

# Unit 6 - Physical Computing ('21-'22)

## Resources

### Lesson 1: Innovations in Computing

#### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides

For the students

- [Computer Science is Changing Everything](#) - Video ([Download](#))
- [Computing Innovations](#) - Activity Guide
- [The Internet of Things](#) - Video

#### Prep

- Review the resource pages linked in Code Studio
- Cue up [The Internet of Things - Video](#) or [Computer Science is Changing Everything - Video](#)
- Print out a copy of the activity guide for each student

### Lesson 2: Designing Screens with Code

#### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides
- [Designing Screens with Code](#) - Resource
- [Random Numbers](#) - Resource
- [Responding to User Input](#) - Resource

#### Prep

There is no prep for this lesson.

## Lesson 3: The Circuit Playground

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides
- [Circuit Playground](#) - Resource

For the students

- [How Computers Work: Hardware & Software](#) - Video ([Download](#))

### Prep

- Make sure that student computers have the drivers and software necessary to connect to the Circuit Playground ([details here](#))
- Prepare a board and USB cable for each pair of students

## Lesson 4: Input Unplugged

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides

For the students

- [Input and Events](#) - Activity Guide

### Prep

- Prepare to display example programs for the whole class.
- A half deck of cards for each group of three students or [deck-of-cards.js.org](#).
- Print one copy of the activity guide for each group of four students.
-

## Lesson 5: Board Events

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides

For the students

- [Board Events](#) - Resource
- [Physical Input](#) - Resource
- [Physical Output](#) - Resource

### Prep

There is no prep for this lesson.

## Lesson 6: Getting Properties

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides
- [Taking Input with getProperty](#) - Resource

### Prep

There is no prep for this lesson.

## Lesson 7: Analog Input

### Resources

For the teachers

- [Analog Sensors](#) - Resource
- [CSD Unit 6 - Physical Computing](#) - Slides
- [Changing Sensor Scale](#) - Resource
- [Date and Change Events](#) - Resource

For the students

- [Difference between Analog and Digital Signals](#) - Video

### Prep

- Cue up the [Difference between Analog and Digital Signals](#)
- If your room isn't very bright, it's useful to have some flashlights or other light sources on hand for testing the light sensor

## Lesson 8: The Program Design Process

### Resources

For the teachers

- [Booleans and Comparison Operators](#) - Resource
- [CSD Unit 6 - Physical Computing](#) - Slides
- [Functions](#) - Resource
- [If Statements](#) - Resource

For the students

- [Emoji Race](#) - Project Guide

### Prep

- Provide students with copies of the project guide

## Lesson 9: Project - Make a Game

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides

For the students

- [Computer Science Practices](#) - Reflection
- [Make a Game](#) - Activity Guide
- [Make a Game](#) - Rubric
- [Make a Game - Student Checklist](#)

### Prep

- Print a copy of the project guide for each group of students
- Print a copy of the rubric for each student

## Lesson 10: Arrays and Color LEDs

### Resources

For the teachers

- [Arrays](#) - Resource
- [CSD Unit 6 - Physical Computing](#) - Slides
- [Circuits and LEDs](#) - Resource
- [Color Lights](#) - Resource

For the students

- [Introduction to Arrays](#) - Video ([Download](#))

### Prep

There is no prep for this lesson.

## Lesson 11: Making Music

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides
- [Playing Notes](#) - Resource
- [Producing Output](#) - Resource

### Prep

There is no prep for this lesson.

## Lesson 12: Arrays and For Loops

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides
- [For Loops](#) - Resource
- [Modifying Arrays](#) - Resource

For the students

- [For Loops](#) - Video ([Download](#))

### Prep

There is no prep for this lesson.

## Lesson 13: Accelerometer

### Resources

For the teachers

- [Accelerometer Events](#) - Resource
- [CSD Unit 6 - Physical Computing](#) - Slides
- [The Accelerometer](#) - Resource

### Prep

There is no prep for this lesson.

## Lesson 14: Functions with Parameters

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides

### Prep

There is no prep for this lesson.

## Lesson 15: Circuits and Physical Prototypes

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides
- [Circuits and Buttons](#) - Resource

For the students

- [How Computers Work: Circuits & Logic](#) - Video ([Download](#))
- [Physical Prototyping](#) - Project Guide

### Prep

- Gather prototyping materials, such as:
  - Structural material (cardboard, construction paper, etc)
  - Connective material (tape, glue, hot glue, etc)
  - Construction tools (scissors, staplers, etc)
  - Other materials (cups, binder clips, paper plates, etc)
- Prepare circuit wiring materials, such as:
  - Alligator clip wires (included in Circuit Playground classroom kit)
  - LEDs (included in Circuit Playground classroom kit)
  - Other conductive material (wire, paper clips, foil, etc)
  - (optional) Buttons or switches
- Print a copy of the project guide for each group of 2-3 students
- Prepare a model button to show the class



## Lesson 16: Project - Prototype an Innovation

### Resources

For the teachers

- [CSD Unit 6 - Physical Computing](#) - Slides

For the students

- [Computer Science Practices](#) - Reflection
- [Prototype an Innovation](#) - Rubric
- [Prototype an Innovation](#) - Project Guide
- [Prototype an Innovation - Student Checklist](#)

### Prep

- Collect materials for physical prototyping, eg.
  - Cardboard
  - Scissors
  - Tape
  - Glue
  - Foil
- Print a copy of the project guide for each pair of students
- Print a copy of the peer review sheet for each student
- Print a copy of the rubric for each student

## Lesson 17: CS Discoveries Post-Course Survey

### Resources

There are no resources for this lesson.

### Prep

There is no prep for this lesson.