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ReadyAi

UNITS OF INQUIRY AND AI

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Lesson Plans

Standards and Guidelines Cited

ISTE Standards

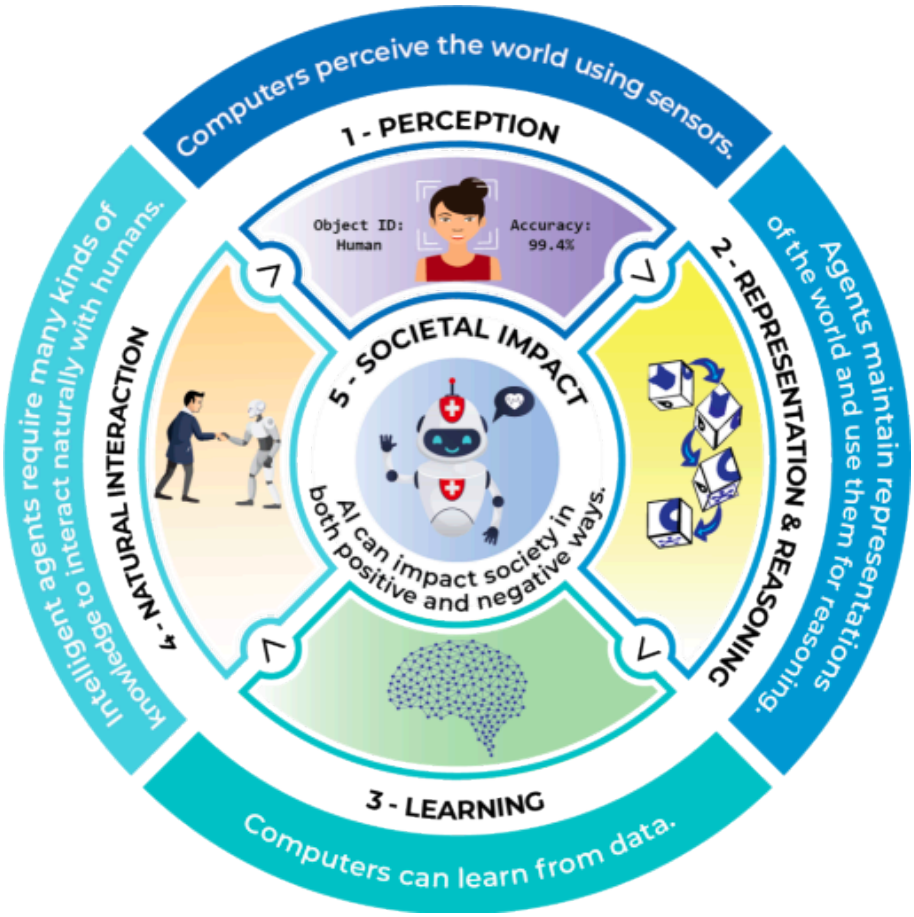
The International Society for Technology in Education (ISTE) produces a series of standards for those involved in education. The lessons in the following curriculum utilize the seven ISTE Student Standards.

- The ISTE Student Standards can be found at https://www.iste.org/standards/iste-standards-for-students

AI4K12 Guidelines

AI4K12.org has released a list of “Five Big Ideas in AI” along with draft grade band progression charts for each of these ideas.

- The five big ideas are summarized on a poster that can be found at https://ai4k12.org/resources/big-ideas-poster/.
- The grade band progression charts are available at https://ai4k12.org/gradeband-progression-charts/



Big Idea 1 - Perception: Computers perceive the world using sensors.

Big Idea 2 - Representation and Reasoning: Agents maintain representations of the world and use them for reasoning.

Big Idea 3 - Learning: Computers can learn from data.

Big Idea 4 - Natural Interaction: Intelligent agents require many kinds of knowledge to interact naturally with humans.

Big Idea 5 - Societal Impact: AI can impact society in both positive and negative ways.

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Introduction to Neural Networks & Quick, Draw!

TEACHING GUIDE

Lesson Objectives:
By the end of this lesson, students will be able to
- age appropriately identify what a neural network is
- explain how *Quick, Draw!* functions

Alignment with Big Ideas:
Big Idea #3: Computers can learn from data

ISTE Standards for Students:
1.1 Empowered Learner
1.3 Knowledge Constructor
1.5 Computational Thinker

ISTE Computational Thinking Competencies:
5.1 Computational Thinking (Learner)

Equipment

Student iPads, computer connected to a projector

Preparation

Ensure the following videos work:
- https://www.youtube.com/watch?v=IX6acE4I1YQ
- https://youtu.be/X8v1GWzZYJ4

Ensure student iPads are properly charged

Lesson Orientation

Warm-Up Ask the students to identify animals being drawn on the board. Begin by drawing something very simple, such as a cat. Ask students to raise their hands once they know what animal is being drawn. Begin to draw less and less of each animal. The goal is for students to identify *strokes* that help them identify which animal is being drawn . Solicit participants to draw animals as well. The animals that work best are animals that many people tend to draw similarly: cats, giraffes, elephants, etc. (i.e. animals with very distinctive features) Explain that students have the ability to identify objects prior to fully seeing the object drawn.	10 minutes
Presentation Explain that, like people, computers can also identify objects prior to “seeing” the entire object. Computers do this by means of something called a ‘neural network.’ Students should watch the following video: https://www.youtube.com/watch?v=IX6acE4I1YQ Ask students what ideas they remember from the video. Highlight the ideas of inputs, Refer to the drawings from the “Warm-Up” activity. Ask students what represented inputs during that activity.	10 minutes
Practice Ask students to pull out their iPads. Students should open Quick, Draw! Ask students to play the game. Encourage students to think about how it is working. Play the following video: https://youtu.be/X8v1GWzZYJ4 Ask students what the experiment designers said about how it works. Ask the students how this kind of technology can help	20 minutes

Produce Ask students to identify what a neural network does. Ask students what other things a neural network might identify other than just human drawings. Ask students how *Quick, Draw!* worked. Allow students to share their experiences but solicit comments on the functionality of the software and how it draws on inputs to produce outputs.	5 minutes
Extension Ask students to play *Quick, Draw!* with their families. Ask them to report back on what their parents thought.	