MYSTERY OBJECTS
MINI LESSON

Why are computers so useful to humans? What unique abilities do people have that computers don't? Explore the unique strengths of humans and computers in this object-based investigation. Then, consider how we can combine these strengths to accomplish more than either humans or computers could do on their own.

This activity is excellent for examining computers' prevalence in our lives, how important human qualities are in computing, and as preparation for further explorations of computational thinking and coding.

Format: Virtual or in-person

Ages: 8 through adult

Length: Approximately 30 minutes

LEARNING GOALS

1. Learners will understand that computers are machines we invented to do work for us.
2. Compare and contrast the distinct strengths of humans and computers.
3. Understand humans can combine our strengths with those of computers to accomplish more than we could do on our own, and that doing this well is called *computational thinking*.

PREPARATION

- Gather several of the objects listed in the table on page 4 and put each one in a bag or box. If you don't have physical objects or are experiencing this as a virtual lesson, print or use the images of objects on pages 5-7.
- Watch the full Mystery Objects lesson video to familiarize yourself with it.
    - Vimeo: https://vimeo.com/inspirect/mysteryobjects
    - YouTube: https://youtu.be/X10M6TSRoh0
- Familiarize yourself with the Computational Thinking information on page 8.

INVESTIGATION

1. Watch the lesson video with learners until 00:50, then pause.
2. Have each learner randomly pick an object from a bag/box or choose one from the photos.
3. Move through the following questions with the learner(s) or in pairs. Allow learners to work through the questions rather than providing answers, but make sure the objects and their functions have been established before moving on. Use the table on page 4 for more information about each object.
    a. **What do you think this object is?** *(If they don't know, prompt them to guess. Talk through parts of the object that are familiar to them.)*
    b. **What do you think this object does?** *(If they don't know, use the same strategies as identifying the object.)*
    c. **Could a person do what the object does or something similar to what the object does without using this object?**
    d. **If a person can do this task, why do we choose to use this object instead?**
4. Repeat with another object if available, talking through questions. Do as many objects as there is interest in doing.

TIPS FOR GUIDED QUESTIONING

Thoughtful questioning strategies help learners to build an independent understanding of an object and what it does if they aren't sure at first.

Even if a learner quickly identifies an object, you can use these starter prompts to set a stronger foundation for the rest of the lesson:

- What materials is the object made out of?
- Do parts of the object remind you of anything you've seen or used before?
- Can you move or interact with parts of the object? How?
- Can anything be attached to or taken out of the object? If so, what sorts of things?
- If the object has buttons, what do you think pressing one would do? How many different kinds of buttons do you see?
- If the object has a screen, why do you think it needs one? What might it show?

SYNTHESIS & REFLECTION

1. Resume the video and watch until 2:55, then pause.
2. Ask: **What do all these objects have in common?**
    - Learners may notice there are numerous similarities. For example, all of the objects have buttons, screens, and use electricity/batteries.
    - Guide the learners to find an umbrella for describing all of the objects, like they are all technology, made by humans, and all are computers. Learners may struggle to see the connection since these objects don't look like a traditional computer.
    - Have learners examine the diagrams on pages 6 and 7 of the objects they discussed, noting how each object has a computer chip inside.
3. Resume the video and watch until 4:10, then pause.
4. Ask: **We do so many things with computers. What are some things that you can do better than a computer?**
    - Answers might include: thinking, moving, having fun, expressing feelings, socializing, being creative, learning, healing.
5. Resume the video and watch to the end.
6. Discuss: **Which of your human strengths do you think would be most fun to combine with what computers are good at? What new things could you do?**

CUSTOMIZING THE LESSON

- For a **single learner**, engage the learner in follow-up questions as the facilitator and avoid providing answers. A little struggle is productive!
- For **multiple learners**, encourage partner conversations and help students work together to draw conclusions. Learners can share an object or compare and contrast different objects.
- For **younger learners**, consider using fewer objects or focusing on just one object overall or at a time.
- For **older learners**, include students in the process of selecting objects. Or, add an activity where they look for more objects in the room that could have computer chips.

LESSON RESOURCES

Table of Mystery Objects

Object	What does this object do?	Could a person do what the object does or something similar to what the object does?	If a person can do this task, why do we choose to use this object instead?
Calculator	Math	Yes, a human can do math.	Because it's faster than a human and can remember big numbers.
Fitness tracker, smartwatch, or pedometer	Track the steps you take, measures other body data like heart rate	Yes, a human can keep track of steps and data about our bodies.	Because it is always tracking and won't forget, only does one thing. Keeping track of steps/ data for so long while also doing other things is hard for humans.
Phone ("smart" or old model)	Lets you talk or message with people	Yes, a human can talk to people and send messages, like written notes or letters.	Because it lets us communicate with people who are far away. It also sends messages instantly.
Portable video game or toy with batteries/ buttons	Entertainment	Yes, humans can play games and use toys without electricity or screens.	Because a video game or toy with batteries is interactive. Stores information and responds to input.
Digital thermometer	Measures temperature	Yes, humans can sense how hot or cold something is.	Because it is more precise.
iPod or MP3 player	Plays music and stores a music library.	Yes, humans can play music, and store sheet music in libraries.	Allows you to listen to more songs than the ones you can play yourself. Stores information.
Digital camera	Takes pictures of the world. Stores information, so can help humans remember things. Acts like an "eye."	Yes, humans can see the world, and remember things visually in their memory. Humans can draw/paint pictures.	Allows you to capture visual images with more precision. Lets you store more visual information, but still probably not as much as a human brain.
Kindle or e-book reader	Lets you read books, can hold more than one book	Yes, humans can read books on paper.	Because you can store the text of many books in a small place instead of carrying them. Lets you make the text bigger or smaller so it's easier to read and more interactive.

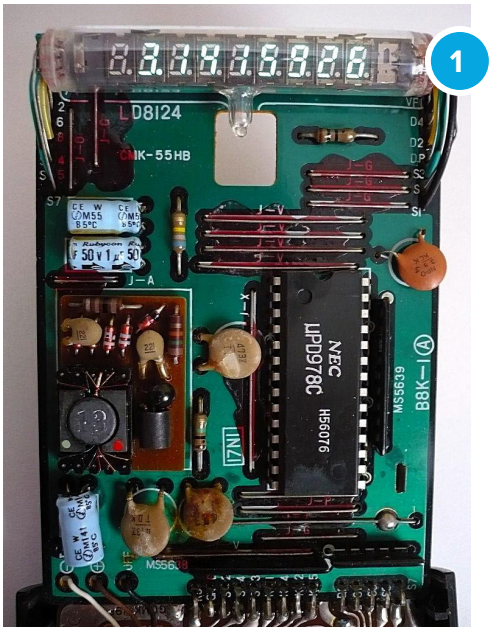
LESSON RESOURCES

Mystery Object Images

For a slideshow of object images and inside views, go to: https://bit.ly/3rT3w0Q

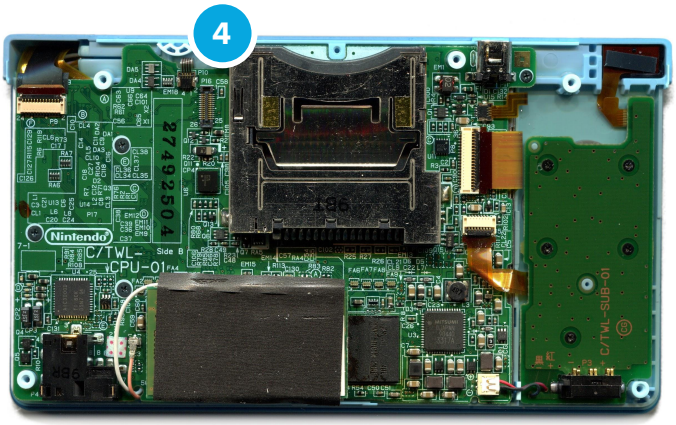
LESSON RESOURCES

Inside Views 1

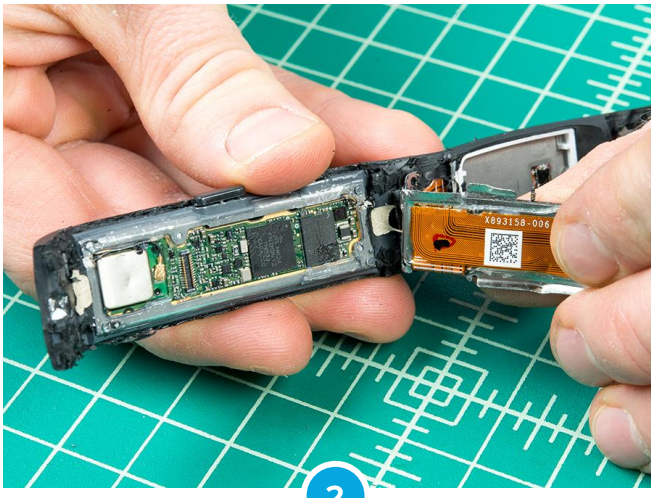


1 Calculator

Handheld Game

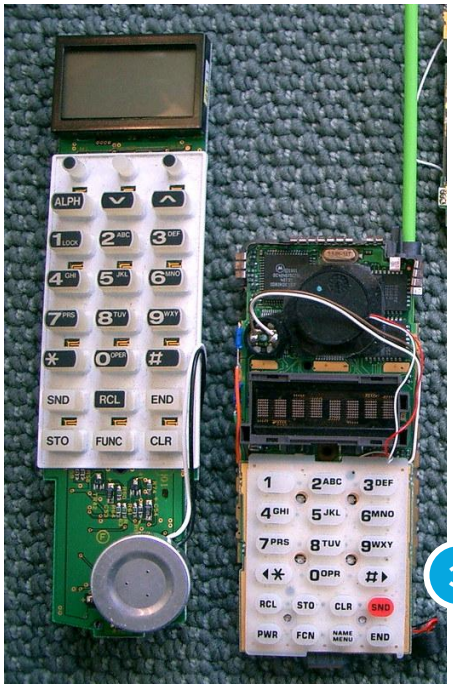


4



2

Fitness Tracker

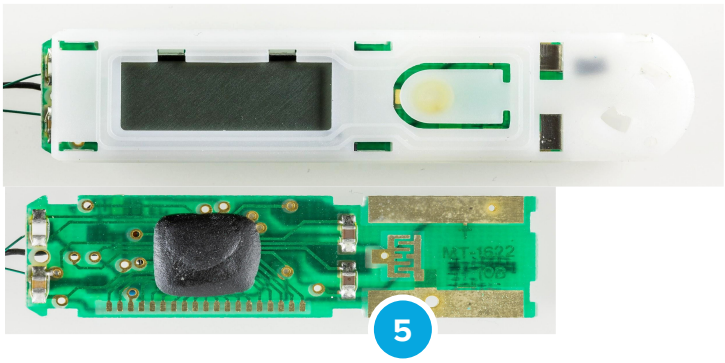


3 Cell Phone

LESSON RESOURCES

Inside Views 2

6 MP3 Music Player



5 Digital Thermometer

7 Digital Camera

8 Ebook Reader

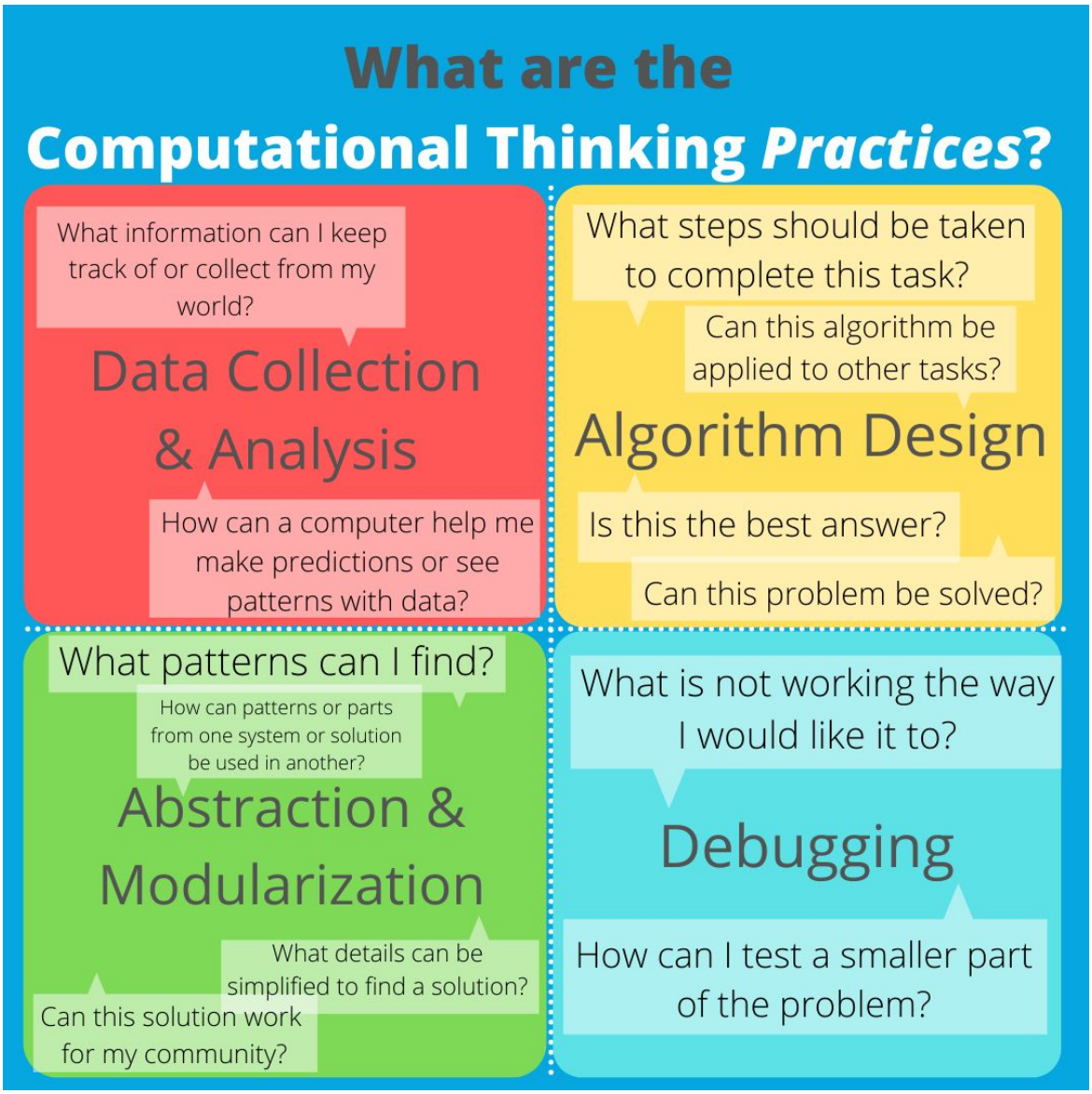
WHAT IS COMPUTATIONAL THINKING?

Our definition for learners:

> *Computational thinking* is when we can skillfully bring together what humans are good at and what computers are good at.

Our definition for teachers and caregivers:

> *Computational thinking* is a set of practices used in computing to frame problems, create solutions, express ideas, and understand the impact of technology in our world.



ATTRIBUTIONS

This lesson was created by the Science Museum of Minnesota as part of the InspireCT project, with generous funding from the Cargill Foundation.
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