WHAT IS A GEOLOGIC MAP AND HOW IS IT USED?

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Level: High School and College

Anticipated Learning Outcomes

• Students will understand how a geologist uses a geologic map to predict locations of unseen rocks after they record observations on base maps, classify data, and analyze map patterns.
• Students will understand relationships between outcrops, contacts, formations, and geologic structures.

Materials

• Large box or tray half-filled with clean, dry sand.
• Numerous circles (1-2" wide) of stiff, colored paper.
• String, colored and lead pencils, and adhesive tape.

Procedure (before class)

1. Mold surface of sand into realistic "landscape" (flat or hilly).
2. Fasten string across box to form coarse grid of squares; prepare copies of base map showing box outline and grid.
3. Each paper circle represents an outcrop of a sedimentary rock (colors represent different rock formations) lying at a given attitude (angle of the circle stuck into the sand). Place "outcrops" across the "landscape" according to a predetermined pattern to represent flat, tilted, folded, and/or faulted strata.
4. Each student should do the following for each "outcrop":
   a. Locate the "outcrop" on her/his base map and mark its location with a small colored dot.
   b. Draw a short line on top of that dot to indicate the strike direction of that "outcrop."
   c. (optional) Draw a short line on top of that dot to indicate the dip direction of that "outcrop."
5. After numerous "outcrops" are marked, students should draw black lines ("contacts") to separate areas of the map with different colored dots. Lines should roughly parallel the strike lines of nearby outcrops. Lightly color all formations on the map.
6. Ask students to predict what rock types are hidden underground between selected "outcrops" and to explain their logic.
Discussion

- Students will benefit greatly from repeated trips to the "field" (terrain model) as they draw contacts and other map symbols.
- If paper squares are used for outcrops, the edges often confuse students' recognition of strike directions.
- Chips of gravel make good "outcrops" of igneous rock.
- A very large number of geologic structures and situations can be represented by this method. Be creative!

Reference