On a hike with your friends, you discover a cliff of red conglomerate and sandstone, with a few beds (layers) of mudstone. You notice that the conglomerate contains well-rounded cobbles of granite. Sand grains in the conglomerate and sandstone are composed of quartz and feldspar. The mudstone beds contain mudcracks, fossil camel tracks, and a few fossilized cacti.

1. List all evidence that suggests that the rocks were deposited on land, rather than in a marine setting.

2. Discuss how you could tell, based on what you observed on the hike, the environment in which these rocks were deposited (river, lake, glacier, or a mudflow next to a mountain front)?

3. Can you tell what type of rock was present in the highlands (mountains) from which the sand and cobbles were eroded?

4. List any observations that help constrain what the climate (hot, cold, wet, dry, etc.) was during the time when the red rocks were deposited.

5. As you continue down canyon on your hike, you discover that the red conglomerate and sandstone are underlain by a number of other units. Armed with your sketching and observing abilities you learned in geology class, you draw a little sketch and make a few key observations about each unit. Assume that the units were formed successively from bottom to top (i.e., the rock on the bottom, the granite, was formed first, and the rock on the top, the conglomerate, was deposited last). Using these observations, make a bullet list outlining what sequence of events may have happened in this area. Think about the possible environment in which each rock type could have been deposited. There is no one right answer, but a small number of possible ones. Most events
are represented by one rock unit (e.g., the sandstone, limestone, etc.), but some events may have occurred between two units (for example, think about at what depth a granite forms and how you would get that rock up to the surface to erode it).

Some events are obvious and others may be subtle and require more thought. Some are very vague and you may not have any clue about the significance of an observation, which is OK. Do a rough outline on another sheet of paper first and then neatly transfer the list to the underlying space. There should be plenty of room. You should have at least 4 or 5 events, and could have many more.

Red conglomerate and sandstone described on other side of paper.

Gray limestone with fossils of coral, starfish, and shark teeth.

Greenish shale and siltstone with fossils of clams and salt-water fish, and with some small grains that look like they were broken off from a coral reef. In the middle of the shale is a thin bed of conglomerate composed totally of broken and smashed coral, starfish, and other shells.

Brown sandstone with small pieces of clam shells. The lower part of the unit contains lots of small angular pieces of granite. The contact between the sandstone and underlying granite is an old erosion surface (called an unconformity).

Granite