

Module 2, Lesson 2

Touring a zoo

The animal kingdom is quite large, with thousands of animal species identified around the world and more being discovered all the time. To make sense of all these species, scientists typically classify animals based on their physical characteristics. They start with a general classification and then get more detailed until they end up with a scientific name for the animal. For example, in the Linnaeus classification, the scientific name for a brown bear is *Ursus arctos*. This means that it has a backbone, is a mammal and a carnivore, and is part of the bear family.

Usually, it is easier to use common names to identify animals. In addition to their physical features, animals have many other characteristics: What country or area do they come from? What habitat do they live in? What kind of food do they like to eat?

For this lesson, the new zoo that has opened in your community needs your mapping expertise again. The zookeepers are so pleased with the map you made that they would like you to create a custom visitors tour. Sometimes, visiting a zoo can feel overwhelming because there is so much to see. In the last lesson, you used the animals' class (whether they were mammals, reptiles, or birds) to tell them apart. You will now explore some of the other information you have about the animals.

The zookeepers would like you to make sure visitors see a wide range of animals from different habitats and different classes. Here is a list of animal characteristics that the zoo would like you to include in your tour:

- One reptile
- One bird
- One animal that lives in the scrubland
- One mammal that lives in the tundra
- One mammal that lives in the savanna and is endangered

The tour also requires that you stop for lunch at the restaurant and make time to buy some souvenirs in the gift shop.

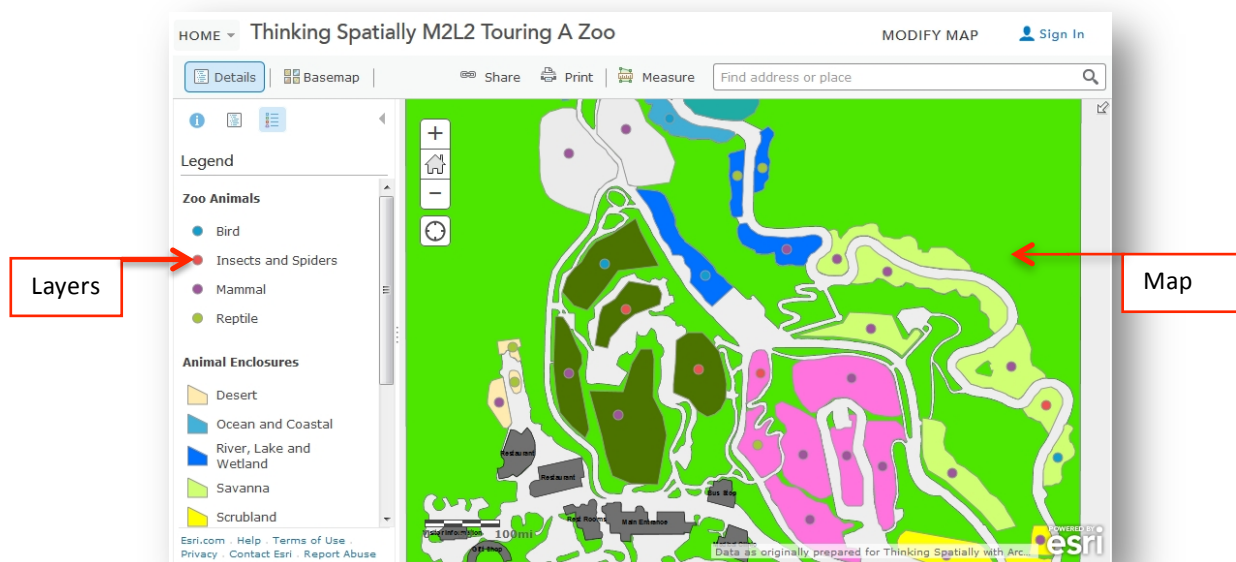
Let's get started on your tour map!

Task 1: Open the map

1. If you do **not** intend to save your work:
 - a) Launch an Internet browser.
 - b) Go to this link:
<http://arcg.is/1K6fA5L>
 - c) Skip Step 2 and proceed with the lesson.

2. If you wish to save in a Public or Organization account, go to <http://esriurl.com/SaveAGO> and follow the directions.

A map of a zoo will be on your screen with other background information. It looks like the map you created in the previous activity. On the left side of the map, you see a list of layers. Layers are used to show geographic data on a GIS map. Each layer has a name and a legend. You can turn each layer on and off. At the top of the map, you see buttons and tools that you will use during this activity.



3. Look at the ArcGIS Online map window and observe the following:
 - On the right side you see a map.
 - On the left side you see a column that displays the legend for the map.
 - In the top right corner you will see a “Modify Map” link.
4. Click on the Modify Map link.
5. Look at the top of the ArcGIS Online map window and notice the different buttons. You will see some of these buttons as you progress through this lesson.



Task 2: Enlarge the ArcGIS Online window

If the ArcGIS Online Map Viewer window is small when the map document first opens, you may wish to enlarge it.

6. In the upper right corner (PC) or upper left corner (Mac) of your ArcGIS Online window there are three buttons. Click the middle button (PC) or the right green button (Mac).

PC



Mac



Now the ArcGIS Online map window fills your whole screen.

You can also change the size of your ArcGIS Online window by stretching it. Stretching the window instead of maximizing it allows you to organize other windows and dialog boxes as they appear.

Task 3: Snakes and lizards

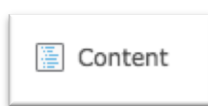
Reptiles are cold-blooded animals with scaly skin. Their skin helps keep their bodies from drying out in the heat. They sit in the sun to get warm and then move to the shade to cool down. This class of animals lays eggs to have their babies. There are more than 6,500 species of reptiles in the world. That's a lot of reptiles!

Remember that your tour needs to include one reptile. Let's see what reptiles are at the zoo so we can choose which one to visit on our tour.

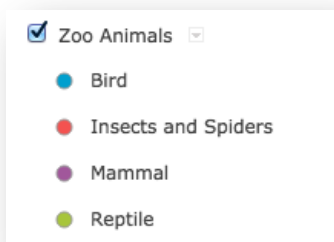
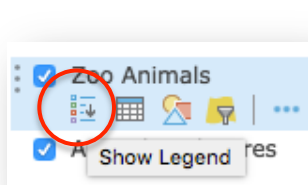
7. Click the Show Contents of Map (or Content) button.



OR



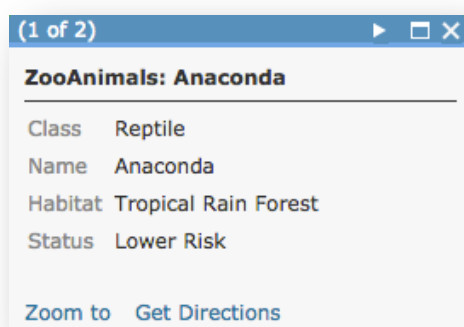
8. Click the Zoo Animals layer name to display the legend.




 **Q1: Look at the Zoo Animals legend. What is the color for reptiles?** _____

A few reptiles live at the zoo. The problem is you don't know what kind of reptiles they are. That information is stored in the attribute table.


9. Click one of the reptile symbols in the zoo.



The popup window contains information about the feature you selected. The information comes from the attribute table.

 **Q2: Write down the name of the reptile in the Filter Answers column on your worksheet (worksheet 1).**

10. Click another reptile symbol.

 **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.)**

11. Close the popup window when you are done. You should have a list of all the reptiles in the zoo on your worksheet.

 **Q4: Have you ever seen one of these reptiles in pictures or in real life? Write down the ones you have seen.**

 **Q5: Write down some things you know about one of the reptiles.**

Task 4: Birds of a feather

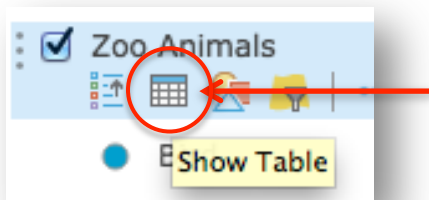
The zoo now wants visitors to see a bird. Birds are warm-blooded animals like mammals, but birds are covered in feathers. They have a backbone and a skeleton. Did you know that some of their bones are hollow to make it easier to fly? Birds lay eggs in nests, and when the babies hatch, the parents bring them food and care for them until they are old enough to fend for themselves. Of more than 8,800 known species of birds, the smallest is the hummingbird, and the largest is the ostrich.

You need to choose one bird for your tour. Do you know what kinds of birds are in the zoo? Let's find out.

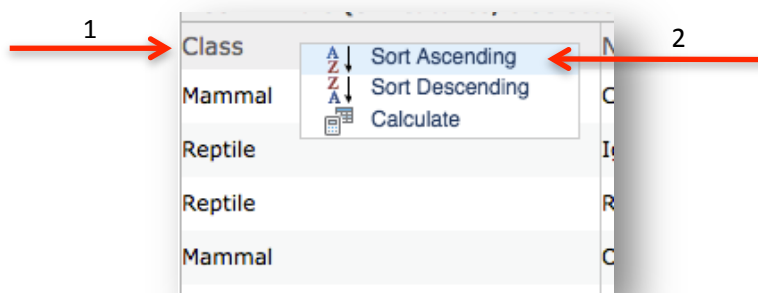
 **Q6: Look at the legend. What is the color for birds?** _____

Instead of using the Identify tool, you are going to select all the birds and then look at the attribute table to see what information you can find.

12. Click on the **Zoo Animals** layer name and click on the **Show Table** button.



13. Click on the field header **Class** and click on **Sort Ascending**.




14. Scroll down to Birds and while holding your shift key down, one at a time click on each line that has information about birds. You will see that the selected features are highlighted in blue in the table.

Zoo Animals (34 features, 4 selected)	
Class	Name
Bird	Flamingo
Bird	Ostrich
Bird	Eagle
Bird	Penguin
Insects and Spiders	Tarantula



At the top of the table window, the number of selected records is shown. (A record is a row in the table) On the map, the bird symbols now have a bright blue box around them that indicates they are selected as well as being highlighted in the table.

 **Q7:** Write the names of all the birds under the *Filter Answers* column on your worksheet.

 **Q8:** Look in the right column on your table and look in the *Status* field. Which birds are listed as *vulnerable* (facing a high risk of extinction in the wild)?

a. _____

b. _____

c. _____

 **Q9:** Have you ever seen one of these birds in pictures or in real life? Write their names here.

 **Q10:** Write down some things you know about one of the birds. _____

15. Close the attribute Table.

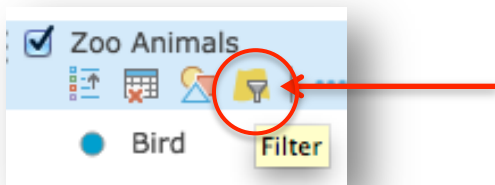
You will notice the selections on the map are cleared when the table is closed.

Task 5: Animals that live in scrubland

Scrublands have hot, dry summers and cool, moist winters. The few trees that grow there do not get very big. Although this seems like a harsh habitat, bobcats, leopards, owls, warthogs, and many other kinds of animals live in scrublands. In this zoo, several animals represent the scrubland. You need to choose one of them to add to your tour.

You have already used the Identify feature and selected features in a table. In a GIS, you can also build queries by filtering the information from the attributes you have.

16. Click on the layer name **Zoo Animals** and click on the **Filter** button.



17. Click the down arrow in the first box and click on **Habitat**.
18. Confirm that the second box has the **is** operator selected.
19. Click on the **Unique** radio button and then click on the down arrow in the third box and click on **Scrubland**.

Your Filter should look like this: **Habitat is Scrubland**

You are asking the GIS to show you all the animals that live in the scrubland.

A screenshot of the 'Filter: Zoo Animals' dialog box. The dialog has a 'Create' tab and a '+ Add another expression' button. Below the tab, it says 'Display features in the layer that match the following expression'. There are three dropdown menus: the first contains 'Habitat', the second contains 'is', and the third contains 'Scrubland'. Below these dropdowns are three radio buttons: 'Value', 'Field', and 'Unique'. The 'Unique' radio button is selected. There is also an 'Ask for values' checkbox. At the bottom of the dialog are three buttons: 'APPLY FILTER', 'APPLY FILTER AND ZOOM TO', and 'CLOSE'. Three red arrows point to the 'Habitat', 'is', and 'Scrubland' dropdowns respectively.

20. Click on **Apply Filter**.

21. Click on the **Zoo Animals** layer name and click on the **Show Table** icon.

The list of animals that live in scrubland are the only animals that show up in the table.

 **Q11: How many animals show in the table?** _____


 **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.**

a. _____

b. _____

c. _____

 **Q14: Write down some things you know about one of the animals.**

22. Close the attribute table.

Task 6: Mammals and cold climates

Mammals are animals that grow fur on their bodies and give birth to living young (they do not lay eggs). They also produce milk to feed their babies. Mammals are warm-blooded animals that regulate their body temperatures. However, that doesn't always mean they live in warm places.

Some mammals (and other animals) live in areas called the tundra. Tundra regions are found in the Arctic where temperatures drop as low as -76 degrees Fahrenheit! The summers can be quite warm, but they don't last long. Plants can still grow there, even though a layer of permafrost (ground that stays frozen all the time) covers the ground.

People are fascinated by animals that can survive in this kind of habitat. Let's find out what mammals at the zoo live in tundra regions.

23. Click on the **Zoo Animals** layer name and click on **Filter**.

24. Click the **Edit** tab to change the previous filter.

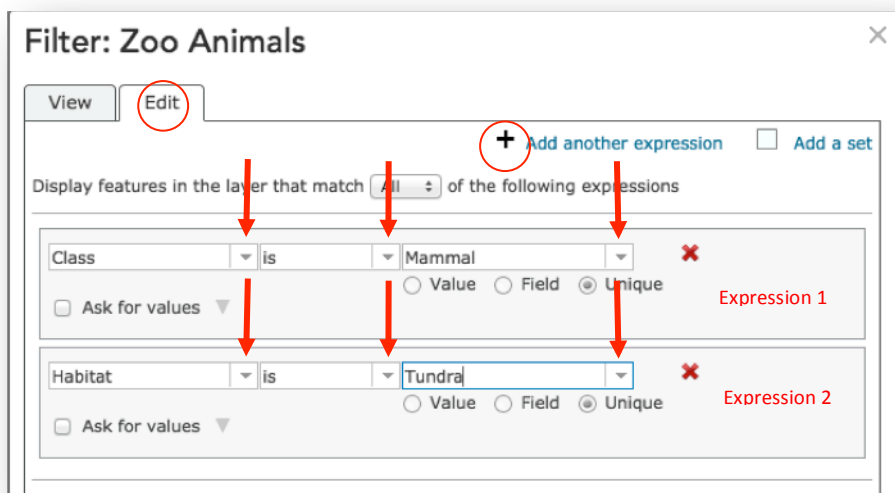
25. Click the down arrow in the first box and click on **Class**.

26. Click the down arrow in the second box and click on the word **is**.

27. Click on the **Unique** radio button and then click on the down arrow in the third box and click on **Mammal**.

28. Click on **Add another expression** at the top right of the Edit window.

29. Repeat steps 25 – 27 creating the expression **Habitat is Tundra** making sure the **Unique** radio button under the third window is clicked. Your filter should look like the screenshot.



You are asking the GIS to show you all the animals that are mammals and that live in the tundra.

30. Click **Apply Filter**.


31. Click on the **Zoo Animals** layer name and click on the **Show Table** icon.

The list of animals that meet these criteria are selected in the table.

🌐 **Q15: How many animals were selected?** _____

🌐 **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.**

 **Q18: Write down some things you know about one of the animals.**

32. Close the attribute table.

Task 7: Help save endangered species

Thousands of animal species all over the world are considered endangered. There are several different levels of endangerment. Some animals have very low populations left and are considered endangered species because they are on the verge of disappearing from the earth (becoming extinct). Other animals are considered threatened species because they may become endangered in the future.

Zoos are often home to threatened and endangered species. Zoos are a way to help preserve their existence. Visitors and researchers appreciate being able to observe and study these animals. Many endangered animals are mammals that live in the African savanna. See if you can locate those animals in the zoo because you need to choose two of them to visit during the tour.

You will now build another complex Filter.

33. Click on the **Zoo Animals** layer name and click on the **Filter** button.

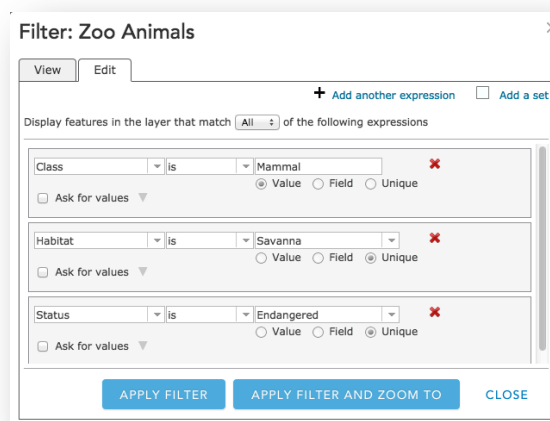
34. Click the **Edit** tab.

35. In the second filter in the third box, change Tundra to Savanna.

36. Click on **Add another expression** at the top right of the Edit window.

37. Repeat steps 35 – 36 creating the expression **Status is Endangered** making sure the **Unique** radio button under the third window is clicked.

38. Your filter should look like the image



You are asking the GIS to show you all the animals that are mammals and that live in the savanna and that are endangered. That's a pretty complicated question!

39. Click **Apply Filter**.

40. Click on the **Zoo Animals** layer and click on **Show Table**.

The list of animals that are endangered mammals that live in the savanna are shown in the table.

 **Q19: How many animals were selected?** _____

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

 **Q21: Have you ever seen one of these animals in pictures or in real life? Write their names here.**

 **Q22: Write down some things you know about one of the animals.**

41. Close the attribute table.

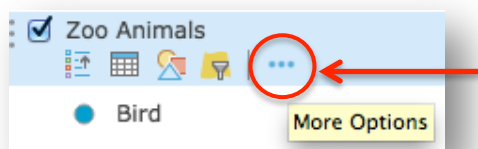
42. Click on the **Zoo Animals** layer name and click on the **Filter** button.

43. Click **Remove Filter**.

Task 8: Decide which animals to visit

Now that you have made a list of animals that meet the requirements you got from the zoo, select the animals you want to visit and in which order. Don't forget to keep lunch and shopping in mind too! Before continuing, you will label the stops.

44. Click on the **Zoo Animals** layer name and click on the ellipses (three dots). Click on **Create Labels**. This opens the **Label Features** window.

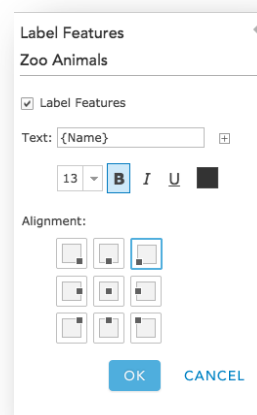


45. Make sure the **Label Features** box is checked.

46. In the **Text** field, make sure that **Name** is chosen.

47. Change the **Text** size from 13 to 10, check to be sure that B for Bold is chosen, and the Alignment is the top right corner box. (This indicates that the label will be size 10, Bold, and appear to the top right of the point.)

48. Click OK.



Now all the animals are labeled by name.

49. Get your worksheet 1 ready. Now you can decide which animals to include on your tour.

50. Look under the Filter Answers column. Choose one animal from each list and write it in the **Animal** column.

Class	Filter Answers	Animal (Write one animal from each Filter answer that you want to visit)	Order in Tour
Reptile	1. Iguana	Snapping turtle	
	2. Anaconda		
	3. Snapping turtle		
	4. Rattlesnake		
	5. Crocodile		

51. Get out the map of the zoo that you created in the first activity.


This map will look like the one on your computer screen. On the paper map you are going to draw the new tour route that visitors will take.

52. Look on the paper map and find the locations of all the animals you want to visit. These are the animals that you wrote in the Animal column on the worksheet.
53. Using the map, decide on the best order to visit the animals, stop for lunch, and shop in the gift shop. Make sure you go in a nice circle around the zoo. You don't want to cross back and forth.
54. Once you have decided the proper order, go to the Order in tour column on your worksheet 1 and write the numbers 1 to 7 next to each stop in the order that you have chosen (you want to start at the Main Entrance).
55. You could now print out a copy of your map and write those same numbers on your map in the correct locations.
56. On your paper map, draw a line that starts at the Main Entrance and joins all the points in order and ends at the Main Entrance.

Your map looks great! Now you can hand it out to visitors who request a custom tour of the zoo.

Task 9: Save your work

57. If you have logged into an ArcGIS Online Organization account, save your work into you're My Contents area now.

 **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.**

Animal	Attribute 1	Attribute 2

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. popuping the animals and their characteristics on a map can make it more interesting to study them and learn more about their lifestyles.

Module 2, Lesson 2

Touring a zoo

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			
Bird			
Animals that live in the Scrubland			
Mammals that live in the Tundra			
Mammals that live in the Savanna and are endangered			
You need stop for lunch at the restaurant			
You need to stop at the gift shop			