

MAPPING

Students study patterns in the landscape and create maps of vegetation patterns, wildlife evidence, landscape features, and other characteristics.

Plants, geological features, and animal evidence are not randomly distributed. They occur in patterns on landscapes in response to environmental conditions and such factors as light exposure, soil type, geological forces, or disturbances. Because the focus of the map is showing distribution and not drawing exact representations of a part of nature, creating maps helps students quickly identify patterns in distribution and sets students up to think about possible causes for the distribution. It also sets them up with a new skill and frame to include in future journaling experiences; once students know how to make a map, they can record a small one for context in journal entries focused on other subjects.

NATURAL PHENOMENA

Plan ahead of time what students will map. You don't find ideal subjects for mapping everywhere. Look for phenomena with strong patterns. Any interesting part of nature that has a spatial component (e.g., otter trails at the edge of a marsh, vegetation zones around a small pond, spider webs in a bush, erosion and deposition patterns where a stream feeds into a lake, fresh and old gopher mounds on a lawn, areas of high- and low-intensity burn after a forest fire, a portion of a creek showing alternating zones of ripples and pools with an overlay of animal evidence, or ant trails in a kitchen).

To determine a focus for mapping, you could use your learning goals to decide what phenomenon you would like students to map, then scout good nearby locations for it. Or you could go explore with mapping in the back of your mind and see what features have strong patterns. Identify the boundaries of the mapping location and major landmarks within it as you scout, so that you can point them out to students as you give the group instructions. After students have some practice with mapping, they could select the features for mapping themselves.

PROCEDURE SUMMARY

1. Make a map of the subject in this area within the boundaries described.
2. Use symbols to show where things occur, and make a key to what each symbol means.
3. Include a North arrow and a scale.
4. Start by recording a few landmarks.

DEMONSTRATION

When the whiteboard icon appears in the procedure description:



Draw a simple map. Model using landmarks to guide the placement of major features on



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published by Heyday books.

Time

Introduction: 10 minutes
Activity: 30–50 minutes
Discussion: 10–15 minutes



Materials

Journals and pencils



optional

- Compass
- Measuring tape
- Examples of maps of your area (vegetation, geology, roads, etc.)

Teaching Notes



Mapping is a complex skill. Give students practice using a journal outdoors before you do this activity, then start with mapping smaller areas (a few square meters of ground) in an area with clear landmarks. Students can make accurate maps without a scale, but you can use a scale if you like.

Ahead of time, figure out whether it will make most sense to orient the map toward a North arrow or to a prominent feature in the landscape.

it. Then create a key and add the elements of the key to the map. Add written notes to call out a few important features (e.g., duck nest). Include a North arrow and, if students are making a scale, a scale bar.

PROCEDURE STEP-BY-STEP

1. Show students an example of a map of a local area and ask them to observe it, discussing the kind of information they notice on the map.

- a. "What do you notice about this map? What kinds of information do you see included?"
- b. "What kinds of information are not included on this map? For example, you might see a line representing a bridge, but the actual shape of the bridge is not included."

2. Explain that the purpose of a map is mostly to show the location of things in an area, not to show accurate pictures of each object in that area.

- a. "Maps don't show everything in the landscape."
- b. "They show the location of certain features (like roads or rivers), but not the details of every single thing in the area."

3. Direct students' attention to the map legend, pointing out how it identifies the symbols used on the map.

- a. "This map key, or legend, shows every symbol that appears on the map."

b. "When you are reading a map, if you see a symbol you don't recognize, you can look for it in the key."

4. Tell students what the subject of their map will be, and explain that they will focus on showing the location of that subject and anything relevant to it.

- a. "We are going to be making a map of gopher holes [pinecones beneath a tree, a small stream, rocks, etc]."
- b. "So we'll record the location of gopher holes [the stream, rocks in the field, etc]."
- c. "Is there anything else that might be helpful to include?" (If students don't bring it up, suggest details relevant to the subject of your map, such as vegetation, water, or rocks.)

5. Help students determine the map orientation by directing them to north or a prominent landscape feature they can mark on their map.

- a. "Our map area will be from [name easily visible landmarks to give boundaries for the map area]."
- b. (If you are orienting the map to north) "This direction is north; please put an arrow at the top of your page with an 'N' under it to show the orientation."
- c. (If you are orienting the map to a prominent landscape feature) "We're going to orient our maps to the flagpole. Put the flagpole in the top right-hand corner of the map, and orient your map around that landmark."



Abigail, age 10

A simple key explains the symbols on the map. This saves time, is easy to read, and takes pressure off drawing.





6. (Optional) Describe how to designate scale, using 1 inch or two squares on graph paper on the map to represent 10 paces. If students already know their pace, you may skip this step and instruct them to correlate 1 inch or two squares on graph paper to a given number of paces on the map.

a. “Now, we will determine and designate the scale. Use your paces to show how far things on your map are from each other; for example, one inch on the map might equal ten paces. Although this should be as accurate as possible, it does not need to be exact.” (You can have a compass and a measuring tape on hand if students want to add greater precision to their maps.)

7. Describe how to use symbols and letters to show where the subject and other important features occur on the map, and how to make a key, emphasizing that students should not make detailed drawings of everything they see.

a. “Add organisms or other things you find to the map. When you want to add an organism to your map (like that tree, for example), first make and label a key symbol.”

b. “Key symbols can be letters or simplified shapes. They should not be detailed drawings, because the goal is not to show the details of every single thing; it is to show their location.”

c. “The symbols should be easy to draw and distinct from one another. They could also be letter codes (such as GH for gopher hole). You can add additional key elements as you go.”

d. “You don’t need to know the names of species of plants or other features to add them to your map. You only need to be able to tell them apart from each other.”

8. Suggest that students use hatching lines or a grid to show features (such as grass) that cover a large area on the map.

a. “If there is a plant, such as a grass, that covers a very large area, you can use hatching lines or a grid to show this.”

9. Help students pick out a couple of landmarks to put on their map before they begin.

a. “Before you begin, pick out a few important landmarks to add to your map. Pick things as reference points that could help you place other features on the map.”

b. (Or, for younger students) “Let’s pick out two landmarks to add to our maps together. We’ll pick these as reference points that will help us place other features on our map. Let’s add that tree over there, and the bench at the end of the schoolyard. Please pace out to show how far they are from one another.” (*Note:* You can also use a pile of backpacks or other equipment and locate it on student maps to get them started, essentially a “You Are Here” sign.)

10. Tell students that they can add questions to their map as they work; make sure they are ready to begin, and send them off.

a. “If any questions occur to you as you make your map, add them in as you go.”

11. As students work, take time to circulate, offer reminders, or support students who are struggling.

a. (After half the time has elapsed) “We’re about halfway through our time for mapping. If you’ve only focused on one area, it’s time to move on so that you can be sure to complete your map in time.”

DISCUSSION

Lead a discussion using the general discussion questions and questions from one of the Crosscutting Concept categories. Interperse pair talk with group discussion.

General Discussion

a. “What did you learn about the distribution of [your chosen map subject] through making your maps? Where were they, and where weren’t they? Were there any patterns you noticed in terms of what your subject was next to?”

b. “What might have caused some of the patterns of distribution you observed? Why do you think that the things you saw occurred in some places and not others?”

c. “What was it like to make a map? What was fun or challenging about it? If you were to do it again in a different area, is there anything you would do differently?”

d. “Was there anything you learned through making your map that was unexpected, anything that surprised you?”

Patterns

- a. "When you made your maps, you were noting patterns. Where was there a lot of [subject of map]? Where were they? Were they in groups or spread evenly? Where were they missing?"
- b. "Are there other patterns you noticed while making your map? What could be some possible explanations for what you observed?"

Cause and Effect

- a. "What are some possible explanations for the patterns we observed, of where certain [map features] were and where others weren't?"
- b. "What seen and unseen processes or forces could impact where different things occur or don't, or grow or don't grow?"
- c. "What kinds of forces could cause a change in the distribution we observed while making our maps?"

Stability and Change

- a. "Do you see any evidence of changes or events that happened a long time ago?"
- b. "What causes change in the distribution of the phenomenon we mapped, and what is your evidence for this?"
- c. "What do you think this area was like _____ ago? What will it be like _____ from now?"
- d. "At what kind of time scale are these changes happening? Quickly? Slowly?" "We'll return to this area in [some amount of time] to see how it has changed."

FOLLOW-UP ACTIVITIES

Making a Cross Section

Draw a landscape cross section (see next activity) between two points on the map that would reveal vertical zones of plants or animals such as you might find along the seashore or at the edge of a pond.

Mapping over Time

Return to the same area weeks, months, or years later and make another map, then talk about what changed.