

Lesson 2: Technology Foundations – What is a Computer?



Overview

In this lesson students develop a preliminary definition of a computer. To begin the lesson, the class will brainstorm possible definitions for a computer and place the results of this brainstorm on the board. Next, students will work in groups to sort pictures into “is a computer” or “is not a computer” on poster paper. Groups will place their posters around the room and briefly explain their motivations for choosing some of their most difficult categorizations. The teacher will then introduce a definition of the computer and allow students to revise their posters according to the new definition.



Purpose

In this lesson, students will consider different types of computers and that these computers input, store, process, and output information as part of the problem solving process. Upcoming lessons will dive much deeper into what an information problem looks like and how computers solve these problems.



Agenda

Warm Up (5 min)

- What Problems Do Computers Help You Solve?

Activity (30 min)

- Computer or Not?
- Present Your Categorizations

Wrap Up (15 min)

- Discussion
- Career Discussion



Objectives

Students will be able to:

- Identify a computer as a machine that processes Information
- Provide a high level description of the different parts of the Input - Output - Store – Process model of a computer



Preparation

For each group

- Print out copies of **What is a Computer – Activity Guide**. Note there are two sets of pictures in the document 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



Links

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

For the Teacher

- What is a Computer? – See [Computer Diagram](#)
- What is a Computer? – See [Exemplar](#)
- What Makes a Computer, a Computer? – [Video](#)

For the Students

- What is a Computer – See [Activity Guide](#)



Vocabulary

- **Computer** - A device that takes input, stores and processes information, and outputs information



Teaching guide

Warm Up (5 min)

What Problems Do Computers help You Solve?

Prompt : There are lots of ways that apps, companies, or governments might collect data. What ways to collect data are you already aware of?

Discuss: Run this conversation as a brainstorm, recording ideas on the board. Note and call out similarities you're seeing the kinds of problems students identified.

Remarks

Computers are clearly an important part of our lives and help us solve all kinds of problems. I want to think more about the kinds of problems computers help us solve, but first I want to ask an important question. What is a computer?

Activity (30 min)

Computer or Not?

Group: Place students in groups of 3 or 4

Distribute: Activity Guide of [What is a Computer – Activity Guide](#) as well as scissors, markers/colored pencils, poster paper, and glue/tape for making posters.

Give students the following directions:

- Draw a line down the middle of your poster, label one side "Computer" and the other "Not a Computer"
- Discuss as a group which of the objects in your set (from the activity guide) belong in each category
- Once your group is in agreement tape your objects to the appropriate side
- Develop a list of characteristics your groups used to determine whether an object is a computer

Circulate: Circle the room as students work to categorize the different images on the activity guide. Encourage groups to talk openly about their ideas and explain why they do or don't think an object should be categorized as a computer. For groups that can't decide on a categorization, ask members to defend their points of view, and take a majority vote. Assure groups that it is ok if one or two people disagree.

At the end of the time bring the class back together and ask them to place their posters at the front of the room.



Discussion Goal

Goal: This warm up makes the transition from thinking about problem solving in a generic sense to thinking about how computers help solve certain kinds of problems. While the lesson will eventually reveal that computers are particularly useful at solving information problems, you don't need to make that point during this brainstorm.



Teaching Tip

Modifications from the Forum: Many teachers have shared ideas for modifying this lesson on the forum ([link](#)). Head there to check out ways teachers have reduced printables, integrated technology, or otherwise adapted this activity to fit the needs of their class. If you do something new, share your ideas too!



Teaching Tip

Tape First: Students will have an opportunity to update their categorizations later in the lesson. For now they should just tape their objects to their poster or even just place them on the correct side.

Present Your Categorizations

Share: Have each group briefly present their posters, focusing their discussion on the following points

1. What rules or definition did you use to categorize your objects?
2. Which item was most difficult for you to categorize? How did you eventually make the decision of where to place it?

Invite the audience to respectfully question any categorizations if they disagree with the presenting group's decisions.

Remarks

As you can see, it's not always clear whether something is a computer, and even experts sometimes have different points of view. Let's have a look, however, at a definition that we'll use throughout this course.

Display: Show [What Makes a Computer, a Computer? – Video](#). This video is also available to students on the Code.org website, including an alternative link for schools where YouTube is blocked. The video presents a computer as a machine that helps with certain kinds of thinking work by processing information. It formally introduces a model of a computer as a machine that inputs, outputs, stores, and processes information. Ask the students questions and leave time for Q&A. Allow students to revise their posters using the definition they have just learned.

Discuss: Did any groups change their minds about whether something was a computer? What about the definition convinced you?

Wrap Up (5 min)

Discussion

Prompt: Today you've had a chance to look at a definition of a computer that focuses on how the computer solves problems. We've also seen many different types of computers. Think of a problem that a computer can help you to solve.

- What is the problem?
- What information is input to the computer?
- What information does the computer store?
- What information does the computer process?
- What information does the computer output?

Career Discussion

Introduce yourself and your career:

- What do you work, what do you do, and what do you love most about your job?
- What or who inspired you?
- How did you get interested in computer science?
- Did you have a mentor?
- Share a story about how tech affects everyone



Teaching Tip

Comparing Categorizations: There are two different sets of objects in the activity guide. The first page of each set is identical while the second pages are different. This will mean all students will see some objects that they categorized already and some that are new. Use this to help drive conversation.



Discussion Goal

Again, it's not necessary for everyone to agree on every item on the list. It's more important that the students use discussion of the items to deepen their understanding of what a computer is. It may be impossible to tell from the picture alone whether or not an item is a computer. Reassure the class that even experts often disagree about what exactly is or is not a computer, and that their understanding will continue to grow as the class continues.



Teaching Tip

Identifying Information Problems: Students are still developing an understanding of what information is or what an information problem that a computer could help solve looks like.

Ask the students questions and leave time for Q&A.

- What jobs are they interested in, what are their favorite tech gadgets or apps, and how do they think they are built?
- Do the students have any questions for you?



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