Learning Activity: Problem Posing from Maps
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(use in conjunction with GITN #611, Goma’s Fiery Eruption:

Introduction


Grade Level: 5-12

Time Frame: about one hour over two class meetings

Objective

Students working in small groups will generate and answer questions based on a map provided to them. The teacher will analyze these questions and answers to gain insight into students’ understanding.

National Geography Standards

• Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.
• Standard 3. How to analyze the spatial organization of people, places, and environments on Earth’s surface.

Terms

• Map content - refers to the topic of the question (i.e., symbols, latitude/longitude, scale). From less to more sophisticated, map processes include such elements as map reading, map interpreting, and map inferencing.
• Map reading - involves the simple recognition of symbols and place names found on the map (i.e., star symbol represents Olduvai Gorge).
• Map interpreting - consists of integrating “two or more pieces of information that are encoded on the map” (Gregg 1997, p. 251). For example, determining the distance between two point symbols (1st piece) requires the use of the graphic scale (2nd piece).
• **Map inferencing** - requires students to incorporate their existing knowledge with information on the map to form conclusions about processes and patterns. Relating the elongated lakes occupying the rift valleys of East Africa to plate tectonics involves making an inference.

**Resources**


**Getting Started**

1. Place students in small groups of two to three students.
2. Provide each group one copy of the map from “Goma’s Fiery Eruption” and three blank sheets of paper. For convenience, enlarge the map to fit on an 8.5 by 11-inch sheet of paper.
3. Each group develops six questions based on the map provided. Instruct the students to write their questions on one of the blank sheets. Six questions are provided at the end of this learning activity as examples.
4. On a second piece of paper, each group answers the questions posed.
5. After answering the questions, the teacher collects the answers.
6. Next, the groups exchange their questions with other groups.
7. After the students answer this second set of questions, the teacher collects the questions and the second round of answers.

**Data Analysis**

• The next class meeting the teacher presents a summary of the data based on the following analysis. First, the teacher calculates the percentage of “sensible” questions. Sr. Gregg (1997) found that more than 90 percent of the questions posed by fifth and seventh grade students were sensible. Questions deemed not sensible should be dropped from further analysis.

• Second, each question should be evaluated as to its content (i.e., topic) and whether it involves a reading, interpreting, or inferencing process (pick one). Construct a table having a row for each content area and the following columns: column 1 = map reading, column 2 = map interpreting, and column 3 = map inferencing. Add an additional row and column to show marginal totals.
• Third, calculate the percent of questions, by content area and map process, which were answered correctly.

• After conducting this exercise, the teacher should be able to assess students’ skill levels associated with map reading, map interpretation, and making inferencing from maps. The quantification of students’ understanding provides the teacher valuable feedback in targeting future instruction.

Potential Questions

The following sample questions were posed from the map contained within “Goma’s Fiery Eruption.” In brackets, the content and process addressed in the questions are noted.

1. List all the bodies of water. [place names, map reading]
2. Why are many of the lakes in East Africa elongated in shape? [faults, map inferencing]
3. Mount Nyiragongo is what direction from Mount Kenya? [direction, map interpreting]
4. Approximately how many miles long is the western branch of the rift valley system? [measurement, map interpreting]
5. Why are volcanoes associated with rift valleys? [tectonic forces, map inferencing]
6. Approximately how large is Lake Victoria? [measurement, map interpreting]

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