GIS Lesson 10
GOOD MAP – BAD MAP
TEACHER INFORMATION

Lesson Summary: The teacher reviews the basic cartographic guidelines, and then shows an example AEJEE map that is cartographically incorrect, incomplete, and poorly designed. Students critique the map. A correct, complete, and attractively designed map is then reviewed for comparison.

Objectives: Students will apply the principles of good cartography to critically evaluate maps for completeness, correctness, and aesthetic appeal.

Estimated Time: 30 minutes

Correlation to Alaska Standards:

Arts C-1	Know the criteria used to evaluate the arts; these may include craftsmanship, function, organization, originality, technique, and theme.
Arts C-3	Accept and offer constructive criticism.
Arts C-4	Recognize and consider an individual's artistic expression.
Arts C-5	Exhibit appropriate audience skills.
Geography A	Make and use maps, globes, and graphs to gather, analyze, and report spatial (geographic) information.

BACKGROUND FOR THE TEACHER

Cartography is defined as the science of making maps, but it is also an art. There are many different kinds of maps, and *how* map information is depicted is highly dependent on the *type* of information and the *intent* of the map. The cartography "Student Checklist for Success" sheet provides a good overview of elements that are desirable in cartographically-correct AEJEE maps, as well as some guidelines to help make good decisions about cartographic design elements.

This exercise can be used before students have done a layout in AEJEE to help them think about what constitutes a "good" map as they begin working on their own map. It can also be used very effectively after students have already had the experience of making a layout of their own and are ready to take their cartography skills up to the next level.

MATERIALS

- At least one example each of a good AEJEE map and a bad AEJEE map, preferably prepared by the teacher, for use as an overhead or as part of a PowerPoint that can be projected on the screen; or, use the examples provided in the "Map Layouts and Cartography" PowerPoint.
- "Map Layouts and Cartography" PowerPoint, available from MapTEACH
- Copies of cartography handout *Student Checklist for Success*
- Blackboard/whiteboard or flip-chart, with appropriate chalk or markers

INSTRUCTIONAL PROCEDURES

Getting Ready

If you wish, prepare your own good and bad map layouts in AEJEE, export them to JPG format, and print as overheads or place in the "Map Layouts and Cartography" PowerPoint to use instead of (or in addition to) the examples that are provided.

Gear-up

- Ask students what sorts of things they would expect or want to see on a professional map. Prompt them with questions that will guide them to recognize that it would be important to have things like a scale, title, north arrow, author, date, etc.
- Explain that cartography is the science of making maps, and that people who professionally make maps are called "cartographers." Cartography has a lot of rules and guidelines, but the biggest mission for mapmakers is to make their maps attractive and easy to understand by their audience. A well-made map is a work of art as much as it is a product of science.
- Use the "Map Layouts and Cartography" PowerPoint cartographic basics slides to review all the things that should be included on a map, and design guidelines that will help students succeed in making professional-looking map products. (Note: you may choose to wait to show this until after the students have first critiqued the maps using their own ideas and opinions of what makes a map "good" or "bad.")
- Explain that you have been making maps in AEJEE just like they have (or will be), and that you are anxious to show them what you can do. In this exercise they will get a chance to evaluate some maps that you, the teacher, made in AEJEE!

Explore

- Project the "bad" map on the screen and ask students what they think of your fine map example. Use the flip-chart or the board to write down each item the students find that is bad. As they make their criticisms, ask them what could be done to correct each problem. Write each "fix" next to the problem.
  - Students love it when you ham it up – if they say something is wrong on the map, prompt them to elaborate by saying things like "What's wrong with my map title? *My cool MaPe* is a perfectly good title – it's my map, and it's cool!" or "What do you mean there's no north arrow? It's right there in the middle of the map – it just happens to be the same color as the feature it's sitting on top of..."
- Project the "good" map on the screen and ask students what they think of this one. Use the flip-chart or the board to record their observations.

Generalize

Pass out the cartography "Student Checklist for Success" handout and ask them if there is anything that they would change if the "good map" were their map. Explain that good cartography is an art as well as a science, and that many design decisions are based on personal preference. You do not expect or want everybody's maps to look the same!

Apply / Assess

GIS lesson "Map Layouts."

TEACHER RESOURCES

Guidance for very basic map design principles can be found at ESRI at:
http://www.esri.com/industries/k-12/PDFs/intrcart.pdf

A very interesting book that investigates how maps have been used to control perceptions and interpretations of geospatial information:
Monmonier, Mark. 1996. *How to Lie with Maps*. University of Chicago Press.

The classic handbook of cartography:
Robinson, Arthur H., Morrison, Joel L., Muehrcke, Phillip C., and Kimerling, A. Jon. 1995. *Elements of Cartography*. Wiley, John & Sons, Incorporated.

Date: _____ Name: _____

Student Checklist for Success:
Cartography and Map Layout for Final Project

Check off every item in this list to make sure you have a complete final map that follows good cartographic principles.

Before You Start

☐ Map has a clearly defined theme – what is the message you are trying to get across to the viewer? This theme will be reflected in your title, your descriptive text, and the data you choose to represent on the map.

In Map View

☐ If appropriate, map includes a suitable raster base layer (topographic map, SPOT5 satellite image, or Landsat satellite image)

You can only choose one for your layout, so think about:

- Your map theme: which base layer will help you get your message across best?
- How large an area your data points spread out over: if your points cover a small area, use a base layer with lots of detail; if your points cover a large area, use a base layer with less detail.
- Legibility and ease of reading: which base layer allows you to see your data better when you plot your points on top of it?

☐ Map includes your selected data points, symbolized and labeled so they are legible and informative.

- Symbol sizes and colors show up well on the base layer and don't interfere with each other.
- Label text is a legible font style, color, and size, and shows up well on the base layer.

☐ Map area is zoomed in on your selected data points and whatever other features you want to show on your map.

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You need to get this all figured out and finalized BEFORE you go on to the next step – you may have problems with AEJEE if you try to go back and change any of these after you have begun your layout

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In Layout View

☐ Map balance: elements are placed on the page so you there is an even distribution of elements covering the page and there isn't a lot of white space.

☐ Fonts for text and titles are carefully selected:

- Choose fonts that are easy-to-read, attractive, and fit your theme.
- Try to limit yourself to no more than two fonts; this helps your map look more uniform and professional.
- The title is usually the largest font size on the map.

☐ Map includes the basic elements essential to a good map layout:

- Data Frame: should be large enough to adequately show the data/features of your map.
- Title and Text: title and text should reflect your map theme - text should provide additional information about your map and data and how it relates to your map theme; it is also helpful to the viewer if you provide information about your map projection and datum.
- Legend: make sure it is legible.
- Scale: choose units that make sense for your map, usually miles or kilometers; typically placed right below the data frame.
- North Arrow: make sure it is easy to see, but not too large; typically placed next to the scale, right below the data frame.
- Author: full name, spelled out the way you would want someone to cite you if they were referencing your work.
- Date: date the map was completed; using a smaller text size, you could also include the date of the base map (if known) and date(s) that data were collected.
- Citation/Credit: give thanks and/or credit to anyone who has contributed to the data on the map, including gathering the data and sharing information or resources with you.
- Photograph: use one or more photographs that relate to your map theme and the data you are representing; be sure to include text explaining what the photo shows and who the photographer was.
- *Optional overview map (also called a location map): this map shows a larger area with an outline of where your map fits into it and gives the viewer an overview of where your map area is located.*