

Module 2, Lesson 1

Mapping a zoo

Lesson overview

Students will explore the concept of classification and how using categories can help make it easier to study certain things and ideas. Students will use GIS and work with a fictitious zoo to learn different methods of classification, create thematic maps, query data, and answer questions about what they see on the map.

While lesson 1, lesson 2, and lesson 3 can be done independently, students would benefit from doing all three lessons sequentially.

Estimated time

Approximately 60 minutes

Materials

The student activity can be found at <http://esri.com/geoinquiries>.

Student activity: TS_M2L1_StudentDirections.pdf

Objectives

After completing the lesson, a student is able to do the following:

- Classify animals using different characteristics and traits
- Interpret map style and create a map legend
- Work with attribute data
- Query data to find answers and make decisions

GIS Tools and Functions

- Open a map file
- Zoom to desired section of the map
- Identify a feature on a map
- Use the Filter to select data based on certain criteria
- Zoom to full extent of all the layers
- Add a layer to the map
 - Turn layers on and off
 - Activate a layer
 - Change map style (legend)
 - Filter attribute data
 - Label features
 - Sort attributes

National Geography Standards

Standard	K-4	5-8
1 How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information	How to display information on maps and other geographic representations	The characteristics, functions, and applications of maps, globes, aerial and other photographs, satellite-produced images, and models
2 How to use mental maps to organize information about people, places, and environments	The locations of places within the local community and in nearby communities	How to translate mental maps into appropriate graphics to display geographic information and answer geographic questions
18 How to apply geography to interpret the present and plan for the future	How people's perceptions affect their interpretation of the world	How varying points of view on geographic context influence plans for change

Teaching the lesson

Introducing the lesson

Begin this lesson by reviewing these concepts:

- The classification of living things
- How classification can make it easier to study certain things such as animals, trees (deciduous or coniferous), books (fiction, nonfiction, biography, mystery, etc.), or food (dairy, meat, fruit, etc.)
- Map legends and symbols
- How features on maps have spatial and attribute information
- How maps can be used for
- Finding where things are
- Finding out how to get from one place to another
- Finding answers to questions

Student activity

We recommend that you complete this lesson yourself before completing it with students. This will allow you to modify the activity to accommodate the specific needs of your students.

Teacher Notes

- Explain the lesson to the students and ensure that they are aware of where to answer the questions asked.

- For younger grades, you can conduct the GIS activity as a teacher-led activity in which students follow along. You can lead students through the GIS steps and ask them the associated questions as a class.
- Students will each need a printed copy of the activity so they can answer questions throughout. They can mark their answers directly on the activity sheet. Alternatively, you can provide a separate answer sheet.
- Sometimes the names of the buildings will not all appear. This is due to the size of the map on your screen.
- Ideally, each student will have access to a computer, but students can complete the lesson in small groups.
- Some questions do require classroom and/or group interaction. You can decide on the best way to handle these questions.
- Students will need access to a printer. Please explain how to use the print options.
- We recommend that students save their work as they progress through the GIS activity. Students can use either the Save command (to save their changes to the original map) or the Save As command (to save their changes to a new map). Please explain to students where and how they should save their work.

The following are things to look for while students are working on this lesson:

- As students work through the steps, are they focusing on the underlying geographic concepts (e.g., What are the spatial relationships between continents? How do major lines of latitude and longitude help us locate places on the earth?).
- Are students answering the questions in the GIS activity as they work through the steps?
- Are students experiencing any difficulties with the buttons, tools, mouse clicking, etc.?

Concluding the lesson

- Engage students in a discussion about animals around the world and where they live. Ask students to pick a specific country, continent, or region and research one or two of the animals that live there. They can present their findings to the classroom or in a report.
- Ask students to share any experiences or knowledge they have about maps. Bring in an atlas and show them different types of maps such as satellite images, street maps, and topographic maps.
- Engage students in a discussion about an endangered animal such as the panda, the gorilla, the elephant, or the tiger. Discuss how their habitats are being encroached on, and ask the students if they have any ideas on how to help endangered animals.
- Has this activity raised any questions that students would like to explore further?
- How can GIS help them learn about animals, organizing information, or finding answers to questions? GIS is used to track animal populations, provide information on habitat ranges, and analyze changes that occur in the environment.
- Have students do some Internet research on how zoos and wildlife preserves use GIS.

Extending the lesson

- Students can expand the zoo even further. Have them research natural habitats or regions and find animals that live in those habitats. They can add new enclosures to the zoo.
- Have students create a map of the classroom and classify the students into different categories such as students with pets, students with siblings, the months of their birthdays, their gender, and so on.
- Have students explore other living things and the ways they can be classified.
- Using the information from your map and from books or the Internet, write the script that a tour guide would give while escorting visitors through the zoo. The script could start like this:

Welcome to our new zoo! Today we are going to start off by visiting the elephant enclosure. Elephants are endangered animals. Some elephants live in Africa, and other elephants live in Asia. Elephants use their trunks to drink water and pick up food (and so on).

References

- www.sandiegozoo.org
- www.torontozoo.com
- <http://www.kidport.com/RefLib/Science/Animals/Animals.htm>
- <http://school.discovery.com/lessonplans/programs/animaladaptations/>

Student activity answer key

Answers appear in blue.

Module 2, Lesson 1

Mapping a zoo


Task 1: Open the map

Task 2: Enlarge the ArcGIS Online window

Task 3: Finding things at the zoo


 **Q1: Look on your map. Answer the following questions:**

- | | | |
|---------------------------------------------------|-----|----|
| a. Can you find the restrooms? | Yes | No |
| b. Can you tell where the zebra lives? | Yes | No |
| c. Can you tell where the tropical rainforest is? | Yes | No |

 **Q2: All your answers should be No. That's okay. Can you give two reasons why it is hard to find these things? Answers (any reason that seems valid, including the three below):**

1. Everything on the map is the same color.
2. There are no labels.
3. There is no legend.


Task 4: Finding the gift shop

 **Q3: How many columns (fields) are in the table? Count them on your screen. You do not need to click the table.**

- a. 3
- b. 1
- c. 2


 **Q4: How many rows (records) are in the table? Count them on your screen. You do not need to click the table.**

- a. 8
- b. 6
- c. 9

 **Q5: Look under the Building field. Write down the name of two buildings that are listed in the attribute table. Answer: Any of the following eight buildings are acceptable:**

1. Main entrance
2. Restrooms
3. Medical clinic
4. Bus stop
5. Restaurant
6. Visitor information
7. Gift shop

Task 5: Finding the tropical rainforest


 **Q6: What kind of attribute information is available in the Habitat field? This field contains information on what type of habitat the animals live in.**


 **Q7: How many different types of habitat are there?**

1. 8
2. 6
3. 10

 **Q8: List two habitats here: Answers may include the following:**







1. Savanna
2. Tropical Rain Forest
3. Desert
4. Scrubland
5. River, Lake, and Wetland
6. Temperate Forest and Taiga
7. Tundra
8. Ocean and Coastal

 **Q9: Look at your map. Can you see which enclosure represents which habitat on your map? Yes or No**

 **Q10: What happened to your map? Describe what happened in your own words.**
Changing the symbols and colors made the map easier to read and understand. Now you can tell where each habitat is located. The legend shows the color that represents each habitat.

 **Q11: What color is the tropical rainforest on your map? This will vary from computer to computer.**

Task 6: Adding the animals.

-  **Q12:** Look at the data in the window and complete the following table: *This will depend on what animal students choose. Here is an example:*
-  **Q13:** Based on the attribute data in the table, list one way that you could classify (put into categories) the animals in the zoo. *Answers may include the following: by class, by habitat, by status, and by name.*
-  **Q14:** Based on the attribute data in the table, list one way that you could symbolize (represent with colors or symbols) the animals in the zoo. *Answers may include a picture of each animal and a different color for each animal.*
-  **Q15:** Can you think of another way that animals can be described or classified that is not in this table? *Answers may include the following:*
- *What type of food they eat*
 - *What country/continent they live in*
 - *What covers their body (fur, feathers, scales, etc.)*
 - *Their size*
 - *Their weight*
-  **Q16:** Explain why your map is much more useful to visitors. What does your map show? What can you say about the colors and symbols? *The map now shows the location of each animal in the zoo. It shows all the different types of animal habitats. The colors and symbols are clear and make it easy for visitors to find what they are looking for. Visitors can plan their day and make sure that they see all the animals they want. They can also find places like the gift shop, the restaurants, and the medical clinic.*
-  **Q17:** Go back to step 3. Can you answer Yes to those questions now?
- Yes*
 - No*