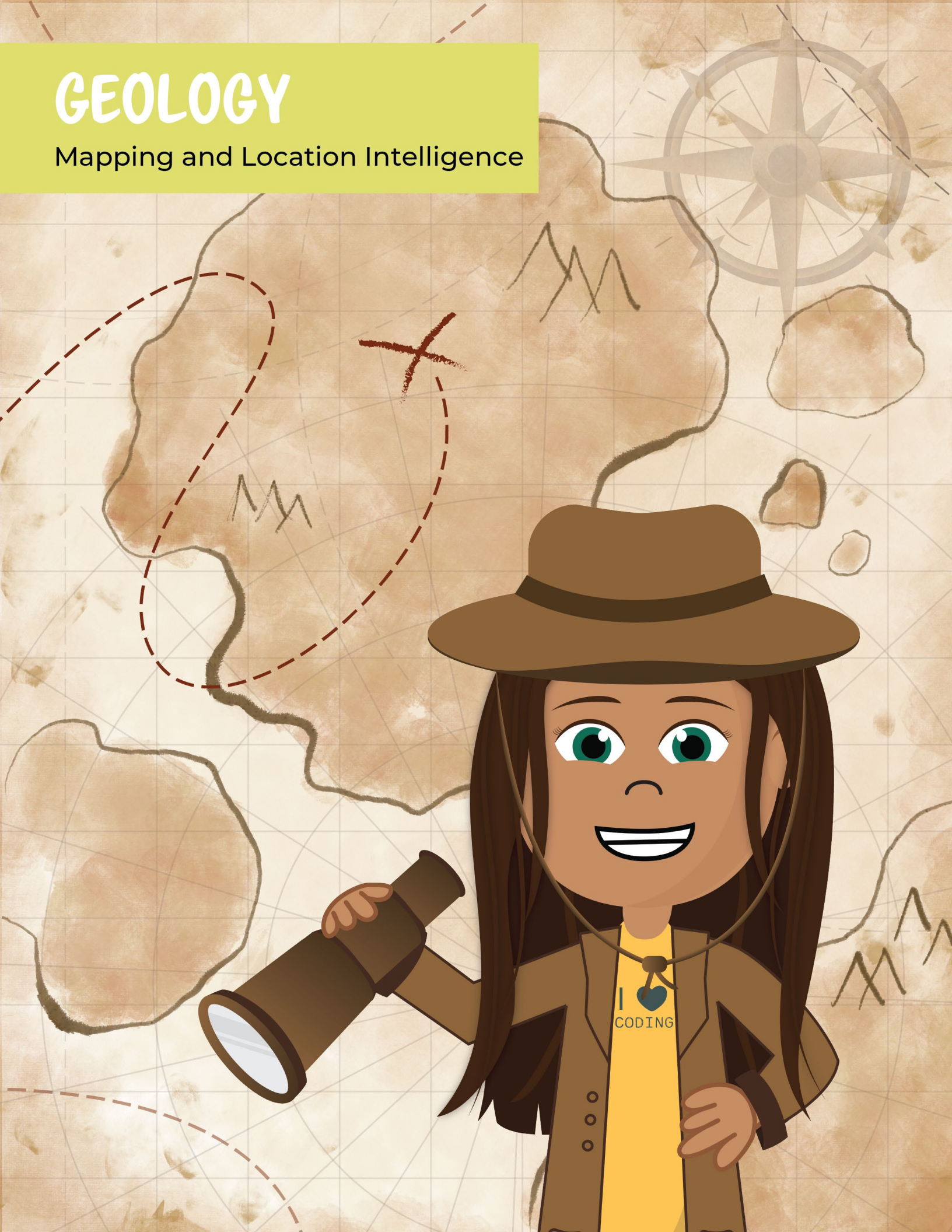
GEOLOGY

Mapping and Location Intelligence



NGSS

5-ESS2-1; 4-ESS1-1

Objective

The student will understand the basic principles of GIS and the importance of cartography.

The student will be able to determine coordinates for a location on a map and develop their own map of their community.

Vocabulary

GIS: Geographic Information System

Latitude: Lines that run East to West (horizontal) on a map.

Longitude: Lines that run North to South (vertical) on a map.

Cartography: The science/practice of making maps.

Key: Element that defines the meaning of symbols on a map.

Background

Cartography is the science or practice of making maps. We use maps and Geographic Information Systems (GIS) for city planning, farming, disaster relief, and transportation services. Some fundamental ideas involved in map making are longitude, latitude, coordinates, the equator, and the prime meridian. Longitude (going north to south) and latitude (going east to west) are lines on a map that enable us to pinpoint a location using coordinates. Coordinates define where on a map something is located with respect to lines of latitude and longitude, and we can also use maps (like Google Earth) determine the coordinates of a landmark or other location. Coordinates are expressed in degrees or “minutes,” always with latitude listed first and longitude listed second. The equator is a line of latitude (so it runs east to west)

and splits the earth in half between north and south. The prime meridian is line of longitude (so it runs north to south) and splits the earth in half between east and west. Other important elements of a map are the key and scale. The map key tells us what the symbols on the map mean and the map scale indicates the relationship (ratio) of space on the map to the corresponding distance on the ground.

Materials

For each group (2-3 students):

- Sheet of paper
- Pencil or pen
- Ruler
- Clipboard
- Google map printouts of the area where the students live or attend school

Procedure

1. Print out the area of a school, home, or other location from Google maps to figure out coordinates of a location familiar to the students.
2. Using a pencil and ruler, draw longitude and latitude lines on a blank piece of paper, with the middle of the paper being the coordinates found on Google Maps for the location.

Note: Students will be making their own map version of the printed out map.

3. If weather permits, have the students choose two landmarks to walk between to figure out the distance between the landmarks. These will be placed onto the blank sheet of paper relative to the location that was determined in step 1. The printed Google map can be a guide in determining where to place the landmarks.
4. Students should work to add detail to their map by adding features like roads, building, or trees. Symbols can be used to help highlight some of these features.
5. Then, have the students create a key to show what the symbols mean on the map.
6. Additionally, have the students add a scale for their map to determine distances for the real life locations. An example could be 1 inch on the map corresponds to 100 actual steps between two locations.

7. Have the students share out their respective maps. If time allows, students can collaborate to design a map for a fictitious island with any feature that they would like to have on it.

Guiding Questions

What is cartography?
What are some different types of maps?
Where is the prime meridian?
Where is the equator?
What are latitude and longitude?
What is scaling up or scaling down in relation to a map?

Career/Future Application

Cartographer, City Planner, Geographer, Civil Engineer

Sources

The Complete Book of Maps and Geography for Grades 3 through 6 by Carson Dellosa.