

Unit 1: Problem Solving & Computing

7th Grade Video Game Coding

10 Class Meetings

Written August 2023

Essential Questions

- What strategies and processes can be used to become a more effective problem solver?
- How can we use a structured problem-solving process and apply it to address various problems?

Enduring Understandings with Unit Goals

EU 1: There are strategies and processes that can be used to become a more effective problem-solver.

- Utilize a structured problem-solving process and apply it to address various problems.
- Create and adopt a more formal structured problem-solving process by reflecting on everyday problems in the classroom and in life.

EU 2: Computers can be used to solve problems in relevant and creative ways.

- Investigate, identify, and decompose different classes of problems to develop personal problem-solving skill using logic puzzles and engineering challenges.

Standards

National Media Arts Standards:

MA:Cr1.1.6: Formulate variations of goals and solutions for media artworks by practicing chosen creative processes, such as sketching, improvising and brainstorming.

MA:Cr2.1.6: Organize, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering purposeful intent.

MA:Cr3.1.6b: Appraise how elements and components can be altered for intentional effects and audience, and refine media artworks to reflect purpose and intent.

MA:Pr5.1.6c: Demonstrate adaptability using tools and techniques in standard and experimental ways in constructing media artworks.

MA:Pr6.1.6c:a. Analyze various presentation formats and fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.

MA:Pr6.1.6c:b. Analyze results of and improvements for presenting media artworks.

MA:Re7.1.6:a Identify, describe, and analyze how message and meaning are created by components of media artworks.

MA:Re7.1.6:b Identify, describe, and analyze how various forms, methods, and styles in media artworks manage audience experience.

MA:Re8.1.6: Analyze the intent of a variety of media artworks, using given criteria.

MA:Re9.1.6: Determine and apply specific criteria to evaluate various media artworks and production processes, considering context and practicing constructive feedback.

MA:Cn 10.1.6: a. Access, evaluate, and use internal and external resources to create media artworks,

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such as knowledge, experiences, interests, and research.

MA:Cn11.1.6: a. Research and show media artworks and ideas relate to personal life, and social, community, and cultural situations, such as personal identity, history, and entertainment.

ISTE Standards

Standard 1: Empowered Learner. Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.

Standard 2: Digital Citizens. Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.

Standard 3: Knowledge Constructor. Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

Standard 6: Creative Communicator. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goal.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.

Competency 2: Speak to diverse audiences in an accountable manner.

Competency 3: Develop the behaviors needed to interact and contribute with others on a team.

Competency 4: Analyze and solve problems independently and collaboratively.

Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

1. Introduction to the Problem-Solving Process

- Work collaboratively to solve problems
- Discover common steps to the problem-solving process
- Explain the problem-solving process

2. Applying the Problem-Solving Process

- Apply the problem-solving process to create a flowchart.
- Discover how to write a computer algorithm
- Translate algorithms into coding language

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Daily Learning Objectives

Students will be able to...

- Collaborate to create a marshmallow tower using marshmallows and spaghetti noodles to discover steps to solve problems.
- Learn the common steps that can be used to solve many different types of problems.
- Create a poster that shows how the problem-solving process can be used.
- Discover how to write a computer algorithm.
- Apply the computer algorithm to create a flowchart of instructions of a simple daily task using coding language.**
- Translate algorithms into a program using coding language on a “Robo-Mouse” grid.**
- Evaluate the flowcharts of peers using the correct algorithm and symbols using a coding checklist.**

Instructional Strategies/Differentiated Instruction

- Check-In Survey
- Whole group instruction
- Small group instructions
- Strategic grouping
- Guided notes
- Instructional videos
- Paragraph frames and sentence starters
- Teacher/student modeling
- Written feedback – teacher and peer
- Think-write-pair-share and small-group discussions
- Graphic organizers
- Accountable talk
- Homework
- Electronic word walls with visuals - Padlet
- Anchor charts
- Conferencing
- Text and video chunking with guiding questions
- Key vocabulary - translation, reinforcing the contextual definition with visuals
- Provide correct pronunciation by repeating student response
- Word wall
- Do Nows as vocabulary review
- Culturally responsive teaching
- Explicit modeling
- Non verbal assessment
- Assignment modification
- Speech to text

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EL Differentiation Instruction:

- Verbal: Prompting, questioning, elaborating, and facilitating higher-level thinking skills
- Explicit modeling
- Word walls with visuals
- Pre-reading strategies
- Guided and independent practice
- Small group instruction
- Strategic grouping
- Key Vocabulary
- Graphic organizers
- KWL charts

Assessments

FORMATIVE ASSESSMENTS:

- Quick Write responses
- Exit Slips
- Accountable Talk Discussions
- Do Now
- Oral questioning
- Graphic organizers
- Regular Homework
- Thumbs up/Thumbs down

SUMMATIVE ASSESSMENT(S):

- Unit Task scoring guide
- Teamwork rubric

Unit Task

Unit Task Name: Problem-Solving Poster

Description: Students will create a poster that shows how the problem solving process can be used to help solve a problem (EU 1) They will need the four steps of the formal problem solving process. (EU 2)

Evaluation: Unit 1A Summative Assessment and Problem-Solving Rubric

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Unit Resources

- Worksheets
- Individual white boards
- Interactive notebook
- Chromebooks