Focus on Hardware '23-'24 (CS Discoveries) Resources

Unit 1 - Problem Solving and Computing ('23-'24)

Lesson 1: Intro to Problem Solving

Resources

For the teachers

- **Code.org How-to Videos**
- **Intro to Problem Solving** - Slides
  Make a Copy

For the students

- **Aluminum Boats** - Activity Guide
  Make a Copy

Preparation

For each group

- 2 sheets of aluminum foil, 5x5 inches in length each
- 1 container that can hold 3-5 inches of water
- Several paper towels or rags that can be placed under the container
- 15 pennies
- One copy of the activity guide

For the teacher

- 1 container that can hold 3-5 inches of water
- 50 pennies
- Extra paper towels or rags
- Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers
- If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 2: The Problem Solving Process

Resources	Preparation
For the teachers • **Problem Solving Process** • **The Problem Solving Process** - Slides ▾ Make a Copy For the students • **Problem Solving Process** - Video (**Download**) • **The Problem Solving Process** - Activity Guide ▾ Make a Copy	For each student • Print a copy of Activity Guide For the class • Poster paper • Markers/colored pencils For the Teacher • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 3: Exploring Problem Solving

Resources	Preparation
For the teachers • **Exploring Problem Solving** - Slides ▾ Make a Copy For the students • **Solving Problems** - Activity Guide ▾ Make a Copy	• Print the activity guide for each student • Scratch paper for the Birthday Party problem • Poster to record strategies for defining problems in wrap up discussion • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 4: What is a Computer?

Resources	Preparation
For the teachers • **What is a Computer** - Slides ▾ Make a Copy For the students • **What is a Computer** - Video (**Download**) • **What is a Computer (Version A)** - Activity Guide ▾ Make a Copy • **What is a Computer (Version B)** - Activity Guide ▾ Make a Copy	**For each group** • Print out copies of the activity guide. Note there are two sets of pictures, but each group only needs a single set. • Scissors (if you will not have time to cut the pictures prior to class) • Poster paper • Markers or colored pencils • Glue or tape to attach pictures **For the teacher** • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 5: Input and Output

Resources	Preparation
For the teachers • **Input and Output** - Slides ▾ Make a Copy For the students • **Input and Output** - Activity Guide ▾ Make a Copy	• Prepare copies of the activity guide • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 6: Processing

Resources	Preparation
For the teachers • **Apps with Processing** - Slides ▾ Make a Copy For the students • **Apps with Processing** - Activity Guide ▾ Make a Copy	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 7: Storage

Resources	Preparation
For the teachers • **Apps with Storage** - Slides ▾ Make a Copy For the students • **Apps with Storage** - Activity Guide ▾ Make a Copy • **What Do Computers Do** - Video (**Download**)	• Print a copy of the activity guide for each student • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 8: Project - Propose an App

Resources	Preparation
For the teachers • **Project - Propose an App** - Slides ▾ Make a Copy For the students • **Apps and Problem Solving** - Activity Guide ▾ Make a Copy • **Apps and Problem Solving** - Peer Review ▾ Make a Copy • **Apps and Problem Solving** - Rubric ▾ Make a Copy • **Apps and Problem Solving - Student Checklist** - Resource ▾ Make a Copy • **Computer Science Practices** - Reflection ▾ Make a Copy	• Print a copy of **Apps and Problem Solving** for each pair of students • Poster paper, pens, markers and other supplies for making posters • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 9: Intro to Problem Solving - Newspaper Table (Alternate Lesson 1)

Resources	Preparation
For the teachers • **Code.org How-to Videos** • **Intro to Problem Solving (Newspapers)** - Slides ▾ Make a Copy For the students • **Build a Newspaper Table** - Activity Guide ▾ Make a Copy	**For each group** • 2 full newspapers for each group of students • 1 roll of tape for each group of students • One copy of the activity guide **For the teacher** • 10-20 books of similar weight. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 10: Intro to Problem Solving - Spaghetti Bridge (Alternate Lesson 1)

Resources	Preparation
For the teachers • **Code.org How-to Videos** • **Intro to Problem Solving (Spaghetti)** - Slides ▾ Make a Copy For the students • **Spaghetti Bridge - Activity Guide** - Activity Guide ▾ Make a Copy	**For each group** • 1 pound of dry spaghetti noodles (about 1 box) • 1 glue gun • One copy of the activity guide **For the teacher** • 10-20 books of similar size and weight • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 11: Intro to Problem Solving - Paper Tower (Alternate Lesson 1)

Resources	Preparation
For the teachers • **Code.org How-to Video Playlist** • **Intro to Problem Solving (Paper Towels)** - Slides ▾ Make a Copy For the students • **Paper Tower** - Activity Guide ▾ Make a Copy	**For each group** • 20 sheets of paper, 8.5 x 11 inches • Space to build their tower • One copy of the activity guide **For the teacher** • Extra paper • Timer • Ruler • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 12: Exploring Problem Solving - Animals Theme (Alternate Lesson 3)

Resources	Preparation
For the teachers • **Exploring Problem Solving (Animals)** - Slides ▾ Make a Copy For the students • **Solving Problems** - Activity Guide ▾ Make a Copy • **Tangrams** - Resource ▾ Make a Copy	• Print the activity guide for each student • Prepare tangrams for students, or print out one tangram sheet and get scissors for each group. • Poster to record strategies for defining problems in wrap up discussion • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 13: Exploring Problem Solving - Games Theme (Alternate Lesson 3)

Resources	Preparation
For the teachers • **Exploring Problem Solving (Games)** - Slides ▾ Make a Copy For the students • **Solving Problems** - Activity Guide ▾ Make a Copy	• Print the activity guide for each student • Scratch paper for the Partner Race Relay problem • Poster to record strategies for defining problems in wrap up discussion • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Unit 2 - Data and Society ('23-'24)

Lesson 1: Representation Matters

Resources	Preparation
For the teachers • **Representation Matters** - Slides ▾ Make a Copy For the students • **Representation Matters** - Activity Guide ▾ Make a Copy	• Print copies of the Meals Data resource so that each group can get one of the four pages • Print one copy of the activity guide for each group • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 2: Patterns and Representation

Resources	Preparation
For the teachers • **Patterns and Representation** - Slides ▾ Make a Copy For the students • **Animal Shapes** ▾ Make a Copy • **Representing Information** - Activity Guide ▾ Make a Copy	• Print one copy of the activity guide for each group of 2-3 • Print and cut up one copy of the manipulative resource for each group of 2-3 • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 3: ASCII and Binary Representation

Resources	Preparation
For the teachers • **ASCII and Binary Representation** - Slides ▾ Make a Copy For the students • **ASCII Challenges** - Activity Guide ▾ Make a Copy • **ASCII Text** - Resource ▾ Make a Copy	• Print copies of the activity guide - 1 per student • Print copies of the ASCII text resource - 1 for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 4: Representing Images

Resources	Preparation
For the teachers • **Representing Images** - Slides ▾ Make a Copy	• Practice using the Pixelation Widget for ~10 mins to prepare to respond to questions • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 5: Representing Numbers

Resources	Preparation
For the teachers • **Number Cards - Digital Manipulative** ▾ Make a Copy • **Representing Numbers** - Slides ▾ Make a Copy For the students • **Binary and Data** - Video (**Download**) • **Number Cards** - Manipulative ▾ Make a Copy • **Representing Numbers 2021** - Activity Guide ▾ Make a Copy	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 6: Combining Representations

Resources	Preparation
For the teachers • **Combining Representations** - Slides Make a Copy For the students • **Activity Guide - Pet Records** - Activity Guide Make a Copy • **ASCII to Binary Table** - Reference Make a Copy	• Have the 8-Bit Binary Widget and Binary to ASCII Table ready to model with the class • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 7: Keeping Data Secret

Resources	Preparation
For the teachers • **Keeping Data Secret** - Slides Make a Copy For the students • **Medical Records** - Activity Guide Make a Copy • **Secret Messages** - Activity Guide Make a Copy	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 8: Project - Create a Representation

Resources	Preparation
For the teachers • **Create a Representation** - Slides ▾ Make a Copy For the students • **Computer Science Practices** - Reflection ▾ Make a Copy • **Create a Representation** ▾ Make a Copy • **Create a Representation** - Rubric ▾ Make a Copy • **Create a Representation - Student Checklist** ▾ Make a Copy	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Unit 3a - (Option A) Creating Apps with Devices - Circuit Playground ('23-'24)

Lesson 1: Intro to App Lab

Resources	Preparation
There are no resources for this lesson.	• Review and complete the online tutorial yourself • Print one or more of the **Exit Ticket examples** at the end of this lesson plan, or create your own.

Lesson 2: Physical Designs

Resources	Preparation
For the teachers • **Physical Designs** - Slides ▾ Make a Copy For the students • **(Warm Up) Word Search** - Activity Guide ▾ Make a Copy • **Physical Design Template** - Resource ▾ Make a Copy • **Physical Designs** - Activity Guide ▾ Make a Copy • **Problem Solving and Design** - Resource ▾ Make a Copy • **The Problem Solving Process** - Video (**Download**)	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 3: The Circuit Playground

Resources	Preparation
For the teachers • **The Circuit Playground** - Slides ▾ Make a Copy For the students • **Circuit Playground** - Resource • **Circuits and Logic** - Video • **Physical Output** - Resource	• 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 • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 4: Updating Screen Elements

Resources	Preparation
For the teachers • **Responding to User Input** - Resource • **Updating Screen Elements** - Slides ▾ Make a Copy For the students • **Designing Screens with Code** - Resource • **Random Numbers** - Resource	• Students do *not* need Circuit Playgrounds for this lesson, and we recommend teaching the lesson without devices to avoid distractions • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 5: Board Events

Resources	Preparation
For the teachers • **Board Events** - Slides ▾ Make a Copy For the students • **Board Events** - Resource • **Physical Input** - Resource	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 6: Variables and If Statements

Resources	Preparation
For the teachers • **Variables and If Statements** - Slides ▾ Make a Copy For the students • **If Statements** - Resource • **If Statements** - Video • **The Counter Pattern** - Video • **The Counter Pattern** - Resource • **Variables** - Resource • **Variables** - Video	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 7: Mini-Project: Field Collector App

Resources	Preparation
For the teachers • **Mini-Project: Field Collector App** - Slides ▾ Make a Copy For the students • **Project Guide - Field Collector App** - Activity Guide ▾ Make a Copy • **Rubric - Field Collector App** - Rubric ▾ Make a Copy	• Review the Project Guide and Rubric to understand the scope of the project. • Review the exemplar projects as examples of what students can create. • (Optional) You may decide to show one of these projects to students to help spark ideas. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 8: Color LEDs

Resources	Preparation
For the teachers • **Color LEDs** - Slides ▾ Make a Copy For the students • **Color Lights** - Resource	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 9: Getting Screen Inputs

Resources	Preparation
For the teachers • **Getting Screen Inputs** - Slides ▾ Make a Copy For the students • **Taking Input with getProperty** - Resource	• Students do *not* need Circuit Playgrounds for this lesson, and we recommend teaching the lesson without devices. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 10: Combining Inputs and Outputs

Resources	Preparation
For the teachers • **Combining Inputs and Outputs** - Slides ▾ Make a Copy For the students • **Input / Output Devices** - Video	• Prepare a board and USB cable for each pair of students • (Optional) consider preparing external reference materials from previous lessons for students, such as a Word Wall or Reference Packet, that students can access. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 11: Project: Human Device Interaction

Resources	Preparation

For the teachers
• **Project: Human Device Interaction** - Slides ▾ Make a Copy
For the students
• **Peer Review - Human Device Interaction** - Resource ▾ Make a Copy
• **Project Guide - Human Device Interaction** - Activity Guide ▾ Make a Copy
• **Rubric - Human Device Interaction** - Rubric ▾ Make a Copy
• **Student Checklist - Human Device Interaction** ▾ Make a Copy
	• Review the Project Guide and Rubric to understand the scope of the project.
	• Review the exemplar projects as examples of what students can create.
	• (Optional) You may decide to show one of these projects to students to help spark ideas.
	• 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)
	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 12: Board Sensors

Resources	Preparation
For the teachers • **Board Sensors** - Slides ▾ Make a Copy For the students • **Analog Sensors** - Resource • **Changing Sensor Scale** - Resource • **Date and Change Events** - Resource	• Prepare a board and USB cable for each pair of students • Consider having some flashlights or other light sources on hand for testing the light sensor • Consider having noisemakers or whistles or small instruments on hand for testing the sound sensor • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 13: Accelerometer

Resources	Preparation
For the teachers • **Accelerometer** - Slides ▾ Make a Copy For the students • **Accelerometer Events** - Resource • **The Accelerometer** - Resource	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 14: Making Music

Resources	Preparation
For the teachers • **Making Music** - Slides ▾ Make a Copy For the students • **Arrays** - Resource • **Introduction to Arrays** - Video • **Modifying Arrays** - Resource • **Playing Notes** - Resource • **Producing Output** - Resource	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 15: Functions

Resources	Preparation
For the teachers • **Functions** - Slides ▾ Make a Copy For the students • **Functions** - Video • **Functions** - Resource • **Functions with Parameters** - Video	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 16: Mini-Project: Interactive Art

Resources	Preparation

For the teachers
• **Mini-Project: Interactive Art** - Slides ▾ Make a Copy
For the students
• **Project Guide - Interactive Art** - Activity Guide ▾ Make a Copy
• **Student Rubric - Interactive Art** - Rubric ▾ Make a Copy
	• Review the Project Guide and Rubric to understand the scope of the project.
	• Review the exemplar projects as examples of what students can create.
	• (Optional) You may decide to show one of these projects to students to help spark ideas.
	• 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)
	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 17: Physical Outputs and LEDs

Resources	Preparation
For the teachers • **Physical Outputs and LEDs** - Slides Make a Copy For the students • **Circuits and LEDs** - Resource	• 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 • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 18: Physical Inputs and Buttons

Resources	Preparation
For the teachers • **Physical Inputs and Buttons** - Slides Make a Copy For the students • **Circuits and Buttons** - Resource	• 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 • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 19: Project - Prototype an Innovation

Resources	Preparation

For the teachers
• **Project: Prototype an Innovation** - Slides ▾ Make a Copy
For the students
• **Peer Review - Prototype an Innovation** (**Download**) ▾ Make a Copy
• **Prototype an Innovation** - Rubric (**Download**) ▾ Make a Copy
• **Prototype an Innovation** - Activity Guide (**Download**) ▾ Make a Copy
• **Prototype an Innovation - Student Checklist** (**Download**) ▾ Make a Copy
	• 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
	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Unit 3B - (Option B) Creating Apps with Devices (micro:bit)

Lesson 1: Intro to App Lab

Resources	Preparation
There are no resources for this lesson.	• Review and complete the online tutorial yourself • Print one or more of the **Exit Ticket examples** at the end of this lesson plan, or create your own.

Lesson 2: Physical Designs

Resources	Preparation
For the teachers • **Physical Designs** - Slides ▾ Make a Copy • **[Exemplar] Physical Designs** - Exemplar ▾ Make a Copy For the students • **(Warm Up) Word Search** - Activity Guide ▾ Make a Copy • **Physical Design Template** - Resource ▾ Make a Copy • **Physical Designs** - Activity Guide ▾ Make a Copy • **Problem Solving and Design** - Resource ▾ Make a Copy • **The Problem Solving Process** - Video (**Download**)	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers • If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

Lesson 3: Introducing the micro:bit

Resources	Preparation
For the teachers • **Introducing the micro:bit** - Slides ▾ Make a Copy For the students • **LED Planning Sheet** - Resource • **The micro:bit LED Display** - Resource • **The micro:bit: Overview** - Resource	• Make sure that student computers have the drivers and software necessary to connect Code.org App Lab to the micro:bit (**details here**) • Prepare a micro:bit and USB cable for each pair of students • Check the "Teacher's Lounge" forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 4: Updating Screen Elements

Resources	Preparation
For the teachers • **Responding to User Input** - Resource • **Updating Screen Elements** - Slides ▾ Make a Copy For the students • **Designing Screens with Code** - Resource • **Random Numbers** - Resource	• Students do *not* need devices for this lesson, and we recommend teaching the lesson without devices to avoid distractions • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 5: Board Events

Resources	Preparation
For the teachers • **Board Events** - Slides ▾ Make a Copy For the students • **Board Events** - Resource • **Micro:bit Inputs** - Resource	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 6: Variables and If Statements

Resources	Preparation
For the teachers • **Variables and If Statements** - Slides ▾ Make a Copy For the students • **If Statements** - Resource • **If Statements** - Video • **The Counter Pattern** - Resource • **The Counter Pattern** - Video • **Variables** - Resource • **Variables** - Video	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 7: Mini-Project: Field Collector App

Resources	Preparation
For the teachers • **Mini-Project: Field Collector App** - Slides ▾ Make a Copy For the students • **Problem Solving Process with Programming** - Resource ▾ Make a Copy • **Project Guide - Field Collector App** - Activity Guide ▾ Make a Copy • **Rubric - Field Collector App** - Rubric ▾ Make a Copy	• Review the Project Guide and Rubric to understand the scope of the project. • Review the exemplar projects as examples of what students can create. • (Optional) You may decide to show one of these projects to students to help spark ideas. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 8: Getting Screen Inputs

Resources	Preparation
For the teachers • **Getting Screen Inputs** - Slides ▾ Make a Copy For the students • **Taking Input with getProperty** - Resource	• Students do *not* need micro:bits for this lesson, and we recommend teaching the lesson without devices. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 9: Combining Inputs and Outputs

Resources	Preparation
For the teachers • **Combining Inputs and Outputs** - Slides ▾ Make a Copy For the students • **Input / Output Devices** - Video	• Prepare a board and USB cable for each pair of students • (Optional) consider preparing external reference materials from previous lessons for students, such as a Word Wall or Reference Packet, that students can access. • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 10: Project: Human Device Interaction

Resources	Preparation

For the teachers
• **Project: Human Device Interaction** - Slides ▾ Make a Copy
For the students
• **Peer Review - Human Device Interaction** - Resource ▾ Make a Copy
• **Problem Solving Process with Programming** - Resource ▾ Make a Copy
• **Project Guide - Human Device Interaction** - Activity Guide ▾ Make a Copy
• **Rubric - Human Device Interaction** - Rubric ▾ Make a Copy
• **Student Checklist - Human Device Interaction** ▾ Make a Copy
	• Review the Project Guide and Rubric to understand the scope of the project.
	• Review the exemplar projects as examples of what students can create.
	• (Optional) You may decide to show one of these projects to students to help spark ideas.
	• 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)
	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 11: Board Sensors

Resources	Preparation
For the teachers • **Board Sensors** - Slides ▾ Make a Copy For the students • **Data & Change Events** - Resource • **Setting Sensor Scale** - Resource • **The micro:bit Sensors** - Resource	• Prepare a board and USB cable for each pair of students • Consider having some flashlights or other light sources on hand for testing the light sensor • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 12: Accelerometer

Resources	Preparation
For the teachers • **Accelerometer** - Slides ▾ Make a Copy For the students • **Accelerometer Events** - Resource • **The micro:bit Accelerometer** - Resource	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 13: Functions

Resources	Preparation
For the teachers • **Functions** - Slides ▾ Make a Copy For the students • **Functions** - Video • **Functions** - Resource • **Functions with Parameters** - Video	• Prepare a board and USB cable for each pair of students • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 14: Mini-Project: Interactive Pet

Resources	Preparation

For the teachers
• **Mini-Project: Interactive Pet** - Slides ▾ Make a Copy
For the students
• **Problem Solving Process with Programming** - Resource ▾ Make a Copy
• **Project Guide - Interactive Pet** - Activity Guide ▾ Make a Copy
• **Student Rubric - Interactive Pet** - Rubric ▾ Make a Copy
	• Review the Project Guide and Rubric to understand the scope of the project.
	• (Optional) You may decide to show one of these projects to students to help spark ideas.
	• 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)
	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 15: Physical Outputs and LEDs

Resources	Preparation

For the teachers
• **Physical Outputs and LEDs** - Slides ▾ Make a Copy
For the students
• **External LEDs on a micro:bit** - Resource
	• Prepare circuit wiring materials, such as:
	  ◦ Alligator clip wires
	  ◦ LEDs
	  ◦ Other conductive material (wire, paper clips, foil, etc)
	  ◦ (optional) Buttons or switches
	• Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 16: Physical Inputs and Buttons

Resources	Preparation
For the teachers • **Physical Inputs and Buttons** - Slides ▾ Make a Copy For the students • **External Buttons on a micro:bit** - Resource	• Prepare circuit wiring materials, such as: ◦ Alligator clip wires ◦ LEDs ◦ Other conductive material (wire, paper clips, foil, etc) ◦ (optional) Buttons or switches • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Lesson 17: Project - Prototype an Innovation

Resources	Preparation
For the teachers • **Project: Prototype an Innovation** - Slides ▾ Make a Copy For the students • **Peer Review - Prototype an Innovation** ▾ Make a Copy • **Prototype an Innovation** - Rubric ▾ Make a Copy • **Prototype an Innovation** - Activity Guide ▾ Make a Copy • **Prototype an Innovation - Student Checklist** ▾ Make a Copy	• 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 • Check the **"Teacher's Lounge"** forum for verified teachers to find additional strategies or resources shared by fellow teachers

Post-Course Survey