# Unit 8: JavaScript Animation and Games

Content Area: **Technology**
Course(s):
Time Period: **Marking Period 4**
Length: **10 blocks**
Status: **Published**

## Course Description & Instructional Notes

**Course Description**

Now, your graphics will come to life. You will learn how to make objects move around the screen. You will also learn how to let the user interact with your program with the mouse. At the end of this section, you will program your very own video game.

**Prior Knowledge:**

Retained knowledge from previous units

**Instructional Notes**:

The course utilizes a blended classroom approach. The content is fully web-based, with

students writing and running code in the browser. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students. Each unit of the course is broken down into lessons. Lessons consist of video tutorials, short quizzes, example programs to explore, and written programming exercises, adding up to over 100 hours of hands-on programming practice in total.

**Technology Integration:**

Computer Science naturally integrates technology on a daily basis.

## Enduring Understandings

Programmers use built-in coding features that allow users to interact through mouse and keyboard events.

Using timers and randomization, designers can make a game more playable and interactive.

## Essential Questions

How do games respond to user's actions?

What are some controls a game designer can use to influence how a game is played?

## Student Learning Objectives

Students will be able to:

- Explain in their own words how animation works
- Create animation in programs using the setTimer function
- Explain what a callback function is
- Create programs with timers to create increasingly challenging animations
- Analyze existing programs and explain how they create animations
- Utilize the Randomizer to generate random events in their animations
- Explain the general workflow of creating an animation program
- Analyze animation programs and identify similarities and differences
- Create increasingly challenging animations using timers, graphics, and the Randomizer
- Create increasingly challenging animations that simulate movement using timers
- Describe how events are different than timers
- Use mouse click events to create programs that respond to user clicks
- Explain how events are different from timers.
- Create interactive programs that use events to respond to the mouse moving.
- Explain how events are different from timers.
- Create interactive programs that use events to respond to the keyboard input.
- Synthesize the skills and concepts learned in the Animation and Games unit to create advanced, interactive programs.

## Vocabulary & Learning Experiences

**Essential Academic Vocabulary**

Start Function, JavaScript Documentation, Canvas, Timer, Coordinate System, Animation, Callback Function, Loop, Randomize, getWidth(), getHeight(), Constant, Magic Number, Parameter, DRY Principle, Edge Case, Global Variable, Radius, Scope, Event, Top Down Design, Counter, Local Variable

**Planned Learning Experiences**

Challenges: Animation and Games

Students will synthesize all of the skills and concepts learned in the Animations unit to solve increasingly challenging puzzles.

## Resources

CodeHS

Code.org

Blown to Bits

## Assessments

**Formative Assessments**

Think like a Computer Scientist Journal:

Students complete at least five journal entries based on teacher provided prompts that could include major topics, key points, vocabulary, syntax, and/or flowcharts/programming planning.

Quizzes embedded in CodeHS Modules and Code Review

**Summative Assessments**

Unit Quizzes (multiple choice only)

Student Choice Unit Project

## NJSLS Standards

*NJSLS Standards Copied and Pasted as well as linked.*

**NJSLS Computer Science and Design Thinking**

8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new

design based on a cost benefit analysis.

8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.

8.2.12.NT.2: Redesign an existing product to improve form or function.

## Additional NJSLS Standards

*NJSLS Standards Copied and Pasted as well as linked.*

***Interdisciplinary Connections***

***NJSLS Career Readiness, Life Literacies, and Key Skills***

**NJSLS Companion Standards Grades 9-12 (Reading & Writing in Science & Technical Subjects)**

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.

## Modifications/Accommodations

GENERAL CONSIDERATIONS FOR DIVERSE LEARNERS

| English Language Learners | Students Receiving Special Education Services | Advanced Learners |
|---|---|---|
| - Personal glossary | - Small group/One to one | - Use of high level academic vocabulary/texts |
| - Text-to-speech | - Additional time | |

- Extended time

- Simplified / verbal instructions

- Frequent breaks

[WIDA Can Do Descriptors for Grade 9-12]

[WIDA Essential Actions Handbook]

[FABRIC Paradigm]

[Wall Township ESL Grading Protocol]

- Review of directions

- Student restates information

- Space for movement or breaks

- Extra visual and verbal cues and prompts

- Preferential seating

- Follow a routine/schedule

- Rest breaks

- Verbal and visual cues regarding directions and staying on task

- Checklists

- Immediate feedback

- Problem-based learning

- Pre assess to condense curriculum

- Interest-based research

- Authentic problem-solving

- Homogeneous grouping opportunities

[Knowledge and Skill Standards in Gifted Education for All Teachers]

[Pre-K-Grade 12 Gifted Programming Standards]

[Gifted Programming Glossary of Terms]

*Use WIDA Can Do Descriptors in coordination with Student Language Portraits (SLPs).

Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner.

[Considerations for Special Education Students 6-12]

[National Center on Universal Design for Learning - About UDL]

[UDL Checklist]

[UDL Key Terms]

Students with 504 Plan

Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.

At Risk Learners / Differentiation Strategies

| | | |
|---|---|---|
| Alternative Assessments | Independent Research & Projects | Jigsaw |
| Choice Boards | Multiple Intelligence Options | Think-Tac-Toe |

Games and Tournaments

Group Investigations

Learning Contracts

Leveled Rubrics

Literature Circles

Multiple Texts

Personal Agendas

Homogeneous Grouping

Project-Based Learning

Varied Supplemental Activities

Varied Journal Prompts

Tiered Activities/Assignments

Tiered Products

Graphic Organizers

Choice of Activities

Mini-Workshops to Reteach or Extend

Think-Pair-Share by readiness or interest

Use of Collaboration of Various Activities

Cubing Activities

Exploration by Interest

Flexible Grouping

Goal-Setting with Students

Homework Options

Open-Ended Activities

Varied Product Choices

Stations/Centers

Work Alone/Together