



Statewide Framework Document for: 110803

Standards may be added to this document prior to submission, but may not be removed from the framework to meet state credit equivalency requirements. Performance assessments may be developed at the local level. In order to earn state approval, performance assessments must be submitted within this framework. **This course is eligible for 1 credit of Geometry.** Washington State Mathematics Standards ([Common Core State Standards](#)) support foundational mathematical knowledge and reasoning. While it is important to develop a conceptual understanding of mathematical topics and fluency in numeracy and procedural skills, teachers should also focus on the application of mathematics to career fields to support the [three \(3\) key shifts of CCSS](#). The [Standards for Mathematical Practice](#) develop mathematical habits of mind and are to be modeled and integrated throughout the course.

Video Game Design/Digital Computer Animation for Game Design	
Course Title: Video Game Design	Total Framework Hours: 540
CIP Code: 110803 <input type="checkbox"/> Exploratory <input checked="" type="checkbox"/> Preparatory	Date Last Modified: May 4, 2015
Career Cluster: Arts, A/V Technology, and Communications	Cluster Pathway: Visual Arts
Eligible for Equivalent Credit in: <input checked="" type="checkbox"/> Math <input type="checkbox"/> Science	Total Number of Units: 17
Course Overview	
<p>Summary: This course focuses on the software, hardware, and mathematical tools used to represent, display, and manipulate topological, two-dimensional, and three-dimensional objects on a video screen. Students learn to function as computer graphics/video game development specialists. The course includes instruction in graphics software and systems; computer programming; digital multimedia; graphic design and video game design and development; graphics devices, processors, and standards; attributes and transformations; projections; surface identification and rendering; and color theory. Students will also learn concepts in algebra, geometry, and trigonometry as they are introduced to various mathematical concepts related to interactive computer and computer graphic-based applications.</p>	

Unit 1: Career Planning	Total Learning Hours for Unit: 5
<p>Unit Summary: In this unit, students will:</p> <ul style="list-style-type: none"> • Complete, discuss, and analyze the results of personality, career interest, and aptitude assessments. • Explore the career clusters as defined by the U.S. Department of Education and summarize the career opportunities in a cluster of personal interest. • Create a personal career portfolio including academic, certification, and technical skill requirements; career opportunities; expected wages; necessary skills and aptitudes; and the impact of technology on careers of personal interest. 	

- Determine academic/training or certification requirements for transition from one learning level to the next and explore opportunities for earning credit/certifications in high school such as Advanced Placement[®], tech prep, International Baccalaureate[®], college in high school, military, and apprenticeship opportunities.
- Develop and analyze tables, charts, and graphs related to career interests and give an oral presentation regarding the career pathway of their choice.
- Develop an awareness of financial aid, scholarships, and other sources of income to support postsecondary education/training and discuss the impact of effective college and career planning.
- Identify how performance on assessments such as the SAT[®], ACT[®], ASVAB[®], ACT Compass[®], and ACCUPLACER[®] affect personal academic and career goals.
- Prepare a personal budget reflecting desired lifestyle, and compare and contrast at least three careers of interest in regard to salary expectations and education/training costs.
- Prepare a program of study for at least one career of interest.
- Apply knowledge gained from individual assessment to a set of goals and a career plan.
- Develop strategies to make an effective transition from school to career.
- Identify industry certification opportunities.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Using career research tools (such as Career Cruising, ASVAB, WOIS), students will prepare a report covering their personal interests, aptitudes, and abilities. They will also cross-reference potential career pathways that appeal to them. The report should include an assessment of students' personal strengths for success in that particular field.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum professionalism lesson *Choose Your Own Identity*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

ARC05.02 Examine the various organizational structures adopted by groups within the arts, audio-video, technology, and communications field to understand the diversity and variety of functions within the industry.

ARC05.03 Analyze the arts, audio-visual technology and communication industry's economic base in order to demonstrate an understanding of the economic factors influencing the industry as a whole.

ARC05.04 Analyze and summarize evidence of interdependence between the technical and the artistic sides of this career cluster in order to demonstrate an understanding of the systems involved in the cluster.

ARC05.05 Analyze and summarize the formal and informal influences in the abstract and formal structures of business organizations within this cluster to demonstrate an understanding of the influences on holding careers in this field.

ARC06.06 Examine and summarize the life style implications and physical demands required by work activities common in the arts, audio/visual, technology and communications cluster to demonstrate a broad perspective regarding the nature of work in the industry.

ARC09.03 Identify, examine and select career opportunities in one or more arts, AV, technology and communication related career pathways in order to explore career options.

ARC10.01 Demonstrate the use of technical knowledge and skills that relate to pathways in this cluster to allow for mobility among numerous career options within the family of related occupations.

ARC10.02 Summarize knowledge of the systems within various pathways contained in the cluster to keep abreast of new technological advancements and tools important to work in this industry.

ARPA01.01 Examine and summarize career opportunities in audio and video technology and film to build an understanding of opportunities in the pathway.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 2: Personal Success

Total Learning Hours for Unit: 5

Unit Summary:

In this unit, students will:

- Implement effective study skills for academic success.
- Develop personal goals using SMART (Specific Measurable Attainable Realistic Timely) objectives and strategies.
- Use interpersonal skills to facilitate effective teamwork.
- Use a problem-solving model and critical thinking skills to make informed decisions.
- Use effective time management and goal-setting strategies.
- Effectively use information and communication technology tools.
- Identify skills that can be transferable among a variety of careers.
- Create and complete appropriate documents such as an electronic portfolio, personal résumé, employment application, letter of intent, letter of recommendation, and thank-you letter.
- Complete job search documents, including job applications and W-4 forms.
- Demonstrate proper interview techniques in various situations.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will generate a résumé and keep a portfolio of their quality work. As they research job openings within a variety of companies, they should compare and contrast their descriptions, duties, and expectations. Students will prepare responses to standard interview questions and participate in a WOIS assessment or other career research assignment. Students will prepare a written report on career research using standard MLA format. Students will present their career research orally using media such as PowerPoint, handouts, and video.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum professionalism lesson *I Believe in Me*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

ARC10.02 Summarize knowledge of the systems within various pathways contained in the cluster to keep abreast of new technological advancements and tools important to work in this industry.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 3: Employability and Entrepreneurship

Total Learning Hours for Unit: 10

Unit Summary:

In this unit, students will:

- Demonstrate effective verbal, nonverbal, written, and electronic communication skills.
- Evaluate the impact of positive and negative personal choices, including use of electronic communications such as social networking sites.
- Model characteristics of effective leadership, teamwork, and conflict management.
- Recognize the importance of a healthy lifestyle, including the ability to manage stress.
- Explore and model characteristics necessary for professional success (such as work ethics, integrity, dedication, perseverance, and the ability to interact with a diverse population).
- Complete activities using techniques to manage their projects and time.
- Identify and model appropriate grooming and appearance for the workplace.
- Demonstrate dependability, punctuality, and initiative.
- Research positive interpersonal skills, including respect for diversity.
- Model appropriate business and personal etiquette in the workplace.
- Exhibit productive work habits, ethical practices, and a positive attitude.
- Demonstrate the ability to work with other employees to support the organization and complete assigned tasks.
- Demonstrate willingness to learn and further develop skills.
- Describe the importance of having a positive attitude and techniques that boost morale.

- Show initiative by coming up with unique solutions and taking on extra responsibilities.
- Explain the importance of setting goals and demonstrate the ability to set, reach, and evaluate goals.
- Explain the importance of taking pride in work accomplished and extrinsic and intrinsic motivators that can be used to increase pride.
- Identify how to prioritize work to fulfill responsibilities and meet deadlines.
- Research and compare published workplace policies and procedures.
- Summarize provisions of the Fair Labor Standards Act.
- Describe the consequences of breach of confidentiality.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will write short essays on the following topics: (1) Work ethic – List the characteristics of a good work ethic, providing examples of what a good work ethic looks like in the workplace, and evaluate your own work ethic in the classroom and/or laboratory; (2) Work communications – Provide proper use and content of e-mails, phone calls, face-to-face conversations, text messages, and social networking personal messages to communicate within the workplace; and (3) Workplace initiative and responsibility – Examine how to develop the ability to work with limited or no supervision and how an individual can take on more responsibility in the workplace.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum work ethic lesson *Get it Done*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

- ARC05.02 Examine the various organizational structures adopted by groups within the arts, audio-video, technology, and communications field to understand the diversity and variety of functions within the industry.
- ARC05.03 Analyze the arts, audio-visual technology and communication industry's economic base in order to demonstrate an understanding of the economic factors influencing the industry as a whole.
- ARC05.05 Analyze and summarize the formal and informal influences in the abstract and formal structures of business organizations within this cluster to demonstrate an understanding of the influences on holding careers in this field.
- ARC06.01 Maintain safe and healthful working conditions by completing work tasks in accordance with rights and applicable responsibilities in a arts, audio-visual technology and communications work environment to protect employees' well being.
- ARC09.01 Explain written organizational policies, rules and procedures common to careers in arts, AV, technology and communication fields to help employees perform their jobs.

ARC09.03 Identify, examine and select career opportunities in one or more arts, AV, technology and communication related career pathways in order to explore career options.

ARC10.01 Demonstrate the use of technical knowledge and skills that relate to pathways in this cluster to allow for mobility among numerous career options within the family of related occupations.

ARC10.02 Summarize knowledge of the systems within various pathways contained in the cluster to keep abreast of new technological advancements and tools important to work in this industry.

ARPA01.01 Examine and summarize career opportunities in audio and video technology and film to build an understanding of opportunities in the pathway.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 4: Problem Solving	Total Learning Hours for Unit: 25
<p>Unit Summary: In this unit, students will:</p> <ul style="list-style-type: none"> • Employ critical thinking skills independently and in teams to solve problems and make decisions. • Employ critical thinking and interpersonal skills to resolve conflicts. • Identify and document workplace performance goals and monitor progress toward those goals. • Conduct technical research to gather information necessary for decision making. • Explain the importance and dynamics of individual and teamwork approaches to problem solving. • Describe methods of researching and validating reliable information relevant to the problem. • Explain strategies used to formulate ideas, proposals, and solutions to problems. • Select potential solutions based on reasoned criteria. • Implement and evaluate solutions. 	
<p>Performance Assessments: <i>Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.</i></p> <p>Students will choose a topic and write a tutorial. Students will draw an assembly sequence diagram for a product using animation skills (e.g., IKEA product assembly directions in pictures without text).</p> <p>Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.</p> <ul style="list-style-type: none"> • Level 0: No Exposure or Not Completed. • Level 1: Exposure Only—general information and some elements are shown. • Level 2: Limited Practice—has practiced job and some elements are complete. • Level 3: Moderately Skilled—has performed job and most elements are complete. • Level 4: Skilled—can perform job and all elements are complete. 	
<p>Leadership Alignment:</p> <ul style="list-style-type: none"> • Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students. 	

- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum decision-making lesson *Making Informed Decisions*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

- Practice 1: Make sense of problems and persevere in solving them.
- Practice 3: Construct viable arguments and critique the reasoning of others.
- Practice 4: Model with mathematics.
- Practice 6: Attend to precision.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

- RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

Unit 5: Health and Safety

Total Learning Hours for Unit: 15

Unit Summary:

In this unit, students will:

- Describe personal and job site safety rules and regulations that maintain safe and healthy work environments.
- Explain emergency procedures to follow in response to workplace accidents.
- Create a disaster and/or emergency response plan.
- Identify and apply OSHA and other health and safety regulations that apply to specific tasks and jobs in the occupational area.
- Identify and apply EPA and other environmental protection regulations that apply to specific tasks and jobs in the occupational area.
- Identify and apply Right-To-Know (Hazard Communication Policy) and other communicative regulations that apply to specific tasks and jobs in the occupational area.
- Explain procedures for documenting and reporting hazards to appropriate authorities.
- List penalties for noncompliance with appropriate health and safety regulations.
- Identify contact information for appropriate health and safety agencies and resources.
- Create a systematic safety program that would achieve OSHA compliance and promote a safe working environment.
- Illustrate a safe environment for students in printing.
- Identify, describe, and demonstrate the effective use of Material Safety Data Sheets (MSDS).
- Read chemical, product, and equipment labels to determine appropriate health and safety considerations.
- Identify, describe, and demonstrate personal, shop, and job site safety practices and procedures.
- Demonstrate safe dress and use of relevant safety gear and personal protective equipment (PPE) including wrist rests, adjustable workspaces and equipment, gloves, boots, earplugs, eye protection, and breathing apparatus.
- Illustrate appropriate safe body mechanics, including proper lifting techniques and ergonomics.

- Locate emergency equipment in the lab, shop, and/or classroom, including (where appropriate) eyewash stations, shower facilities, sinks, fire extinguishers, fire blankets, telephone, master power switches, and emergency exits.
- Demonstrate the safe use, storage, and maintenance of every piece of equipment in the lab, shop, and classroom.
- Describe safety practices and procedures to be followed when working with and around electricity.
- Illustrate proper handling and storage practices, including working with hazardous materials, disposal, and recycling.
- Demonstrate proper workspace cleaning procedures.
- Illustrate first aid procedures for potential injuries and other health concerns in the occupational area.
- Describe the importance of emergency preparedness and an emergency action plan.
- Illustrate procedures used to handle emergency situations and accidents, including identification, reporting, response, evacuation plans, and follow-up procedures.
- Identify practices used to avoid accidents.
- Identify and describe fire protection, precautions, and response procedures.
- Discuss the role of the individual and the company/organization in ensuring workplace safety.
- Discuss ways to identify and prevent workplace/school violence.
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Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Working in teams, students will develop and conduct a comprehensive work environment assessment of the classroom. Students will use WISHA/OSHA standards and other available environmental guidelines (lighting, noise, keyboards, etc.) to develop the assessment instrument. The assessment will include a written report that outlines the standards that were satisfied and suggestions for improvement.

Students will create design projects according to set criteria, including environmental, safety, health, and other requirements/restrictions. They will do requisite research and mathematical computations in designing their projects. Students will submit written and/or oral presentations of their final design projects. Projects will be assessed in terms of environmental, physical, and other needs and restrictions. The instructor will conduct day-to-day observations of students using proper ergonomic considerations at their workstations.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum planning, organizing, and management lesson *Planning to Plan*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

- ARC06.01 Maintain safe and healthful working conditions by completing work tasks in accordance with rights and applicable responsibilities in a arts, audio-visual technology and communications work environment to protect employees' well being.
- ARC06.02 Assess and control methods to reduce sources of office and worksite accident hazards common in the arts, audio-visual technology and communications industry in order to promote a safe and accident free working environment.
- ARC06.03 Examine and summarize the responsibilities various entities have for promoting a safe and healthy work environment in order to understanding the roles involved in maintaining acceptable conditions in the arts, technology and communications field.
- ARC06.05 Apply safety procedures in operating equipment commonly used within the career pathways involved in this cluster to demonstrate a broad understanding of important safety practices.
- ARC06.07 Demonstrate personal safety habits and procedures while on work-related assignments in various locations beyond the business site to ensure personal safety and well-being.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 6: Teamwork and Cooperation

Total Learning Hours for Unit: 15

Unit Summary:

In this unit, students will:

- Employ leadership skills to accomplish organizational goals and objectives.
- Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.
- Conduct and participate in meetings to accomplish work tasks.
- Employ mentoring skills to inspire and teach others.
- Cooperate rather than compete with team members.
- Seek suggestions, opinions, and information from team members.
- Listen to and consider the ideas of team members.
- Support group decisions even if not in total agreement.
- Communicate changes or problems to team members.
- Treat everybody with respect and understanding
- Employ mentoring skills to inspire and teach others.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Assuming the role of a game design team member working with a potential client, students will work on a project (agreed upon by the team and the instructor) that will include the standard procedures for working with clients. For the purpose of this project, the "client" could be the instructor, advisory committee members, parents, etc. The group project should require students to use such leadership skills as goal setting, advocacy, communication, and/or parliamentary procedure to ensure the success of the project. Peer assessment shall be an integral component of the project.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum teamwork lesson *Leading and Following*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

Practice 3: Construct viable arguments and critique the reasoning of others.

Unit 7: Ethics and Legal Responsibilities

Total Learning Hours for Unit: 20

Unit Summary:

In this unit, students will:

- Evaluate and justify decisions based on ethical reasoning.
- Evaluate alternative responses to workplace situations based on employer policies and personal, professional, ethical, and legal responsibilities.
- Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace.
- Interpret and explain written organizational policies and procedures.
- Collaborate with classmates in researching or reviewing an Acceptable Use Policy.
- Conduct an Internet search (optional).
- Understand the responsibilities of Internet use (using the Internet efficiently and ethically for work, identifying the risks of posting personal and work information on the internet, social networking sites, job search sites, taking measures to avoid Internet security risks such as viruses and malware).
- Discuss legal issues associated with locating and retrieving information from the Internet.
- Understand Acceptable Use Policy, Copyright, and Fair Use Laws.
- Conduct research on the Internet and correctly identify and cite sources in a bibliography.
- Use information from electronic communication sources.
- Understand End User License Agreements (EULA).
- Understand intellectual property rights.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Working in teams, students will develop a problem concerning ethical and legal standards in a field related to video game design. Problems selected will require instructor approval. Once the problem has been identified, the teams will conduct research and then develop a group report. The report, which will be presented to the class, will include: description of the problem, legal findings, and solutions. Possible problem areas include: handicapped access, safety standards, design failure, ecology concerns, workers' rights and responsibilities, employers' rights and responsibilities, ergonomics, etc.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only-general information and some elements are shown.
- Level 2: Limited Practice-has practiced job and some elements are complete.
- Level 3: Moderately Skilled-has performed job and most elements are complete.
- Level 4: Skilled-can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum responsibility lesson *Personal Well Being*.

Industry Standards and Competencies**The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:**

ARC08.01 Exhibit ethical conduct in writing, creating, printing, broadcasting, and performing to uphold high standards for behavior in the industry.

ARC08.02 Analyze and apply laws affecting arts, technology and communication enterprises to maintain up-to-date compliance with key regulations influencing the industry.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 8: Time Management**Total Learning Hours for Unit: 10****Unit Summary:**

In this unit, students will:

- Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
- Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
- Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
- Display knowledge of the efficient use of human resources.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Student is expected to attend class on time, dress appropriately, be ready to work and manage assignments, submitting them before the due date using a Virtual Learning Environment.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum planning, organizing, and management lesson *Managing a Plan*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 9: Computer Foundation Skills	Total Learning Hours for Unit: 15
Unit Summary: In this unit, students will: <ul style="list-style-type: none"> • Learn remedial computer knowledge. Students will be comfortable working in, saving, and retrieving files, accessing network folders in a Windows OS environment. • Develop baseline mathematical skills. All students must demonstrate a solid ability to think algebraically. • Develop art and design skills. Students must be willing to express themselves in traditional and electronic visual media. • Reinforce safety knowledge. Students will demonstrate an ability to work safely with computers including correct ergonomics and respect for electronic machinery. 	

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will compete worksheets about various projects discovering pieces of equipment used in game development and animation.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum communications lesson *Message is Clear*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards

Washington state standards were not identified for this unit but may be added at the local level.

Unit 10: Computer Science and Applied Programming	Total Learning Hours for Unit: 90
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Unit Summary:

In this unit, students will learn about:

- Vocabulary related to computers
- Intro to programming languages
- Intro to problem solving / UML / flowcharting / pseudo-code
- Types of variables
- Data types
- Operators and operands
- Statements
- Expressions
- Integrated Development Environment
- Flow control
- Functions and function calls

- Functions with arguments
- Input and output
- Pointers
- Algorithmic reasoning
- Behaviors
- State machine
- Object-oriented programming (abstraction, encapsulation)
- Classes and objects
- Inheritance
- Polymorphism
- Operator overloading
- Pointers to objects
- Structures
- One-dimensional arrays
- Two-dimensional arrays
- File saving and loading
- Bubble-sort algorithm
- Binary-search algorithm
- Binary maps
- Friend functions
- Virtual functions
- Templates
- Dynamic arrays
- Linked lists
- Stack
- Push and pop
- Memory allocation
- Advanced data structures
- Algorithm analysis

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will demonstrate their programming knowledge by successfully completing multiple, progressive game programs using the practices from this unit.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.

Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum teamwork lesson *Leading and Following*. The communication lesson *Putting Your Best Communication Forward* is also relevant.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards**Standards for Mathematical Practice (Common Core State Standards):**

Practice 1: Make sense of problems and persevere in solving them.

Practice 2: Reason abstractly and quantitatively.

Practice 3: Construct viable arguments and critique the reasoning of others.

Practice 4: Model with mathematics.

Practice 5: Use appropriate tools strategically.

Practice 6: Attend to precision.

Practice 7: Look for and make use of structure.

Practice 8: Look for and express regularity in repeated reasoning.

Washington Mathematics Standards (Common Core State Standards):

Cluster: Reason quantitatively and use units to solve problems.

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Cluster: Represent and model with vector quantities.

N.VM.A.1 Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v , $|v|$, $\|v\|$, v).

N.VM.A.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

N.VM.A.3 Solve problems involving velocity and other quantities that can be represented by vectors.

Cluster: Perform operations on vectors.

N.VM.B.4 Add and subtract vectors.

4a Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.

4b Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.

4c Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w , with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.

N.VM.B.5 Multiply a vector by a scalar.

5a Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.

5b Compute the magnitude of a scalar multiple cv using $\|cv\| = |c|v$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).

Cluster: Perform operations on matrices and use matrices in applications.

N.VM.C.6 Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

N.VM.C.7 Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

N.VM.C.8 Add, subtract, and multiply matrices of appropriate dimensions.

N.VM.C.9 Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

N.VM.C.10 Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

N.VM.C.11 Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

N.VM.C.12 Work with 2×2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

Cluster: Interpret the structure of expressions.

A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.

1a Interpret part of an expression, such as terms, factors, and coefficients.

1b Interpret complicated expressions by viewing one or more of their parts as a single entity.

A.SSE.A.2 Use the structure of an expression to identify ways to rewrite it.

Cluster: Create equations that describe numbers or relationships.

A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.

A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Cluster: Understand the concept of a function and use function notation.

F.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

Cluster: Experiment with transformations in the plane.

G.CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Cluster: Apply geometric concepts in modeling situations.

G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Cluster: Understand independence and conditional probability and use them to interpret data.

S.CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (or, and, not).

S.CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S.CP.A.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .

S.CP.A.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

S.CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

Cluster: Use probability to evaluate outcomes of decisions.

S.MD.B.5 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

5a Find the expected payoff for a game of chance.

5b Evaluate and compare strategies on the basis of expected values.

S.MD.B.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S.MD.B.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Unit 11: Applied Mathematics Concepts

Total Learning Hours for Unit: 90

Unit Summary:

In this unit, competencies include:

- Vocabulary
- Understanding that mathematics is embedded in all video games
- Integers
- Decimals
- Fractions
- Functions and transformations
- Graphing functions
- A video game use for linear systems
- A video game use for systems of linear equations
- A video game use for quadratic equations
- Number systems
- Logic gates
- Introduction to trigonometry

- Trigonometric functions
- Trigonometric functions on right triangles
- Trigonometric identities
- Vectors
- Vector types
- Reflection as math
- Position coordinate systems
- Polar coordinates
- Graphing conic sections
- Exponentials/logarithms (link to number systems)
- Series
- Matrices
- Determinant function
- Transformations of a matrix
- Parametric equations
- Complex and imaginary numbers (arithmetic and graphing)

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will implement the mathematics principles in simulations of real-world situations. As they complete video games and animation projects, students will solve math problems related to game design and animation.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

Two possible activities are the SkillsUSA Career Readiness Curriculum self-motivation lesson *Attitude is Everything* and the leadership lesson *The Connection*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

- Practice 1: Make sense of problems and persevere in solving them.
- Practice 2: Reason abstractly and quantitatively.
- Practice 3: Construct viable arguments and critique the reasoning of others.
- Practice 4: Model with mathematics.
- Practice 5: Use appropriate tools strategically.
- Practice 6: Attend to precision.
- Practice 7: Look for and make use of structure.
- Practice 8: Look for and express regularity in repeated reasoning.

Washington Mathematics Standards (Common Core State Standards):

Cluster: Reason quantitatively and use units to solve problems.

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Cluster: Represent and model with vector quantities.

N.VM.A.1 Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v , $|v|$, $\|v\|$, v).

N.VM.A.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

N.VM.A.3 Solve problems involving velocity and other quantities that can be represented by vectors.

Cluster: Perform operations on vectors.

N.VM.B.4 Add and subtract vectors.

4a Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.

4b Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.

4c Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w , with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.

N.VM.B.5 Multiply a vector by a scalar.

5a Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.

5b Compute the magnitude of a scalar multiple cv using $\|cv\| = |c|v$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).

Cluster: Perform operations on matrices and use matrices in applications.

N.VM.C.6 Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

N.VM.C.7 Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

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N.VM.C.11 Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

N.VM.C.12 Work with 2×2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

Cluster: Interpret the structure of expressions.

A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.

1a Interpret part of an expression, such as terms, factors, and coefficients.

1b Interpret complicated expressions by viewing one or more of their parts as a single entity.

A.SSE.A.2 Use the structure of an expression to identify ways to rewrite it.

Cluster: Create equations that describe numbers or relationships.

A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.

A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Cluster: Understand the concept of a function and use function notation.

F.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

Cluster: Interpret functions that arise in applications in terms of the context.

F.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

F.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

F.IF.B.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Cluster: Build new functions from existing functions.

F.BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.BF.B.4 Find inverse functions.

4a Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.

4b Verify by composition that one function is the inverse of another.

4c Read values of an inverse function from a graph or a table, given that the function has an inverse.

4d Produce an invertible function from a non-invertible function by restricting the domain.

F.BF.B.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

Cluster: Experiment with transformations in the plane.

G.CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Cluster: Visualize relationships between two-dimensional and three-dimensional objects.

G.GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Cluster: Apply geometric concepts in modeling situations.

G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

S.IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S.IC.B.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S.IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

S.IC.B.6 Evaluate reports based on data.

Cluster: Understand independence and conditional probability and use them to interpret data.

S.CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (or, and, not).

S.CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S.CP.A.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .

S.CP.A.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

S.CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

Cluster: Use probability to evaluate outcomes of decisions.

S.MD.B.5 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

5a Find the expected payoff for a game of chance.

5b Evaluate and compare strategies on the basis of expected values.

S.MD.B.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S.MD.B.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

Unit Summary:

In this unit, students will learn about:

- C-3.0 vocabulary
- Art/design elements
- Art/design principles
- Color theory
- Intro to 2D drawing application
- Anatomy of motion
- Keyframing and tweening
- Image file types
- Research
- Advanced 2D graphics (e.g., using Photoshop)
- The design process
- Golden rectangles
- Psychology of color
- Character design
- Introduction to 3D modeling and animation application
- 3D primitives and modeling
- 3D spline modeling
- 3D grouping
- 3D textures
- Gestalt theory

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will create original art assets for their games while applying the fundamentals of art design. Students' artwork will communicate appropriately and effectively to the designated audience.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.

- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum teamwork lesson *Cooperation, Get the Job Done*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

Practice 6: Attend to precision.

Washington Mathematics Standards (Common Core State Standards):

Cluster: Apply geometric concepts in modeling situations.

- G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
- G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Washington Arts Standards:

- Arts 1.0 The student understands and applies arts knowledge and skills in dance, music, theatre, and visual arts.
 - 1.1 Understands and applies arts concepts and vocabulary.
 - 1.2 Develops arts skills and techniques.
 - 1.3 Understands and applies arts genres and styles from various artists, cultures, and times.
 - 1.4 Understands and applies audience conventions in a variety of arts settings and performances.
- Arts 2.0 The student demonstrates thinking skills using artistic process.
 - 2.1 Applies a creative process to the arts (dance, music, theatre and visual arts):
 - Identifies audience and purpose.
 - Explores, gathers, and interprets information from diverse sources.
 - Uses ideas, foundations, skills and techniques to develop dance, music, theatre and visual art.
 - Implements choices of arts elements, principles, foundations, skills, and techniques in a creative work.
 - Reflects for the purpose of self-evaluation and improvement of the creative work.
 - Refines work based on feedback, self-reflection, and aesthetic criteria.
 - Presents work to others in a performance, exhibition, and/or production.
 - Performs work for others in a performance and/or production.
 - 2.2 Applies a performance and/or presentation process to the arts (dance, music, theatre and visual arts):
 - Identifies audience and purpose of the work and/or performance.
 - Selects artistic resources, materials and/or repertoire to create, perform and present.
 - Analyzes the structure, context and/or aesthetics of the work.
 - Interprets meaning through personal understanding of the work and/or performance.
 - Rehearses, adjusts, and refines through evaluation, reflection and problem solving.
 - Presents, exhibits, and produces work and/or performance for others.
 - Reflects and self-evaluates work and/or performance to set goals.
 - 2.3 Applies a responding process to an arts performance and/or presentation of dance, music, theatre and visual arts):
 - Engages the senses actively and purposefully in perceiving the work.

- Describes what is seen, felt and/or heard (perceived/experienced).
- Interprets meaning based on personal experiences and knowledge.
- Evaluates and justifies using supportive evidence and aesthetic criteria.
- Applies a responding process to an arts presentation working towards independence with teacher mentoring.

Arts 3.0 The student communicates through the arts.

- 3.1 Uses the arts to express feelings and present ideas.
- 3.2 Uses the arts to communicate for a specific purpose.
- 3.3 Develops personal aesthetic criteria to communicate artistic choices.

Arts 4.0 The student makes connections within and across the arts to other disciplines, life, cultures and work.

- 4.1 Demonstrates and analyzes the connections among the arts disciplines.
- 4.2 Demonstrates and analyzes the connections between the arts and other content areas.
- 4.3 Understands how the arts impact and reflect personal choices throughout life.
- 4.4 Understands how the arts influence and reflect culture/civilization, place and time.
- 4.5 Understands how arts knowledge and skills are used in the world of work including careers in the arts.

Unit 13: Game Design Concepts

Total Learning Hours for Unit: 90

Unit Summary:

In this unit, students will learn about:

- History of computer and video game industry
- Definition of computer game
- Entertainment value
- Computer game development process
- Computer game development team
- Computer game platforms
- Computer game engine and tools
- Scripting
- Game genres
- Character design, including enemies
- Story proposal
- Design presentation
- Requirements analysis
- Production of art assets
- Game user interface (GUI) design
- AI design
- Sound and music
- Game design document
- Technical design document
- Digital prototyping process
- Playability
- Measuring and handling player feedback
- Cultural sensitivity and appreciation
- Localization

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will present their game designs and thinking to teachers, peers, and groups. Their presentation will demonstrate an understanding of the design process. Future iterations of the design process will demonstrate that students have grown in their understanding.

Students will use the computer game development process in teams to create at least two games of different genres using the competencies from this unit (listed above) and present them to the class and the instructor for final grade based on industry standards.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.
-

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

Two possible activities are the SkillsUSA Career Readiness Curriculum teamwork lesson *Capitalizing on Strengths* and integrity lesson *To Be or Not to Be*.

Industry Standards and Competencies

Industry standards were not identified for this unit but may be added at the local level.

Aligned Washington State Standards**Standards for Mathematical Practice (Common Core State Standards):**

Practice 1: Make sense of problems and persevere in solving them.

Practice 2: Reason abstractly and quantitatively.

Practice 3: Construct viable arguments and critique the reasoning of others.

Practice 4: Model with mathematics.

Practice 5: Use appropriate tools strategically.

Practice 6: Attend to precision.

Practice 7: Look for and make use of structure.

Practice 8: Look for and express regularity in repeated reasoning.

Washington Mathematics Standards (Common Core State Standards):

Cluster: Reason quantitatively and use units to solve problems.

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Cluster: Create equations that describe numbers or relationships.

A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.

A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Cluster: Understand the concept of a function and use function notation.

F.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

Cluster: Experiment with transformations in the plane.

G.CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Cluster: Understand independence and conditional probability and use them to interpret data.

S.CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (or, and, not).

S.CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S.CP.A.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A , and the conditional probability of B given A is the same as the probability of B .

S.CP.A.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.

S.CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

Cluster: Use probability to evaluate outcomes of decisions.

S.MD.B.5 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

5a Find the expected payoff for a game of chance.

5b Evaluate and compare strategies on the basis of expected values.

S.MD.B.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S.MD.B.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

Unit 14: Computer Concepts

Total Learning Hours for Unit: 20

Unit Summary:

In this unit, students will:

- Identify internal computer parts, peripherals, and mobile technology.
- Contrast and compare different models of a PC (low, medium, and high priced).
- Research the “short cut” or “hot keys” in software applications.
- Understand the basics of different operating systems.
- Review Internet search basics.
- Identify sources of help with computer hardware or with software issues that arise from time to time.
- Employ proper social media and email etiquette.
- Use file maintenance, backup, and security to safeguard student work.
- Read and understand computer user agreements, including their legal implications.
- Understand copyright and intellectual property protection.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Student will write a research paper with a partner about the history of computers, or another related topic. Students will demonstrate their understanding of computers by preparing a poster board for presentation to the class.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.

- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum multicultural sensitivity and awareness lesson *Fostering Diversity*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

- ARC05.01 Analyze and summarize the history and evolution of the arts, audio-video technology, and communications field to understand the current place the field holds within society and the economy.
- ARC06.04 Examine and summarize safety related problems that may result from working with electrical circuits used in this cluster to demonstrate a broad understanding of health and safety concerns.
- ARC06.06 Examine and summarize the life style implications and physical demands required by work activities common in the arts, audio/visual, technology and communications cluster to demonstrate a broad perspective regarding the nature of work in the industry.
- ARC06.07 Demonstrate personal safety habits and procedures while on work-related assignments in various locations beyond the business site to ensure personal safety and well-being.
- ARC10.01 Demonstrate the use of technical knowledge and skills that relate to pathways in this cluster to allow for mobility among numerous career options within the family of related occupations.
- ARC10.02 Summarize knowledge of the systems within various pathways contained in the cluster to keep abreast of new technological advancements and tools important to work in this industry.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

- Practice 2: Reason abstractly and quantitatively.
- Practice 5: Use appropriate tools strategically.
- Practice 7: Look for and make use of structure.
- Practice 8: Look for and express regularity in repeated reasoning.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

- RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

Unit Summary:

In this unit, students will:

- Become familiar with the following art elements and principles:
 - Form versus content
 - Inserting shots and cutaways
 - Defining composition
 - Static composition
 - Dynamic composition
 - Clearly establishing objectives
 - Single center of interest
 - Shifting the center of interest
 - Leading the subject
 - Rule of thirds
 - S-curve
 - Maintaining tonal balance
 - Balance mass
 - Concrete and abstract art
 - Framing the central subject matter
 - Conveying meaning through colors and tones
 - Controlling the number of prime objects
 - Balancing complexity and order
 - Movement and meaning
- Learn about the following key concepts:
 - Color and value theory
 - Design principles and visual storytelling
 - Basic art history
 - Art appreciation
 - Using source references
 - Timing, spacing, and placement
 - Observational drawing (drawing from life, rather than from pictures or screen-based imagery)
- Gain experience with the following animation principles:
 - Differences between 2D, 3D, and other forms of animation
 - Key frames, breakdown positions, and in-betweens
- Learn the fundamentals of gesture drawing:
 - Fast and slow poses of sequential action via live model
 - Keeping an animator's sketchbook and observing life outside the classroom

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will complete a series of worksheets on competencies listed above and produce an animation incorporating art elements and principles, color and value, and design principles in 2D and 3D. Students will present their animation for peer evaluation and feedback and final product to instructor who will score

according to industry standards.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum leadership lesson *Opening the Door*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

ARC05.01 Analyze and summarize the history and evolution of the arts, audio-video technology, and communications field to understand the current place the field holds within society and the economy.

ARC05.02 Examine the various organizational structures adopted by groups within the arts, audio-video, technology, and communications field to understand the diversity and variety of functions within the industry.

ARC05.04 Analyze and summarize evidence of interdependence between the technical and the artistic sides of this career cluster in order to demonstrate an understanding of the systems involved in the cluster.

ARC08.01 Exhibit ethical conduct in writing, creating, printing, broadcasting, and performing to uphold high standards for behavior in the industry.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

Practice 1: Make sense of problems and persevere in solving them.

Practice 2: Reason abstractly and quantitatively.

Practice 4: Model with mathematics.

Practice 5: Use appropriate tools strategically.

Practice 6: Attend to precision.

Practice 7: Look for and make use of structure.

Practice 8: Look for and express regularity in repeated reasoning.

Washington Mathematics Standards (Common Core State Standards):

Cluster: Reason quantitatively and use units to solve problems.

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Cluster: Experiment with transformations in the plane.

G.CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line,

distance along a line, and distance around a circular arc.

G.CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Cluster: Understand congruence in terms of rigid motions.

G.CO.B.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G.CO.B.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G.CO.B.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Cluster: Make geometric constructions.

G.CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).

G.CO.D.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Cluster: Understand similarity in terms of similarity transformations.

G.SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor:

1a A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

1b The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G.SRT.A.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G.SRT.A.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Cluster: Understand and apply theorems about circles.

G.C.A.1 Prove that all circles are similar.

G.C.A.2 Identify and describe relationships among inscribed angles, radii, and chords.

G.C.A.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G.C.A.4 Construct a tangent line from a point outside a given circle to the circle.

Cluster: Visualize relationships between two-dimensional and three-dimensional objects.

G.GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Cluster: Apply geometric concepts in modeling situations.

G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
 RST.11-12.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.
 RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
 RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

Unit 16: Storyboarding and Preproduction	Total Learning Hours for Unit: 30
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Unit Summary:
 In this unit, students will:

- Learn to set milestones, establish a budget, and schedule deadlines.
- Research and design a character.
- Design concept art for a storyboard.
- Create a storyboard and develop a simple animatic that gives a sense of the story timeline.
- Develop a shot list, including such elements as staging, layout, reading, and a rehearsal schedule.
- Learn how to deal with location logistics and clearances, including release forms.
- Learn about cutaway shots and jump cuts.
- Consider different aspects of camera shots: fields, frames, and camera angles.
- Apply art elements and principles.
- Learn how to color scripts (for film productions with multiple scenes).
- Learn about the production pipeline, with a required 30% of production time spent in preproduction.
- Gain exposure to audio tracks and timing.
- Record a scratch (guide) track on which to base animatic timings.

Performance Assessments:
Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will demonstrate that they can practically apply the unit concepts by creating a preproduction notebook. Their ultimate project is to create a video introduction or trailer for one of the game designs that they developed previously.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.

- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum responsibility lesson *You Can Count On Me*.

Industry Standards and Competencies

The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:

ARC05.02 Examine the various organizational structures adopted by groups within the arts, audio-video, technology, and communications field to understand the diversity and variety of functions within the industry.

ARC05.04 Analyze and summarize evidence of interdependence between the technical and the artistic sides of this career cluster in order to demonstrate an understanding of the systems involved in the cluster.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

Practice 2: Reason abstractly and quantitatively.

Practice 3: Construct viable arguments and critique the reasoning of others.

Practice 5: Use appropriate tools strategically.

Practice 6: Attend to precision.

Practice 7: Look for and make use of structure.

Washington Mathematics Standards (Common Core State Standards):

Cluster: Understand and apply theorems about circles.

G.C.A.1 Prove that all circles are similar.

G.C.A.2 Identify and describe relationships among inscribed angles, radii, and chords.

G.C.A.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G.C.A.4 Construct a tangent line from a point outside a given circle to the circle.

Cluster: Apply geometric concepts in modeling situations.

G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

RST.11-12.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Unit 17: Lighting and Meters**Total Learning Hours for Unit: 10****Unit Summary:**

In this unit, students will:

- Study three-point lighting (key, fill, and back/rim/kicker).
- Become familiar with different types of lighting instruments.
- Learn about the uses of different type of lamps (hard, soft, and natural).
- Understand how to adjust for lighting intensity and color.
- Understand the concept of contrast ratio.
- Learn how to use light meters.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Students will work in pairs to produce three different shots that include different combinations of the unit's competencies. They should present their results to the class and defend their process and product.

Using a performance rubric, the student will demonstrate proficiency at a level 3 or greater.

- Level 0: No Exposure or Not Completed.
- Level 1: Exposure Only—general information and some elements are shown.
- Level 2: Limited Practice—has practiced job and some elements are complete.
- Level 3: Moderately Skilled—has performed job and most elements are complete.
- Level 4: Skilled—can perform job and all elements are complete.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

One possible activity is the SkillsUSA Career Readiness Curriculum integrity lesson *Accept Responsibility*.

Industry Standards and Competencies**The Common Career Technical Core Standards - Arts, A/V Technology, and Communications Cluster: A/V Technology & Film Pathway:**

ARC05.02 Examine the various organizational structures adopted by groups within the arts, audio-video, technology, and communications field to understand the diversity and variety of functions within the industry.

ARC05.04 Analyze and summarize evidence of interdependence between the technical and the artistic sides of this career cluster in order to demonstrate an understanding of the systems involved in the cluster.

ARC06.01 Maintain safe and healthful working conditions by completing work tasks in accordance with rights and applicable responsibilities in a arts, audio-visual technology and communications work environment to protect employees' well being.

ARC06.02 Assess and control methods to reduce sources of office and worksite accident hazards common in the arts, audio-visual technology and communications industry in order to promote a safe and accident free working environment.

- ARC06.03 Examine and summarize the responsibilities various entities have for promoting a safe and healthy work environment in order to understanding the roles involved in maintaining acceptable conditions in the arts, technology and communications field.
- ARC06.04 Examine and summarize safety related problems that may result from working with electrical circuits used in this cluster to demonstrate a broad understanding of health and safety concerns.
- ARC06.05 Apply safety procedures in operating equipment commonly used within the career pathways involved in this cluster to demonstrate a broad understanding of important safety practices.
- ARC06.07 Demonstrate personal safety habits and procedures while on work-related assignments in various locations beyond the business site to ensure personal safety and well-being.
- ARC09.03 Identify, examine and select career opportunities in one or more arts, AV, technology and communication related career pathways in order to explore career options.
- ARC10.01 Demonstrate the use of technical knowledge and skills that relate to pathways in this cluster to allow for mobility among numerous career options within the family of related occupations.
- ARC10.02 Summarize knowledge of the systems within various pathways contained in the cluster to keep abreast of new technological advancements and tools important to work in this industry.

Aligned Washington State Standards

Standards for Mathematical Practice (Common Core State Standards):

- Practice 1: Make sense of problems and persevere in solving them.
- Practice 2: Reason abstractly and quantitatively.
- Practice 4: Model with mathematics.
- Practice 5: Use appropriate tools strategically.
- Practice 6: Attend to precision.
- Practice 7: Look for and make use of structure.
- Practice 8: Look for and express regularity in repeated reasoning.

Washington Mathematics Standards (Common Core State Standards):

- Cluster: Reason quantitatively and use units to solve problems.
- N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
 - N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
 - N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
- Cluster: Prove geometric theorems.
- G.CO.C.9 Prove theorems about lines and angles.
 - G.CO.C.10 Prove theorems about triangles.
 - G.CO.C.11 Prove theorems about parallelograms.
- Cluster: Define trigonometric ratios and solve problems involving right triangles.
- G.SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
 - G.SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles.
 - G.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
- Cluster: Summarize, represent, and interpret data on a single count or measurement variable.
- S.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).
 - S.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
 - S.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S.ID.A.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 11-12):

- RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
- RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

21st Century Skills

Students will demonstrate in this course:

LEARNING & INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgments and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others