

# Artificial Intelligence Lesson Plans Collection 2023

## Key Stage Two

### Identifiers

Phase	7-11
Year	Y3/4/5/6

### Curriculum links

England: National Curriculum for Computing – KS2	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
Wales: Digital Competence Framework	<b>Producing:</b> I can adjust keywords and search techniques to find relevant information.  <b>Data and Computational Thinking:</b> I can understand the importance of the order of statements within algorithms.
Scotland: Curriculum for Excellence	<b>Technologies: Computing Science</b> I understand the operation of a process and its outcome. I can structure related items of information. I can create, develop and evaluate computing solutions in response to a design challenge.

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## Activity Guidance

<p><b>Outcome Criteria</b></p> <p>Child(ren) will be able to...</p>	<p>Understand how simple machine learning works.</p> <p>Understand some of the risks with machine learning and AI.</p> <p>Teach a machine to distinguish between two or more audio or visual variables.</p>
<p><b>Questions to ask</b></p>	<p><b>Starter:</b> What do all of these items have in common? What does “AI” stand for?          What artificial intelligence do you interact with?          How do you know this is a duck?</p> <p><b>Main:</b> How many inputs will make for the best output? Have your machines learnt correctly? Why might your machine not correctly identify those variables? Were your inputs accurate?          What might the risks be with machine learning and AI? What could happen if AI was given incorrect, flawed or biased learning data?</p> <p><b>Wrap-up:</b> Can we trust AI outputs?</p>
<p><b>Activity Descriptor</b></p>	<p><b>Computers don't lie, but liars can compute</b></p> <p><b>Starter:</b>          Show images/list of various AI-based products/items and ask what they all have in common. Discuss how AI is used widely in the modern world – give examples children can relate to, i.e., Alexa, Siri, Netflix recommendations etc.</p> <p>Explain that AI is underpinned by machine learning and explain that this “machine learning” aspect is what the lesson will be focusing on.</p> <p>Images of ducks. Share images of ducks on slide deck (from different angles, on water/off water, head under-water, different types of duck, etc) and ask children to identify what they are images of and how they know.</p>

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Discuss how AI machine learning works – all the inputs result in the machine being able to identify a duck from a rabbit. On slide deck, show images and ask “duck or not duck” (could alternatively be done as a physical sorting activity). Each image will be displayed for 10 seconds.

NOTE: The slide deck includes images of ducks for you to use, but you may also wish to use a set of images from a topic or theme that you are already teaching. For example, Roman coin or not, House or not, Allied or Axis planes (WW2) etc...

**Main:**

Pupils will need access to internet-connected devices for the activity.

Go to [Teachable Machine](#) and explore the “About” section and show the group the examples videos of this AI tool (short video at top right of webpage, also copied to slide 4).

NOTE: There are tutorials and “how to” videos further down this page – you may wish to share some of these with the class

How many inputs would make for the best output?

Using Google’s [Teachable Machine](#), pupils create inputs to teach their machine and test the outputs. Have their machines learnt correctly? If not, ask the pupils to consider why – what might have impacted their outputs?

Were their inputs accurate?

If possible, share pupils’ teachable machine outputs with the class.

Discuss in partners what would happen if the machine had been taught something inaccurate.

Explain risks with teachable machines, which are what AI systems are built on. If the information they are taught at the start is inaccurate, or biased, then the responses the system gives will be wrong.

If time allows, pupils could go and use the Teachable Machine again and teach it incorrectly – again, some or all of these could be shared with the class. Alternatively, this could be done as a whole class activity (e.g., using audio – quiet (everyone making lots of noise) and loud (whispering))

#### Wrap-Up:

Based on what pupils have learnt today, can we trust AI outputs? Using a continuum (either on paper, on the whiteboard or in-person) from “not at all” to “completely”, pupils to mark, place a post-it or stand where they believe to be true. As an extension, pupils could be asked to write a few sentences to support their opinion.

Emphasise that the quality, security and legality of the output of AI is not certain, because we cannot necessarily see all the learning data behind AI systems. Therefore, we cannot rely on AI output to be 100% accurate or truthful and should always ensure that we refer to a different source of information to verify the accuracy as they may not always be correct.

#### Additional activities:

You could explore AI in the wider curriculum too:

- Art - [Quick, Draw! \(quickdraw.withgoogle.com\)](https://quickdraw.withgoogle.com) - Can a neural network learn to recognize doodling? Help teach it by adding your drawings to the world's largest doodling data set, shared publicly to help with machine learning research. (Doodles are easier on a touch-screen than with a mouse)
- Art - [AutoDraw](https://autodraw.com) - pairs machine learning with drawings from talented artists to help everyone create anything visual, fast. Uses the same technology as Quick, Draw! (Drawings are easier on a touch-screen than with a mouse)
- Art/English - [DALL·E 2 \(openai.com\)](https://openai.com) - requires a login, Dall-E is an AI system that can create realistic images and art from a description in words.
- English - [TextFX](https://textfx.com) - AI-powered tools for rappers, writers and wordsmiths – take a keyword and the AI will spin-off related alliterative words, similes, provide phrases to describe scenes, etc. There are 10

	<p>different tools to play with words in diverse ways.</p> <ul style="list-style-type: none"> <li>• Music - <a href="#">AI Music Generator - SOUNDRAW</a> - Choose the mood, the genre and the length of the music, and the AI will compose a range of pieces for you. Perhaps play a video clip and ask children to create a suitable soundtrack. Each track is divided into short sections of around 10 seconds, and users can move these around to create their own pieces to suit.</li> <li>• Music - <a href="#">Blob Opera — Google Arts &amp; Culture</a> - Particularly suitable for younger pupils. A fun way to explore how AI can be taught to sing harmonies in up to 4 parts! By moving the blobs up/down, left/right, a range of operatic melodies can be created.</li> <li>• History - Create a <a href="#">timeline</a> of key moments in the history of AI</li> <li>• Modern Foreign Languages - <a href="#">Thing Translator (thing-translator.appspot.com)</a> - point your device's camera at an object and the AI will recognise the object and provide a translation into any one of a wide range of languages.</li> </ul>
Activity Resource	<p>Tablets/Laptops Slide Deck Optional: hard copies of duck images for students</p>

Suggested adjustments for those with additional needs	
<p>When using Google Teachable Machine, adults may wish to select whether images, poses or sounds would better suit these pupil(s), according to their needs. Children could physically do this with toys or marbles, or other objects. With adult support, take photographs as the training images and then child to physically sort images themselves (with support if required) using a decision tree.</p>	