

This interdisciplinary course introduces students to the foundational concepts, applications, and ethical considerations of artificial intelligence (AI). Through hands-on/minds-on activities, real-world applications, and project-based learning, students explore the capabilities of AI, its risks and benefits, and responsible use inside and outside the classroom. Students practice prompt engineering and learn to use generative AI and language models to research, learn, and create solutions to relevant problems. Students also learn how AI works, exploring data collection and organization, classifiers, and algorithms in fun and engaging projects.

The curriculum prepares students to critically engage with AI technologies, consider societal impact, and discover meaningful applications of AI in today's workforce.

PLTW Principles of Artificial Intelligence (PAI) is a semester-long course that includes 80 days of hands-on, structured learning experiences to engage students in individual or group problem solving. Students learn about the fundamentals of artificial intelligence and its societal and ethical impact. They learn the principles of AI from prompt engineering to data classification. Along the way, they practice transportable skills including collaboration, communication, and ethical reasoning. The course also exposes students to a variety of careers and highlights a diverse group of industry professionals.

Principles of Artificial Intelligence is designed with strong connections to the AI Literacy Framework (Empowering Learners for the Age of AI: An AI Literacy Framework for Primary and Secondary Education). This framework is a joint initiative of the European Commission and the Organization for Economic Cooperation and Development (OECD). The course is also designed with the Computer Science Teachers Association (CSTA) national standards (2026) in mind. The course has intentional connections that will help students gain confidence and reinforce essential concepts and skills students need beyond their high school career.

The course includes the following two units:

PAI Unit Summary

Unit 1	Foundations of Artificial Intelligence	(38 days)
Unit 2	Intelligence in Practice	(42 days)



Unit 1: Foundations of Artificial Intelligence (38 days)

Unit 1 introduces students to the world of artificial intelligence, covering a wide range of topics like the evolution of AI, ethical and responsible use, an introduction to prompt engineering, and the use of data, classifiers, and model training.

Foundations of Artificial Intelligence Unit Summary

Lesson 1.1	Responsible Use of AI	(16 days)
Lesson 1.2	All About Data	(17 days)
Lesson 1.3	Learning With AI	(5 days)

Lesson 1.1: Responsible Use of AI

Students learn how AI systems get their information. Using this understanding as a lens, they explore questions such as “Is AI my friend?”, “How can I use AI responsibly for schoolwork?”, and “How can I create original works in collaboration with AI?” Students work with AI to create news articles, surveys, and a creative piece with consideration for the ethics of using AI in each of these scenarios.

Activity 1.1.1	Is AI My Friend?	(3 days)
Activity 1.1.2	Responsible Academic Use	(2 days)
Activity 1.1.3	Where Does AI Get Its Information?	(3 days)
Activity 1.1.4	Introduction to Prompt Engineering	(3 days)
Project 1.1.5	What a Ripoff	(5 days)

Lesson 1.2: All About Data

Students examine the training data and techniques that make modern generative AI different from other AI algorithms. They play a game to gain firsthand experience with the differences between deterministic and probabilistic algorithms. Students use Teachable Machine to train a classifier AI to solve problems. They use AI to generate and process data that would typically be manipulated in spreadsheet software and then visualize that data on an AI-generated website they create.

Activity 1.2.1	Responding in Real Time	(3 days)
Activity 1.2.2	But Does It Understand?	(4 days)
Activity 1.2.3	Creating With AI	(3 days)
Project 1.2.4	Using AI to Help Us Understand	(7 days)



Lesson 1.3: Learning With AI

Students apply their understanding of how best to collaborate with AI to create a teaching resource with younger learners as the target audience. They can create a board game, picture book, or any other multimedia product. As they work, students evaluate the content produced by AI for bias or harmful content and document their collaboration with AI.

Project 1.3.1 Learning With AI: Think, Do, Review (5 days)

Unit 2: Intelligence in Practice (42 days)

Unit 2 transitions into exploring how AI works, creating AI solutions, and looking closely at the impact of AI.

Intelligence in Practice Unit Summary

Lesson 2.1	Training Models	(19 days)
Lesson 2.2	Impact of AI	(13 days)
Lesson 2.3	AI in Action	(10 days)

Lesson 2.1: Training Models

Students learn how AI systems generate responses by identifying patterns in data. They explore prompt and context engineering, supervised learning, and the role of data in shaping outcomes, including the potential for bias. Students apply their understanding by designing an AI-powered app while emphasizing responsible design choices.

Activity 2.1.1	A Small Language Model	(2 days)
Activity 2.1.2	Prompt and Context Engineering	(2 days)
Activity 2.1.3	How Does AI Find Answers?	(3 days)
Activity 2.1.4	AI and Social Media	(5 days)
Activity 2.1.5	Data Feeds the Machine	(2 days)
Project 2.1.6	Create Your Own App	(5 days)

Lesson 2.2: Impact of AI

Students examine how AI is used in real-world decision-making contexts such as hiring and healthcare. They analyze how algorithms support human judgment, explore the impact of AI automation on industries, and design a human-centered AI workflow that anticipates and prevents potential failures.



Activity 2.2.1	Humans in the Loop	(2 days)
Activity 2.2.2	Planning With AI	(3 days)
Activity 2.2.3	Automation Pressure	(3 days)
Project 2.2.4	Plan for AI Mistakes	(5 days)

Lesson 2.3: AI in Action

Students apply algorithmic thinking by analyzing the mathematical strategy behind the game of Nim and translating logical steps into working code. They explore how clear rules and structured logic can be formalized into automated systems, which prepare them to design a structured solution in the Unit 2 Problem.

Activity 2.3.1	The AI of Nim	(3 days)
Problem 2.3.2	AI in Action	(7 days)

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