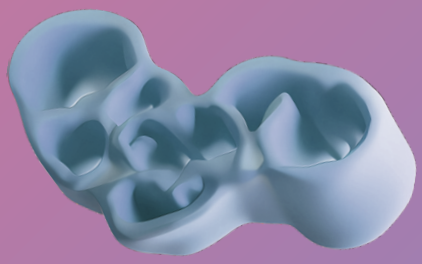
AI for Children

Artificial Intelligence Curriculum for Elementary and Secondary Schools

Biology

Plants Around Us



https://kurikulum.aidetem.cz/en

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These teaching materials were translated using ChatGPT.
Please note possible imperfections in the expressions or wording.

National Pedagogical Institute of the Czech Republic

We create methodologies in cooperation with the National Pedagogical Institute.

Form for comments

Plants Around Us

A few words to begin

Dear Teacher,

You are receiving a teacher material developed to support the teaching of artificial intelligence at the elementary and secondary school levels. The aim of this lesson is to introduce students to how AI applications can be used for plant classification, to explain in general terms how such systems work, and to highlight their limitations.
willingness, energy, and courage to engage your students with the topic of artificial intelligence.

– AI for Children team

20 min

Pl@ntNet

This lesson uses the Pl@ntNet app to identify plants from images. It's online, free and no registration required. You can find it here →

Lesson presentation in PDF

Editable presentation in Canva

Lesson Overview

Recommended Age, Lesson Length
Children aged 11-15, 45–90 minutes.

What Are the Students Learning?
Plants can be classified from a photo using artificial intelligence apps. Plant classification apps do not always provide correct results.

Why Are They Learning This?
By understanding how plant classification applications work, students learn to critically assess and verify the accuracy of the results.

How Do We Know They Have Learned It?
Students classify a plant using an application based on machine learning and verify the accuracy of the result.

Tools
Teacher: A projector and the accompanying presentation.
Students: A phone, tablet or computer (one per student or group), internet access, printed worksheets, pens, and scissors.

Five Big Ideas
5-B-I AI & Culture (AI in Everyday Life).

Digital Competence
Professional Engagement.
Communication and Collaboration.

Bloom's Taxonomy
Applying: Students use the Pl@ntNet app to identify plants.
Analysing: They analyze the condition of the plants, assess whether their placement is appropriate, and critically evaluate the accuracy of the identification results from Pl@ntNet.
Creating: They create an informational leaflet about plant care that summarizes their findings and provides accurate and practical guidance.

Note: Gender equality is key for AI for children, but for brevity we use masculine formulations in our methodologies.

Glossary of terms

Artificial Intelligence (AI)
None of the definitions of the term artificial intelligence are actually fixed, but they all agree that it is a system that simulates human thinking and actions.
Artificial intelligence usually takes the form of a computer program and is used to solve tasks that previously required considerable human intellect and were therefore the domain of humans.
It is also, among other things, a scientific field with origins dating back to the first half of the 20th century. It seeks not only to understand intelligent systems, but especially to create them.

Machine Learning (ML)
Just like humans can learn from examples and experience, machines created by humans can do the same.
Machines use a method called machine learning, which enables AI systems to go beyond executing pre-programmed actions–they can actually come up with new solutions on their own.
The goal of machine learning methods is to uncover patterns hidden in large volumes of data.

Computer Vision (CV)
This field began developing even before the rise of artificial intelligence–mainly for recognizing patterns in images. However, with the advent of artificial neural networks, it has evolved dramatically: computers can now "see" in ways similar to humans.
If we provide image recognition systems with enough data, they can learn to recognize virtually anything–from people and landmarks to household pets.
Today, computer vision allows us to unlock our phones just by showing our face (Face ID), measure distances, and search for information about objects we can't even name (Google Lens). We can even take AI into the forest with us (BirdNET). Thanks to precise recognition of traffic signs, lanes, and obstacles, computer vision is also key to the development of self-driving cars.

Bias
Poorly prepared data–or a lack of diverse data–can lead to artificial intelligence being biased in certain ways.
For example, if we want an AI to learn to recognize shoes but only show it images of sneakers, it won't consider high heels, sandals, or boots as shoes at all.
To ensure that AI systems behave ethically and minimize the risk of bias, developers continuously fine-tune these systems and carefully evaluate the data they are trained on. This is the only way to make sure that AI works well for everyone.

Applications of AI
In today's interconnected world, artificial intelligence is used in many areas of everyday life. We encounter AI and its decisions at work, while shopping, and even during our free time.
It can suggest the shortest or most eco-friendly route, identify a plant, recommend a song or a movie, translate a text, generate or search for images, detect anomalies on X-rays, play a game with us, chat with us–or even drive us somewhere.

Engage

5 min

Recall & share

Discuss with the students.

Where in the school building can you find plants? How many do you estimate there are altogether?
Plants may be found in hallways, classrooms, staff offices, or the teachers' lounge…
If your school doesn't have any indoor plants, you can focus on plants around the school grounds or ask students to take photos of plants they have at home.

Who do you think takes care of the plants at school?
Is it the cleaning staff, students, teachers…?

What do houseplants need in order to be well cared for, in your opinion?
They need the right spot (a certain amount of sunlight, proper temperature, enough space away from drafts…), adequate watering (the right moisture level in the root ball, misting the leaves…), fertilizing, and a suitable pot size. Each plant's needs also vary depending on whether it's in a growing or resting phase.

How could we ensure better care for the plants at school?
To care for plants properly, we need to understand their needs and pay close attention to them.

Understand

30 min

5 min

Activity 1

Presentation slides 02–07

According to the instructions in Worksheet 1 or the presentation (slides 02–07), students will try out the Pl@ntNet app while still in the classroom.
They first read about what the app is used for and how it works. Then, following the step-by-step guide, they use their own devices to try it out. The web version of the app (no installation required) is available for free and does not require registration. Students can use a smartphone or tablet, but it must be connected to the internet and have a working camera. Pl@ntNet is available at: identify.plantnet.org/cs

10 min

Activity 2

Presentation slide 08

Data Collection Phase
Cut Worksheet 2 into thirds and give each group one table. Students divide the school (or a part of it) into areas – depending on how many groups they have formed – and agree on which group will explore which area. The division depends on the size of the school. Each group assigns roles – some students will use the app, while others write down the plant names and how many of each they find (if they come across several of the same species). They also record the condition of the plants (e.g. "wilted," "dusty," or "healthy"). Then the groups head off to their assigned areas to collect data.

10 min

Activity 3

Presentation slide 09

Students search for information about one specific plant on the internet and write the details into a table.
Cut Worksheet in half and hand out one part to each group. Students choose one plant and use online images to check whether the identification by Pl@ntNet was correct. They then fill in the table in Worksheet 3 with the information they found online. For younger students, we recommend allowing extra time for peer review and verification of the gathered information.
Afterward, the table can be cut out and attached to the actual plant – for example, taped to the wall above it, placed on a label stick, or laminated. Students should also check whether the plant is in a suitable location (e.g., if it prefers shade for most of the day, etc.). They can also agree on a watering schedule and divide up the responsibility.

5 min

Groups Present Their Data Analysis

Data analysis.
Once students are back together, they compare their group tables.

On a summary table (for example, written on the board), they record:
1) The total number of plants found in the school
2) The number of different plant species identified
3) The overall condition of the plants

Reflect

10 min

Describe

Discuss with the students.
Encourage the students to try and describe in their own words what the Pl@ntNet app is and how it works. They already read about it in Worksheet 1 or on slides 02 and 03 of the presentation.

How the app works: Pl@ntNet is an app for sharing, searching, and identifying pictures of plants.
It learns to recognize plants largely through user-submitted data. Users can upload photos of plants, label which part of the plant is shown (e.g. leaf, flower), and let the app try to identify it. Other users can then vote on whether the identification is correct. If the app gets it wrong, users can help correct the mistake.
Thanks to this feedback, the app keeps improving over time. This way, a large database of documented plant photos is continuously being built.

Choose one specific plant and describe what new information you learned about it.

Moving forward

How else could we use the Pl@ntNet app (or similar ones, like iNaturalist) – at school or at home?
Can you think of a school project that could benefit plants in some way? Could we use a similar approach to care for outdoor plants – for example, in the school garden? Who takes care of the plants at your home? Would you say the plants there are well looked after?

What is the Pl@ntNet app and how do you use it?

Read about the app: **Pl@ntNet is an app for sharing, searching, and identifying pictures of plants.**

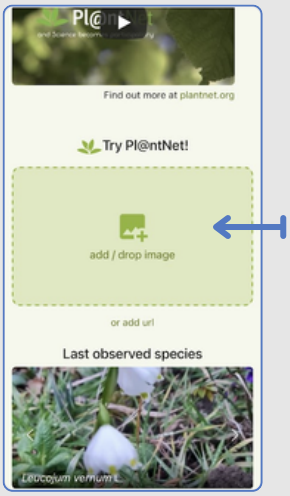
It learns to recognize plants mainly through user-submitted data. Users can upload their own plant photos, mark which part of the plant is shown (for example, leaf or flower), and let the app try to identify it. Other users can then vote to confirm whether the identification is correct. If the app makes a mistake, users can correct it. Thanks to this process, the app is constantly improving. Over time, a large database of documented plant images is being created and refined by the community.

1

Visit Pl@ntNet: identify.plantnet.org

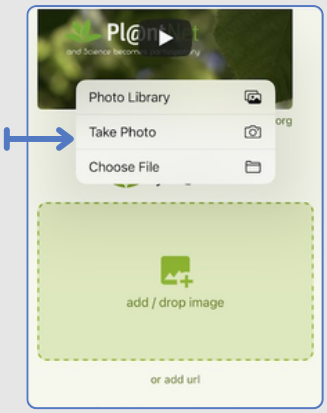
2

In the grey box titled "Try Pl@ntNet!", click on "add/drop an image."



3

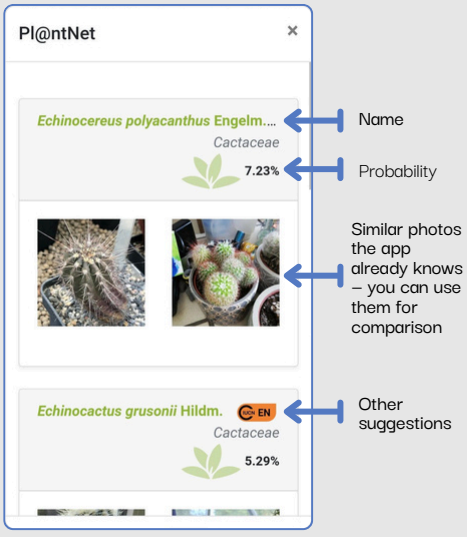
Select "Take Photo" as the input method. When it opens, take a photo of the plant – ideally against a plain background. Make sure the flower is in focus.



How to photograph a plant: Take a sharp, close-up photo of a flower, leaf, or fruit. Use a white sheet of paper as a background and focus on the plant, not what's behind it. Avoid including other objects like fingers or pots.

4

After a moment, the app will display a list of plant suggestions. In addition to the names, pay attention to the percentage values– these indicate how confident the app is in each identification. Look at more photo examples and consider which of the suggested plants best matches the one you photographed.



5

Tap on a plant name to open its details. You'll probably see more photos of the suggested plant, and you can also read additional information about it.

Plant Name	Plant Location (e.g. hallway)	Condition

Plant Name	Plant Location (e.g. hallway)	Condition

Plant Name	Plant Location (e.g. hallway)	Condition

Plant name in English

Occurrence

Plant name in Latin

Family

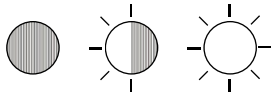
How often to fertilize

Date of last fertilization

Who takes care of the plant

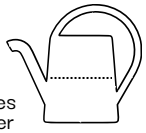
Ideal Placement

Color the symbol



Watering

Write on the watering can how many times a week to water (higher number in winter, lower in summer)



Which day(s) to water

Fill in the circles

MO TU WE TH FR SA SU

Plant name in English

Occurrence

Plant name in Latin

Family

How often to fertilize

Date of last fertilization

Who takes care of the plant

Ideal Placement

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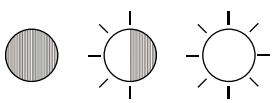

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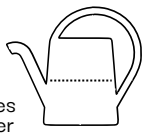

Which day(s) to water

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