Hypothesis Array

## Procedure:

1) Students are provided with text descriptions or sketches of several alternative working hypotheses that might depict a process or structure of the system under consideration.
2) Students explore a database of professionally collected data, seeking to assemble evidence in support of one of the hypotheses.

Theory of Action:

Experts often begin their exploration of a new dataset with some ideas or "schemata" in mind about what the data might be showing, whereas students may begin with no idea of what they are looking for. The hypothesis array moves the students' starting point from "I have no idea what I am looking for" to "I am looking for one of these patterns." Also, by comparing and contrasting the candidate hypotheses, students can formulate a strategy for which aspects of the data to attend to.

Example:
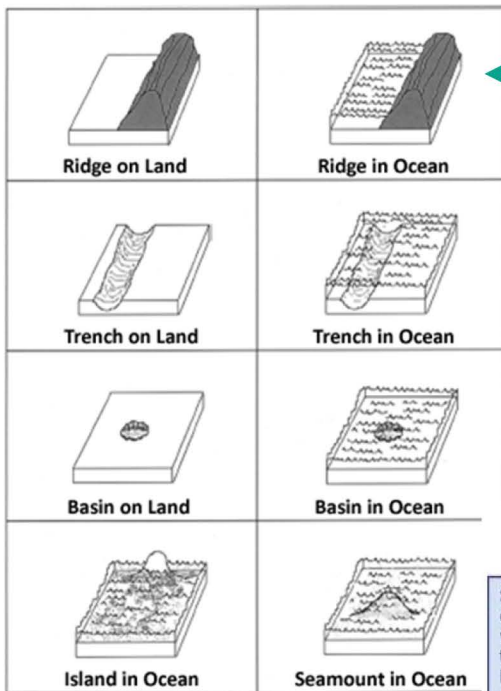
1) Students are provided with eight simple sketches that depict possible physiographic features on the surface of a planet.

2a) Students are shown how to access a bathymetry/topographic database and use an associated data visualization tool. The tool allows them to make profiles between any two points, which they choose by clicking on a provided map.

2b) Students seek to assemble evidence that one of the hypothesized physiographic features is present in the area under consideration.

Ridge on Land — Ridge in Ocean — Trench on Land — Trench in Ocean — Basin on Land — Basin in Ocean — Island in Ocean — Seamount in Ocean

Find the Unknown Feature

Use the Profile Tool to see if you can determine the shape of the topographic feature.

Students used a computer program which allowed them to plot profiles between any two points on a map, and they could plot as many profiles as they wanted.
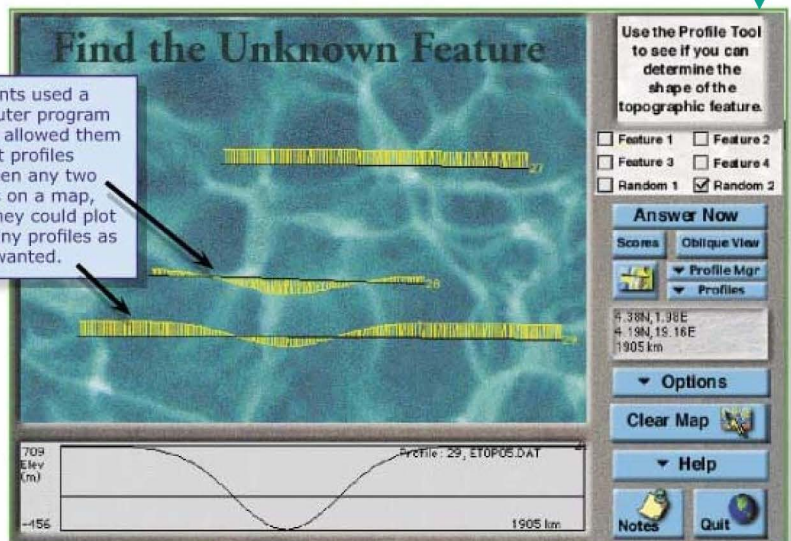
Mayer, R. E., Mautone, P., & Prothero, W. (2002). Pictorial aids for learning by doing in a multimedia geology simulation game. *Journal of Educational Psychology, 94*(1), 171-185.