Unit 10: Programming Basics | Creating a Video Game

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships.

Ask questions about what would happen if a variable is changed.

Identify scientific (testable) and non-scientific (non-testable) questions.

Use prior knowledge to describe problems that can be solved.

Practice 2. Developing and using models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

Identify limitations of models.

Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

Practice 3. Planning and carrying out investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

Make predictions about what would happen if a variable changes.

Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.

AAAA.K-12.1	Inquire, think critically, and gain knowledge.
AAAA.K-12.1.1	Skills
AAAA.K-12.1.1.2	Use prior and background knowledge as context for new learning.
AAAA.K-12.1.1.9	Collaborate with others to broaden and deepen understanding.
AAAA.K-12.1.2	Dispositions in Action
AAAA.K-12.1.2.2	Demonstrate confidence and self- direction by making independent choices in the selection of resources and information.
AAAA.K-12.1.4	Self-Assessment Strategies
AAAA.K-12.1.4.4	Seek appropriate help when it is needed.

AAAA.K-12.2	Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.
AAAA.K-12.2.1	Skills
AAAA.K-12.2.1.5	Collaborate with others to exchange ideas, develop new understandings, make decisions, and solve problems.
AAAA.K-12.2.3	Responsibilities
AAAA.K-12.2.3.1	Connect understanding to the real world.
AAAA.K-12.3	Share knowledge and participate ethically and productively as members of our democratic society.
AAAA.K-12.3.1	Skills
AAAA.K-12.3.1.2	Participate and collaborate as members of a social and intellectual network of learners.
AAAA.K-12.3.1.6	Use information and technology ethically and responsibly.
AAAA.K-12.3.3	Responsibilities
AAAA.K-12.3.3.4	Create products that apply to authentic, real-world contexts.
AAAA.K-12.3.3.5	Contribute to the exchange of ideas within and beyond the learning community.
AAAA.K-12.3.4	Self-Assessment Strategies
AAAA.K-12.3.4.2	Assess the quality and effectiveness of the learning product.
AAAA.K-12.4	Pursue personal and aesthetic growth.
AAAA.K-12.4.1	Skills
AAAA.K-12.4.1.7	Use social networks and information tools to gather and share information.
AAAA.K-12.4.3	Responsibilities
AAAA.K-12.4.3.1	Participate in the social exchange of ideas, both electronically and in person.
AAAA.K-12.4.3.2	Recognize that resources are created for a variety of purposes.
AAAA.K-12.4.4	Self-Assessment Strategies
AAAA.K-12.4.4.1	Identify own areas of interest.
AAAA.K-12.4.4.2	Recognize the limits of own personal knowledge.
AAAA.K-12.4.4.3	Recognize how to focus efforts in personal learning.

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.

CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.1.5	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.5.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
TECH.8.1.5.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.5.D.3	Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.
TECH.8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
TECH.8.2.5	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.5.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.5.B.1	Examine ethical considerations in the development and production of a product through its life cycle.
TECH.8.2.5.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.5.C.1	Collaborate with peers to illustrate components of a designed system.
TECH.8.2.5.C.2	Explain how specifications and limitations can be used to direct a product's development.
TECH.8.2.5.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.
TECH.8.2.5.E.1	Identify how computer programming impacts our everyday lives.
TECH.8.2.5.E.3	Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.
TECH.8.2.5.E.4	Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

	Craft and Structure
LA.K-12.NJSLSA.R4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape

	meaning or tone.
LA.RI.5	Reading Informational Text
LA.RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
LA.K-12.NJSLSA.SL	Speaking and Listening
	Comprehension and Collaboration
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
LA.K-12.NJSLSA.SL2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
LA.SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
LA.SL.5.1.A	Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
LA.SL.5.1.B	Follow agreed-upon rules for discussions and carry out assigned roles.
LA.SL.5.1.C	Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
LA.SL.5.1.D	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
LA.SL.5.2	Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale
Unit Rationale The purpose of this unit…

21st Century learners develop skills to explore 21st century career paths.

Meaning

Essential Questions

Essential Questions

- In a world of constant change, what skills should we learn?
- How can technology tools be used to enhance learning, increase productivity, and promote creativity?
- How can productivity tools be used to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works?
- What are the elements of a balanced and effective video game?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

- Students use technology tools to enhance learning, increase productivity, and promote creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- Students create balanced and effective video games designed to engage, challenge, and entertain.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- Video game terms and concepts (e.g. avatar, enemy, boss, block, point, counter, space).
- Concepts about the elements of a game (e.g. space, components, mechanics, goals, rules).
- Recognize games as dynamic systems.

- Identify the balance of fun and challenge in effective games.

Skills

Skills

Student will be skilled at …

- Applying concepts about the elements of a game (e.g. space, components, mechanics, goals, and rules).
- Creating balanced and effective video games designed to engage, challenge, and entertain.

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- Web browser (e.g. Google Chrome)
- Username and password cards for "Gamestar Mechanic" website - The format for the username is *schoolnamegrade&teacherlastname*. The password for all students accounts is *testing1*. *ex) garfield5gsmith* (If there is more than one student in the class with the same last name use a number after the student's last name).
- Lesson materials - see "Gamestar Mechanic" website - see attached

Gamestar Mechanic - Learn to design video games

Formative Assessment Strategies

Formative Assessment Strategies

- Index card summaries/questions
- Hand signals
- Web or concept map
- Misconception check
- Student conference
- Observation
- Exit card
- Quiz
- Choral response

- Debriefing
- Think-pair-share
- Ticket to leave
- Oral questioning

Learning Activities/Unit of Study

Learning Activities/Unit of Study

- Terms and Concepts
  - Students learn the names and concepts behind the basic elements of a game by playing and analyzing Gamestar Mechanic.
  - Students complete a matching game that connects the images in Gamestar to the terms used to describe the game.
- Core Design Elements
  - Students understand games as systems
  - Students become familiar with the elements of a game system.
  - Students discuss the Core Design Elements sheet, identifying examples for each element from Gamestar Mechanic.
  - Students explore a game system by editing the Change the Element template game.
- Balance
  - For a game to be fun, it must also be challenging. In this lesson, students balance the elements of a game in Gamestar Mechanic.
- Design
  - Having acquired information on game design elements and balance, students now have the resources to design a fun and challenging game.
  - Students design their own games in Gamestar Mechanic.
- Playtest and Iterate
  - Students play/test each other's games and give effective feedback. Then they improve their game designs

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students

better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with

extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.