UNITS OF INQUIRY

(K-2)

Table of Contents

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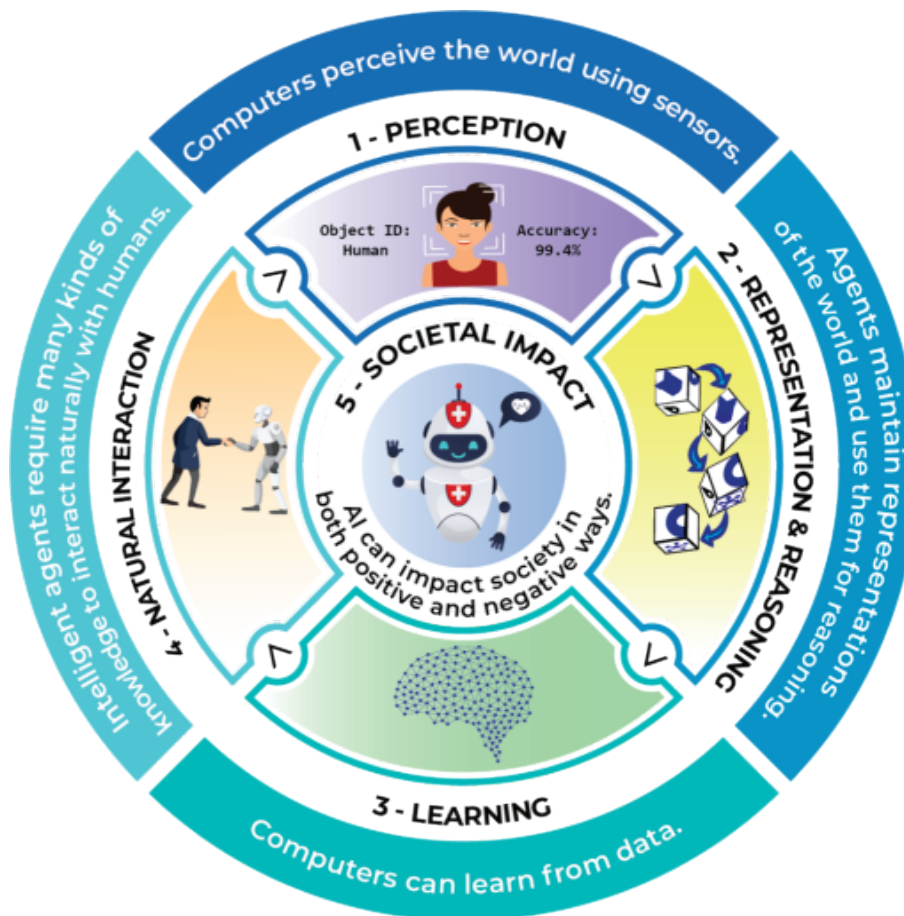
Big Idea 1 - Perception: Computers perceive the world using sensors.

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.

Curriculum Map - K

Subject: Computer Science   **Time Frame:** 2022-2023 School Year

Grade: Kindergarten

Essential Question:
- What is technology?
- How do we use technology every day?
- How have computers changed the daily lives of humans?
- What is a sensor and how is it used in artificial intelligence?

Objectives:
- Students will be able to demonstrate basic directional coding
- Students understand how robots use sensors to perceive the world
- Students will identify color sensors on robots
- Students will complete unplugged movement coding activities to understand the concepts of loop and directional coding

Standards:
- **ISTE1 Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
- **ISTE 5 Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
- **ISTE 6 Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems, and operations.
- **Five Big Ideas of AI, Idea #1 Perception:** Computers perceive the world using sensors.

Skills:
- Programming using beginning coding programs
- Control robots through various mazes
- Identify sensors

Coding Programs:
- Code Monkey Jr.
- Kodable
- Code.org:
- Pre-reader Express
- Blockly Coding

Materials:
- Chromebooks/iPads
- Dash Robot
- Robot Table
- Ozobot

Activities:
- Unplugged coding activity: learn a dance using code
- Control Dash Robot to get to the different vegetables
- Read the Tortoise and the Hare and complete the fast and slow Ozobot activity

Resources:
- ISTE: Teach computer science
- Seesaw: Join the Code Crew
- Technology Teaching with Brittany Washburn

Assessment:
- Review Seesaw assignments
- Code.org Progress Chart
- Ozobot fast and slow coding assignments
- Kodable Progress chart

Computer Science

SCOPE & SEQUENCE
Kindergarten | 2023

UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4

INTRO TO CLASS	
WEEK 1:	**Title: iPad Basics** 1. Classroom procedures and computer care 2. Using a computer keyboard and login skills
WEEK 2:	**Title: Digital Citizenship** 1. How to be responsible and safe online 2. How to create secure passwords
UNIT 1: What is Technology?	
WEEK 3:	**Title: Introduction to Technology** 1. Discuss methods, processes, and devices used for practical purposes 2. Identify technology around the school building in different rooms
WEEK 4:	**Title: Programming with Code Monkey Jr.** 1. Complete Part 1: Sequencing 2. Self-guided challenges to help the monkey get to the banana
WEEK 5:	**Title: Dash Robot and Avoiding Obstacles** 1. Create a wall with Large Lego blocks 2. Control Dash to avoid obstacles
WEEK 6:	**Title: Dash Robot and Directional Coding** 1. Use Blockly coding to move dash forward and backward 2. Code basic shapes on the ground with Dash: triangle and square
WEEK 7:	**Title: Types of Technology** 1. Create a display with devices, robots, and video game controllers 2. Discuss what technology is and what technology is not

UNIT 2: How do we use Technology Daily?

WEEK 8:	**Title: Ways to learn, communicate and create with technology** 1. Communication tools like smartphones, Alexa, and 2. Learning with educational tech and creating with art and music tools
WEEK 9:	**Title: Indi Robot and designing mazes** 1. Design a maze with multiple turns and one treasure chest 2. Work in pairs to solve the maze with Indi and get to the treasure
WEEK 10:	**Title: Indi Robot in the Community** 1. Construct a house, library, bank, and store 2. Program Indi robot to visit each location and spin
WEEK 11:	**Title: Programming with Code Monkey Jr.** 1. Complete Part 2: Loops 2. Discuss how computer scientists use loops in programming
WEEK 12:	**Title: Interview with a Computer Scientist & IT Consultant** 1. Students write questions about technology 2. Computer Scientist & IT describe their jobs and answer questions

UNIT 3: How have computers changed our lives?

WEEK 13:	**Title: Past and Present** 1. Create a "Museum" with old computers and technology 2. Discuss how smart devices and computers have improved our lives
WEEK 14:	**Title: Programming with Kodable** 1. Complete Fuzztopia and Beach Cleanup with directional code 2. Help blueFuzz complete challenges while learning to code
WEEK 15:	**Title: Explore apps for learning** 1. Discover how apps and different educational software work 2. Create a new idea for an app that would help children learn
WEEK 16:	**Title: Programming with Kodable** 1. Complete Smeeborg and Cloud Haven with directional code 2. Learn introduction to loops and sequence
WEEK 17:	**Title: Unplugged coding activity** 1. Create an unplugged program with dance moves 2. Complete the dance and change the code to create a new dance

UNIT 4: What is a sensor and how is it used in AI?	
WEEK 18:	**Title: Ozobot and "The Tortoise & the Hare"** 1. Fast (hare) and slow (tortoise) color codes 2. Identify color sensor used in Ozobot robot
WEEK 19:	**Title: AI Penguin Trackers and Ozobot Penguins** 1. Discover how artificial intelligence is used to track animals 2. Dress an Ozobot like a penguin and program it to visit igloos
WEEK 20:	**Title: Programming with Code.org** 1. Begin Pre-reader Express 2. Learn the basics of computer science with drag and drop blocks
WEEK 21:	**Title: Sensors in Robots** 1. Discuss color sensors and motion sensors in Ozobot, Dash, Indi Robot 2. Explore how Boston Dynamics dog robot Spot uses sensors
WEEK 22:	**Title: Programming with Code.org** 1. Complete Pre-reader Express 2. Complete challenges with Angry Birds and Star Wars characters
WEEK 23:	**Title: Interview with an AI Engineer** 1. Students ask questions about AI and sensors 2. AI Engineer describes their job and answers questions
END OF CLASS	
WEEK 24:	**Title: Digital Citizenship Moving Forward** 1. How can I use programming and controlling robots for good 2. Complete Seesaw activity on Digital Citizenship
WEEK 25:	**Title: Robot Playground** 1. Use Dash, Indi Robot, and Ozobot in a robot playground 2. Present on what you learned about one of the robots

Curriculum Map - G1

Subject: Computer Science

Time Frame: 2022-2023 School Year

Grade: First Grade

Essential Question:
- As technology continually changes and improves, how can we know what skills to learn?
- How can we know what technological tools (both hardware and software) to use for a particular task?
- How has technology increased human productivity?
- What type of artificial intelligence is used in smart devices?

Objectives:
- Students will identify parts of a computer including inputs and outputs
- Students will understand digital citizenship related to societal issues related to technology
- Students will interact with smart devices including Roomba, virtual assistants, Hue lights, and Alexa
- Students will program coding robots to complete increasingly complex mazes
- Students will identify how machine learning can be used to clean up the oceans

Standards:
- **ISTE1 Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
- **ISTE 4 Critical Thinking, Problem Solving, and Decision Making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
- **ISTE 5 Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
- **ISTE 6 Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems, and operations.
- **Five Big Ideas of AI:** Idea #2: Representation & Reasoning: Agents maintain representations of the world and use them for reasoning

Skills:	Coding Programs:	Materials:	Activities:
• Using a microphone, mouse, & touchscreen • Programming using coding programs • Controlling robots using directional code • Identifying smart devices	• Code.org: Course A • Scratch Jr. • Tynker Coding: Programming 1A • Code Monkey Jr. • Blockly Coding	• Chromebooks/iPads • Dash Robot • Sphero Robot • Cozmo Robot • Robot table • Code.org: AI for Oceans • Mini Drone	• Program Dash to complete complex mazes • Use Teachable Machine to to differentiate between plastics, fly mini drones • Use Sphero robot to change color and direction • Use Cozmo robot to identify objects

Resources:
- Common Sense Media: Digital Citizenship
- Ready AI: AI and Me Books
- Seesaw: Join the Code Crew
- Teachable Machine

Assessment:
- Tynker coding quizzes
- Tynker coding progress chart
- Completion of Blockly coding challenges using Dash robot

Computer Science
SCOPE & SEQUENCE
First Grade | 2023

UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4

INTRO TO CLASS	
WEEK 1:	**Title: Welcome and Goals for the Year** 1. Use Padlet to identify student goals 2. Share goals and rules with parents and display them in the classroom
WEEK 2:	**Title: Mini Paper Computer & Keyboard** 1. Identify keys on the keyboard 2. Label programs and logins used in class
UNIT 1: Technology Skills	
WEEK 3:	**Title: Computer Inputs and Outputs** 1. Identify inputs: keyboard, mouse, camera, microphone 2. Identify outputs: printer, speaker, headphones, monitor
WEEK 4:	**Title: Programming with Scratch Jr.** 1. Create a story with the Scratch Cat and his friends 2. Present the story to classmates explaining the selected coding blocks
WEEK 5:	**Title: Game Design with Scratch Jr.** 1. Code an interactive game with coding blocks 2. Add points and sound effects to the interactive game
WEEK 6:	**Title: Computer Mouse Skills** 1. Practice using a computer mouse to point and click 2. Learn "copy and paste," image resize, and drag and drop
WEEK 7:	**Title: Interview a Hardware Engineer** 1. Students learn about the skills needed to be a hardware engineer 2. Students look inside a computer with a hardware engineer

UNIT 2: Technology Tools

WEEK 8:	**Title: Communication tools** 1. Email communication and how it works 2. Chat and IM: uses for companies
WEEK 9:	**Title: Digital Citizenship and Communication** 1. Responsible communication and respecting the privacy of others 2. Knowing when to use a casual chat and when to use an email
WEEK 10:	**Title: Tynker Programming with sequences** 1. Begin Programming 1A 2. Learn about sequences with Candy Quest adventures
WEEK 11:	**Title: Tynker Programming with loops** 1. Continue Programming 1A 2. Learn about loops with space adventures
WEEK 12:	**Title: Dash Robot with loops** 1. Program Dash robot to move through a maze using loops 2. Dash robot plays a sound effect when it arrives at the final bell

UNIT 3: Impact of Technology

WEEK 13:	**Title: How has Technology been used for good** 1. Helps to clean up oceans, assist people with special needs 2. Interview teachers at the school to find out what technology they use
WEEK 14:	**Title: Code.org AI for Oceans** 1. Students identify fish and trash in this interactive coding activity 2. Students learn that a large amount of data is needed in AI
WEEK 15:	**Title: Teachable Machine** 1. Students use different types of plastic containers to train a machine 2. Students learn about labeling classes in machine learning
WEEK 16:	**Title: Mini Drones** 1. Students learn how drones help to identify trash in the ocean 2. Students use cameras on mini drones to identify trash in the room
WEEK 17:	**Title: Sphero Robot** 1. Students control Sphero robot to land on different star images 2. Students create challenges for each other with increasing difficulty

UNIT 4: Smart Devices & AI

WEEK 18:	**Title: Cozmo Robot and Object Recognition** 1. Use the Explorer Mode on Cozmo Robot to identify different signs 2. Discuss how Cozmo could help a special needs person to read signs
WEEK 19:	**Title: Cozmo Robot and Conditional Statements** 1. Program Cozmo robot to move through a maze with conditionals 2. Help Cozmo to make a decision based on what Cozmo encounters
WEEK 20:	**Title: Seesaw and Algorithms** 1. Watch videos and complete coding activities with the Code Crew 2. Learn about making cakes and building block towers with algorithms
WEEK 21:	**Title: Blockly Coding** 1. Use directional code to help a construction truck move rocks 2. Use Dash robot with plow extension to move rocks on robot table
WEEK 22:	**Title: Smart Devices** 1. Students interact with Roomba, Alexa, Siri, and Hue Lights 2. Locate sensors and discuss machine learning for each smart device
WEEK 23:	**Title: Interview Parents** 1. Use Flipgrid to interview parents about smart devices in the home 2. Students discuss what other smart devices they could create

END OF CLASS

WEEK 24:	**Title: Digital Citizenship and Digital Wellness** 1. Understanding when to take a break from screens 2. Using devices to assist in daily life and not overusing technology
WEEK 25:	**Title: Dash Playground** 1. Use Dash robot with extensions to throw balls and move piles 2. Have students take turns controlling robots and planning the routes

Curriculum Map - G2

Subject: Computer Science	**Time Frame:** 2022-2023 School Year

Grade: Second Grade

Essential Question:
- How do simple circuits work and how are circuits used in robotics?
- What is a digital footprint?
- How is data used in artificial intelligence and what is data bias?
- How can AI robots support the emotional needs of humans?

Objectives:
- Students will learn about problem-solving with data and the role of data bias
- Students will learn how circuits work in robotics and build simple circuits
- Students will identify the impact of their digital footprint
- Students will write code to control a robot through a challenging maze
- Using AI-robots, students will discover how emotional intelligence works

Standards:
- **ISTE 1.5 Computational Thinker:** Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- **ISTE 1.2 Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
- **ISTE 1.3 Knowledge Constructor:** Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- **Five Big Ideas of AI:** Idea #3 Learning: Computers can learn from data

Skills:	Coding Programs:	Materials:	Activities:
• Completing a circuit using robotics kits • Identify types of data bias in data • Code robots to complete maze challenges • Program robots using color codes	• CS First: Characterization & Interactive Presentation • Tynker Coding: Dragon Tales • Code Club: Scratch Coding • Ozoblockly Programming Editor	• Chromebooks/ iPads • Little Bits: Crawly Creature • Ozobots & Ozoblockly • Makey Makey • Osmo Explorer Kits • Moxie Robot • Teachable Machine	• Create a piano with Makey Makey, Play Doh & 5 Bananas • Binary Baubles • Emotions guessing game with Moxie Robot • Little Bits Circuits to create a crawling creature • A Fresh Squeeze on Data

Resources:	Assessment:
• A Fresh Squeeze on Data: Intro to Data Bias lesson plans • Common Sense Media: Digital Footprint & Identity • Little Bits Educators' Guide • Ozoblockly Tutorial and Online Site	• Binary Coding worksheet and bracelet • Tynker Coding Progress Charts and Quizzes • Ozoblockly maze challenges • Little Bits circuit project completion

Computer Science

SCOPE & SEQUENCE

Second Grade | 2023

UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4

INTRO TO CLASS	
WEEK 1:	**Title: Digital Citizenship and Me** 1. Handling technology in the school and at home with care 2. Routines for robots, devices, and login procedures
WEEK 2:	**Title: What is a Digital Footprint** 1. Use online tools safely and carefully selecting what you post (Flipgrid) 2. Using email and chat messengers effectively (GMail and GChat)
UNIT 1: Simple Circuits	
WEEK 3:	**Title: Makey Makey "Piano App"** 1. Learn about simple circuits and play Makey Makey "Is it Conductive" 2. Create a circuit using Makey Makey and play songs using the Piano App & bananas
WEEK 4:	**Title: Makey Makey "Make-a-Sketch"** 1. Use Makey Makey as a controller to play "Make-a-Sketch" 2. Design art work in a group using Play Doh and Makey Makey
WEEK 5:	**Title: "A Fresh Squeeze on Data"** 1. Read A Fresh Squeeze on Data book and discussion questions 2. Complete "Candy Stand" activity and visually represent their data
WEEK 6:	**Title: Teachable Machine** 1. Complete "Select a Pet for the Family" activity with the decision tree 2. Use Teachable Machine, to train the computer to identify pets
WEEK 7:	**Title: Tynker Coding** 1. Begin Dragon Spells using block based code 2. Focus on sequencing and repetition using loops

UNIT 2: Color Sensors

WEEK 8:	**Title: Ozobots and Storytelling** 1. Read "The Tortoise and the Hare" and discuss story 2. Use color codes to create a class racetrack with slow and fast codes
WEEK 9:	**Title: Ozobots and Flower Maze Coding** 1. Learn about color sensors and complete Flower Maze Coding 2. Create a life cycle of a flower using Ozobots and color codes
WEEK 10:	**Title: Binary Baubles** 1. Encode letters into binary using the Code.org activity 2. Create beaded bracelets in binary form
WEEK 11:	**Title: CS First - Characterization** 1. Provide details about a character who is missing homework 2. Use code to describe the character's actions, thoughts, and words
WEEK 12:	**Title: CS First - Interactive Presentation** 1. Create an interactive presentation 2. Learn about computer science and create slides on selected topic

UNIT 3: Emotional Intelligence

WEEK 13:	**Title: Emotional Intelligence & Moxie Robot** 1. Learn what emotional intelligence is and how machines respond to EI 2. Describe characteristics of a friend and train Moxie as a robot friend
WEEK 14:	**Title: Moxie Robot Guess the Emotion** 1. Discuss situations where they feel emotions like happy, sad, or angry 2. Play a guessing game with Moxie to guess the emotion
WEEK 15:	**Title: Super Hero Avatars with Voki.com** 1. Create an avatar of a super hero who could help at the school 2. Record your voice for the avatar and present creation to class
WEEK 16:	**Title: Tynker Coding Barbie You Can Be Anything** 1. Learn about a career as robotics engineer 2. Code using block coding for events and loops
WEEK 17:	**Title: Conditional Statements with Tynker Coding** 1. Learn about a career as an astronaut & planet themed coding levels 2. Use conditional statements to help the astronaut explore space

UNIT 4: Pattern Recognition	
WEEK 18:	**Title: Osmo Explorer and Pattern Recognition** 1. Use Tangrams to exercise spatial and visual problem-solving skills 2. Arrange the Tangram pieces to match the puzzles on the screen
WEEK 19:	**Title: Physics and Osmo Explorer** 1. Learn about Newton's law of motion with Ozmo 2. Help get the falling on-screen balls into targeted zones
WEEK 20:	**Title: Little Bits Starter Kit** 1. Use Little Bits robotics to create a moving hand that waves hello 2. Reinforce the concept of completing a circuit using Little Bits
WEEK 21:	**Title: Little Bits Crawly Creatures** 1. Create a moving insect using Crawly Creatures activity 2. Design the insect in a group & place all the moving insects together
WEEK 22:	**Title: Code Club with Scratch Coding** 1. Complete the Rock Band coding activity in Scratch 2. Use block coding to create musical instruments
WEEK 23:	**Title: Paint Box with Code Club** 1. Create a paint program using Scratch coding 2. Discover how colors and patterns can be used to create artwork
END OF CLASS	
WEEK 24:	**Title: Digital Citizenship & Identity** 1. Common Sense Media "This is Me" activity 2. Reflect on unique identity, password protection, & online posting
WEEK 25:	**Title: Wrap Up with Robot stations** 1. Stations with: Emotional Intelligence with Moxie, Sensors with Ozobot, Circuits with Makey Makey, & pattern recognition with Osmo Explorer 2. Review concepts from this year & sneak peak at 3rd Grade concepts

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AI & Facial Recognition (K-2)

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TEACHING GUIDE

Lesson Overview:
In this lesson, students will learn about AI and facial recognition. To engage all learners, students will create faces and show them to a facial recognition program to test whether the AI can recognize those faces. Finally, students will test the limits of the AI facial recognition tools through experimentation

Lesson Objectives:
By the end of this lesson, students will be able to
• 	Explain in age appropriate terms how facial recognition works
• 	Test the limits of industry AI apps
• 	Posit causes for the limitations they discovered

Alignment with Big Ideas:
Big Idea #1: Computers perceive the world using sensors.

ISTE Standards for Students:
1.1 Empowered Learner
• 	1.1d - Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
1.3 Knowledge Constructor
• 	1.3d - Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

ISTE Computational Thinking Competencies:
5.1 Computational Thinking (Learner)
• 	Recognize how computing and society interact to create opportunities, inequities, responsibilities and threats for individuals and organizations.

Equipment

Student iPads, computer connected to a projector, *AI+Me Book 1: Perception: How Artificial Intelligence Sees the World*; printed copies of facial features, heads; Post-It/Sticky Notes; popsicle sticks (or other supplies that can hold a paper head aright; general art supplies
• 	AI & Facial Recognition - K-2 Face Templates PDF[1]

Preperation

Ensure the following websites are accessible:
• 	https://calypso-robotics.com/

Ensure student iPads are properly charged.

1 	https://drive.google.com/file/d/1pFbWytn1FgZVYj6ogspAxNdGbyVUeaU8/view?usp=sharing

Warm-Up Open Cloud Calypso on iPads. Students may do this by going to https://calypso-robotics.com/ Alternatively, students may be trained to use a QR code on the screen to open the Cloud Calypso website. Demonstrate the facial emotion recognition feature of Cloud Calypso. Ask students what emotions the teacher is demonstrating. Then, ask students if the Cloud Calypso software is accurately identifying the emotion. Allow students a moment to play with the facial recognition feature themselves. To close this portion of the work, ask students where they have seen facial recognition in their lives. Some answers may include: • Entry to Neom • Unlocking phones or other devices	5 minutes
Presentation How does a computer recognize emotions? Distribute to students the AI+Me Book 1: Perception: How Artificial Intelligence Sees the World. Read the book with students. Focus on the portions of the book that discuss facial features. Explain that computers are trained to identify facial features and extrapolate data, such as human emotions, from those facial features. Demonstrate to students how eyebrows, eye shape, or the shape of the mouth can suggest emotions on their own.	15 minutes
Practice Introduce students to the facial recognition tools in Calypso. Demonstrate with the teacher's face some of the emotions that Calypso can identify. Students should also recognize how colors are paired with emotions so that when a person is happy, the face appears in one color. Explain that this is a powerful facial recognition tool and that students are now going to test its capacity. To test the technology, however, students will play with facial features printed out for them. Students can cut out the eyebrows, eyes, noses, and mouths and glue them to a paper face.	15 minutes

Students should have a means to affix the cut-out facial features to the face. Then, students can affix the facial feature to a post-it/sticky note. By doing this, students can interchange facial features easily onto different heads. Students can also affix the different heads to popsicle sticks or other ways to hold the head in front of the camera.

Ask students to try to make a happy face first. Which eyes, mouth, nose, and eyebrows are needed to convey happiness? Encourage students to share their responses.

Next, students should experiment with different eyes, noses, mouths, and so forth to create these emotions:
- Angry
- Surprise
- Sad
- Neutral

Students should then show their created faces to the AI system. What emotion does the system attribute to the face?

Students can experiment with changing out the mouth with a different mouth shape and/or changing the eyebrow positioning to see how this affects the emotion the AI program detects. For example, an open mouth and wide eyes are indications of surprise, while a smiling mouth is an indication of happiness. Pursed lips might indicate anger, but the eyebrow positions and eye shape might also be important in discriminating anger vs. fear or sadness.

Production
Explain that the computer knows where the eyes, nose, mouth, and so forth should be on a normal human being.

Explain that students will now test the limits of the AI system. For instance, what happens if only part of the face is showing? Students should cover half the face and see if the AI still recognizes the face. Ask students to share what happened.

Enrichment - For kindergarten through 2nd grade, students can continuously attempt more advanced experiments
Students can test the system in other ways. Have students test different experiments with Visage:
- Mismatch emotions, i.e. put a happy face with angry or sad eyes, etc.
- Put the eyeballs vertically instead of horizontally
- Show the camera the picture upside down or sideways
- Scribble over one part of the face
- Put non-matching eyes/eyebrows on the face

Conclusion
Ask students to share what they are learning and offer possibilities for why the AI facial recognition software fails some tests and passes others.

Extension Ask students to identify a moment in their life around Neom where they may be interacting with facial recognition and share it during the next class.	