

Module 2, Lesson 1

Mapping a zoo

Animals are a big part of our life. Animals fascinate us, whether they live with us as pets or roam wild places on our planet. One exciting way to connect with animals from beyond our back yard is to visit the zoo. Zoological parks, or zoos, are a great way to bring people closer to animals. It is a chance for people to more deeply appreciate and understand how animals live and what they are like.

Zoos have been around for a long time. Queen Hatshepsut of Egypt had one about 3,500 years ago, and the Chinese emperor Wen Wang created a large zoo named the Garden of Intelligence about 3,000 years ago. Many leaders used zoos to show power and wealth. Zoos became popular starting about 500 years ago in the 1500s, when European explorers brought animals from the New World (the Americas) back to Europe.

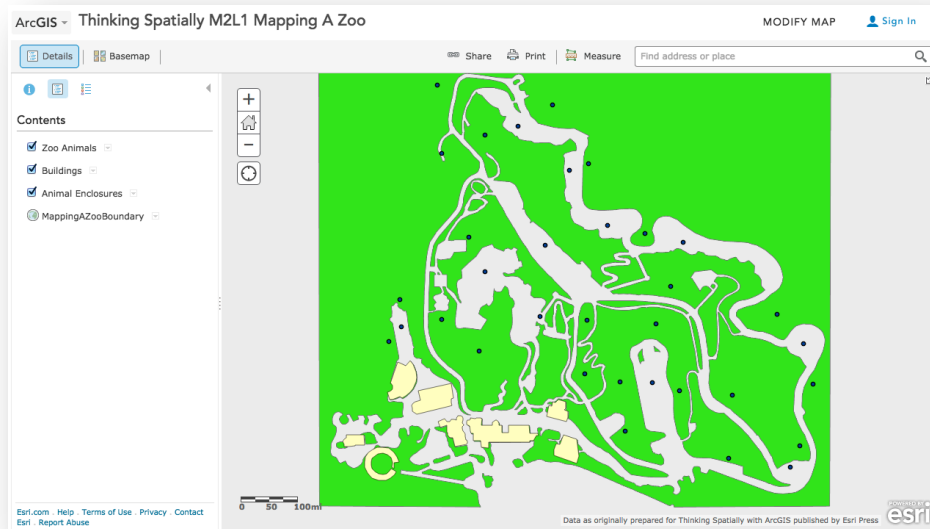
Nowadays, zoos are a place where people can see animals from all over the world. Zoos are also a place where researchers can study animals more closely so that wildlife can survive where they normally live, in their natural habitat. This is important when evaluating how to help certain animals, especially endangered species, that otherwise might not survive on their own.

For this exercise, imagine that a new zoo is being built near your home. The animal enclosures are ready, and the animals are about to move into their new homes. With opening day quickly approaching, the zoo managers realized that they forgot to prepare a map for visitors! Your job will be to create a map that identifies the kinds of animals in the zoo; shows where they live; and provides information about the visitors' center, restrooms, and other facilities.

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/1K6fuv2>
 - 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 document has been created for you to use in this exercise. When the map document opens, you see a map of a model zoo. The ArcGIS Online map title is in the top left corner of the window.



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



6. Look at the top of the ArcGIS Online map window and notice the different buttons. You will use 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.

7. 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 Viewer 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.


8. Place the cursor on any corner of the ArcGIS Online window that is not at the edge of your screen. The cursor changes to a diagonal double-headed arrow. Click and drag the window outward until the ArcGIS Online window fills about two-thirds of the screen. Let go of the mouse button.

Task 3: Finding things at the zoo

First you should look at the information that is already on your map. Besides the animals themselves, there are many other features that make up a 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?**

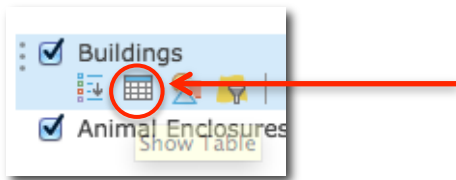
- _____
- _____
- _____

Answers to questions in this activity should be recorded on the answer sheet.

Task 4: Finding the gift shop


To help visitors find what they are looking for on the map, you should consider the kind of geographic data you can use to improve or enhance your map. Each layer has an attribute table full of information about the features in that layer. Let's take a closer look at the attribute table for the Buildings layer.

9. Click on the **Buildings** layer name and click on the **Show Table** icon that appears. The attribute table for the layer appears.




An attribute table is made up of fields (columns) and records (rows). This is where all the information about a layer is contained.


Buildings (8 features, 0 selected)		
Building		
Bus Stop		
Restaurant		
Visitor Information		
Gift Shop		
Restaurant		

 **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

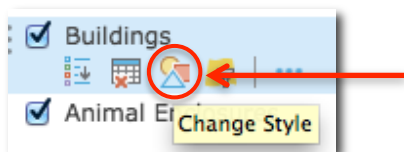
 **Q5: Look under the Building field. Write down the name of two buildings that are listed in the attribute table.**

- a. _____
- b. _____

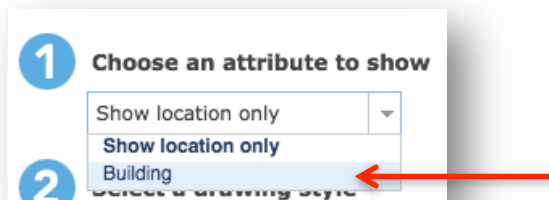
10. Close the table for the **Buildings** layer by clicking on the X in the top right corner.

Now you can use the information you found in the attribute table to add more details to your map.

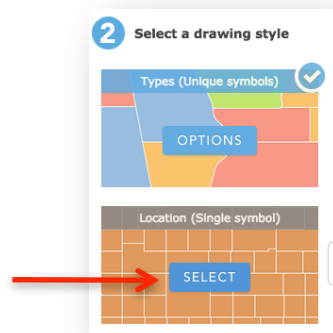
11. Click on the **Buildings** layer name and click on the **Change Style** icon that appears.



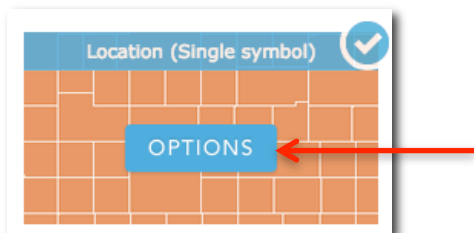
12. Change **Choose an attribute to show** to **Building**.



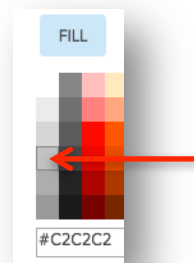
13. Click the **Select** button on the **Location (Single symbol)** box.



14. Click the Options button to enter the Location wizard.



15. Click the **Symbols** link and choose the 30% gray color.



16. Click **OK**.

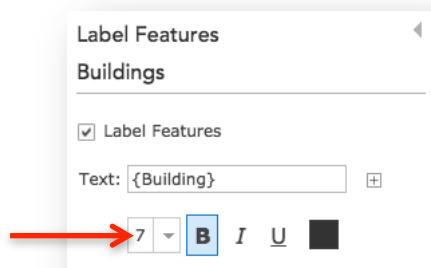
17. Click **OK** once again and click **Done**.

Now the buildings are all colored gray. But you still don't know which building is which. You need to add some labels.

18. Click on the **Buildings** layer name and click the ellipses (three dots) to the right of the Buildings layer and choose **Create Label**



19. Change the size to **7**.



20. Click OK.

The buildings are now labeled with their name. Visitors can find their way to the gift shop, the restrooms, and the restaurants.



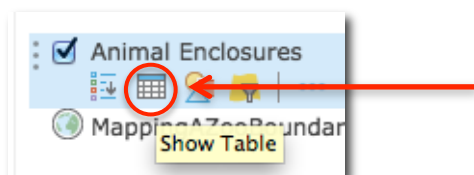
21. If you are logged in to an ArcGIS Online Organization account, now is a good time to save your work. Save your map as Mappingazoo1.

Task 5: Finding the tropical rainforest

Zoos increasingly try to build their enclosures to imitate the natural habitat of animals that live in the wild.

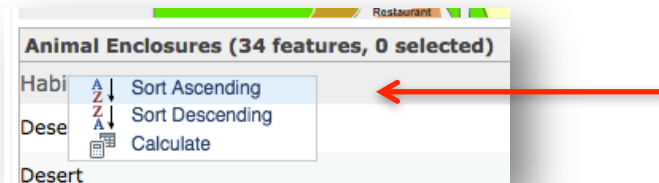
We are going to make a map so that visitors can easily find the tropical rain-forest that the zoo created and visit the animals living there. They will also be able to visit all the other types of habitats the zoo created along the way.

22. Click on the **Animal Enclosures** layer name and click on the **Show Table** button.



This attribute table contains all the information you have about the enclosures at the zoo. You can organize your table in different ways so that it is easier to read.

19. Click the field name **Habitat** and choose **Sort Ascending**. This will rearrange the habitats in alphabetical order.



 **Q6: What kind of attribute information is available in the Habitat field?**

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

1. 8
2. 6
3. 10

 **Q8: List two habitats here:**

a. _____

b. _____

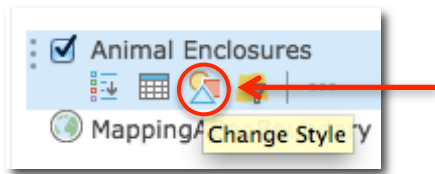
20. Close the **Animal Enclosures** table.

 **Q9: Look at your map. Can you see which enclosure represents which habitat on your map?**

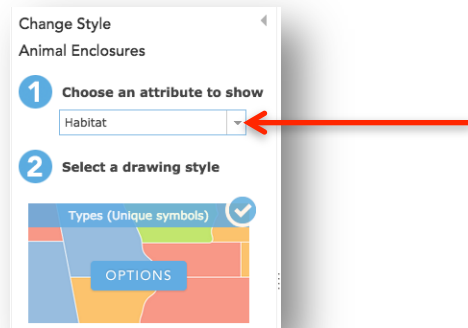
Yes or No

21. Once again, your answer is No. If the habitats were different colors, they would be a lot easier to see. Let's set up symbols for the enclosures.

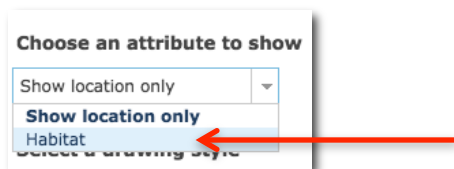
22. Click on the **Animal Enclosures** layer name and choose the **Change Style** button.



23. Change **Choose an attribute to show** to **Habitat**.



24. In the **Choose an attribute to show** pull down menu, choose **Habitat**.

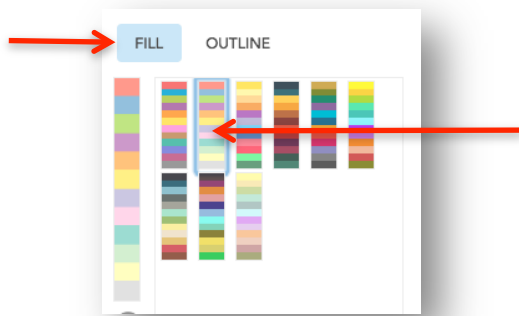


25. In the **Select a drawing style**, choose **Types (Unique symbols)** by clicking on **Options**.

26. Click on the **Change all symbols** color ramp.



27. Choose **Fill** and a pastel color ramp.



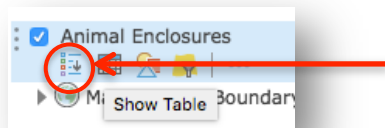
28. Click **OK** and **OK** again to save the style.

29. Click **Done**.

The drawing style assigns a different color to each enclosure based on the habitat type it represents.

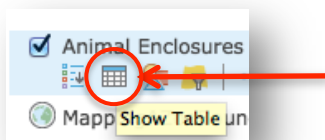
 **Q10: What happened to your map? Describe what happened in your own words.**

30. Click on the layer name **Animal Enclosures** and the Show Table icon to open the legend.



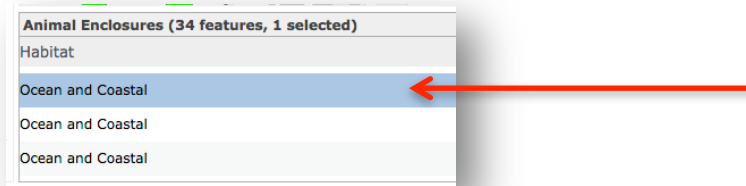
 **Q11: What color is the tropical rainforest on your map?**

31. Click on the **Animal Enclosures** layer name and click on the **Show Table** button.



32. Click on the field title **Habitat** and click on **Sort Ascending**.

33. Scroll down and click one of the rows for **Ocean and Coastal** habitat.



34. The row is highlighted in blue. The matching enclosure is outlined in blue on the map.



35. Hold the Shift key (Command key on a Mac) down and click on each Ocean and Coastal row until all three Ocean and Coastal rows are highlighted. Hint: If you can see the highlights on the map, click and drag the map down slightly.

Now you can see the relationship between the attribute table and the map. Using the attribute table, let's make your map more useful.

36. Close the **Animal Enclosures** table.

37. If you have signed into an ArcGIS Online Organization account, ask your teacher about where and how to save your work. Save your map document as Mappingazoo1.

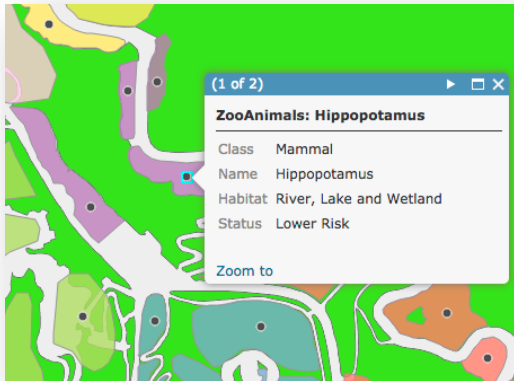
Task 6: Adding the animals.

Sometimes, a zoo groups animals together based on their appearance. Other times, they are grouped based on their collective activities. Butterflies need to be in enclosed spaces (like a butterfly

emporium) so they can't fly away. Monkeys need lots of trees and branches for swinging and climbing. Polar bears need a pool for swimming.

Your map is already full of great information, but you are still missing one key piece—the animals! Let's add them to the map.

38. Click on any animal point.



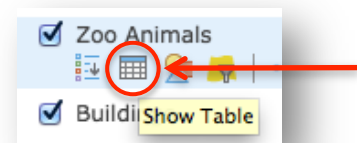
Q12: Look at the data in the popup window and complete the following table:

Class	
Name	
Habitat	
Status	

39. Close the popup window.

By clicking on the animals on the map, you will get the information for one animal at a time.

40. Click on the **Zoo Animals** layer name and choose the **Show Table** button.



This is the attribute table associated with the animals. It gives you all the information about all the features at once.

41. Click the **Name** field and choose **Sort Ascending**. This will rearrange the animals in alphabetical order.

42. Scroll down the list of animals.

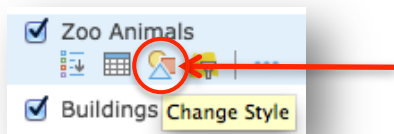
Q13: *Based on the attribute data in the table, list one way that you could classify (put into categories) the animals in the zoo.*

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.*

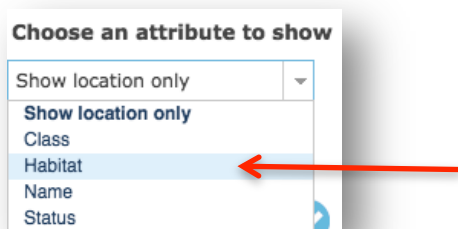
Q15: *Can you think of another way that animals can be described or classified that is not in this table?*

43. Close the attribute Table for the Zoo Animals layer.

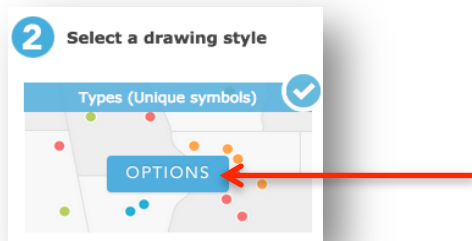
44. Hover over the Zoo Animals layer and click on the **Change Style** button.



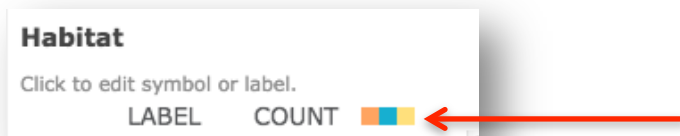
45. In the **Choose an attribute to show** pull down menu, choose **Habitat**.



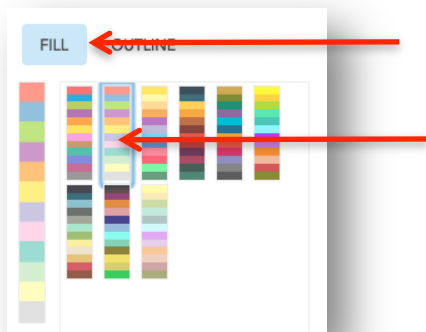
46. In the **Select a drawing style**, choose **Types (Unique symbols)** by clicking on **Options**.



47. Click on the **Change all symbols** color ramp.



48. Choose **Fill** and a pastel color ramp.



49. Click **OK** and **OK** again to save the style.

50. Click **Done**.

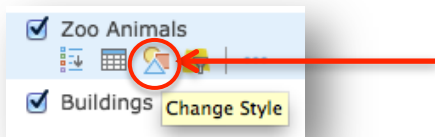
Now the animals are classified using habitat type. This is the same way the enclosures are classified. Does this give a visitor much extra information? Not really.

For example, look at the savanna habitat area. What information are you showing about the animals that live in that area? Only that they live in the savanna.

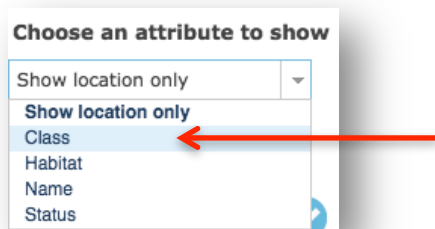
Let's try mapping the animals using different information. You can use the Class field so that visitors

can see which animals are mammals, reptiles, birds, or insects.

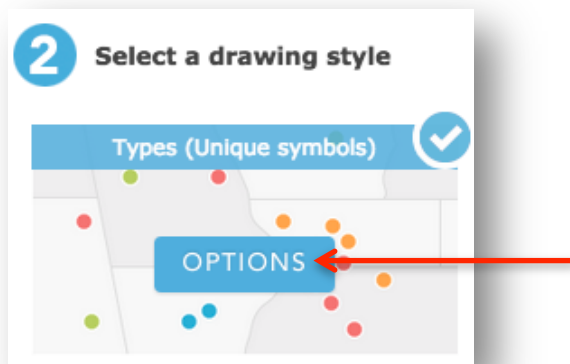
51. Click on the **Zoo Animals** layer name and choose the **Change Style** button.



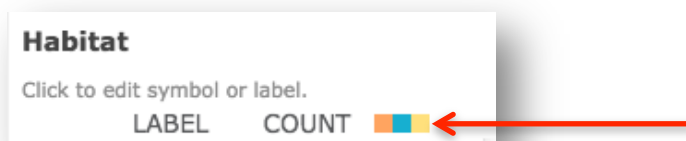
52. In the **Choose an attribute to show** pull down menu, choose **Class**.



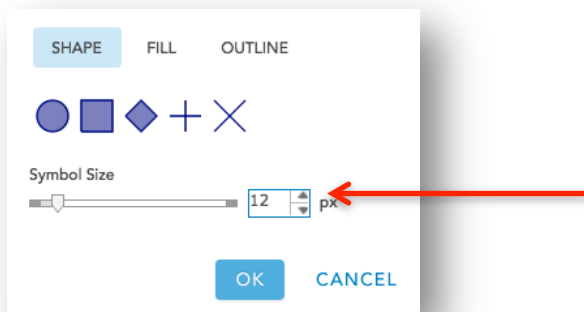
53. In the **Select a drawing style**, choose **Types (Unique symbols)** by clicking on **Options**.



54. Click on the **Change all symbols** color ramp.



55. Click on the up arrow to change the Symbol Size to 12.

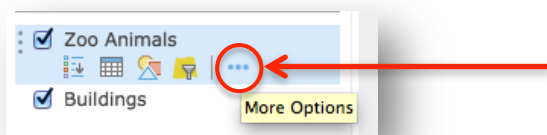


56. Accept the color choice that is made for you.

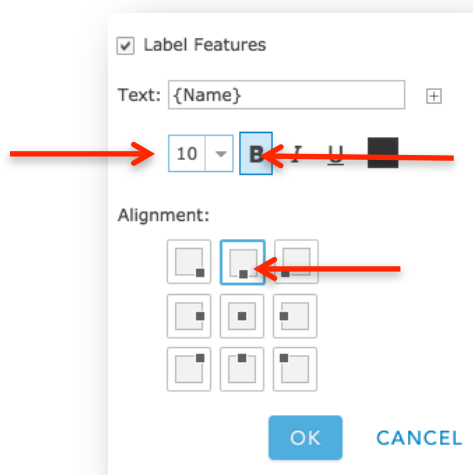
57. Click **OK**, **OK** and **Done** to accept your changes.

Finally, you need to label the animals so that visitors can see and find the location of specific animals in the zoo.

58. Click on the **Zoo Animals** layer name and click on the ellipses and click on **Create Labels**.




59. Change the size to **10** and complete the rest of the label information as indicated in the picture.



60. Click OK.

Now the animals are all labeled with their names.

 **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?**

 **Q17: Go back to step 3. Can you answer Yes to those questions now?**

a. Yes

b. No

You are ready for opening day!

Conclusion

Well done. You have now created a useful and informative map of your community's new zoo. Classifying features is not easy, and it is important to keep in mind what you are trying to show.

Visitors can use your map at a computer kiosk at the zoo entrance to plan a full day of fun at the zoo, including observing the animals, having lunch, and shopping. Looking at the map, visitors can learn a lot about the animals living in the zoo and understand how it is organized.

Zoos are constantly evolving and changing. Many animals are losing their natural habitats as the human population increases. Zoos and conservation groups around the world are using geographic information systems (GIS) to locate and monitor habitat loss. GIS is one of many tools that zoos use today to help people understand and appreciate the value of animals on our planet.