

Ozobots on the Silk Road

Course Name: Social Studies
Unit/Theme: Classical Civilizations

Time Frame (in minutes): 90 mins
Grade Level: 6th Grade

CONTENT AND SKILLS
Learning Objectives: • Students will code and debug an Ozobot's movement along a trade path in order to acquire a specific item. • Students will use their experience with the Ozobot to reflect on and suggest improvements to the design of the robot's computing technology. • Students will propose design changes for the Ozobots to ensure greater accessibility for all learners.
Essential Questions: • How did the Silk Road help spread ideas and technology across the Eastern Hemisphere? • How do algorithms help accomplish a task? • Are there multiple algorithms that can be used to accomplish the same task?
Students I can statements . . . • I can explain the importance of the Silk Road. • I can code and debug at least one algorithm in order to get an Ozobot from point A to point B. • I can offer recommendations to enhance the Ozobots' accessibility for all students.
How will you meet the needs of SWD and ELL/MLL students? • Modifications and accommodations according to individualized plans and 504s will be met. • Printed blank code templates can be provided for students who need support drawing their code. • Exit slip questions can be provided alternatively as a digital questionnaire.
Content Standards List all standard indicators (do not need standard statement)
• 6.5a Geographic factors influence the development of classical civilizations and their political structures. • 6.5c A period of peace, prosperity, and cultural achievements may be indicative of a golden age.
NYS Computer Science and Digital Fluency Standards

List all standards that authentically align

- **4-6.CT.6** Compare two or more algorithms and discuss the advantages and disadvantages of each for a specific task.
- **4-6.CT.9** Explain each step of an algorithm or program that includes repetition and conditionals for the purposes of debugging.
- **4-6.CT.10** Describe the steps taken and choices made to design and develop a solution using an iterative design process.
- **4-6.NSD.1** Propose improvements to the design of a computing technology based on an analysis of user interactions with that technology.
- **4-6.IC.6** Identify and explain ways to improve the accessibility and usability of a computing device or software application for the diverse needs and wants of users.

NYS SEL BENCHMARKS

<https://www.p12.nysed.gov/sss/documents/SELBenchmarks2022.pdf>

- **1C.3a.** Develop a plan and prioritize steps in working toward a goal.
- **2C.3b.** Demonstrate cooperation and teamwork to promote group wellbeing and collective efficacy.

INSTRUCTIONAL PLAN

List the steps of the lesson, including instructions for the students including how they will construct and practice content knowledge.

Add Standard Indicators next to activity that aligns and highlight them.

Prep:

- This lesson supports prior learning about the Silk Road. This lesson fits in at the end of the Classical Civilizations unit after students have studied Ancient China, Ancient Greece, and Ancient Rome.
- Additionally, students have participated in three social emotional learning read aloud books about disability advocates ([Splash!](#) by Elisa Boxer, [All the Way to the Top](#) by Annette Bay Pimentel, and [Fighting for YES!](#) by Maryann Cocca-Leffler) and have been discussing accessibility.
- Ensure that the Ozobots are fully charged and that the pens all work.
- Decide how to pair up students for the activity, groups of 2-3 will work best if you have enough Ozobots. (FYI: Each group will need one prepared **Ozobot Silk Road**, **Ozobot and Markers**, and a **Trader Card**.)
- Prepare enough **Ozobot Silk Roads** so that each group has one. This will work best on a large white poster board sized paper. You can also tape (on the back) four 11"x17" white construction papers together to form a large sheet. Then, glue each of the six **City Labels** onto the correct positions. See the **Example Constructed Silk Road** for reference.
- Print copies of the **Trader Card** for all student groups. (There are four different tasks on each sheet, students only need one task. However, you may want to print extras for

early finishers).

- Have blank white paper, glue sticks, and scissors available in case students need to recode their design or fix a mistake.
- Print one copy of the **Ozobot Code Reference Sheets** for each group.
- Print one copy of the **Trader's Logs** for each group.
- Print one copy of the **Ozobot Calibration Dot** to keep handy in case any Ozobots need to be calibrated. Calibrate them all for the first time at the beginning of the lesson as you hand them out.
- Print a copy of the **Teacher Answer Key and Reference Documents** or have digital access to them.
- If using a written **Exit Ticket**, post on Google Classroom (or print a paper version).

Launch:

- Have students gather around a table. Draw a black path along a piece of paper, place an Ozobot on the line and show the students how it follows the line.
- Then, add a spin code at the end of the line (red, green, red, green) followed by another black line. Start the Ozobot again and show the students how the code changes the Ozobot's actions.
- Have students return to their seats. Introduce the lesson to the students using the **Ozobot Slide Deck**. Refresh students' knowledge of the Silk Road. Introduce Ozobots and explain that they are controlled by color patterns. Explain that by selecting and filling in the correct color patterns, students will be able to get their Ozobot to travel along the Silk Road. Then go through the slides explaining the activity.
- When slide 14 is reached, demonstrate the different rules and how to approach parallel to the cities (to ensure enough room for the code) on an example copy of the **Ozobot Silk Road**. Stop on slide #14 while students complete the activity.

Activity:

- Students will collaborate with their partner(s) to read the task on their **Trader Card** and complete iterative coding to accomplish the given task.
- Students should use the **Ozobot Markers** to complete the coding needed for their tasks on the **Ozobot Silk Road**, ensuring they follow the "Rules of Trading" as outlined in the **Ozobot Slide Deck**. (4-6.CT.10).
- Students should run their Ozobot through the code (4-6.CT.10) and debug as necessary. As you circle the room, ask probing questions in order to help students explain their iterative design process and their debugging decisions. This will help them when they need to answer this on the exit ticket. (Note: If they need to re-write a color code, they can cut out a piece of white paper and glue it on top to cover the first try.)
- Circle around the room providing helpful tips as needed, try to avoid giving them hints of how to be successful without needing to de-bug (for instance, don't suggest they plan their route out first before beginning to code). However, if students come up with these strategies naturally, that's fine.
- As groups finish their journey, pair them up with another group that has the same Trader Card. Have each group demonstrate their journey for each other. Then, have the students compare the algorithms and discuss the pros and cons of each route design (4-6.CT.6). If only one group has finished, pose this question to them: "is there another way you can accomplish your trading goal using another algorithm (route)?" Then have them compare the pros and cons of both routes (4-6.CT.6).

- If there are very early finishers, then students can be given a new copy of the **Ozobot Silk Road** and a different **Trader Card** to complete.

Exit Ticket:

- Have students complete the **Exit Ticket** (4-6.CT.10). Alternatively, they can complete it as they finish their route. If students compared two route designs, have them complete the additional portion of the exit ticket as well (4-6.CT.6).

Wrap Up Discussion:

- Once students have finished coding their routes and completing the **Exit Ticket** (or the questions on the back of the **Trader's Log**), call them back together.
- Show them slide #15 on the **Ozobot Slide Deck**, have a discussion about what improvements can be made to the functionality of the Ozobot's computing technology (4-6.NSD.1). Use the prompts on the slide to help guide the discussion. If students are struggling to come up with proposed changes, ask them what was difficult for them when using the Ozobots. Then follow with "What could solve that problem for you?"
- Once students have come up with some proposed changes, go to slide #16.
- Remind students of prior learning about disability advocates. Transition to the discussion prompts on the slide. If students struggle with coming up with ideas, propose situations and ask them how it would affect their ability to use the Ozobots (4-6.IC.6). For example: "What challenges would you have using the Ozobots if you were colorblind?" followed by, "What would need to change about the Ozobots in order to solve that problem for you?" Another potential challenge would be for students with motor issues, drawing lines could be a challenge.

FUTURE READY COMPETENCIES

Check off each competency that students will interact with during this lesson.

- ☒ Collaboration
- ☒ Communication
- ☒ Critical Thinking/Problem Solving
- ☒ Creativity & Innovation

MATERIALS / RESOURCES

Add additional resources needed for this lesson such as instructional technology templates, images, videos, etc. ***Including Instructional Technology Tools***

- [Trader Cards](#)
- [Trader's Logs & Exit Ticket](#) (can be printed double sided or print the Trader's Log page and post the exit ticket questions digitally)
- Ozobots and Markers (Ozobot Markers or Crayola Markers)
- Extra Blank White Paper, Scissors, and Glue Sticks
- [Ozobot Slide Deck](#)
- Ozobot Silk Roads (constructed using printed and cut out [City Labels](#) and four pieces of 11"x17" white construction paper, see [Ozobot Silk Road Map Example](#) for reference)
- [Ozobot Code Reference Sheets](#)
- [Ozobot Calibration Dot](#)
- [Introduction to Ozobots Video](#) (in lesson slide deck)
- [Teacher Answer Key and Reference Documents](#)

- [Blank Code Printable Template](#) (provided as an accommodation if needed)