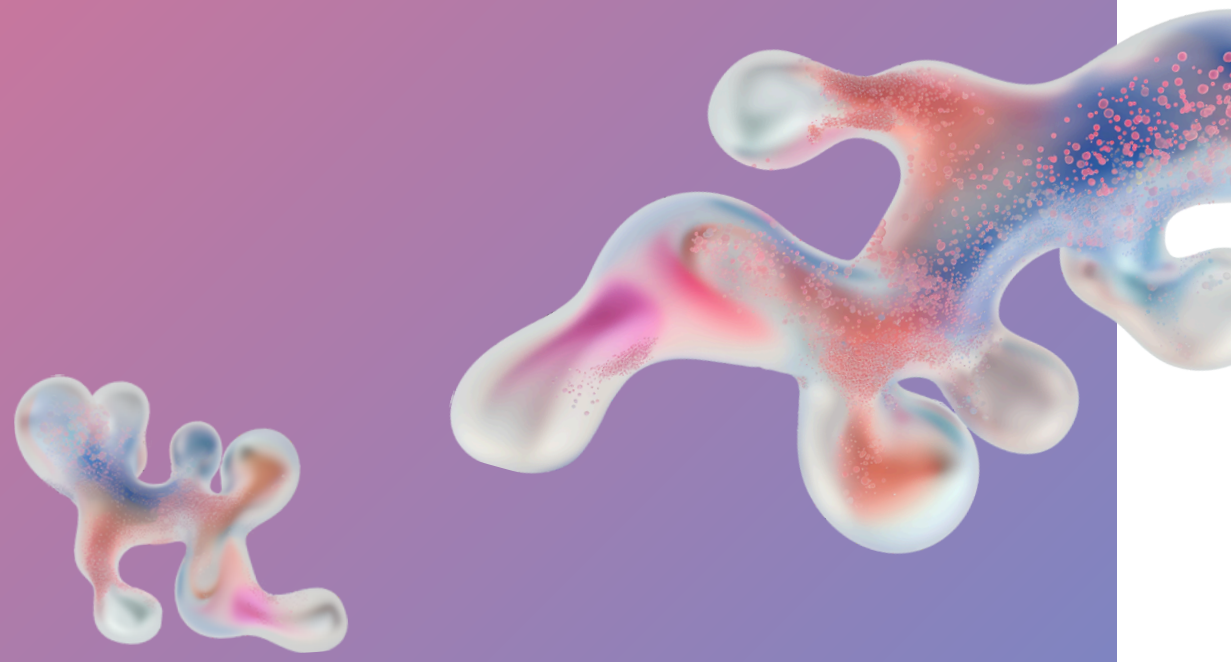
AI for Children

Artificial Intelligence Curriculum for Elementary and Secondary Schools

Math I

Real-Life Math



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Form for comments

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

AI for Children's Artificial Intelligence Curriculum Teacher material
for the Development of Digital Competence for Elementary and Secondary Schools

Real-Life Math

A few words to begin

Dear teacher,

The goal of this lesson is to provide teachers with a practical guide for conducting a single class session in which students have the opportunity to interact with a chatbot as a mentor and guide while exploring their future career options–especially those that involve using mathematics in everyday life. At this stage of their education, many students begin to see math merely as a subject to get through, often questioning its relevance to the real world. Will they ever use it outside the classroom?
This activity is designed to reawaken their curiosity and motivation by helping them see how math can be meaningful in real-life situations–especially in connection with their future careers.

– AI for Children team

Lesson presentation in PDF

Editable presentation in Canva

Lesson Overview

Entry level knowledge/recommended grades, lesson length
Children aged 13–15, 45 minutes.

What Are the Students Learning?
Mathematics has real-world applications in professional life.
A chatbot can be a useful tool for brainstorming.

Why Are They Learning This?
They strengthen their motivation to study mathematics.

How Do We Know They Have Learned It?
They use a questionnaire to identify their career interests.
They use a chatbot for brainstorming and evaluate the quality of its outputs.

Tools
Teacher: Projection device, presentation for display.
Student: Digital device, worksheet, registration in a chat application.

Digital Competence
Professional Engagement.
Problem solving.

Bloom's Taxonomy
Understanding: Students understand how mathematical principles are applied in various professions and everyday life.
Applying: They use chatbots for brainstorming.
Evaluating: They assess the chatbot's suggestions, reflect on their relevance, and provide feedback to the chatbot.

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

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)
There is no universally accepted definition of the term artificial intelligence. However, all definitions agree that it refers to systems that simulate human thinking and behavior.
Artificial intelligence typically takes the form of a computer program and is used to solve tasks that previously required significant human intellect and were thus considered the domain of humans.
In addition, AI is a scientific field in its own right, with roots dating back to the first half of the 20th century. This field not only seeks to understand intelligent systems but especially to design and build them.

Machine Learning (ML)
Just as humans can learn from examples and experience, machines created by humans can learn too.
Machines use a method called machine learning, which enables AI systems to go beyond executing a fixed set of pre-programmed actions – instead, they can come up with new solutions on their own.
The goal of machine learning methods is to uncover patterns found in large volumes of data.
Machine learning is a subfield of artificial intelligence.

Chatbot
A chatbot is a computer program designed to conduct automated conversations with users. It uses artificial intelligence or predefined rules to answer questions, provide information, or perform various tasks – such as booking a hotel or ordering food.
Chatbots can operate within apps, websites, or communication platforms.

Generative artificial intelligence
Generative artificial intelligence is a type of AI designed to create new content – such as text, images, music, videos, and more – based on the data it was trained on.
Unlike traditional AI systems that focus on analyzing or classifying information, generative AI uses algorithms such as neural networks to "learn" the style and structure of existing data in order to produce new, original content.
Often, this content is so realistic that it's hard to distinguish it from content created by humans.

Large Language Model (LLM)
A large language model (such as GPT-4o) is a sophisticated computer program designed to analyze and generate text. It can be used for a wide range of tasks, including machine translation, speech recognition, answering questions, or even generating literary works.
These models are trained on vast volumes of data (so-called corpora), such as internet content (like Common Crawl), digitized books, or Wikipedia.
Only a few of these models exist globally, as their development requires enormous computing power, and they are therefore created exclusively by large tech companies.
Currently, the most well-known LLMs include GPT (OpenAI), Claude (Anthropic), Gemini (Google), Llama (Meta), and LaMDA (DeepMind).

Preparation for teachers

In this lesson, you can use chatbots listed below.
Both applications offer limited free access. However, it's possible that students may run out of tokens during a conversation, so we recommend using the paid version. Age restrictions for both chatbots are also provided.

If you choose to use an application with a higher age limit, you as the teacher can operate it, while students only ask questions.

ChatGPT
Age 13+

MS Copilot
Age 18+

In this lesson, students use chatbots as advisors and guides in exploring future career options that involve the use of mathematics in everyday life.
Chatbots can serve students quite well for this type of task, but it's important to understand and inform students that their responses can vary and the quality may differ. We've prepared an AI assistant for ChatGPT (it works even in the free version) to guide students through the lesson. If you prefer to work with a different tool, we recommend using MS Copilot. In this case, students won't be using the assistant, but rather need to input a prompt – which we've also prepared for you. We recommend trying both options out before the lesson.

How AI assistants differ from regular prompts
Unlike regular prompts that you enter into a general chat, AI assistants are created for specific purposes or topics. You can "set them up" to act as experts in a particular field, such as cooking, travel, or language learning. As a result, AI assistants have deeper context and can tailor their responses more effectively to your needs.

Choose your tool and follow the next steps accordingly.
If you decide to work with ChatGPT, download the AI assistant. If you choose MS Copilot, copy the prompt.

Download the AI assistant for the ChatGPT app.

Link: chatgpt.com/g/g-6853068cb83c81919f7d129096447717-math-focused-career-advisor

Here you will find the MS Copilot prompt to copy.

Link: bit.ly/448Ot7O

In this lesson, the chatbot serves as a tool for brainstorming. Brainstorming is a creativity-supporting technique in which a group of people (or a person and a chatbot) spontaneously generates ideas on a given topic. It is one of the ways a chatbot can be used in the classroom.

Note: If you plan to register multiple students for ChatGPT during a lesson, it likely won't work, as they will be signing up from the same IP address. Therefore, we recommend that students create their accounts at home using their school email.

Engage

5 min

Think and discuss

Presentation slide 02

Discuss with students.

Do you think the math we learn at school will be useful in everyday life?
Possible answer: It might not always seem that way, but most mathematical principles have practical uses – we just don't always see them right away.

What kind of math do you use in your daily life? Can you give a specific example?
Possible answer: I often use percentages, for example when calculating discounts while shopping. The rule of three is useful when I need to adjust quantities in recipes or split money fairly.

Think, pair, share

Think: Students first reflect individually on the topic.
Pair: They then pair up to discuss their thoughts with a partner.
Share: After some time, selected pairs share their ideas with the whole class.

Do you think you'll use math in your future career? Can you think of how?
Possible answer: Definitely yes – almost every job requires some math skills. If I worked as a programmer or in business, equations, statistics, and logic would be essential. When building a house, trigonometry is needed; in design, geometry plays a key role; in a cooking profession, the rule of three is useful; an accountant uses percentages, equations, and statistics...

Understand

25 min

10 min
Activity 1

Students work with a career choice questionnaire and look for ways mathematics can be applied.
This activity has two variations. The first is working with a worksheet that students fill out, take a photo of, and then upload to the chatbot. The second is without a worksheet, in which students directly use the chatbot to guide them through the questions in the worksheet.

Both variants then look similar – students discuss the recommendations the chatbot has generated for them with the chatbot and give it feedback. This discussion is usually necessary and it would be a good idea to make students aware of this. The initial recommendations from the chatbot are usually very general and are only improved with feedback.

Worksheet version

Presentation slides 03–05

Students complete a questionnaire to help them choose a future career.
Students work independently with worksheet 01 – they fill out a questionnaire for choosing a future profession. Tell students to fill out the questionnaire with a pen with dark ink, to write legibly and to try not to cross out/overwrite, as they will upload a photo of the worksheet to the chatbot for evaluation.

Version without worksheet

Presentation of slides 06–07

The chatbot guides students through a questionnaire to choose a future profession (presentation slide 06).
If you do not want to work with the worksheet, show the students the presentation on slide 06. There they will find links to download the AI assistant or prompt for MS Copilot (explained in the preparation for educators on page 02 of this methodology).

Students start a conversation with the chatbot by saying "Hello" (presentation slide 07).
The chatbot asks the students 15 questions identical to the worksheet. The chatbot then (as in the worksheet variant) generates suggestions for future careers based on the student's preferences. The students give the chatbot feedback as in the first variant.

15 min

Activity 2

Together with chatbots, students invent applications of mathematics in selected professions.
When the student is satisfied with the proposed profession, he/she tells the chatbot and it tries to create examples of the use of mathematics in this profession. In this case, too, it is desirable that the students give feedback to the chatbot. In this lesson, the chatbot serves as a brainstorming tool (see the previous page of this methodology). The task of the students is to think together with the chatbot about the use of mathematics in a specific profession.

Students write down meaningful examples of using mathematics on sticky notes.
On one piece of paper, they always write down one example of the use of mathematics along with the name of the profession.

Reflect

15 min

10 min

Activity 3

Clusters
Students briefly write down their answers on post-its and then match those that are similar.

Students present the content of the papers with examples of the use of mathematics in various professions.
The card contains the name of the profession and a short description of a situation where mathematics is used.
Example: When preparing project documentation, a designer calculates the roof area.

Group similar examples together (e.g. by type of occupation, mathematical concepts, situations where mathematics is needed) and evaluate which mathematical concepts are most applicable in everyday life.

Discuss the answers on the slips of paper.
Which mathematical skills are key in each group?
Which profession appeared most frequently and why?
Are there any mathematical skills that are universal and applicable across multiple fields?

Discuss professions.
Which profession interested you the most and why?
What math skills would you need in this profession?
What else could you do to have a better chance of doing this job?

5 min

Discuss and evaluate

Try to formulate specific things that interested or surprised you while working with the chatbot.
Students can rate whether they found brainstorming with the chatbot beneficial (e.g. on a scale of 1–5). They will give reasons why they found the conversation enriching or why they did not.
Evaluates the level of conversation with the chatbot.

Career questionnaire

This worksheet will help you think about what kind of job you might like to do in the future. Fill in the numbers in the questionnaire below according to the key on the right. →→→

Legend:

1 Strongly agree
2 Somewhat agree
3 I'm in the middle
4 Somewhat disagree
5 Strongly disagree

Fill in the numbers here according to the key.

- Math is one of my favorite subjects.
- I like sports and I spend time doing them, even if not in a club.
- I prefer being at home rather than outside.
- [I enjoy fixing things, building, or using tools.
- [I like being around people, talking, and sharing.
- [Presenting in front of the class is a great opportunity to share what I know.
- I enjoy creating new and unusual things.
- I can convince other people of my opinion.
- I play a musical instrument or sing and I really enjoy it.
- [I like creating things on a computer or device.
- I really like taking care of animals!
- I'm interested in politics and relationships between people and countries.
- I care about nature and how people treat it.
- I enjoy dancing or doing gymnastics.
- I really like reading books.

Describe how you would most like to spend a free day.

What do you think you're really good at?

What is something you don't know how to do yet but would like to learn?

What do you think you're not good at at all?