Unit 02: Board Game Design

Content Area: **Computer Science**
Course(s):
Time Period: **Marking Period 1**
Length: **15 - 20 days**
Status: **Published**

Summary

This unit focuses on board game development. Students will use, if necessary, the brainstorming techniques in Unit 1 along with their knowledge of the formal and dramatic elements of a game to begin designing their own board game. Students may optionally choose to avail themselves of the 3D printer, in which case they'll need to learn about free online software necessary to design and print a model. If a student decides to use the 3D printer, it is required that the student designs their own products; students cannot simply print an existing online template. The goal here is to ensure that students learn about what goes into 3D printing. This kind of printing differs from paper printing; students must give thought to the orientation and design of what they wish to print. The 3D printer works by building up individual layers. If students are not cognizant of this, the printer may end up trying to print in mid-air, with disappointing results. There are printer settings that can help to mitigate these problems, which students should understand. The iterative design process will also be stressed. Students will also need to develop and employ time-management skills. While a student may have a great idea, game designers have deadlines, and many times, the creative process must fit a given schedule.

Revised Date: July 2025

Designing products through an inclusive fashion will include information about various people and their culture/history. This addresses the following:

Amistad Commission

This unit also reflects the goals of the Department of Education and the Amistad Commission including the infusion of the history of Africans and African-Americans into the curriculum in order to provide an accurate, complete, and inclusive history regarding the importance of of African-Americans to the growth and development of American society in a global context.

Asian American and Pacific Islander History Law

This unit includes instructional materials that highlight the history and contributions of Asian Americans and Pacific Islanders in accordance with the New Jersey Student Learning Standards in Social Studies.

New Jersey Diversity and Inclusion Law

In accordance with New Jersey’s Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity, including:

economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance.

MATH.K-12.1	Make sense of problems and persevere in solving them
MATH.K-12.2	Reason abstractly and quantitatively
MATH.K-12.3	Construct viable arguments and critique the reasoning of others
TECH.K-12.1.1.d	understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
MATH.K-12.5	Use appropriate tools strategically
MATH.K-12.6	Attend to precision
MATH.K-12.7	Look for and make use of structure
TECH.K-12.1.4.a	know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
TECH.K-12.1.4.b	select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
TECH.K-12.1.4.c	develop, test and refine prototypes as part of a cyclical design process.
TECH.K-12.1.4.d	exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
TECH.K-12.1.6.a	choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
MATH.9-12.S.MD.B	Use probability to evaluate outcomes of decisions
MATH.9-12.S.MD.B.5.a	Find the expected payoff for a game of chance.
CS.K-12.1	Fostering an Inclusive Computing and Design Culture
CS.K-12.2	Collaborating Around Computing and Design
CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.7	Communicating About Computing and Design

Essential Questions/Enduring Understandings

Essential Questions:

- How can play-testing help you to develop a good game?
- How can you maximize the chance that a 3D model will print as intended?

Enduring Understandings:

- Having people play your game may help you to realize areas for enhancement with your game that

would have otherwise gone unnoticed. You may observe that the game is too easy, or that the game does not flow smoothly. Having many people play-test your game will help to ensure that your game is fun, and that it appeals to as wide a variety of people as possible.

- 3D printing software has features that can project how the model will print. This, along with advanced knowledge of the 3D printer's settings, can help you to achieve the desired print. Printing a smaller model of what you have in mind first may also be helpful. If the smaller version looks good, you can then proceed with the larger print with greater confidence that it will print as intended. For longer prints, periodically check on the printer's progress. If the print does not go as planned, you can cancel the print before too many resources are lost.

Objectives

Students Will Know:

- Software that can help with 3D printing.
- Questions to ask as their game is play-tested.

Students Will be Skilled at:

- Utilizing 3D print software to achieve a desired print.
- Taking down player feedback on their game so that it can be improved.

Learning Plan

- Allow students to form groups if they wish.
- Introduce students to 3D software if they wish to use it.
- Periodically check in with students to ensure proper incorporation of formal & dramatic elements, and timely game development.
- Allow for a few days for all students to have their games play-tested.
- Allow time for students to incorporate into their games the feedback from play-testing.

Assessment

- Assessments

- Formative: Daily assessments using examples from class notes and CodeHS.com.
- Summative: Teacher-created assessments/projects and CodeHS Computer Science Projects.
- Benchmark: Check for understanding benchmark assessments on CodeHS.
- Alternative Assessments: Student-centered activities such as a doorbell coding project, game design projects, and other activities involving real world applications shown below:
    - Periodic check-ins as students work.
    - Finished board game.

Materials

- Core instructional materials: Core Book List including Game Design Workshop by Fullerton

Supplemental materials:

- CodeHS
- Construction materials
    - Cardboard for board game foundation
    - Glue
    - Construction paper
    - Scissors
    - Dice
    - Markers
    - Etc
- 3D Printer
- Computers

Integrated Accommodation and Modifications

See linked document.