

GIS Lesson 1
MANY LAYERS MAKE A MAP
TEACHER INFORMATION

Lesson Summary: Students brainstorm a list of information portrayed on topographic maps, sort that information into categories or themes and then trace a few layers onto mylar in imitation of GIS layers/themes.

Objectives: Students will become familiar with the concept of layers or “themes” in GIS and review basic topographic map reading.

Estimated Time: 1 hour

Correlation to Alaska Standards:

Cultural E-2 Understand the ecology and geography of the bioregion they inhabit.

Geography A-2 Use maps and other geographic representations.

Science A-1 Understand the processes of scientific inquiry.

BACKGROUND FOR THE TEACHER

Maps provide a bird's eye view of the Earth and are created for many different purposes. Some maps may show roads, towns and cities, while others show elevation features, rivers and lakes, weather forecasts, or park boundaries and still others are much more specific, such as a map of earthquake epicenters in Alaska. There can be many different maps of the same place and not all information about a place can be put onto one piece of paper. Every map serves a specific purpose and is the result of conscious design decisions. Cartographers decide how to use lines, symbols and color to symbolize what they are trying to show. They select features to show and omit other features and often generalize the data, simplifying the information so that the map is easier to read.

Because there are so many different types of information that can be included on a map, individual layers of information are separated in a GIS into individual pieces. These layers can then be selectively combined into a map that fits the selected purpose.

MATERIALS

For each student

- 8½ x 11 inch prints of 1:63,360 topographic maps of community
- USGS Topographic Map Symbols guide (Available in MapTEACH DVD appendix or by download from: <http://erg.usgs.gov/isb/pubs/booklets/symbols/topomapsymbols.pdf>)
- 2-3 sheets of mylar
- colored pencils
- paper clips

For Activity Introduction

- chart-sized 1:63,360 topographic map of community
- half-sheets of paper taped to board
- masking tape
- felt marker

INSTRUCTIONAL PROCEDURES

- Hand out topographic maps and legend guides to students
- Lead a brainstorming session in which students name many of the features they observe on their maps (rivers, creeks, mountains, roads, runways, swamps, schools etc). As students name features, write each one down on a separate ½ sheet of paper. Use chart-map on board to prompt observations.
- Lead a classification activity in which these features are physically sorted by theme. For example create a “water” theme and then group all streams, rivers, lakes, and ocean under that theme (physically moving the brainstormed ½ sheets under theme headings).
- After all of the features have been sorted, explain that students will now use mylar to create theme layers using their maps. Model the student activity using the wall map to demonstrate the steps:
 - secure mylar to topographic map with paper clips
 - “register” corners of topographic map by drawing corners on mylar layer
 - examine topographic map closely to get oriented and get a sense of all the colors, lines and symbols on the map
 - find and trace features from one of the themes developed during the group classification exercise onto the mylar overlay
- Students work to create several layers, one theme per layer.
- Discuss why the ability to pick and choose layers would be helpful for creation of maps and explain that this layering idea is integral to creating a GIS project.