A solution is made by dissolving 10.9 g of methanol in enough water to make 240. mL of solution. What is the molarity of the methanol?

21. In an experiment, 40.00 mL of 0.100 M $Pb(NO_3)_2$ was mixed with 60.00 mL of 0.300 M NaCl, and a white precipitate of $PbCl_2$ was formed. The precipitate was collected by filtration, dried, and found to weigh 1.068 g. (MW $PbCl_2$ = 278.1 g)

(a) Write the molecular, ionic, and net ionic equations.

(b) Calculate the maximum amount of $PbCl_2$ that could precipitate.

(c) What is the name of the limiting reactant? _____

(d) Calculate the percentage yield of $PbCl_2$ in this reaction.

22. Burning of a 0.514 g sample of a C, H, and O containing compound from clover leaves produced the following masses: 0.501 g CO_2 and 0.103 g H_2O. What is the its empirical formula? The molar mass is 90.04 g. What is its molecular formula? Write a balanced combustion equation for the molecule. Draw the molecule.

Chemistry II
Sample Thermochemistry Exam

Thermochemistry Test

MULTIPLE CHOICE

1. Which of the following is true (at standard state)?

   (a) Heat of formation of hydrogen gas is 0.0 kJ.

   (b) Heat of formation of $H^+_{(aq)}$ is 0.0 kJ.

   (c) Standard entropy of hydrogen gas is 0.0 J/K.

   (d) Standard entropy of $H^+_{(aq)}$ is 0.0 J/K.

2. If $\Delta G^o = 0$ for a process, then which of the following statements about the equilibrium constant is true?

   (a) K = 1 (b) K = 0 (c) K > 1 (d) K < 1.

3. A cube of ice is added to some hot water in an insulated container, which is then sealed. There is no heat exchange with the surroundings. Which describes the system once it has shifted to a new equilibrium?

   (I) The average kinetic energy of the liquid phase has decreased.

   (II) The total energy of the system has decreased.

   (III) The entropy of the system has increased.

   (a) I only (c) I and II only (e) I and III only

   (b) III only (d) I, II, and III

4. For which one of the following reactions would you expect the entropy change to be closest to zero?

   (a) $Zn_{(s)} + 2\ H^+_{(aq)} \text{----> } Zn^{2+}_{(aq)} + H_{2(g)}$

   (b) $2\ H_{2(g)} + O_{2(g)} \text{----> } 2\ H_2O_{(g)}$

   (c) $2\ H_{2(g)} + O_{2(g)} \text{----> } 2\ H_2O_{(l)+}$

   (d) $N_{2(g)} + O_{2(g)} \text{----> } 2\ NO_{(g)}$

5. If 100.0 J of heat are added to 1.00 mole of $Ne_{(g)}$ at 30.0°C and constant pressure, how much will its temperature rise? (Sp. Heat Cap. of Ne = 0.904 J/gK)

(a) 2.3° (b) 5.5°(c) 10.0° (d) 30.0° (e) 42.8°

6. For a given reaction, the values for standard free energy change and the equilibrium constant are both measures of the extent to which a reaction proceeds. Which range includes the value for ΔG^o (at 298 K) in kilojoules, when the corresponding value for

K_{eq} is 1 x 10^{-5}? (lnK = -11.5)

(a) less then 20
(b) 20 to 40
(c) 40 to 80
(d) 80 to 160
(e) greater than 160

8. Which describes the process of melting of ice at its normal melting point and 1 atmosphere of pressure?

	ΔH	**ΔS**	**ΔG**		**ΔH**	**ΔS**	**ΔG**
(a)	+	+	+	(f)	+	-	+
(b)	+	+	-	(g)	-	+	-
(c)	+	+	0	(h)	+	-	-
(d)	-	-	-	(i)	-	+	0
(e)	-	-	+	(j)	+	-	0
(f)	-	-	0	(k)	-	+	0

SHORT ANSWER

(a) State the First and Second Laws of Thermodynamics

(b) (a) When liquid water is introduced into an evacuated vessel at 25^{o}C, some of the water vaporizes. Predict how the enthalpy, entropy, free energy, and temperature change in the system during this process. Explain the basis for each of your predictions.

(b) When a large amount of ammonium chloride is added to water at 25^{o}C, some of it dissolves and the temperature of the system decreases. Predict how the enthalpy, entropy, and free energy change in the system during this process. Explain the basis for each of your predictions.

(c) If the temperature of the aqueous ammonium chloride system in part (b) were to be increased to 30°C, predict how the solubility of the ammonium chloride would be affected. Explain the basis for each of your predictions.

(c) $Cl_{2(g)} + 3\ F_{2(g)} \text{---> } 2\ ClF_{3(g)}$

ClF_3 can be prepared by the reaction represented by the equation above. For ClF_3 the standard enthalpy of formation, $\Delta H°_f$ =, is -163.2 kilojoules/mole and the standard free energy of formation, $\Delta G°_f$, is -123.0 kilojoules/mole.

(a) Calculate the value of the equilibrium constant for the reaction at 298K.

(b) Calculate the standard entropy change, $\Delta S°$, for the reaction at 298K.

(c) If ClF_3 were produced as a liquid rather than as a gas, how would the sign and the magnitude of ΔS for the reaction be affected? Explain

4. $C_6H_5OH(s) + 7\ O_2(g) \rightarrow 6\ CO_2(g) + 3H_2O(l)$

When a 2.000-gram sample of pure phenol, $C_6H_5OH(s)$, is completely burned according to the equation above, 64.98 kilojoules of heat is released. Use the information in the table below to answer the questions that follow.

Substance	Standard Heat of Formation, $\Delta H°_f$, at 25°C (kJ/mol)	Absolute Entropy, S°, at 25°C (J/mol-K)
C(graphite)	0.00	5.69
$CO_2(g)$	-395.5	213.6
$H_2(g)$	0.00	130.6
$H_2O(l)$	-285.85	69.91
$O_2(g)$	0.00	205.0
$C_6H_5OH(s)$	?	144.0

(a) Calculate the molar heat of combustion of phenol in kilojoules per mole at 25°C.

(b) Calculate the standard heat of formation, ΔH°_f, of phenol in kilojoules per mole at 25°C.

(c) Calculate the value of the standard free-energy change, ΔG° ° for the combustion of phenol at 25°C.

(d) If the volume of the combustion container is 10.0 liters, calculate the final pressure in the container when the temperature is changed to 110°C. (Assume no oxygen remains unreacted and that all products are gaseous.)