

FRAMEWORK FOR
VOCATIONAL-TECHNICAL PROGRAMS
REVISED IN
2010

SECONDARY
EXECUTIVE SUMMARY

2010

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Foreword

Secondary vocational-technical education programs in Mississippi are faced with many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, ch. 487, §14; Laws, 1991, ch. 423, §1; Laws, 1992, ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
 - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
 - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.

- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21st Century Skills, which were developed by the Partnership for 21st Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills learned in school and those needed in communities and the workplace. A portion of the 21st Century Skills addresses learning skills needed in the 21st century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21st Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21st century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21st Century Skills.
- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

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VIDEO GAME DESIGN

Program Description

Video Game Design and Development is a pathway in the Science, Technology, Engineering, and Mathematics (STEM) career cluster. This program is designed for students who wish to develop, design, and implement projects in the fast-growing field of game design and development. The program emphasizes the techniques and tools used in game design and the creative design or content of such media. Both theoretical learning and activity-based learning are provided for students who wish to develop and enhance their competencies and skills. The course focuses on the basic areas of ethics, character development, audio and video production, and design using visualization software. The program finishes with a performance-based unit that requires students to develop their own gaming environment. This comprehensive project component provides practical experience toward developing a portfolio of work. Membership is encouraged in the student organization, Technology Student Association (TSA), which promotes technological literacy, leadership, and problem solving, resulting in personal growth and opportunity.

Industry Certification

Research with Mississippi industry suggests that this curriculum should be written to the Autodesk Certified Associate Certification. This exam assesses the foundation of animation skills students need to create effective animation using game design tools. This certification was developed after a group of industries met with educators to design the entry-level skill industry standards for game design and development and animation. Additionally, 3ds Max® is the recognized industry software for animation production.

Articulation

An articulation agreement is currently under development. As soon as the agreement is finalized, this document will be updated to reflect the proposed agreement.

Assessment

Students will be assessed using the Video Game Design and Development test. The MS-CPAS2 blueprint can be found at <http://redesign.rcu.msstate.edu/curriculum/>. If there are questions regarding assessment of this program, please contact the STEM instructional design specialists at the Research and Curriculum Unit at 662.325.2510.

Student Prerequisites

An eligible student will have completed the ninth grade and Algebra I and will have an overall B average. Prior to a student's being enrolled in the course, a behavior reference must be obtained from an academic technology teacher.

Proposed Applied Academic Credit

The academic credit is still pending for this curriculum.

Licensure Requirements

The 988 license is needed to teach the Video Game Design and Development program. The requirements for the 988 license endorsement are listed below:

1. Applicant must have a 4-year degree in a related field or one approved by the Mississippi Department of Education (MDE).
2. Applicant must enroll immediately in the Vocational Instructor Preparation (VIP) program or the College and Career Readiness Education Program (CCREP).
3. Applicant must complete the individualized Professional Development Plan (PDP) requirements of the VIP or CCREP prior to the expiration date of the 3-year vocational license.
4. Applicant must possess and maintain Autodesk Certified Associate Certification.
5. Applicant must successfully complete an MDE-approved computer literacy certification exam.
6. Applicant must successfully complete certification for an online learning workshop, module, or course that is approved by the MDE.
7. Applicant must successfully complete a video game design and development certification workshop, module, or course that is approved by the MDE.

Note: If an applicant meets all requirements listed above, that applicant will be issued a 988 endorsement—a 5-year license. If an applicant does not meet all requirements, the applicant will be issued a 3-year endorsement license, and all requirements stated above must be satisfied prior to the ending date of that license.

Professional Learning

The professional learning itinerary for the middle school or individual pathways can be found at <http://redesign.rcu.msstate.edu>. If you have specific questions about the content of each training session provided, please contact the Research and Curriculum Unit at 662.325.2510, and ask for the Professional Learning Specialist.

Course Outlines

This curriculum framework allows for local school districts to meet student needs and scheduling demands. The first option groups units into four one-Carnegie-unit courses. The second option groups units into two two-Carnegie-unit courses. A discussion of each option is listed below.

Video Game Design and Development I, II, and III courses introduce students to the principles and skills associated with game design and development technology as related to meeting the needs of clients and producing game design products. Video

Game Design Development IV concentrates on video game production, a directed group project, and portfolio finalization. These courses must be taken in sequential order.

Option 1

By following this course of study for Video Game Design and Development, the students will progress through a series of four one-credit courses that should be completed in the following sequence:

1. Ethics, Design Theory, and Photography (Course Code: 994402)
2. Design Visualization and Character Development (Course Code: 994403)
3. Audio and Video Production (Course Code: 994404)
4. Business, Evaluation, and Development of Gaming (Course Code: 994405)

Course Description: Ethics, Design Theory, and Photography includes the foundation skills necessary in the game design industry. Content such as safety, ethical issues, video game history, career opportunities, game mechanics, and photography will be offered to students. (Course Code: 994402)

Course Description: Design Visualization and Character Development emphasizes real-world, hands-on practice. Content related to illustration, level design, character development, and animation will be offered to students. This one-Carnegie-unit course should only be taken after students successfully pass Ethics, Design Theory, and Photography (Course Code: 994402). (Course Code: 994403)

Course Description: Audio and Video Production focuses on audio design, programming, and video production. This one-Carnegie-unit course should only be taken after students successfully pass Design Visualization and Character Development (Course Code: 994403). (Course Code: 994404)

Course Description: Business, Evaluation, and Development of Gaming is a culminating course that gives students the opportunity to produce a final video game project that incorporates the skill and knowledge learned in the first three Video Game Design and Development courses, giving the students the chance to showcase what they have learned and accomplished. Upon the completion of this course, the students will also have put the finishing touches on a video game portfolio that is cumulative of their work throughout all semesters of Video Game Design and Development. This is a one-Carnegie-unit course and should be taken after students successfully pass Ethics, Design Theory, and Photography (Course Code: 994402), Design Visualization and Character Development (Course Code: 994403), and Audio and Video Production (Course Code: 994404). (Course Code: 994405)

Ethics, Design Theory, and Photography (One Carnegie Unit) - Course Code: 994402

Unit	Title	Hours
1	Introduction, Safety, and Orientation	10
2	Ethics in the Game Design Industry	20
3	Games and Society	20
4	Game Design Theory and Mechanics	60
5	Photography for Game Design	30
		140

Design Visualization and Character Development (One Carnegie Unit) - Course Code: 994403

Unit	Title	Hours
6	Artistic Rendering Using Illustration Software	30
7	Design Visualization Software Introduction	10
8	Geometry in Design Visualization Software	20
9	World Design Using Design Visualization Software	30
10	Character Development and Animation	50
		140

Audio and Video Production (One Carnegie Unit) - Course Code: 994404

Unit	Title	Hours
11	Audio Design	40
12	Video Game Programming	60
13	Video Game Production	40
		140

Business, Evaluation, and Development (One Carnegie Unit) - Course Code: 994405

Unit	Title	Hours
14	Business of Gaming	40
15	Video Game Design and Development Seminar and Experience	80
16	Game Evaluation	20
		140

Option 2

Course Description: Video Game Design and Development I encompasses the foundation skills necessary in the game design industry. Content such as safety, ethical issues, video game history, career opportunities, game mechanics, and photography

with emphasis placed on real-world, hands-on practice related to illustration, level design, character development, and animation is offered to students. Students will receive two Carnegie units upon completion of the course.

Course Description: Video Game Design and Development II focuses on audio design, programming, and video game production. This course gives students the opportunity to produce a final video game project that incorporates the skills and knowledge learned in the Video Game Design and Development I, II, and III courses, allowing the students the chance to showcase what they have learned and accomplished. Upon the completion of this course, the students will also have put the finishing touches on a video game portfolio that is cumulative of their work throughout all semesters of Video Game Design and Development. Students will receive two Carnegie units upon completion of the course.

Video Game Design and Evaluation I (One Carnegie Unit) - Course Code: 994400

Unit	Title	Hours
1	Introduction, Safety, and Orientation	10
2	Ethics in the Game Design Industry	20
3	Games and Society	20
4	Game Design Theory and Mechanics	60
5	Photography for Game Design	30
6	Artistic Rendering Using Illustration Software	30
7	Design Visualization Software Introduction	10
8	Geometry in Design Visualization Software	20
9	World Design Using Design Visualization Software	30
10	Character Development and Animation	50
		280

Video Game Design and Evaluation II (One Carnegie Unit) - Course Code: 994401

Unit	Title	Hours
11	Audio Design	40
12	Video Game Programming	60
13	Video Game Production	40
14	Business of Gaming	40
15	Video Game Design and Development Seminar and Experience	80
16	Game Evaluation	20

Pathway Name: Video Game Design

CIP Code: 19.0709

ETHICS, DESIGN, THEORY, AND PHOTOGRAPHY

Introduction, Safety, and Orientation

1. Identify course expectations, school policies, program policies, and safety procedures related to Video Game Design and Development.
 - a. Identify course expectations, school policies, and program policies related to Game Design Technology.
 - b. Apply safety procedures in the computer classroom and lab.
2. Explore personality development, leadership, and teamwork in relation to the classroom environment, interpersonal skills, and others.
 - a. Identify potential influences that shape the personality development including personality traits, heredity, and environment.
 - b. Develop a report on how personality traits affect teamwork and leadership skills.
 - c. Identify forces that shape personality development including personality traits, heredity, and environment.
 - d. Develop effective leadership, decision-making, and communication skills.

Ethics in the Game Design Industry

1. Research copyright rules, regulations, and issues related to graphics and images produced by others and original work, and adhere to those rules and regulations when developing work.
 - a. Define terms related to copyright rules, regulations, and issues related to graphics and images produced by others and original work.
 - b. Research copyright laws related to graphics, images, video games, sounds, and other original work.
 - c. Give examples of copyright violations related to trademark, symbols, length of time, and public domain.
 - d. Prepare images, songs, sounds, and video that meet copyright guidelines.
2. Research online content, and evaluate content bias, currency, and source.
 - a. Determine how to search for information online.
 - b. Correlate information with multiple sources.
3. Define and abide by the game designer's code of ethics
 - a. Define terms related to the game design code of ethics.
 - b. Identify the similarities and differences between game ratings.
 - c. Demonstrate the ability to create and follow a personal code of ethics.
 - d. Demonstrate proper use of pictures, sounds bites, and videos.
 - e. Discuss plagiarism and the consequences of plagiarizing.
 - f. Describe the Philosophical Approach to Morality and the consequentialist theory.

Games and Society

1. Understand how games reflect and construct individuals and groups.
 - a. Discuss the historical aspects of game design and development technology in order to analyze the emergence of the “culture” of gaming.
 - b. Discuss the game market and the reasons why people play video games.
 - c. Understand the key elements in game design and development technology.
 - d. Demonstrate an understanding of game genres.
2. Research and identify careers and roles within the game design and development industry.
 - a. Describe the responsibilities of producers, programmers, artists, designers, riggers, animators, modelers, writers, and quality assurance personnel function in relation to the daily operation of a game design company to include budgets, schedules, personnel, and tracking progress.
 - b. Discuss the job outlook for producers, programmers, artists, designers, and quality assurance personnel.
 - c. Understand the organizational structure of a game design company.
3. Develop a professional portfolio.
 - a. Research career areas in design and/or print production.
 - b. Identify the purpose of a portfolio as it relates to career planning.
 - c. Construct a portfolio.
 - d. Present a portfolio.
4. Discuss the future of video games.
 - a. Research the future of game design and development in terms of new technology and education.
 - b. Discuss the concept of an “ideal” game of the future.

Game Design Theory and Mechanics

1. Identify the core components of game design theory and mechanics.
 - a. Discuss the core components of game design theory and mechanics.
 - b. Discuss storytelling traditions and how it influences game ideas.
 - c. Determine the steps in creating and editing a game design document.
 - d. Demonstrate use of a traditional story structure *three-act* plot structure.
 - e. Demonstrate use of the *monomyth* story structure, aka “hero’s journey” by Joseph Campbell.
 - f. Understand story elements.
 - g. Understand storyboarding.
2. Understand the character creation process.
 - a. Understand the elements of a character’s identity.
 - b. Discuss how tone, audience, and purpose impact character identity development.
 - c. Discuss the design sequence-rules and regulations for game design.
3. Apply design principles and techniques in the creation of a 2D, digital, and 3D character.

- a. Understand design principles and techniques for use in planning, designing, and producing a game character.
- b. Describe sketching as an artistic concept. Explain the basic concepts of sketching as a tool for game design.
- c. Demonstrate the use of digital drawing tablets as a 2D digital artistic concept.
- d. Understand 3D.
4. Understand the “rules of play” in game design technology.
 - a. Discuss the relationship between gameplay and game story.
 - b. Demonstrate use of “rules of play” in game design technology.
 - c. Discuss the structure of game “rules.” How should games be structured? How do you create balance within a game?
5. Identify hardware and software related to the game design industry.
 - a. Identify standard hardware platforms available to game players.
 - b. Identify standard software examples for game design and development technology.

Photography for Game Design

1. Demonstrate proficiency in the setup, operation, and troubleshooting of a graphic design computer.
 - a. Demonstrate proficiency in the setup and maintenance of a graphic computer system.
 - b. Manipulate a window by using application software functions and keyboard shortcuts.
 - c. Demonstrate knowledge of an electronic file management system and folder management.
2. Explain photography and graphic digital manipulation elements.
 - a. Identify safety and proper use of equipment related to photography.
 - b. Identify the basic components of a digital camera and photography-related terms.
3. Complete a photography project that meets the needs of an audience.
 - a. Explore image composition and elements of visual design through photography.
 - b. Distinguish file type per job needed.
 - c. Use digital cameras to learn the basics of photography.
 - d. Identify and produce portrait photographs, art photographs (objects in the classroom), and landscape photographs.
 - e. Use photo manipulation to investigate the potential of color enhancement and retouching.
 - f. Compare and contrast the advantages of manipulating a saved copy of an image in various formats.
4. Use photo editing software to create and edit a product for a customer.
 - a. Identify terminology related to the photo editing software.

- b. Demonstrate how to open and save an image from a digital camera and an image from a scanner in photo editing software.
- c. Apply the following tools of photo editing software:
 - Histogram
 - Levels
 - Curves
 - Brightness
 - Auto color correction
 - Clone stamp
 - Lasso
 - Magic wand
 - Crop
 - Image
 - Canvas size
 - Transform
- d. Determine proper resolution for incorporating an image in visual design software.
- e. Use Photomerge to create panoramic images.

DESIGN VISUALIZATION AND CHARACTER DEVELOPMENT

Artistic Rendering Using Illustration Software

1. Understand the elements of visual design in relation to game design.
 - a. Discuss the visual elements that make up a video game.
 - b. Discuss the basic elements of an image.
 - c. Discuss the element of color and number of colors related to game design.
 - d. Demonstrate the manipulation of images with the use of software commands.
2. Demonstrate the use of illustration software.
 - e. Understand the elements of the illustration software user interface.
 - f. Explore and discuss the tools, features, and preferences within the illustration software.
 - g. Understand the two types of digital images: bitmap and vector, and learn the common image format types.
 - h. Differentiate between the use of value and texture in illustrative art.
 - i. Explore spatial illusions using illustration software.
 - j. Demonstrate mastery of illustration software.
 - k. Save and export completed image(s) into design visualization software.

Design Visualization Software Introduction

1. Interact with the design visualization software effectively and productively with the User Interface.
 - a. Demonstrate the use of User Interface components in the design interface.
 - b. Demonstrate the manipulation and configuration of the viewports.
 - c. Demonstrate the use of menus, toolbars, and command panels in relation to creating and manipulating objects.
 - d. Demonstrate the use of dialog boxes, controls, and keyboard shortcuts.
2. Manage design visualization software file input and output.
 - a. Demonstrate starting a new project and working on an existing project.
 - b. Demonstrate saving a project for the first time and subsequent times.
 - c. Demonstrate the merging of files.
 - d. Demonstrate the importing and exporting of files.
 - e. Demonstrate the linking and attaching of files.
 - f. Explore spatial illusions using illustration software.

Geometry in Design Visualization Software

1. Set an environment for working with design visualization software and create objects using basic geometry.
 - a. Discuss the basic concepts of object creation and manipulation using basic geometry. (DOGeometry in Design VisuaK1)
 - b. Discuss the options for setting preferences and tool options in the user interface in relation to artists and designers.
 - c. Use simple geometry and pivot points in relation to design visualization software.
 - d. Manipulate dialog boxes, controls, and keyboard shortcuts.
 - e. Transform objects using the basic transform commands.
 - f. Demonstrate the use of align tools.
 - g. Demonstrate the making of duplicate objects (cloning).
 - h. Demonstrate object modification by manipulating basic controls in the stack.
 - i. Demonstrate collapsing the stack.
2. Design, create and analyze the visual component of games.
 - a. Demonstrate the use of basic AES tools in relation to design visualization software.
 - b. Distinguish between the basic elements of a shape through modeling.
 - c. Discuss Boolean operations.
 - d. Demonstrate geometry concepts through Boolean and Pro-Boolean operations in design visualization software.

World Design Using Design Visualization Software

1. Identify the fundamental architectural and structural principles of level design in relation to game environments.
 - a. Discuss the history of architecture and how it relates to realistic game environments.
 - b. Discuss the relationship of level design and gameplay--what events occur in each level.
 - c. Demonstrate the similarities and differences between real-world spaces and game spaces.
2. Create, manipulate, and analyze the visual components of the game world.
 - a. Identify and manipulate mapping coordinates.
 - b. Demonstrate how mapping coordinates work and how to manipulate those coordinates using modifiers in the design visualization software.
 - c. Demonstrate the creation of basic materials and the assignment of those materials to objects in a game scene.
 - d. Demonstrate space design by layering multiple texture maps onto a surface to create a composite image using design visualization software.
 - e. Demonstrate the application of sub-maps on similar objects to give unique identity.
3. Manipulate 3-dimensional aspects of the world design by adjusting cameras, lighting, and adding special effects.
 - a. Identify camera perspective and the effects on the game world and gameplay.
 - b. Demonstrate the creation of a camera and the adjustment of the camera angle and perspective.
 - c. Demonstrate the use of different lighting methods.
 - d. Demonstrate the use of particle systems, lens effects, and constraints to create special effects in a game world.

Character Development and Animation

1. Develop an understanding of the principles and history of visual asset generation.
 - a. Discuss the developments in the history of game design and animation.
 - b. Discuss character types and archetypes in relationship to character development.
 - c. Describe ways that characters develop throughout the course of playing a game.
 - d. Discuss character identity through names, verbal and visual character development.
 - e. Discuss the differences in characters from different media.
2. Examine the process of developing visual assets.
 - a. Discuss the importance of time in animation.
 - b. Describe the process of animation and animation techniques.
 - c. Describe the characteristics of reactive animation.

- d. Describe animation curves, path constraints, and alternative pivot points, and how to edit them.
- e. Describe hierarchical animation.

AUDIO AND VIDEO PRODUCTION

Audio Design

1. Research audio history and theory.
 - a. Discuss the components of audio and game design.
 - b. Discuss the history of audio components and their importance in game design.
 - c. Describe the components of a sound system and game audio formats.
2. Understand the functions of audio design fundamentals (creating the atmosphere), and interactive audio for game design.
 - a. Describe how sound can set the mood for a game.
 - b. Create digital sound effects.
 - c. Describe the purpose and primary functions of music in video games.
 - d. Demonstrate music composition.
 - e. Explain voiceovers and how they add personality to game characters.
 - f. Demonstrate the creation of voiceovers, edit, and test voiceovers.
3. Apply fundamentals of 3D audio in order to blend video game audio elements.
 - a. Describe the audio asset assembly, delivery, and the priority process.
 - b. Demonstrate the difference between occlusion and obstruction and the effect on game audio.
 - c. Describe the effect technology has had in the past and may have in the future on game audio.

Video Game Programming

1. Analyze the structure of the C++ language.
 - a. Define C++ programming terms.
 - b. Explain the program development cycle to include input/output, processing, and storage.
 - c. Convert binary code to decimals.
 - d. Construct an algorithm for computer programming technology.
 - e. Demonstrate screen output using the C++ language.
 - f. Classify variable and constants.
 - g. Create, run, and debug an original program to input data, process data, and print a report.
 - h. Create programs that perform calculations using arithmetic operations to include addition, subtraction, multiplication, division, and exponentiation.
 - i. Create programs that include decision, selection, and iteration statements to include IF/THEN statements, Case statements, Do loops and For/Next loops.
 - j. Create programs that use array/table structures.

2. Analyze the purpose, importance, and structure of game engines.
 - a. Identify the core components of game engines relative to game development.
 - b. Discuss the importance of game engines in the game development process.
 - c. Demonstrate object-oriented design and code reuse patterns, and the applications among game developers.
 - d. Develop an understanding of the elements of the game design engine.
 - e. Create game code using a game engine.
3. Develop an understanding of computer networks as they relate to game design technology.
 - a. Define terminology related to computer networks.
 - b. Identify hardware components needed to network two or more computers, such as a NIC card, cables, hubs, switches, and a server.
 - c. Identify the various operating systems for networks such as Novell, Windows NT, Windows XP, Windows Vista, UNIX, Linux, and Mac OS.
 - d. Discuss examples of recognized network topologies.
 - e. Compare network topologies.
 - f. Discuss network protocols related to the game design industry.

Video Game Production

1. Identify the company roles, and team roles and responsibilities related to the game development process.
 - a. Describe the elements of leadership and the qualities necessary to become a successful leader.
 - b. Identify the company roles related to the game development process.
 - c. Identify game development team roles involved in the game development process.
 - d. Explain the phases associated with developing a game from concept to completion.
 - e. Explain the Five-Stage Team Management Model and how it can be used in the game development process.
 - f. Explain and demonstrate how to conduct meetings.
2. Planning, creating, interpreting, and analyzing budgets for game design and development.
 - a. Discuss the elements of a game design budget.
 - b. Plan, construct, interpret, and analyze a game design budget.
3. Apply time and project management skills.
 - a. Explain the components of each stage in the game development process.
 - b. Describe the milestones in project management and how they are accomplished.
4. Communicate with peers, supervisors, and subordinates.
 - a. Explain the communications process.
 - b. Demonstrate active listening skills.

5. Discuss quality assurance and the role it plays in game design.
 - a. Identify the various stages of quality assurance for game development.
 - b. Identify best practices regarding quality assurance.

BUSINESS, EVALUATION, AND DEVELOPMENT

Business of Gaming

1. Explain the importance of audience knowledge and target marketing in game design technology.
 - a. Discuss target markets and how to get a video game sold.
 - b. Explain demographic segregation and how it can be used in a marketing campaign.
 - c. Describe the marketing tools and how each can be used to attract buyers to a product.
 - d. Compare and contrast the areas of the distribution process.
2. Research consumer behavior and publisher relations within the functions of marketing, such as advertising, public relations, sales, and promotions.
 - a. Explain consumer behavior and the influence it can have on the functions of marketing.
 - b. Discuss how game companies and publisher work together to bring a game to market.
 - c. Discuss contracts between game companies and publishers.
3. Research and analyze the economics of the video game industry.
 - a. Discuss the supply chain and how the economy is impacted.
 - b. Investigate cost versus profit for video games.
 - c. Analyze and predict costs and profits for video games.

Video Game Design and Development Seminar and Experience

1. Apply practical video game design mechanics, programming, visual and audio elements, and game production techniques while working in teams.
 - a. Identify the five phases of idea generation.
 - b. Conduct interviews with possible candidates and/or clients.
 - c. Create a “concept” for the video game.
 - d. Create a game inventory.
 - e. Create a menu tree.
 - f. Create a block diagram or chart that represents the elements to be created by specific departments.
 - g. Create a video game.

Game Evaluation

1. Explore and understand video game architecture through testing, defect tracking, technical reviews, and inspections
 - a. Identify the elements of game architecture and the evaluation process.
 - b. Explain the process of bug testing.
 - c. Explain bug fixing.
2. Critically evaluate game design, character development, character animation, sound design, playability, and compatibility.
 - a. Classify the testing priority of elements of game design, character development and animation, sound design, playability, and compatibility.
 - b. Design and develop a video game evaluation plan.
 - c. Demonstrate the process of correcting game problem areas and satisfying quality assurance requirements.

Appendix A: IGDA Standards

CRITICAL GAME STUDIES - Criticism, Analysis & History of electronic and non-electronic games.

VGD.01. Game Criticism

- VGD.01.01 Game studies – ludology, critical theory and research, critical vocabulary
- VGD.01.02 Experience-centered criticism (Player-centered approach) – study of interactivity, function and uses of exploration in virtual worlds, creating player immersion
- VGD.01.03 Consumer-oriented criticism – game advertising, legislative and judicial impact on the game industry, analyzing and understanding the function and current state of the gaming press
- VGD.01.04 Genre analysis – how game genres are defined, history of genres
- VGD.01.05 Auteur studies – authorship issues, branding
- VGD.01.06 Analysis of Game Design – gameplay, narrative, story and plot, character development, art and sound design

VGD.02. Media Studies

- VGD.02.01 Media Research Methods – data collection, ethnography, introduction to mass media, general game research
- VGD.02.02 Core Experiences – game review, criticism

GAMES AND SOCIETY - Understanding how games reflect and construct individuals and groups, as well as how games reflect and are constructed by individuals and groups.

VGD.03. Players and Effects

- VGD.03.01 Gaming Demographics – gender, diversity, child development, patterns of buyers and players, and game-related organizations
- VGD.03.02 The “Cultures” of Gaming – Pop, fan, and mass culture

VGD.04. History

VGD.05. Experience of Play

- VGD.05.01 Historical aspects of the experience of play – history of play, cross-cultural anthropology of play, commonalities and difference of games across nationalities, role of the economy in history of play
- VGD.05.02 Social aspects – social games, “safe spaces”, effects of cheating, stereotypes, ethical and social issues in games
- VGD.05.03 Psychological aspects – theories of intelligence, cognitive theory, games and violence/addiction
- VGD.05.04 Economic aspect - push for larger sales (more sequels of successful products), more licensed products, role of game quality

and supply in the crash of the 80s, changing demographics, new opportunities

VGD.05.05 Human/machine interaction - usability issues, accessibility issues

VGD.06. Construction of Games and Game Technologies

VGD.06.01 Historical aspects of the technologies and institutions that frame the game industry - history of game technologies, game companies, video game litigation and patents

VGD.06.02 Anthropology of the game industry - political and economic context of the game industry, practice of game development, cultural context of game development, game developer "culture", the intersection of gamer culture and game producer culture, the transnational production of games and game technologies

GAME DESIGN - Principles and methodologies behind the rules and play of games.

VGD.07. Conceptual Game Design

VGD.07.01 Understanding the atomic parts of games – game objects (tokens) and game setting, rules, dynamics, play mechanics, goal(s), conflict, theme/color

VGD.07.02 Play Mechanics – game rules, core mechanics, game theory, balance in games

VGD.07.03 Approaches to game design – algorithmic design, player experience approach, world design

VGD.07.04 Boardgame and roleplaying design – wargames, roleplaying games, collectable card games, chance and probability, narrative and flavor

VGD.07.05 Ideas – turning ideas into concept, evaluating game concepts

VGD.07.06 Fun – different kinds of fun, define fun

VGD.07.07 Abstract design elements – positive and negative feedback systems, emergent complexity, simulation and emulation, communication systems

VGD.07.08 Psychological design considerations – operant conditioning, flow states, addiction in gaming, rewards and penalties, difficulty curve, diverse social systems

VGD.07.09 Interface design – theory, human-computer interaction, user task modeling

VGD.07.10 Iterative nature of game design: create, test, change, and repeat

VGD.08. Serious Game Design

VGD.08.01 Uses of games in training, therapeutic and other non-entertainment applications, such as education, instructional design, political statements, artistic medium, and assessment

VGD.09. Practical Game Design

- VGD.09.01 Spatial design – abstract spaces, pacing, narrative, interactive and responsive worlds, goal communication through game design
- VGD.09.02 Task design – action and interaction, puzzles, providing feedback to players
- VGD.09.03 Design integration – melding space and task, integrating art and gameplay
- VGD.09.04 Control schemes – direct/indirect interact manipulation, movement and navigation, item manipulation, inventories
- VGD.09.05 Custom tool use – getting design concepts into a game’s underlying system
- VGD.09.06 Training – teaching how to play the game, consistent challenges and appropriate feedback, keeping track of what players have done
- VGD.09.07 Game tuning – what makes a balanced game, understanding games as dynamic systems, balancing player advancement
- VGD.09.08 Game player analysis – understanding the audience, designing for diverse populations, quality assurance
- VGD.09.09 Play testing – theory, human-computer interaction, user task modeling
- VGD.09.10 Prototyping – creating physical prototypes for turn-based and realtime games, creating digital prototypes for individual systems, rapid prototyping
- VGD.09.11 Game design documentation – writing and maintaining game design document, writing concepts/proposals/rules documents, communicating design ideas, change tracking
- VGD.09.12 Content design – level design

GAME PROGRAMMING - Aspects of traditional computer science and software engineering – modified to address the technical aspects of gaming

VGD.10. Math and Science Techniques

- VGD.10.01 Math - calculus, linear algebra, probability and statistics, geometry
- VGD.10.02 Science - physics, computational mechanics

VGD.11 Style and Design Principles

- VGD.11.01 Coherency
- VGD.11.02 Object oriented programming paradigms
- VGD.11.03 Design patterns – game design patterns

VG.D.12 Information Design

- VG.D.12.01 Data structures – data architecture, file formats, data organization, data compression
- VG.D.12.02 Asset pipelining
- VG.D.12.03 Computational geometry
- VG.D.12.04 Environmental models, spatial data structures
- VG.D.12.05 Database
- VG.D.12.06 Machine Architecture
- VG.D.12.07 Optimization (CPU and GPU)
- VG.D.12.08 Embedded System Development
- VG.D.12.09 Configuration Control and Source Control Systems
- VG.D.12.10 Software Architecture
- VG.D.12.11 Software Engineering

VG.D.13 Game Engine Design

- VG.D.13.01 Purpose and importance
- VG.D.13.02 Architecture and design
- VG.D.13.03 Data Pipelines
- VG.D.13.04 Methodologies and practices to create stand-alone gaming
- VG.D.13.05 Generic and universal issues in programming for 3D engines – graphics libraries, programming object and camera motions, collision detection, special effects

VG.D.14 Prototyping

- VG.D.14.01 Tools and skills for fast, iterative development
- VG.D.14.02 Building flexible systems, configurable by others

VG.D.15 Programming teams -- structure and working relationships

- VG.D.15.01 Working in interdisciplinary teams
- VG.D.15.02 Talking with programmers/artists/designers/producers/etc
- VG.D.15.03 Team programming processes and methodologies

VG.D.16 Design/Technology synthesis

- VG.D.16.01 Supporting player goals and actions
- VG.D.16.02 Building intelligent, coherent, consistent, reactive game environments
- VG.D.16.03 Platform issues

VG.D.17 System architecture for real time game environments and simulations

- VG.D.17.01 Concurrent programming techniques
- VG.D.17.02 Integration of sub systems (Physics, Collision detection, AI, Input, Render, Scripting)
- VG.D.17.03 Incorporating and extending third party systems in a game engine
- VG.D.17.04 Resource budgeting (CPU, GPU, memory)

VG.D.18 Computer Architecture

- VG.D.18.01 Structure of a CPU with implications to program design (eg, avoiding branching)
- VG.D.18.02 The memory hierarchy with implications to program design (eg, alignment of data structures in memory, locality of reference)
- VG.D.18.03 Algorithm design considerations for CPU versus GPU implementation

VG.D.19 Tools Construction

- VG.D.19.01 "Tool Development"
- VG.D.19.02 GUI creation
- VG.D.19.03 Tools for multimedia content creation, modification and management
- VG.D.19.04 Custom design tools
- VG.D.19.05 Building flexible systems for non-programmers to use

VG.D.20 Graphics Programming

- VG.D.20.01 Rendering - Transforms, lighting, texturing, clipping, occlusions, transparency, level of detail considerations, using data structures to optimize rendering time
- VG.D.20.02 Animation- forward and inverse kinematics, transform representations, interpolation, techniques, camera animation
- VG.D.20.03 Graphics system design
- VG.D.20.04 Procedural content generation (Textures, Models, etc.)

VG.D.21 Sound / Audio Programming

- VG.D.21.01 Physics of sound and human hearing
- VG.D.21.02 Programming 3D positional sound
- VG.D.21.03 Utilizing Audio Channels
- VG.D.21.04 Audio Prioritization

VG.D.22 Artificial intelligence

- VG.D.22.01 Difference in goals between Game AI and traditional AI
- VG.D.22.02 Path planning, search algorithms
- VG.D.22.03 Agent architectures
- VG.D.22.04 Decision-making systems
- VG.D.22.05 State machine design
- VG.D.22.06 Statistical machine learning

VG.D.23 Networks

- VG.D.23.01 Networking and Server design
- VG.D.23.02 Performance metrics
- VG.D.23.03 Topologies
- VG.D.23.04 Protocols – TCP/IP, UDP, etc
- VG.D.23.05 Security

- VG.D.23.06 Game Servers
- VG.D.23.07 Game Protocol Development
- VG.D.23.08 Available Network Libraries
- VG.D.23.09 Open Source Network Game Case Studies

VG.D.24 Game Logic

- VG.D.24.01 Compilers
- VG.D.24.02 Scripting languages

VG.D.25 Play analysis

- VG.D.25.01 Play testing to monitor player frustration, progress and enjoyment
- VG.D.25.02 Monitoring player state -- gameplay data logging
- VG.D.25.03 Player metrics

VISUAL DESIGN - Designing, creating and analyzing the visual components of games.

VG.D.26 Basic Visual Design

- VG.D.26.01 Art history & theory
- VG.D.26.02 Visual design fundamentals – composition, lighting and color, graphic design and typography
- VG.D.26.03 Fundamentals of drawing
- VG.D.26.04 Painting techniques
- VG.D.26.05 Sculpting
- VG.D.26.06 Anatomy and life drawing
- VG.D.26.07 Physiology and kinesiology

VG.D.27 Non-narrative graphics/Abstraction as expressive tool

VG.D.28 Visual design in an interactive context

VG.D.29 Visual narratives: painting, comics, photography, film

VG.D.30 Motion Graphics

- VG.D.30.01 Animation
- VG.D.30.02 Cinematography
- VG.D.30.03 Camera angles and framing
- VG.D.30.04 Visual narrative / storyboarding
- VG.D.30.05 Filmmaking: framing, types of shots and camera movement, editing
- VG.D.30.06 Kinematics

VG.D.31 Visual Asset Generation

- VG.D.31.01 2d graphics - pixel art
- VG.D.31.02 3d modeling
- VG.D.31.03 Textures
- VG.D.31.04 Interface design

VGD.31.05 Character design - conceptual design, character modeling, character animation

VGD.32 World Design

VGD.32.01 Environmental modeling

VGD.33 Architecture

VGD.33.01 Fundamental principles of architecture

VGD.33.02 History of architecture

VGD.33.03 Fundamental principles of architecture

VGD.33.04 Real-world spaces vs. game spaces

VGD.33.05 Space design

VGD.33.06 Navigation

VGD.33.07 Materials

VGD.34 Working with 3D Hardware

VGD.34.01 Procedural shading

VGD.34.02 Lighting

VGD.34.03 Effects

VGD.35 Game Art (digital based art with game content)

VGD.35.01 Custom tool use – getting game art into a game's engine

VGD.36 Information Visualization

VGD.37 Procedural content

AUDIO DESIGN - Designing and creating sound and sound environments

VGD.38 Audio History & Theory

VGD.39 Basic Technical Skills

VGD.40 Basic Studio Skills

VGD.40.01 Familiarity with hardware and software (e.g., microphones, mixers, outboard gear)

VGD.40.02 Recording, mixing and mastering

VGD.40.03 Studio organization

VGD.41 Audio Programming

VGD.42 Audio Assets

VGD.43 Audio Tools

VGD.44 Audio Design Fundamentals

VGD.44.01 Setting mood, managing tension and resolution

- VGD.44.02 Processing, mixing and controlling sound for aesthetic effect
- VGD.44.03 General workflow for game creation
- VGD.44.04 Audio engine terminology and functionality

VGD.45 Introduction to Interactive Audio

- VGD.45.01 Designing sound for interactivity
- VGD.45.02 Sound effects
- VGD.45.03 Music
- VGD.45.04 Voice recording

VGD.46 Sound Effects

- VGD.46.01 Simulation of sound environments
- VGD.46.02 Ambience versus musicality in soundtracks

VGD.47 Music

- VGD.47.01 Composition
- VGD.47.02 Interactive scoring

VGD.48 3d Audio

- VGD.48.01 Fundamentals of 3D and multi-channel sound
- VGD.48.02 Modeling for effects, echo, room size simulation

INTERACTIVE STORYTELLING - Traditional storytelling and the challenges of interactive narrative

VGD.49 Story in Non-Interactive Media

- VGD.49.01 Literary Theory & Narratology - traditional narrative “act” structure, thinking abstractly and concretely about “story”, traditional narratives (folktales), structuralism/narratology, post-structuralism, post-modern literature
- VGD.49.02 Theatre - performance theory, theorists: Aristotle, Brecht, Artaud, Boal, etc
- VGD.49.03 Story creation - setting: time, place, character actions/motivations/dialogue, events
- VGD.49.04 Discourse – style, voice and point of view, event structure
- VGD.49.05 Characterization in fiction, film and theatre
- VGD.49.06 Introduction to film and literary theory
- VGD.49.07 Theories of game and narrative
- VGD.49.08 Context-setting versus traditional storytelling
- VGD.49.09 Back-story and fictional setting design
- VGD.49.10 Creating compelling characters

VG.D.50 Narrative in Interactive Media

- VG.D.50.01 Theoretical issues - agency, immersion, interactivity vs. narrative, cybertext, algorithmic storytelling and process intensity, cohesion and “well-formed” narrative
- VG.D.50.02 Interactive story in non-computer-based media - role-playing games, oral storytelling, literary examples – Oulipo, Nabakov’s Pale Fire, etc, theatre examples – forum theatre, theatre of the oppressed, etc
- VG.D.50.03 Alternating fixed story with interactive game - visual novels (Japanese genre)
- VG.D.50.04 Exploratory narratives – hypertext
- VG.D.50.05 Branching trees: branching narrative, branching dialogue
- VG.D.50.06 Emergent narrative approaches - story generators
- VG.D.50.07 Interactive fiction
- VG.D.50.08 Collaborative storytelling - web-based collaborative stories, alternative reality games, MUDs, MMOGs

VG.D.51 Writing for other media

- VG.D.51.01 Fiction-writing
- VG.D.51.02 Dramatic writing – screenwriting, playwriting, writing for the radio

VG.D.52 Abstract audiovisual narrative

- VG.D.52.01 Semiotics and symbology
- VG.D.52.02 Creating mood and drama with music and sound

GAME PRODUCTION - Practical challenges of managing the development of games

VG.D.53 People management and collaborative development

VG.D.54 Budgeting a development project

VG.D.55 Where to find industry standard info, industry info – trades, trades from different parts of the industry, other media trades

VG.D.56 Typical budgets and budget categories

VG.D.57 Team make-up

- VG.D.57.01 Job descriptions
- VG.D.57.02 Recruiting, training
- VG.D.57.03 Balancing talent, experience, budget

VG.D.58 The Game Development Lifecycle

- VG.D.58.01 Pre-production / Production / Testing
- VG.D.58.02 Shipping and maintaining customer loyalty

VGD.58.03 Different approaches to production process – waterfall/spiral/v-shaped/evolutionary, Scrum/Agile, iterative/incremental, development, rapid prototyping, etc, strengths and weaknesses, issues specific to game development

VGD.59 Workflow

VGD.59.01 Knowing which tools to use and when

VGD.59.02 Evaluating and using computer-supported collaborative work tools - bug-tracking systems, wikis, spreadsheets, message boards/forums, databases, version-control

VGD.59.03 Problem evaluation and investing appropriate resources

VGD.59.04 Task breakdown - creating a backlog, dropping features

VGD.60 Group dynamics

VGD.60.01 Team building

VGD.60.02 Establishing clear roles and clear goals

VGD.60.03 Realities of development teams

VGD.60.04 Building effective teams - working as a team to realize a unified gameplay vision, leadership, delegation and responsibility, defining the interfaces between team members

VGD.61 Design and development documentation

VGD.61.01 Why document?

VGD.61.02 What should you document?

VGD.61.03 How much documentation is enough/too much?

VGD.61.04 Who is the audience for the documentation?

VGD.61.05 To storyboard or not to storyboard?

VGD.61.06 Non-text based documentation: using prototypes, physical models, pictures

VGD.61.07 Design and Development Documents - concept document/proposal, game specifications, design document, story bible, script, art bible, storyboards, technical design document, schedules and business/marketing documents, test plan

VGD.62 Testing

VGD.62.01 Code review and test harnesses

VGD.62.02 Designing tests and incorporating feedback from Quality Assurance

VGD.62.03 Bug fixing, bug databases, creating stable code bases

VGD.63 Scheduling and Time Management

VGD.63.01 Creating a schedule

VGD.63.02 Goals of a schedule – milestones

VGD.63.03 Balancing quality and reality

VGD.63.04 Working with a schedule, using it to help you ship

- VGD.63.05 Typical schedules
- VGD.63.06 Crunch time issues
- VGD.63.07 Quality of life issues

VGD.64 Communication skills

- VGD.64.01 Rhetoric
- VGD.64.02 Communicating with peers, supervisors and subordinates - communicating clearly in print and in speech, collaboration skills - speaking the same language/speaking across disciplinary divides

VGD.65 Coordinating the efforts of development, quality assurance, sales, marketing, public relations and finance

VGD.66 Localization issues, processes and skills

- VGD.66.01 Writing “around” the game – packaging, player manuals, websites, etc

VGD.67 Product post-mortems

- VGD.67.01 Evaluating decisions, after the fact - design decisions, process decisions, business decisions

VGD.68 Quality Assurance

- VGD.68.01 Planning and QA Plans

VGD.69 Defect Tracking

VGD.70 Technical Reviews and Inspections

VGD.71 Architecture

- VGD.71.01 Software Testing - beta testing, system testing, code review and test harnesses, designing tests and incorporating feedback from quality assurance, bug fixing, bug databases, creating stable code bases
- VGD.71.02 Game Testing

VGD.72 Working with marketing

- VGD.72.01 Marketing plans and schedules
- VGD.72.02 Marketing asset needs

BUSINESS OF GAMING - Economic, legal and policy aspects of games

VGD.73 Game industry economics

- VGD.73.01 Retailers, shelf-space, digital distribution: How audiences currently reach the games

VGD.73.02	Platform choices – the tradeoffs of developing for consoles, PCs and handheld and mobile devices
VGD.73.03	Internationalization / globalization of development - offshoring / outsourcing, changing barriers-to-entry (knowledge, technology, manpower), challenges of cultures, distance, time-zones
VGD.73.04	Distribution channels
VGD.73.05	Microtransactions, one-time payment, software as a service with monthly payments, free to play with some features available to paying members, etc
VGD.73.06	Real money transactions in virtual worlds and MMOs
VGD.73.07	Different delivery method and revenue streams (MS Arcade, PS Home, etc)
VGD.73.08	Independent vs Publisher/Developer game development
VGD.73.09	Piracy
VGD.74 Audience	
VGD.74.01	Marketing and sales: How games currently reach an audience
VGD.74.02	Understanding audiences for different game genres
VGD.74.03	How to reach and keep given audiences
VGD.74.04	Consumer behavior and psychology (what do consumers of various sorts and various populations want?)
VGD.75 Publisher/Developer Relationships	
VGD.75.01	The deal - what it covers, how it gets done, what it is likely to say, greenlighting process
VGD.75.02	Day-to-day: Once signed up, what interactions and processes occur
VGD.75.03	Milestone review
VGD.76 Intellectual property	
VGD.76.01	Technology and Copyright - key cases, major players
VGD.76.02	Content
VGD.76.03	Licenses - acquisition of licenses, use of licenses, working with licensors
VGD.76.04	Piracy
VGD.77 Patents and the game industry	
VGD.78 Contracts	
VGD.78.01	Publisher/developer
VGD.78.02	Employer/employee
VGD.78.03	Contractors

VGD.79 Content Regulation

VGD.79.01 Game Ratings and Classification - ESRB (North America), PEGI (Europe), CERO (Japan)

VGD.79.02 Government regulation - North America, Europe / Oceania, Asia

Appendix B: 21st Century Skills Standards

- CS1 Flexibility and Adaptability
- CS2 Initiative and Self-Direction
- CS3 Social and Cross-Cultural Skills
- CS4 Productivity and Accountability
- CS5 Leadership and Responsibility

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.

CS 1 Flexibility and Adaptability

- Adapting to varied roles and responsibilities
- Working effectively in a climate of ambiguity and changing priorities

CS 2 Initiative and Self-Direction

- Monitoring one's own understanding and learning needs
- Going beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise
- Demonstrating initiative to advance skill levels toward a professional level
- Defining, prioritizing, and completing tasks without direct oversight
- Utilizing time efficiently and managing workload
- Demonstrating commitment to learning as a lifelong process

CS 3 Social and Cross-Cultural Skills

- Working appropriately and productively with others
- Leveraging the collective intelligence of groups when appropriate
- Bridging cultural differences and using differing perspectives to increase innovation and the quality of work

CS 4 Productivity and Accountability

- Setting and meeting high standards and goals for delivering quality work on time
- Demonstrating diligence and a positive work ethic (e.g., being punctual and reliable)

CS 5 Leadership and Responsibility

- Using interpersonal and problem-solving skills to influence and guide others toward a goal
- Leveraging strengths of others to accomplish a common goal
- Demonstrating integrity and ethical behavior
- Acting responsibly with the interests of the larger community in mind

Appendix C: ACT College Readiness Standards

English

E1 Topic Development in Terms of Purpose and Focus

- Identify the basic purpose or role of a specified phrase or sentence.
- Delete a clause or sentence because it is obviously irrelevant to the essay.
- Identify the central idea or main topic of a straightforward piece of writing.
- Determine relevancy when presented with a variety of sentence-level details.
- Identify the focus of a simple essay, applying that knowledge to add a sentence that sharpens that focus or to determine if an essay has met a specified goal.
- Delete material primarily because it disturbs the flow and development of the paragraph.
- Add a sentence to accomplish a fairly straightforward purpose such as illustrating a given statement.
- Apply an awareness of the focus and purpose of a fairly involved essay to determine the rhetorical effect and suitability of an existing phrase or sentence or to determine the need to delete plausible but irrelevant material.
- Add a sentence to accomplish a subtle rhetorical purpose such as to emphasize, to add supporting detail, or to express meaning through connotation.
- Determine whether a complex essay has accomplished a specific purpose.
- Add a phrase or sentence to accomplish a complex purpose, often expressed in terms of the main focus of the essay.

E2 Organization, Unity, and Coherence

- Use conjunctive adverbs or phrases to show time relationship in simple narrative essays (e.g., *then*, *this time*, etc.).
- Select the most logical place to add a sentence in a paragraph.
- Use conjunctive adverbs or phrases to express straightforward logical relationships (e.g., *first*, *afterward*, *in response*).
- Decide the most logical place to add a sentence in an essay.
- Add a sentence that introduces a simple paragraph.
- Determine the need for conjunctive adverbs or phrases to create subtle logical connections between sentences (e.g., *therefore*, *however*, *in addition*).
- Rearrange the sentences in a fairly uncomplicated paragraph for the sake of logic.
- Add a sentence to introduce or conclude the essay or to provide a transition between paragraphs when the essay is fairly straightforward.
- Make sophisticated distinctions concerning the logical use of conjunctive adverbs or phrases, particularly when signaling a shift between paragraphs.
- Rearrange sentences to improve the logic and coherence of a complex paragraph.
- Add a sentence to introduce or conclude a fairly complex paragraph.

- Consider the need for introductory sentences or transitions, basing decisions on a thorough understanding of both the logic and rhetorical effect of the paragraph and essay.

E3 Word Choice in Terms of Style, Tone, Clarity, and Economy

- Revise sentences to correct awkward and confusing arrangements of sentence elements.
- Revise vague nouns and pronouns that create obvious logic problems.
- Delete obviously synonymous and wordy material in a sentence.
- Revise expressions that deviate from the style of an essay.
- Delete redundant material when information is repeated in different parts of speech (e.g., *alarmingly startled*).
- Use the word or phrase most consistent with the style and tone of a fairly straightforward essay.
- Determine the clearest and most logical conjunction to link clauses.
- Revise a phrase that is redundant in terms of the meaning and logic of the entire sentence.
- Identify and correct ambiguous pronoun references.
- Use the word or phrase most appropriate in terms of the content of the sentence and tone of the essay.
- Correct redundant material that involves sophisticated vocabulary and sounds acceptable as conversational English (e.g., *an aesthetic viewpoint* versus *the outlook of an aesthetic viewpoint*).
- Correct vague and wordy or clumsy and confusing writing containing sophisticated language.
- Delete redundant material that involves subtle concepts or that is redundant in terms of the paragraph as a whole.

E4 Sentence Structure and Formation

- Use conjunctions or punctuation to join simple clauses.
- Revise shifts in verb tense between simple clauses in a sentence or between simple adjoining sentences.
- Determine the need for punctuation and conjunctions to avoid awkward sounding sentence fragments and fused sentences.
- Decide the appropriate verb tense and voice by considering the meaning of the entire sentence.
- Recognize and correct marked disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers).
- Revise to avoid faulty placement of phrases and faulty coordination and subordination of clauses in sentences with subtle structural problems.
- Maintain consistent verb tense and pronoun person on the basis of the preceding clause or sentence.

- Use sentence-combining techniques, effectively avoiding problematic comma splices, run-on sentences, and sentence fragments, especially in sentences containing compound subjects or verbs.
- Maintain a consistent and logical use of verb tense and pronoun person on the basis of information in the paragraph or essay as a whole.
- Work comfortably with long sentences and complex clausal relationships within sentences, avoiding weak conjunctions between independent clauses and maintaining parallel structure between clauses.

E5 Conventions of Usage

- Solve such basic grammatical problems as how to form the past and past participle of irregular but commonly used verbs and how to form comparative and superlative adjectives.
- Solve such grammatical problems as whether to use an adverb or adjective form, how to ensure straightforward subject–verb and pronoun–antecedent agreement, and which preposition to use in simple contexts.
- Recognize and use the appropriate word in frequently confused pairs such as *there* and *their*, *past* and *passed*, and *led* and *lead*.
- Use idiomatically appropriate prepositions, especially in combination with verbs (e.g., *long for*, *appeal to*).
- Ensure that a verb agrees with its subject when there is some text between the two.
- Ensure that a pronoun agrees with its antecedent when the two occur in separate clauses or sentences.
- Identify the correct past and past participle forms of irregular and infrequently used verbs, and form present–perfect verbs by using *have* rather than *of*.
- Correctly use reflexive pronouns, the possessive pronouns *its* and *your*, and the relative pronouns *who* and *whom*.
- Ensure that a verb agrees with its subject in unusual situations (e.g., when the subject–verb order is inverted or when the subject is an indefinite pronoun).
- Provide idiomatically and contextually appropriate prepositions following verbs in situations involving sophisticated language or ideas.
- Ensure that a verb agrees with its subject when a phrase or clause between the two suggests a different number for the verb.

E6 Conventions of Punctuation

- Delete commas that create basic sense problems (e.g., between verb and direct object).
- Provide appropriate punctuation in straightforward situations (e.g., items in a series).
- Delete commas that disturb the sentence flow (e.g., between modifier and modified element).
- Use commas to set off simple parenthetical phrases.

- Delete unnecessary commas when an incorrect reading of the sentence suggests a pause that should be punctuated (e.g., between verb and direct object clause).
- Use punctuation to set off complex parenthetical phrases.
- Recognize and delete unnecessary commas based on a careful reading of a complicated sentence (e.g., between the elements of a compound subject or compound verb joined by *and*).
- Use apostrophes to indicate simple possessive nouns.
- Recognize inappropriate uses of colons and semicolons.
- Use commas to set off a nonessential/nonrestrictive appositive or clause.
- Deal with multiple punctuation problems (e.g., compound sentences containing unnecessary commas and phrases that may or may not be parenthetical).
- Use an apostrophe to show possession, especially with irregular plural nouns.
- Use a semicolon to indicate a relationship between closely related independent clauses.
- Use a colon to introduce an example or an elaboration.

Math

M1 Basic Operations and Applications

- Perform one-operation computation with whole numbers and decimals.
- Solve problems in one or two steps using whole numbers.
- Perform common conversions (e.g., inches to feet or hours to minutes).
- Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent.
- Solve some routine two-step arithmetic problems.
- Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average.
- Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour).
- Solve word problems containing several rates, proportions, or percentages.
- Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings).

M2 Probability, Statistics, and Data Analysis

- Calculate the average of a list of positive whole numbers.
- Perform a single computation using information from a table or chart.
- Calculate the average of a list of numbers.
- Calculate the average, given the number of data values and the sum of the data values.
- Read tables and graphs.
- Perform computations on data from tables and graphs.

- Use the relationship between the probability of an event and the probability of its complement.
- Calculate the missing data value, given the average and all data values but one.
- Translate from one representation of data to another (e.g., a bar graph to a circle graph).
- Determine the probability of a simple event.
- Exhibit knowledge of simple counting techniques.*
- Calculate the average, given the frequency counts of all the data values.
- Manipulate data from tables and graphs.
- Compute straightforward probabilities for common situations.
- Use Venn diagrams in counting.*
- Calculate or use a weighted average.
- Interpret and use information from figures, tables, and graphs.
- Apply counting techniques.
- Compute a probability when the event and/or sample space is not given or obvious.
- Distinguish between mean, median, and mode for a list of numbers.
- Analyze and draw conclusions based on information from figures, tables, and graphs.
- Exhibit knowledge of conditional and joint probability.

M3 Numbers: Concepts and Properties

- Recognize equivalent fractions and fractions in lowest terms.
- Recognize one-digit factors of a number.
- Identify a digit's place value.
- Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor.
- Find and use the least common multiple.
- Order fractions.
- Work with numerical factors.
- Work with scientific notation.
- Work with squares and square roots of numbers.
- Work problems involving positive integer exponents.*
- Work with cubes and cube roots of numbers.*
- Determine when an expression is undefined.*
- Exhibit some knowledge of the complex numbers.†
- Apply number properties involving prime factorization.
- Apply number properties involving even and odd numbers and factors and multiples.
- Apply number properties involving positive and negative numbers.
- Apply rules of exponents.
- Multiply two complex numbers.†

- Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers.
- Exhibit knowledge of logarithms and geometric sequences.
- Apply properties of complex numbers.

M4 Expressions, Equations, and Inequalities

- Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$).
- Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals.
- Substitute whole numbers for unknown quantities to evaluate expressions.
- Solve one-step equations having integer or decimal answers.
- Combine like terms (e.g., $2x + 5x$).
- Evaluate algebraic expressions by substituting integers for unknown quantities.
- Add and subtract simple algebraic expressions.
- Solve routine first-degree equations.
- Perform straightforward word-to-symbol translations.
- Multiply two binomials.*
- Solve real-world problems using first-degree equations.
- Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions).
- Identify solutions to simple quadratic equations.
- Add, subtract, and multiply polynomials.*
- Factor simple quadratics (e.g., the difference of squares and perfect square trinomials).*
- Solve first-degree inequalities that do not require reversing the inequality sign.*
- Manipulate expressions and equations.
- Write expressions, equations, and inequalities for common algebra settings.
- Solve linear inequalities that require reversing the inequality sign.
- Solve absolute value equations.
- Solve quadratic equations.
- Find solutions to systems of linear equations.
- Write expressions that require planning and/or manipulating to accurately model a situation.
- Write equations and inequalities that require planning, manipulating, and/or solving.
- Solve simple absolute value inequalities.

M5 Graphical Representations

- Identify the location of a point with a positive coordinate on the number line.
- Locate points on the number line and in the first quadrant.
- Locate points in the coordinate plane.
- Comprehend the concept of length on the number line.*
- Exhibit knowledge of slope.*
- Identify the graph of a linear inequality on the number line.*
- Determine the slope of a line from points or equations.*
- Match linear graphs with their equations.*
- Find the midpoint of a line segment.*
- Interpret and use information from graphs in the coordinate plane.
- Match number line graphs with solution sets of linear inequalities.
- Use the distance formula.
- Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point.
- Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle).†
- Match number line graphs with solution sets of simple quadratic inequalities.
- Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$.
- Solve problems integrating multiple algebraic and/or geometric concepts.
- Analyze and draw conclusions based on information from graphs in the coordinate plane.

M6 Properties of Plane Figures

- Exhibit some knowledge of the angles associated with parallel lines.
- Find the measure of an angle using properties of parallel lines.
- Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90° , 180° , and 360°).
- Use several angle properties to find an unknown angle measure.
- Recognize Pythagorean triples.*
- Use properties of isosceles triangles.*
- Apply properties of 30° - 60° - 90° , 45° - 45° - 90° , similar, and congruent triangles.
- Use the Pythagorean theorem.
- Draw conclusions based on a set of conditions.
- Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas.
- Use relationships among angles, arcs, and distances in a circle.

M7 Measurement

- Estimate or calculate the length of a line segment based on other lengths given on a geometric figure.
- Compute the perimeter of polygons when all side lengths are given.

- Compute the area of rectangles when whole number dimensions are given.
- Compute the area and perimeter of triangles and rectangles in simple problems.
- Use geometric formulas when all necessary information is given.
- Compute the area of triangles and rectangles when one or more additional simple steps are required.
- Compute the area and circumference of circles after identifying necessary information.
- Compute the perimeter of simple composite geometric figures with unknown side lengths.*
- Use relationships involving area, perimeter, and volume of geometric figures to compute another measure.
- Use scale factors to determine the magnitude of a size change.
- Compute the area of composite geometric figures when planning or visualization is required.

M8 Functions

- Evaluate quadratic functions, expressed in function notation, at integer values.
- Evaluate polynomial functions, expressed in function notation, at integer values.†
- Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths.†
- Evaluate composite functions at integer values.†
- Apply basic trigonometric ratios to solve right-triangle problems.†
- Write an expression for the composite of two simple functions.†
- Use trigonometric concepts and basic identities to solve problems.†
- Exhibit knowledge of unit circle trigonometry.†
- Match graphs of basic trigonometric functions with their equations.

Notes

- Students who score in the 1–12 range are most likely beginning to develop the knowledge and skills assessed in the other ranges.
- Standards followed by an asterisk (*) apply to the PLAN and ACT Mathematics tests only.
- Standards followed by a dagger (†) apply to the ACT Mathematics test only.

Reading

R1 Main Ideas and Author's Approach

- Recognize a clear intent of an author or narrator in uncomplicated literary narratives.
- Identify a clear main idea or purpose of straightforward paragraphs in uncomplicated literary narratives.
- Infer the main idea or purpose of straightforward paragraphs in uncomplicated literary narratives.

- Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in uncomplicated passages.
- Identify a clear main idea or purpose of any paragraph or paragraphs in uncomplicated passages.
- Infer the main idea or purpose of straightforward paragraphs in more challenging passages.
- Summarize basic events and ideas in more challenging passages.
- Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in more challenging passages.
- Infer the main idea or purpose of more challenging passages or their paragraphs.
- Summarize events and ideas in virtually any passage.
- Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in virtually any passage.
- Identify clear main ideas or purposes of complex passages or their paragraphs.

R2 Supporting Details

- Locate basic facts (e.g., names, dates, events) clearly stated in a passage.
- Locate simple details at the sentence and paragraph level in uncomplicated passages.
- Recognize a clear function of a part of an uncomplicated passage.
- Locate important details in uncomplicated passages.
- Make simple inferences about how details are used in passages.
- Locate important details in more challenging passages.
- Locate and interpret minor or subtly stated details in uncomplicated passages.
- Discern which details, though they may appear in different sections throughout a passage, support important points in more challenging passages.
- Locate and interpret minor or subtly stated details in more challenging passages.
- Use details from different sections of some complex informational passages to support a specific point or argument.
- Locate and interpret details in complex passages.
- Understand the function of a part of a passage when the function is subtle or complex.

R3 Sequential, Comparative, and Cause–Effect Relationships

- Determine when (e.g., first, last, before, after) or if an event occurred in uncomplicated passages.
- Recognize clear cause–effect relationships described within a single sentence in a passage.
- Identify relationships between main characters in uncomplicated literary narratives.
- Recognize clear cause–effect relationships within a single paragraph in uncomplicated literary narratives.
- Order simple sequences of events in uncomplicated literary narratives.

- Identify clear relationships between people, ideas, and so forth in uncomplicated passages.
- Identify clear cause–effect relationships in uncomplicated passages.
- Order sequences of events in uncomplicated passages.
- Understand relationships between people, ideas, and so forth in uncomplicated passages.
- Identify clear relationships between characters, ideas, and so forth in more challenging literary narratives.
- Understand implied or subtly stated cause–effect relationships in uncomplicated passages.
- Identify clear cause–effect relationships in more challenging passages.
- Order sequences of events in more challenging passages.
- Understand the dynamics between people, ideas, and so forth in more challenging passages.
- Understand implied or subtly stated cause–effect relationships in more challenging passages.
- Order sequences of events in complex passages.
- Understand the subtleties in relationships between people, ideas, and so forth in virtually any passage.
- Understand implied, subtle, or complex cause–effect relationships in virtually any passage.

R4 Meaning of Words

- Understand the implication of a familiar word or phrase and of simple descriptive language.
- Use context to understand basic figurative language.
- Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in uncomplicated passages.
- Use context to determine the appropriate meaning of virtually any word, phrase, or statement in uncomplicated passages.
- Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in more challenging passages.
- Determine the appropriate meaning of words, phrases, or statements from figurative or somewhat technical contexts.
- Determine, even when the language is richly figurative and the vocabulary is difficult, the appropriate meaning of context-dependent words, phrases, or statements in virtually any passage.

R5 Generalizations and Conclusions

- Draw simple generalizations and conclusions about the main characters in uncomplicated literary narratives.
- Draw simple generalizations and conclusions about people, ideas, and so forth in uncomplicated passages.

- Draw generalizations and conclusions about people, ideas, and so forth in uncomplicated passages.
- Draw simple generalizations and conclusions using details that support the main points of more challenging passages.
- Draw subtle generalizations and conclusions about characters, ideas, and so forth in uncomplicated literary narratives.
- Draw generalizations and conclusions about people, ideas, and so forth in more challenging passages.
- Use information from one or more sections of a more challenging passage to draw generalizations and conclusions about people, ideas, and so forth.
- Draw complex or subtle generalizations and conclusions about people, ideas, and so forth, often by synthesizing information from different portions of the passage.
- Understand and generalize about portions of a complex literary narrative.

Science

S1 Interpretation of Data

- Select a single piece of data (numerical or non-numerical) from a simple data presentation (e.g., a table or graph with two or three variables, a food web diagram).
- Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels).
- Select two or more pieces of data from a simple data presentation.
- Understand basic scientific terminology.
- Find basic information in a brief body of text.
- Determine how the value of one variable changes as the value of another variable changes in a simple data presentation.
- Select data from a complex data presentation (e.g., a table or graph with more than three variables, a phase diagram).
- Compare or combine data from a simple data presentation (e.g., order or sum data from a table).
- Translate information into a table, graph, or diagram.
- Compare or combine data from two or more simple data presentations (e.g., categorize data from a table using a scale from another table).
- Compare or combine data from a complex data presentation.
- Interpolate between data points in a table or graph.
- Determine how the value of one variable changes as the value of another variable changes in a complex data presentation.
- Identify and/or use a simple (e.g., linear) mathematical relationship between data.
- Analyze given information when presented with new, simple information.
- Compare or combine data from a simple data presentation with data from a complex data presentation.

- Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data.
- Extrapolate from data points in a table or graph.
- Compare or combine data from two or more complex data presentations.
- Analyze given information when presented with new, complex information.

S2 Scientific Investigation

- Understand the methods and tools used in a simple experiment.
- Understand the methods and tools used in a moderately complex experiment.
- Understand a simple experimental design.
- Identify a control in an experiment.
- Identify similarities and differences between experiments.
- Understand the methods and tools used in a complex experiment.
- Understand a complex experimental design.
- Predict the results of an additional trial or measurement in an experiment.
- Determine the experimental conditions that would produce specified results.
- Determine the hypothesis for an experiment.
- Identify an alternate method for testing a hypothesis.
- Understand precision and accuracy issues.
- Predict how modifying the design or methods of an experiment will affect results.
- Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results.

S3 Evaluation of Models, Inferences, and Experimental Results

- Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model.
- Identify key issues or assumptions in a model.
- Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models.
- Determine whether given information supports or contradicts a simple hypothesis or conclusion and why.
- Identify strengths and weaknesses in one or more models.
- Identify similarities and differences between models.
- Determine which model(s) is/are supported or weakened by new information.
- Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion.
- Select a complex hypothesis, prediction, or conclusion that is supported by a data presentation or model.
- Determine whether new information supports or weakens a model and why.
- Use new information to make a prediction based on a model.
- Select a complex hypothesis, prediction, or conclusion that is supported by two or more data presentations or models.

- Determine whether given information supports or contradicts a complex hypothesis or conclusion and why.

Writing

W1 Expressing Judgments

- Show a little understanding of the persuasive purpose of the task, but neglect to take or to maintain a position on the issue in the prompt.
- Show limited recognition of the complexity of the issue in the prompt.
- Show a basic understanding of the persuasive purpose of the task by taking a position on the issue in the prompt but may not maintain that position.
- Show a little recognition of the complexity of the issue in the prompt by acknowledging, but only briefly describing, a counterargument to the writer's position.
- Show understanding of the persuasive purpose of the task by taking a position on the issue in the prompt.
- Show some recognition of the complexity of the issue in the prompt by doing the following:
 - Acknowledging counterarguments to the writer's position
 - Providing some response to counterarguments to the writer's position
- Show clear understanding of the persuasive purpose of the task by taking a position on the specific issue in the prompt and offering a broad context for discussion.
- Show recognition of the complexity of the issue in the prompt by doing the following:
 - Partially evaluating implications and/or complications of the issue
 - Posing and partially responding to counterarguments to the writer's position
- Show clear understanding of the persuasive purpose of the task by taking a position on the specific issue in the prompt and offering a critical context for discussion.
- Show understanding of the complexity of the issue in the prompt by doing the following:
 - Examining different perspectives
 - Evaluating implications or complications of the issue
 - Posing and fully discussing counterarguments to the writer's position

W2 Focusing on the Topic

- Maintain a focus on the general topic in the prompt through most of the essay.
- Maintain a focus on the general topic in the prompt throughout the essay.
- Maintain a focus on the general topic in the prompt throughout the essay, and attempt a focus on the specific issue in the prompt.
- Present a thesis that establishes focus on the topic.
- Maintain a focus on discussion of the specific topic and issue in the prompt throughout the essay.

- Present a thesis that establishes a focus on the writer's position on the issue.
- Maintain a clear focus on discussion of the specific topic and issue in the prompt throughout the essay.
- Present a critical thesis that clearly establishes the focus on the writer's position on the issue.

W3 Developing a Position

- Offer a little development, with one or two ideas; if examples are given, they are general and may not be clearly relevant; resort often to merely repeating ideas.
- Show little or no movement between general and specific ideas and examples.
- Offer limited development of ideas using a few general examples; resort sometimes to merely repeating ideas.
- Show little movement between general and specific ideas and examples.
- Develop ideas by using some specific reasons, details, and examples.
- Show some movement between general and specific ideas and examples.
- Develop most ideas fully, using some specific and relevant reasons, details, and examples.
- Show clear movement between general and specific ideas and examples.
- Develop several ideas fully, using specific and relevant reasons, details, and examples.
- Show effective movement between general and specific ideas and examples.

W4 Organizing Ideas

- Provide a discernible organization with some logical grouping of ideas in parts of the essay.
- Use a few simple and obvious transitions.
- Present a discernible, though minimally developed, introduction and conclusion.
- Provide a simple organization with logical grouping of ideas in parts of the essay.
- Use some simple and obvious transitional words, though they may at times be inappropriate or misleading.
- Present a discernible, though underdeveloped, introduction and conclusion.
- Provide an adequate but simple organization with logical grouping of ideas in parts of the essay but with little evidence of logical progression of ideas.
- Use some simple and obvious, but appropriate, transitional words and phrases.
- Present a discernible introduction and conclusion with a little development.
- Provide unity and coherence throughout the essay, sometimes with a logical progression of ideas.
- Use relevant, though at times simple and obvious, transitional words and phrases to convey logical relationships between ideas.
- Present a somewhat developed introduction and conclusion.
- Provide unity and coherence throughout the essay, often with a logical progression of ideas.

- Use relevant transitional words, phrases, and sentences to convey logical relationships between ideas.
- Present a well-developed introduction and conclusion.

W5 Using Language

- Show limited control of language by doing the following:
 - Correctly employing some of the conventions of standard English grammar, usage, and mechanics but with distracting errors that sometimes significantly impede understanding
 - Using simple vocabulary
 - Using simple sentence structure
 - Correctly employing some of the conventions of standard English grammar, usage, and mechanics but with distracting errors that sometimes impede understanding
 - Using simple but appropriate vocabulary
 - Using a little sentence variety, though most sentences are simple in structure
 - Correctly employing many of the conventions of standard English grammar, usage, and mechanics but with some distracting errors that may occasionally impede understanding
 - Using appropriate vocabulary
 - Using some varied kinds of sentence structures to vary pace
 - Correctly employing most conventions of standard English grammar, usage, and mechanics with a few distracting errors but none that impede understanding
 - Using some precise and varied vocabulary
 - Using several kinds of sentence structures to vary pace and to support meaning
 - Correctly employing most conventions of standard English grammar, usage, and mechanics with just a few, if any, errors
 - Using precise and varied vocabulary
 - Using a variety of kinds of sentence structures to vary pace and to support meaning