Barefoot
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Recommended for
ages 5-7

How Computers Learn

Duration: **60 minutes**

Concepts and approaches covered


Pattern


Debugging


Evaluation

Learning objectives

By the end of the lesson, pupils will:

- Understand that data needs to be provided to allow the computer to learn.
- Recognise that computers can make mistakes if training data is limited or lacking variety
- Know that computers can learn how to complete tasks.
- Identify the data a computer needs to learn a task.
- Understand one reason why a computer might make a mistake

Resources needed

- Presentation slides
- Access to URLs in the presentation
- Art materials: paper, colouring pencils/pens, paints, or
- Access to a paint app such as Paintz (free)
- Two large display sheets labelled 'Cat' and 'Dog'

Key Words

- Artificial intelligence
- Data set
- Label

Step-by-step guide

Introduction (5 minutes)

Starter Activity: Spot the Elephants

Show the class slide 2 and ask them to find all the elephants. Use slide 3 to discuss the strategies they used, highlighting prior knowledge from books, TV, or zoos.

Main Activity (50 minutes)

Introduce Artificial Intelligence

Show slide 4 and ask what pupils think AI means. Collect ideas.

Use slide 5 to explain:

"Artificial Intelligence is when a computer learns and completes tasks in a similar way to a human."

Ask pupils when they've used technology to help them do something.

Training Computers

Explain that people need to provide information for computers to learn. Use the example of a computer learning to identify an elephant – first it must be shown what an elephant looks like.

Play the video from the slide 6 showing a computer trained to recognise elephants. You can also model this yourself using the link provided.
If you want to run the activity with your class the URL to elephant identifier is provide in the notes for the slide.

What is a Data Set?

Introduce the term data set (also used in the video). Explain:

- A data set is information that a computer uses to learn.

Use slide 8 to show how a computer uses a data set to decide if an image is an elephant or not.

Scenario: AI Cat-Flap

Introduce a family who wants an AI cat-flap that lets in cats but not dogs (slide 9). Ask:

- What kind of pictures does the computer need to learn from?

Create a Training Data Set

Pupils create pictures of cats and dogs (using art materials or digital tools like Paintz).

- Display the drawings on two large sheets labelled 'Cat' and 'Dog'.
- Explain that labelling helps the computer learn the difference.

Discuss:

- Why do we label the images?
- How will the computer use them?

When computers make mistakes

Use slides 11 and 12 to display the data set used to train a computer to recognise cats and dogs. Identify that the data is labelled.

Show slide 13 of a black-and-white cat the AI didn't recognise. Ask:

- Why didn’t the computer recognise the cat?

Use the images from the data sets on slide 11–12 (displayed on slide 13) to explore the idea that the AI may have only seen black-and-white dogs in the data set it was given. Therefore, it assumed that black and white animals were dogs.

Use slide 14 to explain that a computer is likely to make mistakes if it is only provided with a small amount of information to learn from. Continue to explain that there should also be lots of different types of examples in the information. Discuss thoughts on whether the computer would recognise the cat displayed on the slide?

Reflect on the Data Set

Look at the class data set:

- Does it include enough variety?
- What could we add to make it better?

If time allows, let pupils draw more varied examples of cats and dogs to improve the set.

Assessment Opportunity

Look for pupils who suggest or draw underrepresented types of cats or dogs.

Plenary (5 minutes)

Review key learning using slides 15–18:

- What does AI stand for?
- What is a data set?
- Why is variety important in a data set?

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