PATERSON PUBLIC SCHOOLS

Preparing All Children for College and Career

Department of College and Career Readiness

Game Development: 2D/3D Modeling Curriculum

5.0 Credits

Unit Two

Game Development: 2D/3D Modeling

Course Description

This course provides an introduction to 2D and 3D video game history, design, theory, development, and programming. Emphasis is placed on understanding the history of video games and analyzing industry roles, game genres, game play, art design, playability, storytelling, rule dynamics and what makes quality game. In the first half of the course, students will be responsible for every aspect of creating a 2D game. This will entail preplanning, 2D art creation, 2D animation creation, creating music and sound effects, creating rules and balance for the game, and testing the game for bugs and playability. The second half of the course extends to the introduction to 3D modeling, 3D Animation, and creating a 3D game. Topics include geometric transformation, 3D object models, understanding what makes up a mesh, texturing, lighting, animation, creating physics, and creating interactivity in a 3D world.

Game Development: 2D/3D Modeling

Pacing Guide		
Unit	**Topic**	**Suggested Timing**
Unit 1	Video Game History & Theory, and Understanding and Creating 2D Graphics	approx. 6 weeks
Unit 2	2D Game Development, Design, and Creation	approx. 10 weeks
Unit 3	3D Modeling, Texturing, and Lighting	approx. 9 weeks
Unit 4	3D Game Development, Design, and Creation	approx. 10 weeks

Educational Technology Standards

8.1.12.A.2, 8.1.12.A.3, 8.1.12.B.2, 8.1.12.D.1, 8.1.12.F.1

➢ **Technology Operations and Concepts**

- Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

- Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

➢ **Creativity and Innovation**

- Apply previous content knowledge by creating and piloting a digital learning game or tutorial.

➢ **Digital Citizenship**

- Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.

➢ **Critical Thinking, Problem Solving, Decision Making**

- Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

CRP1. **Act as a responsible and contributing citizen and employee**
Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

CRP2. Apply appropriate academic and technical skills.
Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

CRP3. Attend to personal health and financial well-being.
Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.

CRP4. Communicate clearly and effectively and with reason.
Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

CRP5. Consider the environmental, social and economic impacts of decisions.
Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.

CRP6. Demonstrate creativity and innovation.
Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

CRP7. Employ valid and reliable research strategies.
Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

CRP9. Model integrity, ethical leadership and effective management.
Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

CRP10. Plan education and career paths aligned to personal goals.
Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

CRP11. Use technology to enhance productivity.
Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

CRP12. Work productively in teams while using cultural global competence.
Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Differentiated Instruction

Strategies to Accommodate Students Based on Individual Needs

Time/General	Processing	Comprehension	Recall
• Extra time for assigned tasks • Adjust length of assignment • Timeline with due dates for reports and projects • Communication system between home and school • Provide lecture notes/assignments, and tutorials outline	• Extra Response time • Have students verbalize steps • Repeat, clarify or reword directions • Mini-breaks between tasks • Provide a warning for transitions • Video lessons online	• Precise step-by-step directions • Short manageable tasks • Brief and concrete directions • Provide immediate feedback • Small group instruction • Emphasize multi-sensory learning	• Teacher-made checklist • Use visual graphic organizers • Reference resources to promote independence • Visual and verbal reminders • Graphic organizers
Assistive Technology	**Tests/Quizzes/Grading**	**Behavior/Attention**	**Organization**
• Computer/whiteboard • Video lesson • Spell-checker • Text speech software	• Adjusted rubrics for projects • Study guides • Shortened tests • Read directions aloud	• Consistent daily structured routine • Simple and clear classroom rules • Frequent feedback	• Individual daily planner • Display a written agenda • Note-taking assistance • Color code materials

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Enrichment
Strategies Used to Accommodate Based on Students Individual Needs:

- Adaption of Material and Requirements

- Evaluate Vocabulary

- Elevated Text Complexity

- Elevated Projects Rubrics

- Independent Written and Video Online Tutorials

- Projects completed individual or with Partners

- Self Selection of Research

- Tiered/Multilevel Activities

- Online Learning Communities

- Individual Response Board

- Independent Book Studies

- Open-ended activities

- Community/Subject expert mentorships

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Assessments

Suggested Formative/Summative Classroom Assessments

- Storyboards

- Teacher-created Unit Assessments, Topic Assessments, Quizzes

- Teacher-created DBQs, Essays, Short Answer

- Accountable Talk, Debate, Oral Report, Role Playing, Think Pair, and Share

- Projects, Portfolio, Presentations, Prezi, Gallery Walks

- Homework

- Concept Mapping

- Primary and Secondary Source analysis

- Photo, Video, Political Cartoon, Radio, Game Analysis

- Create an Original Song, Animation, Board Game

- Game salad Video Tutorials

- Khan Academy intro to coding.

Interdisciplinary Connections

English Language Arts
- Story writing
- Close reading of industry-related content
- Keep a running word wall of industry vocabulary

Social Studies
- Research the history of a given industry/profession
- Use historical references to solve problems
- Research the social impact of a given career or industry

World Language
- Translate industry-content
- Create a translated index of industry vocabulary

Math
- Use geometry to create objects
- Create objects and shapes on a coordinate plane
- Assign variables and values for the variables

Fine & Performing Arts
- Create graphics (landscapes, menus, characters etc.) for use in game.
- Design 2D images that appear 3D.

Science
- Research latest developments in industry technology
- Investigate applicable-careers in STEM fields
- Use physics to create believable movements in game

New Jersey Student Learning Standards

8.2 Technology

TECHNOLOGY AND SOCIETY

- 8.2.12.B.1 Research and analyze the impact of the design constraints (specifications and limits) for a product or technology driven by a cultural, social, economic or political need and publish for review.

COMPUTATIONAL THINKING: PROGRAMMING:

- 8.2.12.E.3 Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).
- 8.2.12.E.4 Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements)
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9.1 Personal Financial Literacy

- 9.1.12.E.4: Evaluate how media, bias, purpose, and validity affect the prioritization of consumer decisions and spending.

9.3– Career and Technical Education

CAREER CLUSTER: ARTS, A/V TECHNOLOGY & COMMUNICATIONS (AR)

- 9.3.12.AR.1: Analyze the interdependence of the technical and artistic elements of various careers within the Arts, A/V Technology & Communications Career Cluster.
- 9.3.12.AR.3: Analyze the lifestyle implications and physical demands required in the arts, audio/visual technology and communications workplace.

- 9.3.12.AR.4: Analyze the legal and ethical responsibilities required in the arts, audio/visual technology and communications workplace.
- 9.3.12.AR.6: Evaluate technological advancements and tools that are essential to occupations within the Arts, A/V Technology & Communications Career Cluster.

PATHWAY: VISUAL ARTS (AR-VIS)

- 9.3.12.AR-VIS.2 Analyze how the application of visual arts elements and principles of design communicate and express ideas.
- 9.3.12.AR-VIS.3: Analyze and create two and three-dimensional visual art forms using various media.

INFORMATION TECHNOLOGY CAREER CLUSTER

- 9.3.IT.2: Use product or service design processes and guidelines to produce a quality information technology (IT) product or service.
- 9.3.IT.3: Demonstrate the use of cross-functional teams in achieving IT project goals.
- 9.3.IT.6: Describe trends in emerging and evolving computer technologies and their influence on IT practices.

PATHWAY: PROGRAMMING & SOFTWARE DEVELOPMENT (IT-PRG)

- 9.3.IT-PRG.4: Demonstrate the effective use of software development tools to develop software applications.
- 9.3.IT-PRG.5: Apply an appropriate software development process to design a software application.
- 9.3.IT-PRG.6: Program a computer application using the appropriate programming language.
- 9.3.IT-PRG.7: Demonstrate software-testing procedures to ensure quality products.

PATHWAY: INFORMATION SUPPORT & SERVICES (IT-SUP)

- 9.3.IT-SUP.2: Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- 9.3.IT-SUP.3: Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

CAREER CLUSTER: SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS (ST)

- 9.3.ST.6: Demonstrate technical skills needed in a chosen STEM field.

PATHWAY: ENGINEERING & TECHNOLOGY CAREER PATHWAY (ST-ET)

- 9.3.ST-ET.3: Apply processes and concepts for the use of technological tools in STEM.
- 9.3.ST-ET.4: Apply the elements of the design process.

Common Career Technical Core (CCTC)

Arts, A/V Technology & Communications Career Cluster (AR)

AR 1– Analyze the interdependence of the technical and artistic elements of various careers within the Arts, A/V Technology & Communications Career Cluster.

- AR 1.1 Summarize the features of the partnership that technology and the arts have in developing presentations and productions.
- AR 01.4 – State how various Career Pathways within the cluster work together to generate productions, media and other activities.

AR 03 – Analyze the lifestyle implications and physical demands required in the arts, audio/visual technology and communications workplace.

- AR 03.3 – 3. Analyze ethical conduct that provides proper credit to those whose ideas and content have been used.

AR 06 - Evaluate technological advancements and tools that are essential to occupations within the Arts, A/V Technology & Communications Career Cluster.

- AR 06.1 – Research the impact of potential new technological advancements related to this cluster in the future.
- AR 06.2 – Analyze the technological systems that are apparent within the various pathways in this cluster.

AR AV 4 - Design an audio, video and/or film production.

- AR AV4.2. Identify the basic functions and resources for editing an audio/video production.

AR VIS 1 - Analyze how the application of visual arts elements and principles of design communicate and express ideas.

- AR VIS 01.5 – Analyze the development of tools and technologies employed in the visual arts.

AR VIS 3 - Analyze and create two- and three-dimensional art forms using various media.

- AR VIS 03.1 – Analyze art elements and principles of two-dimensional works of visual art in various media, including drawing, printmaking and computer software.
- AR VIS 03.3 – Analyze multimedia applications of software/hardware for the purposes of visual communications.
- AR VIS 03.5. -- Apply art elements and principles to virtual and interactive platforms.

Information Technology Career Cluster (IT)

IT 02 - Use product or service design processes and guidelines to produce a quality information technology (IT) product or service.

- IT 1.1 Summarize the process of IT product/service design.
- IT 1.2 Identify and implement new products/services.

IT 06 - Describe trends in emerging and evolving computer technologies and their influence on IT practices.

- IT 06. - 1. Identify new IT technologies.

IT 07 - Perform standard computer backup and restore procedures to protect IT information.

- IT 07.1 – Explain the need for regular backup procedures.
- IT 07.2 – Configure, perform and maintain backup procedures.

IT PRG 02 - Demonstrate the use of industry standard strategies and project planning to meet customer specifications.

- IT PRG 02.3 Design project plan.

IT PRG 04 - Demonstrate the effective use of software development tools to develop software applications.

- IT PRG 04.1. Employ tools in developing software applications.

- IT PRG 04.2. Demonstrate use of computer-aided software engineering (CASE) tools.
- IT PRG 04.3. Apply language-specific programming tools/techniques.

IT PRG 05 - Apply an appropriate software development process to design a software application.

- IT PRG 05.1 Describe software development processes and methodology.

IT PRG 06 – Program a computer application using the appropriate programming language.

- IT PRG 06.1. Summarize program development methodology.
- IT PRG 06.3. Demonstrate proficiency in developing an application using an appropriate programming language.
- IT PRG 06.4. Explain basic software systems implementation.
- IT PRG 06. Resolve problems with integration.

IT WD 04 - Demonstrate the effective use of tools for digital communication production, development and project management.

- IT WD 04.1 - Select and use appropriate software tools.

IT WD 06 - Design, create and publish a digital communication product based on customer needs.

- IT WD 06.1. Produce a digital communication product as member of a development team.
- IT WD 06.2. List and employ functional design terms and criteria.
- IT WD 06.3. Create product visual design.
- IT WD 06.4. Acquire and produce content for a digital communication product.
- IT WD 06.7. Employ basic motion graphic programming knowledge.

Common Core State Standards (CCSS)

CCSS - English-Language Arts

Craft and Structure:

- CCSS.ELA-LITERACY. RI.12.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

Research to Build and Present Knowledge:

- CCSS.ELA-LITERACY. W.12.9b. Draw evidence from informational texts to support analysis, reflection, and research; apply *grade 12 Reading standards* to literary nonfiction

CCSS - Mathematics

Extending to Three Dimensions:

- CCSS.MATH.CONTENT.HSS.G.GMD.4 Identify the shape of a two-dimensional cross-section of a three-dimensional figure and identify three-dimensional objects created by the rotation of two-dimensional objects.
- CCSS.MATH.CONTENT.HSS.G.MG.1 Use geometric shapes, their measures, and their properties to describe objects
- CCSS.MATH.CONTENT.HSS.G.MG.14 Solve design problems using geometric methods.

Congruence, Proof, and Construction:

- CCSS.MATH.CONTENT.HSS. G.CO.2, G.CO.3, G.CO.4, G.CO.5 Develop and perform rigid transformations that include reflections, rotations, translations and dilations using geometric software, graph paper, tracing paper, and geometric tools and compare them to non-rigid transformations.

Course: Game Development 2D/3D Modeling	Unit Overview:
Unit: 2 – 2D Game development and production.	Students will understand the process of 2D video game production and be responsible for all the elements of the production of an original 2D game, from inception to distribution.
Grade Level: 9-12	

New Jersey Student Learning Standards (NJSLS): 8.2.12B.1, 8.2.12.E.3, 8.2.12.E.4, 9.1.12E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.AR.4, 9.3.12.ARR.6, 9.3.12.AR.AV4.2, 9.3.12.AR.VIS.2, 9.3.12.AR.VIS.3, 9.3.IT.2, 9.3.IT.3, 9.3.IT.6, 9.3.IT.PRG.4, 9.3.IT.PRG.5, 9.3.IT.PRG.5, 9.3.IT.PRG.6, 9.3.IT.PRG.7, 9.3.IT.PRG.10, 9.3.IT.SUP.2, 9.3.IT.SUP.3, 9.3.ST.6, 9.3.ST.ET.3, .3.ST.ET.4

Common Career Technical Core (CCTC): AR 1.1, AR 01.4, AR 03.3-3, AR 06.1, AR 06.2, AR VIS 01.5, AR VIS 03.1, AR VIS 03.3, AR VIS 03.5, IT 1.1. IT 1.2, IT 06.1, IT 07.1, IT 07.2, IT PRG 02.3, IT PRG 04.1, IT PRG 04.2, IT PRG 04.3, IT PRG 05.1, IT PRG 06.1, IT PRG 06.3, IT PRG 06.4, IT PRG 06, IT WD 04.1, IT WD 06.1, IT WD 06.2, IT WD 06.3, IT WD 06.4, IT WD 06.7

Common Core State Standards (CCSS): CCSS.ELA-LITERACY.RI.12.4, CCEE.ELA-LITERACY.W.12.9b, CSS.MATH.CONTENT.HSS.G.GMD.4, CSS.MATH.CONTENT.HSS.G.MG.1, CSS.MATH.CONTENT.HSS.G..MG.14, CCSS.MATH.CONTENT.HSS.G.CO.2, GO.3, G.CO.4, G.CO.5

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
Dissect, critique, and replicate all the elements of a 2D game. **NJSLS:** 8.2.12B.1, 8.2.12.E.4, 9.1.12E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.ARR.6,	Why is it important to consider what platform the player will be playing on? Do makes a quality game? What elements might	▪ Identify and describe 2D video game genres. ▪ Describe what it means to have a balanced game. ▪ Compare and contrast the different platforms available	**Teachers for a Day** Student pairs are assigned a genre of game. Students will do research on the genre (where it started, its popularity, its target audience, popular games etc.). Then turn key the	**Writing Your First Freelance Video Game Review** http://www.freelancewriting.com/articles/FF-writing-a-video-game-review.php

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
9.3.12.AR.AV4.2, 9.3.12.AR.VIS.2, **CCTC:** AR 01.4, AR 03.3-3, AR 06.1, AR 06.2 **CCSS:** CCSS.ELA-LITERACY.RI.12.4, CCEE.ELA-LITERACY.W.12.9b	affect a player's emotional reaction to a game? How does having a balanced game affect the player? Does a game's genre affect a games objective/reward system?	for 2D games. ▪ Explain the reasons for and importance of creating a rewards system. ▪ Critically analyze a game for playability. ▪ Break down a 2D game into its core elements. ▪ Identify different ways to let the player know their objective in a game. ▪ Identify ways a game teaches a player how to play.	information to the rest of the classroom. **Game Review** Students read game reviews written by professional and discuss the style of writing and content. Students then write a review of their own on a game of their choice. **Think Pair Share** What happens when a game lacks balance? Have you ever played an unbalanced game? Is game balance objective or subjective? **Card Sort** Student pairs sort cards with characteristics of 2D gaming platforms in to the correct platform.	**Know Your Retro Gaming Genres** http://classicgames.about.com/od/glossary/p/Get-To-Know-Your-Retro-Gaming-Genres-Platformers.htm **Understanding Balance in Video Games** http://www.gamasutra.com/view/feature/134768/understanding_balance_in_video_.php?print=1 **The Many Ways to Show the Player How It's Done With In-Game Tutorials** http://gamedevelopment.tutsplus.com/tutorials/the-many-ways-to-show-the-player-how-its-done-with-in-game-tutorials--gamedev-400

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
Use the appropriate software development process to preplan for the creation of a 2D game. **NJSLS:** 8.2.12B.1, 8.2.12.E.4, 9.1.12E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.AR.4, 9.3.12.ARR.6, 9.3.IT.AR.VIS.2, 9.3.IT.3 **CCTC:** AR 01.4, AR 03.3-3, AR 06.1, AR 06.2, IT 1.1. IT 1.2, IT.PRG.02.3, IT.PRG.05.1, IT.PRG.06.01, IT.PRG.06.03, IT.PRG.06.04 **CCSS:** CCSS.ELA-LITERACY.RI.12.4, CCEE.ELA-LITERACY.W.12.9b	Should multiple genres be mixed into one game? What are some things to look for when a player is playing your game that let you know the game is too hard, too easy, fun or boring? What are the qualities of good rules? How do different combinations of level parameters give rise to different kinds of games? How do core mechanics create patterns of action within a game?	▪ Brainstorm a 2D video game with 3 levels. ▪ Create a graphic organizer. ▪ Create a story map for a 2D game. ▪ Design a visual style for a 2D video game. ▪ Design a storyboard for a 2D video game. ▪ Create a balanced set of rules for a 2D video game. ▪ Create a rewards system for a 2D game. ▪ Present 2D video game concept in mock sales pitch.	**Storyboard** Students create a storyboard for a 2D Video game. **Web Graphic Organizer** Students create a web graphic organizer as a way to visually represent their video game's rules, rewards, objectives, power ups, and story progression. **Mock Sale Pitch** Once students have completed the preplanning process they will present their game idea to the class as if they are trying to gain funding for the game. The rest of the class will review the presentation and provide feed back to the presenter.	**Creating a Roadmap: Storyboarding as an Element of Game Design** https://gamestarmechanic.com/teachers/sample_lesson_hodgson **Gamester Mechanic Learning Guide** https://sites.google.com/a/elinemedia.com/gsmlearningguide/ **Creatley Graphic Organizer Software** http://creately.com/Free-K12-Education-Templates

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
Understand how technology is used in the production audio for use in a video game and create audio files for their own 2D video game. **NJSLS:** 8.2.12.E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.AR.4, 9.3.IT.6, 9.3.IT.SUP.2, 9.3.IT.SUP.3, 9.3.ST.6, 9.3.ST.ET.3, 9.3.ST.ER.4, **CCTC:** AR 1.1, AR 01.4, AR 03.3-3, AR 06.1, AR 06.2, IT 06.1, IT 07.1, IT 07.2, IT WD 04.1, IT WD 06.4 – 4, IT WD 06.2, IT WD 06.4 **CCSS:** CCSS.ELA-	What role does audio play in a video game? How does audio function as a reward in a video game? How can audio be used to add depth to a visual element? How can go or bad audio add or take away from a games playability? Do video games have their own genre of music?	▪ Identify and use audio loops. ▪ Identify different audio file types. ▪ Operate loop based sequencing software. ▪ Create measure/beat based patterns. ▪ Record/import audio into music production software. ▪ Edit audio within the digital domain. ▪ Mix multiple tracks to one stereo master	**Create a Song Using Only Free Loops.** Students use loops based audio mixing software to create an original track to use in their game. **Sound Effects Studio** Students research how professionals sound effect artist replicate sound effects in a studio. Students then think of ways to do the same and record their own sound effects for their game. **Emotion through Audio** Assign each student 2 emotions and task them to create songs that will evoke those emotions in the listener. Students	**How to Make Beats** https://www.platinumloops.com/how-to-make-beats-the-beginners-guide/ **How Movie Sound Effects are Made** https://www.youtube.com/watch?v=iV7XiOMTvdY **Acid Planet Music Creation Software** http://www.acidplanet.com/downloads/xpress/

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
LITERACY.RI.12.4, CCEE.ELA-LITERACY.W.12.9b			can present the songs and have the classmates guess the emotion.	
Create 2D animations designed to be use in their original 2D video game. **NJSLS:** 8.2.12.E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.AR.4, 9.3.12.AR.VIS.2, 9.3.12.AR.VIS.3, 9.3.IT.6, 9.3.IT.SUP.2, 9.3.IT.SUP.3, 9.3.ST.6, 9.3.ST.ET.3, 9.3.ST.ER.4 **CCTC:** AR 1.1, AR 01.4, AR 03.3-3, AR 06.1, AR 06.2, IT 06.1, IT 07.1, IT 07.2, IT WD 04.1, IT WD 06.4 – 4, **CCSS:** CCSS.ELA-LITERACY.RI.12.4,	Why is it important to sketch out designs before animating? How do the principles of art and design fit into animation? How has technology changed 2D animation? Where can you find jobs in computer animation? What are the pros and cons of key-frame animation?	▪ Identify the basics of animation timing. ▪ Understand how to design a character for 2D video game animation. ▪ Explain the importance of walk cycles and their basic construction ▪ Create a 2D animation. ▪ Explain and utilize Key-frame animation. ▪ Explain how a 2D object can be given a sense of flexibility. ▪ Stage a 2D scene using original graphics.	Sprite Sheet Creation Students use 2D graphic software to create a spite sheet for there video game. Ball Key Frame Animation Students use key-frame animation software to create basic animation of a ball bouncing. Focus should be on including squish and stretch in the animation. Technology and Animation Guided Notes Teacher prepares handouts that outline the day's lesson for the students but leave blank spaces. Students are to fill in the blanks during	**Create a Sprite Sheet in Photoshop** https://www.youtube.com /watch?v=cRE2G96591E **Unity 4.3 Sprite Sheet Animation** https://www.youtube.com /watch?v=zMJRs866XL0 **2D Key-Frame Animation Software** http://www.pencil2d.org/

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
CCEE.ELA-LITERACY.W.12.9b, CSS.MATH.CONTENT.HSS.G.GMD.4, CSS.MATH.CONTENT.HSS.G.MG.1, CSS.MATH.CONTENT.HSS.G..MG.14, CCSS.MATH.CONTENT.HSS.G.CO.2, GO.3, G.CO.4, G.CO.5			instruction.	
Understand the basics of computer coding and create interactive software using block bases programing. **NJSLS:** 8.2.12B.1, 8.2.12.E.3, 8.2.12.E.4, 9.1.12E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.AR.4, 9.3.12.ARR.6, 9.3.12.AR.AV4.2, 9.3.12.AR.VIS.2, 9.3.12.AR.VIS.3,	What is programming? What are the fundamentals of computer programming? How do you create a program? How can you use computer programming to complete a task?	▪ Understand and utilize top down design in coding. ▪ Understand and Identify "If" statements. ▪ Create interactivity between a user and a software program. ▪ Create an animation using code. ▪ Relate the active screen to a coordinate plane and you X and Y points to	**Kahn Academy Intro to Java Script** Students will complete the online course **Recreate Flappy Bird on Hour of Code** Students will follow and complete the online tutorial **Reverse Engineer a Concept Map** Student groups choose a popular game and	**Hour of Code Make your own Flappy Bird** https://studio.code.org/flappy/2 **Khan Academy Computing** https://www.khanacademy.org/computing **Brain POP Video Game Concept Map Creation**

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9.3.IT.2, 9.3.IT.3, 9.3.IT.6, 9.3.IT.PRG.4, 9.3.IT.PRG.5, 9.3.IT.PRG.5, 9.3.IT.PRG.6, 9.3.IT.PRG.7, 9.3.IT.PRG.10, 9.3.IT.SUP.2, 9.3.IT.SUP.3, 9.3.ST.6, 9.3.ST.ET.3, .3.ST.ET.4 **CCTC:** AR 01.4, AR 03.3-3, AR 06.1, AR 06.2, AR VIS 03.3, AR VIS 03.5, IT 06.1, IT 07.1, IT 07.2, IT PRG 04.1, IT PRG 04.2, IT PRG 04.3, IT PRG 05.1, IT PRG 06.1, IT PRG 06.3, IT PRG 06.4, IT PRG 06, IT WD 04.1, IT WD 06.2, IT WD 06.7 **CCSS:** CCSS.ELA-LITERACY.RI.12.4, CCEE.ELA-LITERACY.W.12.9b, CSS.MATH.CONTENT.H	How is computer programming useful in real life? How might you use computer programming in your future career? Why should you use comments?	arrange objects. ▪ Create an object using coding software. ▪ Display Text through coding. ▪ Play audio in a student created software.	assume the role of its developers. They are to create the concept map as if they where in the preproduction stage of creating the chosen game.	https://www.brainpop.com/technology/computerscience/videogames/

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SS.G.GMD.4, CSS.MATH.CONTENT.H SS.G.MG.1, CSS.MATH.CONTENT.H SS.G..MG.14, CCSS.MATH.CONTENT. HSS.G.CO.2, GO.3, G.CO.4, G.CO.5				
Combine all previous knowledge to create a multileveled 2D video game. **NJSLS:** 8.2.12B.1, 8.2.12.E.3, 9.1.12E.4, 9.3.12.AR.1, 9.3.12.AR.3, 9.3.12.AR.4, 9.3.12.ARR.6, 9.3.12.AR.AV4.2, 9.3.IT.2, 9.3.IT.PRG.4, 9.3.IT.PRG.5, 9.3.IT.PRG.5, 9.3.IT.PRG.6, 9.3.IT.PRG.7, 9.3.IT.PRG.10, 9.3.IT.SUP.2,	Who is the target audience for your game? What is the main objective of your game? What is the visual style of your game? What past games influence your game design? What genres are represented in you game?	▪ Import original graphics to in to student created game. ▪ Create a navigation system for the player to move in and out of menus and playing field. ▪ Import original audio into student created game ▪ Create a control system for player to interact with the game. ▪ Translate preproduction materials (concept map. Rules, rewards,	**Test Classmate's Game for bugs** Students play another student's game and take notes as they play looking for bugs, or other issues. **Whole Group Trouble Shoot** A student presents an issue they are having in creating their game. They must present what is happening or not happening as well as the desired result. The whole group then brainstorms ideas that can rectify the problem.	**2D ROGUELIKE TUTORIAL** https://unity3d.com/learn/ tutorials/projects/2d-roguelike-tutorial **2D MODE** https://unity3d.com/learn/ tutorials/topics/2d-game-creation/2d-mode?playlist=17093 **2D PHYSICS OVERVIEW** https://unity3d.com/learn/ tutorials/topics/2d-game-creation/2d-physics-overview?playlist=17093

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9.3.IT.SUP.3, 9.3.ST.6, 9.3.ST.ET.3, .3.ST.ET.4 **CCTC:** AR 01.4, AR 03.3-3, AR 06.1, AR 06.2, AR VIS 03.1, AR VIS 03.3, AR VIS 03.5, IT 1.1. IT 1.2, IT 06.1, IT 07.1, IT 07.2, IT PRG 02.3, IT PRG 04.1, IT PRG 04.2, IT PRG 04.3, IT PRG 05.1, IT PRG 06.1, IT PRG 06.3, IT PRG 06.4, IT PRG 06, IT WD 04.1, IT WD 06.1, IT WD 06.2, IT WD 06.3, IT WD 06.4, IT WD 06.7 **CCSS:** CCSS.ELA-LITERACY.RI.12.4, CCEE.ELA-LITERACY.W.12.9b, CSS.MATH.CONTENT.HSS.G.GMD.4, CSS.MATH.CONTENT.HSS.G.MG.1, CSS.MATH.CONTENT.HSS.G..MG.14,	What is the general mood of your game?	story boards etc.) into playable video game. ▪ Upload video game onto a game distribution site for people around the word to play. ▪ Create interactive animations.	**Build your game** Students assume the role of developer, artist, director, audio engineer, programmer and distributer to create a 3 level game and distribute it to potential players.	

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CCSS.MATH.CONTENT. HSS.G.CO.2, GO.3, G.CO.4, G.CO.5				

Unit 2 Vocabulary

2D Animation
Ambient Audio
Audio
Audio Level
File Extension
Key-Frame Animation
Architectural Animation
Storyboards
Fade
Editor
Frame Rate
Frame
Morphing
Navigation
Mixer
Interactivity
Button
Compression
Midi

Design Documentation
Copyright
Stereo
Peak Audio
Lines
Sound Effect
MP3
Segments
Track
Joints
Figures
Object Based Animation
Sound Effect
Timelines
Tweening
Wave File

Suggested Unit Projects	
Choose At Least One	
Students are assign 2 emotions and are tasked to create audio and an accompanying graphic that will evoke those emotions. This multimedia project will be presented to the class. It will be the audience's job to guess the emotion.	Create a 2D Video game that has 3 Levels. Game should be fully fictional and have original artwork and audio.

Suggested Structured Learning Experiences	
Museum of Play- 1 Manhattan Square Rochester, NY 14607 http://www.museumofplay.org/about/icheg Nintendo NY 10 Rockefeller Plaza New York, New York 10020 http://nintendonyc.com/faq/	Cooper Hewitt 2 East 91st Street New your, New York 10128 http://www.cooperhewitt.org/visit/getting-here/