

Lesson Plan: Coordinate Planes & Cartography

Grades and Contents:

5th Social Studies

5th Math

Topic:

Westward Expansion

Graphing Coordinate Pairs in First Quadrant

Enduring Understanding

People moved West seeking economic opportunities; they faced many challenges.

Coordinate pairs can be used to showcase key points when plotted on a plane.

Standards/Indicators

Social Studies:

5-2.1 Analyze the geographic and economic factors that influenced westward expansion and the ways that these factors affected travel and settlement, including physical features of the land; the climate and natural resources; and land ownership and other economic opportunities.

Social Studies 21st Century Literacy Skills:

Create maps, mental maps, and geographic models to represent spatial relationships.

Math:

5.G.1 Define a coordinate system.

- a. The x- and y- axes are perpendicular number lines that intersect at 0 (the origin);
- b. Any point on the coordinate plane can be represented by its coordinates;
- c. The first number in an ordered pair is the x-coordinate and represents the horizontal distance from the origin;
- d. The second number in an ordered pair is the y-coordinate and represents the vertical distance from the origin.

5.G.2 Plot and interpret points in the first quadrant of the coordinate plane to represent real world and mathematical situations.

Academic Language

Vocabulary

- Westward Expansion
- Perpendicular
- Coordinate
- Physical Map (specific physical features listed under criteria for mastery)
- Transcontinental Railroad

Objectives/Language Function

- Verbally identify the pros and cons of different types of maps for displaying information about Westward Expansion.



- Explain in writing the relationship between the coordinates on the map and key places on the Westward Expansion map by creating a map key.
- Identify key geographic places, landforms, and hardships that impacted travel and may have caused economic hardships during Westward Expansion.
- Explain verbally or in writing using the coordinate plane map as a visual aid some of the geographic factors which impacted travel and settlement during Westward Expansion.

Assessment Plan

- Pre-Assessment-
 - Have students complete the “before” section of the anticipation guide as a pre assessment.
- Post-Assessment- Before releasing students to create their map or as a “center rotation”, perform a quick formative assessment using quizziz.com. The following link will take you to precreated 11 question formative check which you can then duplicate in your account and have students take.
<https://quizziz.com/admin/quiz/5b7c5000840d0d001a15682d/westward-expansion-5th-grade-5-21>
 (Printed copies of the formative assessment are also an option.)
 At the end of the lesson students will complete the after reading anticipation guide.
- Criteria for Mastery for the Map/Letter:
 - Have the following key places plotted on their map:
St. Louis “Gateway to the West”, Rocky Mountains, Missouri River, Mississippi River, Columbia River, Colorado River, Snake River, Great Plains “America’s Breadbasket”
 - Show accurate coordinates (x, y) for at least 4 key places (answers may vary per student, but should be similar)
 - Show at least 3 other “challenges” or “crossings” on their map:
Hot, dry summers, dust storms, Native American Trails, Insect swarms, Inclement Weather
 - In the letter, students will explain the setup of their map and they should explain key places on the map that would be important for fellow pioneers planning to travel out West to know about. Students should reference the coordinate pairs (absolute location) and/or cardinal directions/other landforms (relative location) in order to showcase knowledge of how to use and read a physical map.

Materials

- Read Aloud copy of *You Wouldn't Want to Be an American Pioneer!*
- Copies of Anticipation Guide with the Map Plan on the back
- Grid fabric (precut)
- US Map Stencil outline (to save time you can prepare a few of these ahead of time)
- Sharpie markers for plotting points
- Copies of a variety of US maps (physical, political, thematic) for use if needed
- Paper (for letter writing) or Device to record a short video



Teacher Preparation

This lesson can be used as an introduction to or as a entry level lesson into Westward Expansion, a review/support lesson for graphing coordinate pairs, and a reinforcement for maps skills/informational text graphic aids and features.

It may be to set up 3 stations in addition to student desks/tables/workspace. Although they will each create their own map, students could rotate through stations at their own pace where they complete specific tasks. (1) Formative Check on Quizizz.com (2) Brainstorming/Prototyping their map (3) Compose a letter explaining the map features (adds time to lesson) (4) Embellishing map (not required) once the “Hook” portion of the lesson is complete.

Meat of Lesson

● **Hook**

1. Tell students: *Sometimes you must rely on the experiences and expertise of others in order to be successful, other times you have to take the risk and fail to be successful. Traveling out West was no different. Before we get started I need to learn a little about some skills you already have.*
2. Have students complete the Before Reading portion of the Anticipation guide. While completing scan the work of students to see if time needs to be spent reviewing what a physical map is vs. what a political map. If needed, explain once back in whole group.
3. Complete the discussion questions in order to activate background knowledge.
4. **Introduction:** Today we are going back in time to see what it may have been like to be one such trailblazer. We are going to use skills from Math in order to be cartographers. Before we can get started we need to take the time to learn more about some of the specific geographical challenges faced by those traveling out West. We are focusing on geography challenges today, so as I read certain sections from this text, be sure to take a few notes about challenges you hear.
5. Read Aloud Specific Portions of the text. (suggested ones are marked, our choose your own, if time allows before the lesson the book could be available to students)
6. Have students then do 3-4 rotations of “Give 1, Get 1” to share out key geographical features/challenges, making sure to circulate to check for understanding.

● **Brainstorm**

- Have students flip their anticipation guide over. Quickly review coordinate planes (labeling x,y, axis) numbering and then plotting. Explain that they must have the most important geographical landforms that posed challenges plotted on their map (have them share out or show an anchor chart with them listed). Explain that some challenges that are related to geography but aren’t landforms per se, can still be showcased on the map (ie. locust swarms!) During this time students will also plan which landforms they want to physically recreate for their map and how they plan to do.

● **Prototype**



- Before prototyping or intermittently during their brainstorming time, it may be beneficial to have students complete the formative assessment on quizziz. It is self-paced and the data is stored. This will be helpful to know which students may need more time and/or guidance with identifying key geographical places and why they were a hindrance.
- Students will use the grid fabric to create their map. There is a US Map Stencil included that students (or you beforehand) can use to draw out the US if they want it to be uniform.
- They will then use the materials to design and create their map.
- **Share**
 - Have students assemble two circles. One circle will be the inner circle and one circle will be the outer circle. Students once in their circles, should turn to face each other (outside circle student facing an inside circle student) this will be a quick way for students to share their maps with many classmates. Give about 45 seconds for each students to talk and then have students rotate. This can be repeated at least 3 times (repeating more if time allows).
1st rotation: How did you plan for your map design?
2nd rotation: What did you think was the biggest challenge to showcase on a map?
3rd rotation: What is one thing you did on your map to make it easy for pioneers to use?
 - If you let students take their maps home, try to take a picture of each student's map beforehand, and post the picture of their map with their completed letter.
- **Synthesize**
 - Have students return as a group. Close out the lesson by a brief discussion.
 - Have students complete the After Reflection on the discussion guide.

Supports for Student Learning

Accommodations

- **ELs**- Provide a skeleton for the letter that explains the map or allow students to video themselves explaining their map to others as if they were going to travel out West.
- **Grade Level adaptations**- N/A
- **Advanced students**- Students could create journal entries or travel logs for a few of the key challenging places to cross, expanding on the ways travel/settlement were impacted as opposed to a letter.
- **Additional supports**- More modeling in areas needed for support (IE gradual release method to plot St. Louis and guided brainstorm of how to represent that visual with a 3D pen)

Discussion Guides

- Hook-
What challenges do you think travelers heading out West may have faced?



Native American trails were often used to by pioneers and became like very common roads after much usage. Why do you think they used these? Why not create their own?

How can challenges that they faced be best shown on a map? (*Map Key, etc*)

Why is a physical map the best choice for this? (*Shows landforms not political boundaries, etc*)

What is a cartographer?

How might those skills have been valued during this time?

- Synthesis-
 - How did our ability to graph coordinate pairs help us design better maps?
 - Sometimes, following in the path of others helps us to be successful. Were there any tips or tricks that you learned from one of your classmates that helped you design a better map? Explain.
 - Where there any landforms that you were struggling to plot or design on the map that you did something different with? What?
 - How did this cartography lesson today help you understand what it may have been like to travel out West during this time period?
 - What was challenging about today's lesson? What was fun?

More to Explore (Resources)

