Module 2, Lesson 2
Touring a zoo

Lesson overview

Students will create a custom tour of the animals in a zoo. They will examine the relationship between features and attribute data. They will perform simple and complex queries to answer questions about the information on the map and in the database. The will use the information they collect to make decisions about what animals to visit on the tour and draw the path that the tour will take.

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_M2L2_StudentDirections.pdf

Objectives
After completing the lesson, a student is able to do the following:
- Work with tabular data
- Filter data to find answers and make decisions
- Create a map legend for interpretation
- Explain different ways that animals can be classified

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
    - Change map style (legend)
    - Filter attribute data
    - Label features
    - Sort attributes

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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 or discussing the following concepts:

- How features on maps have spatial and attribute information
- The use of maps to answer questions and make decisions
- How guided tours are organized at zoos or other parks; examine ideas on which animals are popular, which animals are easy to see, and the kind of information that tours provide
- Visit your local zoo or wildlife preserve

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

- Students must receive both handouts for this lesson—a table to be completed and a paper map of the zoo. Students should complete the first handout (the table) in its entirety and use the second handout (a map of the zoo) to draw their walking tour.
- 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.

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- 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:

- Are students thinking about the underlying geographic concepts as they work through the steps (e.g., how the animals are classified, how the zoo is organized, what attributes are available for the animals and habitats)?
- 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

- 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.
- Have students ever used a map at a zoo or amusement park? Ask students to compare their GIS map of a zoo to a paper map of a local zoo.
- Has this activity raised any questions that they would like to explore further?
- How can GIS be used to plan routes? Look at how GIS is used in evacuation planning, ambulance and fire truck routing, and even pizza delivery!

Extending the lesson

- Have students create a tour of the school. They should decide on what areas to visit and highlight and the most optimal way to visit them.
- Students can look at vacation tour maps and critique the tour—does it cover all the highlights of a city/town? Does it take into account some free time for tourists?
- Using the information from your map, books, and the Internet, write the script that a tour guide would use while escorting visitors through the zoo. The script could start like this:

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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/

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Student activity answer key

Answers appear in blue.

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Task 1: Open the map

Task 2: Enlarge the ArcGIS Online window

Task 3: Snakes and lizards

- ***Q1: Look at the Zoo Animals legend. What is the color for reptiles?*** ***Green***
- ***Q2: Write down the name of the reptile in the Filter answers column on your worksheet (worksheet 1).***
- ***Q3: Write down the name of this reptile in the Filter answers column on your worksheet. Do this for all the reptiles. (Hint: There are 5 of them.)***
- ***Q4: Have you ever seen one of these reptiles in pictures or in real life?*** ***Write down the ones you have seen. Students should list which animals they have seen.***
- ***Q5: Write down some things you know about one of the reptiles.*** ***Students should describe the animal they have seen. They can also include where they have seen it, what it looks like, if they touched it, and so on. There are many acceptable answers.***

Task 4: Birds of a feather

- ***Q6: Look at the legend. What is the color for birds?*** ***Blue***
- ***Q7: Write the names of all the birds under the Filter answers column on your worksheet.***
- ***Q8: Scroll your table to the right. Look in the Status field. Which birds are listed as vulnerable (facing a high risk of extinction in the wild)?***
    a. ***Flamingo***
    b. ***Penguin***
    c. ***Eagle***

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- ***Q9: Have you ever seen one of these birds in pictures or in real life? Write their names here. Students should list which animals they have seen.***

- ***Q10: Write down some things you know about one of the birds. Students should describe the animal they have seen. They can also include where they have seen it, what it looks like, if they touched it, and so on. There are many acceptable answers.***

Task 5: Animals that live in scrubland

- ***Q11: How many animals show in the table? Three***

- ***Q12: Write the names of all the animals under the Filter answer column on your worksheet.***

- ***Q13: Have you ever seen one of these animals in pictures or in real life? Write their names here. Students should list which animals they have seen.***

- ***Q14: Write down some things you know about one of the animals. Students should describe the animal they have seen. They can also include where they have seen it, what it looks like, if they touched it, and so on. There are many acceptable answers.***

Task 6: Mammals and cold climates

- ***Q15: How many animals were selected? Two***

- ***Q16: Write the names of all the animals under the Filter answer column on your worksheet.***

- ***Q17: Have you ever seen one of these animals in pictures or in real life? Write their names here. Students should list which animals they have seen.***

- ***Q18: Write down some things you know about one of the animals. Students should describe the animal they have seen. They can also include where they have seen it, what it looks like, if they touched it, and so on. There are many acceptable answers.***

Task 7: Help save endangered species

- ***Q19: How many animals were selected? Two***

- ***Q20: Write the names of all the animals under the Filter answer column on your worksheet.***

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- ***Q21: Have you ever seen one of these animals in pictures or in real life?*** ***Write their names here. Students should list which animals they have seen.***

- ***Q22: Write down some things you know about one of the animals.*** ***Students should describe the animal they have seen. They can also include where they have seen it, what it looks like, if they touched it, and so on. There are many acceptable answers.***

Task 8: Decide which animals to visit

Task 9: Save your work

- ***Q23: From the tour you created, can you tell what additional animals will be seen along the way (besides the ones you selected)?*** ***List three of them here and two attributes (characteristics) about each animal. The answers will vary from student to student depending on the tour route they choose to create.***

Conclusion

A great deal of planning and research goes into creating a custom tour of a zoo or any other tourist attraction. You want to make sure that the visitors get the most information and best look at the zoo.

All the animals have different characteristics and come from unique places. Identifying the animals and their characteristics on a map can make it more interesting to study them and learn more about their lifestyles.

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Worksheet 1

This handout will help you organize and keep track of your answers in the lesson. Enter the answers to your queries in the spaces below. In some cases, there will be more animals than you need. Choose one animal from each filter answer to use in your tour.

Class	Filter answers	Animal (Write one animal from each filter answer that you want to visit)	Order in tour
Reptile	***1. Iguana***	***The answers in this column will vary from student to student.***	***The answer in this column will vary from student to student.***
	2. Anaconda		
	3. Snapping turtle		
	4. Rattlesnake		
	5. Crocodile		
Bird	***1. Flamingo***		
	2. Penguin		
	3. Eagle		
	4. Ostrich		
Animals that live in the Scrubland	***1. Kangaroo***		
	2. Koala		
	3. Tasmanian devil		
Mammals that live in the Tundra	***1. Polar bear***		
	2. Wolf		
Mammals that live in the Savanna and are endangered	***1. Zebra***		
	2. Elephant		
You need stop for lunch at the restaurant			
You need to stop at the gift shop			

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