

Lesson 5: Input and Output

Overview

Question of the Day: How do computers use input and output to get and give the information that they need to solve problems?

In this lesson students consider how computers get and give information to the user through inputs and outputs. Students first consider what information they would need to solve a "thinking problem", then use that information to produce a recommendation. They then identify the inputs and outputs to that process. Afterwards, students consider an app that engages in the same process and determine how that app inputs and outputs information. Last, they consider other types of inputs and outputs that computers can use to help solve problems.

Purpose

In the previous lesson students began brainstorming features that can help classify devices as a computer. This lesson introduces input and output as one of these features and has students identify different methods of input or output in common apps.

Assessment Opportunities

1. Select the inputs and outputs used to perform common computing tasks

In the wrap-up discussion, make sure that students come up with multiple examples of tasks that involve input and output, and that they are coming up with multiple types of inputs and outputs specific to the task at hand. You might also collect individual answers to this question as an exit ticket.

2. Explain the role that input and output take when computers are used to solve information problems.

On the activity guide, check that "student app" has appropriate inputs and outputs listed, with a reasonable explanation for why each is necessary. Student answers will vary, but you can use the exemplar linked on the first level of the Code Studio progression as a guide.

Objectives

Students will be able to:

- Explain the role that input and output take when computers are used to solve information problems.
- Select the inputs and outputs used to perform common computing tasks

Preparation

- Prepare copies of the activity guide

Links

Heads Up! Please make a copy of any documents you plan to share with students.

For the teachers

- **CSD Unit 1 - Problem Solving and Computing** - Slides

For the students

- **Input and Output** - Activity Guide

Vocabulary

- **Input** - the information computers get from users, devices, or other computers
- **Output** - the information computers give to users, devices, or other computers

Standards

Full Course Alignment

Agenda

Lesson Modifications

Warm Up (5 minutes)

Recommending a Pet

Activity (35 minutes)

Inputs and Outputs

Pet Chooser

Story Creator

Improved Pet App

Wrap Up (5 minutes)

What Inputs and Outputs Do I Use?

Teaching Guide

Lesson Modifications



Attention, teachers! If you are teaching virtually or in a socially-distanced

classroom, please **click here** to access modifications that can be used during this lesson.

Warm Up (5 minutes)

Recommending a Pet

Journal

Prompt: Imagine that you are going to recommend a pet to someone. What are three questions you would ask them to help make that recommendation?

Give students time to write down their three questions.

Remarks

In the last lesson we learned that a computer is a machine that "works with information". Right now, we're going to work with information to make a pet recommendation to a classmate.

Group: Put students into pairs.

Prompt: Take turns asking your questions and making a recommendation to your partner.

Discuss: After students have had time to each make a recommendation, allow some students to share out the answers that their partner gave them and the recommendation that they made. Make a list on the board with the "answers" next to the "recommendations".

Goal: In today's lesson students will be talking about the concepts of "input" and "output" in computing. For this discussion, it's not so important the exact answers and recommendations, but that students can see that this information falls into two different categories.

Remarks

In order to solve this problem, you had to **get** information from your partner in the form of answers to your questions. You also had to **give** information to your partner in the form of a recommendation. Computers do the same thing. The information that they get from users is called **input**, and the information that they give to users is called **output**. Let's take a look at an app that also makes pet recommendations.

Key Vocabulary:

- **Input** - the information computers get from users, devices, or other computers
- **Output** - the information computer give to users, devices, or other computers

Question of the Day: How do computers use input and output to get and give the information that they need to solve problems?

Activity (35 minutes)

Inputs and Outputs

Distribute: Copies of the activity guide to each pair (or ask them to answer the questions in their journals).

Vocabulary: The two vocabulary words of the day are found on the top of the activity guide.

Sample Apps

Transition: Send pairs to Code Studio.

Pet Chooser

Look at the pet chooser app together. Note that it does something very similar to what the students just did in pairs. As a group, answer the first two questions about the app's input. Make sure students understand that the app gets the input from the user's behavior, in this case, pressing a button. Depending on the group, you may want to model the question around output or have students work on it in pairs.



App: Pet Chooser

Teaching Tip

Students do not need the exact input for every possible question asked. It's sufficient to say that the input is information about whether the user has allergies, wants to play with the pet, etc., and that the app gets this information from the user pressing a button.

Story Creator

Next, allow pairs to look at the story creation app on their own, answering similar questions about its input and output. This app allows students to put specific information into a form, then generate a personalized story based on the information provided.



App: Story Creator

✓ Assessment Opportunity ▲

Ensure that students are identifying appropriate inputs and outputs. Student answers may vary slightly, but they should be similar to those in the exemplar provided in the "Teachers Only" box of the first level in Code Studio.

Student Apps

In pairs or larger groups, students come up with their own app ideas, and decide the types of input and output that would be needed for those apps.

Share: Allow students to present their app ideas and the inputs and outputs that they would need.

Other Sources of Input

Prompt: So far, all of the input that we have seen comes directly from the user. Is there any other way that apps can get the information that they need?

Discuss: Allow students to brainstorm silently, then talk in pairs or small groups before soliciting answers from the entire group.

💬 Discussion Goal ▲

As students come up with their ideas, ensure that the Internet and sensor data (such as GPS, microphone, and camera), come up. You may need to prompt students by asking them whether there is anything that a smartphone knows without the user having to tell it. Although students may not be familiar with every possible sensor on a phone, by the end of the discussion, they should understand that the phone has sensors that it can use to get data without the user's direct input.

Improved Pet App

Students should look at the new pet app that is similar to the one they saw before, but with the additional feature that it gives the user directions to a nearby pet shop where they can get the pet.

Students should identify the different inputs to the improved app, including which inputs are from the user, which from the Internet, and which from the phone sensors.



App: Improved Pet App

Wrap Up (5 minutes)

Question of the Day: How do computers use input and output to get and give the information that they need to solve problems?

What Inputs and Outputs Do I Use?

Key Vocabulary:

- **Input** - the information computers get from users, devices, or other computers
- **Output** - the information computers give to users, devices, or other computers

Prompt: Brainstorm an everyday activity you or people you know do with an app or computer.

1. What is the input used for that activity?
2. What is the output?

Circulate: Have students brainstorm individually and record their ideas on their activity guides or journals.

Discuss: As a class discuss the examples students brainstormed.

✔ Assessment Opportunity ▲

Use this wrap up activity to assess how well students have understood the role of input and output in some common activities on a computer. For example:

- Typing on a Keyboard (Input) Makes Letters Appear on a Screen (Output)
- Moving a Mouse or Touch Screen (Input) Changes What Appears on the Screen (Output)
- Pressing play on a touchscreen (Input) Makes a Song Play through the Speakers (Output)

If you need, give students this or other examples to prompt more examples