



Charting Mammal Life Spans

Life spans

Time Frame: 45-60 minutes

Grade: 2

Overview:

Different animals have different life spans. A variety of factors can contribute to these differences. In this activity, students will have the opportunity to explore one or more of these factors that may contribute to length of life. Students will practice 2-digit subtraction and create pictographs to explore these differences and communicate their learning.

This lesson is a modification of the “Charting Animal Life Spans” activity available from the Arizona Game and Fish Department’s Focus Wild Arizona education program (<http://www.azgfd.gov/focuswild>).

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Essential Questions

- What factors contribute to the survival of wildlife species?
- How can graphs be used to help people solve problems and communicate results?

Objectives

- Compare numbers and use proper vocabulary to describe their relationship.
- Put a list of 2-digit numbers in order least to greatest.
- Subtract 2-digit numbers using regrouping.
- Formulate questions about relationships between numbers.
- Create a pictograph.
- Interpret information on a pictograph.

Arizona Department of Education Standards

2nd Grade

Mathematics

- 2.NBT.5
- 2.MD.10
- 2.MP.1
- 2.MP.3
- 2.MP.4
- 2.MP.6
- 2.MP.8

Science

- S1.C1.PO1
- S1.C2.PO2
- S1.C3.PO1
- S1.C3.PO2
- S1.C3.PO3
- S1.C4.PO1
- S1.C4.PO2
- S4.C2.PO2



Materials and Resources

- *Average Life Spans of Common Arizona Mammals* (one per group)
- Sample pictograph
- Animal cards with photo and life span
- Easy-to-remove labels or stickers
- Large butcher paper (one per group)
- Markers
- Blank transparency
- Overhead projector
- *How Many Candles?* Picture book by Helen Griffith (optional)



Teacher Preparation

- Make a copy of the *Average Life Span in Years* worksheet for each student.
- Gather enough markers (or crayons or colored pencils) and paper for each group to use.
- Use the Bone Box Resource DVD (or the Focus Wild Arizona website – <http://www.azgfd.gov/focuswild>) to print out pictures of the following animals:
 - Black bear
 - Bobcat
 - Coyote
 - Jackrabbit
 - Javelina
 - Mountain lion
 - Raccoon
 - Ringtail
 - White-tailed deer
- On the front of each picture, attach a label with the name of the animal. On the back, put the life span of that animal. Use a label or sticker to cover the life span.
- Make an overhead of the sample pictograph.

Background Information:

Mammals are a group of living organisms with some common characteristics. These include the presence of hair or fur, live birth, and the production of milk. Even with these similarities, however, mammals are quite diverse. They come in different shapes and sizes. They have different diets. They even live for different lengths of time. Some rodents may survive for a year or two, while humans can live to be over 100 years old.

In this lesson, students will make estimate the life spans of some common Arizona mammals and then compare those predictions with real data. They will analyze the data using two-digit subtraction. Finally, they will create pictographs to communicate the differences in life spans.

Optional Introduction:

1. Show the students the front cover of the *How Many Candles?* book by Helen Griffith.

Read the title and ask students what they think the name means. If no one guesses that it's about birthday candles, guide them to this idea. Continue the discussion. How many candles were on their last cake? Who would have the most candles in their family?

2. Read the book aloud. Be sure to stop occasionally to discuss. What is a life span? Do short life spans contain all the same stages?
3. When the reading is finished, continue the discussion.

Procedures:

1. Divide the class into nine small groups.
2. Give each group an animal card. Ask students to estimate (and write down on their card) how long they believe their life form generally lives.
3. Have students arrange themselves in order from shortest to longest life based on their predictions. Ask students to explain their reasons. Encourage dialog and allow students to adjust their estimates.

4. Have students remove the sticker covering the actual average life span. (Explain *average* briefly only to clarify that some animals may live longer, and some may live shorter lives.) Were they correct? Demonstrate how to subtract to find how close their estimates were. Introduce the vocabulary words: *most, least, equal, more than, less than, and greatest* as appropriate. Post vocabulary on a word wall to remind students of proper terminology.
5. Have the students line up in order again, this time using the average life spans.
6. As a group, find out the range of the life spans by subtracting the shortest from the longest.
7. Hold a brief discussion of why some animals live longer than others. Ask students to generate ideas. Perhaps, for example, they believe that body size affects life span.
8. Hand out the *Average Life Spans of Common Arizona Mammals* chart to each group. Have students examine it. Does the new information support any of the ideas they generated? Why or why not?
9. Have students formulate new questions based on the data. Possible questions include "Why do two different rabbits, the cottontail and the jack rabbit, have such different life spans?" or "Do closely related animals, such as raccoons and ringtails, bobcats and mountain lions, or coyotes and foxes, have similar life spans?"
10. Have each group choose one of the questions. Selected questions should involve the comparison of at least two animals. You may also require students to use the animal that they were provided in the beginning of the lesson.
11. Place the sample pictograph on the overhead. Review how to read pictographs.

Ask some comprehension questions. Which animal has the greatest life span? Which animal lives the least number of years? Which animals have equal life spans? If students do not have a basic understanding of pictographs, review the supplemental activity provided with this lesson.

12. Groups should develop a pictograph that looks at their chosen question. Charts **MUST** use correct terminology! Groups are to prepare the pictograph, but individuals are responsible for being able to answer any of the following questions about the relationships between the life spans:
 - a. What animal has the greatest life span?
 - b. What animal lives the least years?
 - c. Do any of the animals have equal life spans?
 - d. How much is one animal's life span more than or less than another's?
13. Allow group time for planning and creating the pictograph.
14. Once each group has completed their graphs, have them share. Teacher interviews groups and individuals to check for understanding.
15. Students can check each other's work by exchanging charts and calculating the differences.
16. Individual students should write a short reflection. Potential topics include:
 - a. What they understand or are unsure of about life spans.
 - b. Questions they still have about 2-digit subtraction
 - c. What they liked about creating pictographs? What other uses pictographs might have?

Differentiated Instruction:*Extensions:*

- Use the *Average Life Spans in Years* chart to have students compare mammals with other types of wildlife and plants. Have students create a new pictograph.
- Have students think about their own life. They should be able to come up with something that can be represented by a pictograph and make the graph.
- Provide fact sheets about the various animals. Have students read and compare to see if there are other factors, such as diet or habitat, which may contribute to life span.
- Require students to convert their pictograph into both horizontal and vertical bar graphs.

Modifications:

- Do not introduce the *Average Life Spans of Common Arizona Mammals* chart. Have students make pictographs using only information from the original nine animals.
- Create a class pictograph instead of individual group ones.

**Reflection:**

Use the space below to reflect on the success of the lesson. What worked? What didn't? What changes would you make? These notes can be used to help the next time you teach the lesson. In addition, the Department would appreciate any feedback. Please send your comments to focuswild@azgfd.gov. We'd love to see student samples of the pictographs, as well!

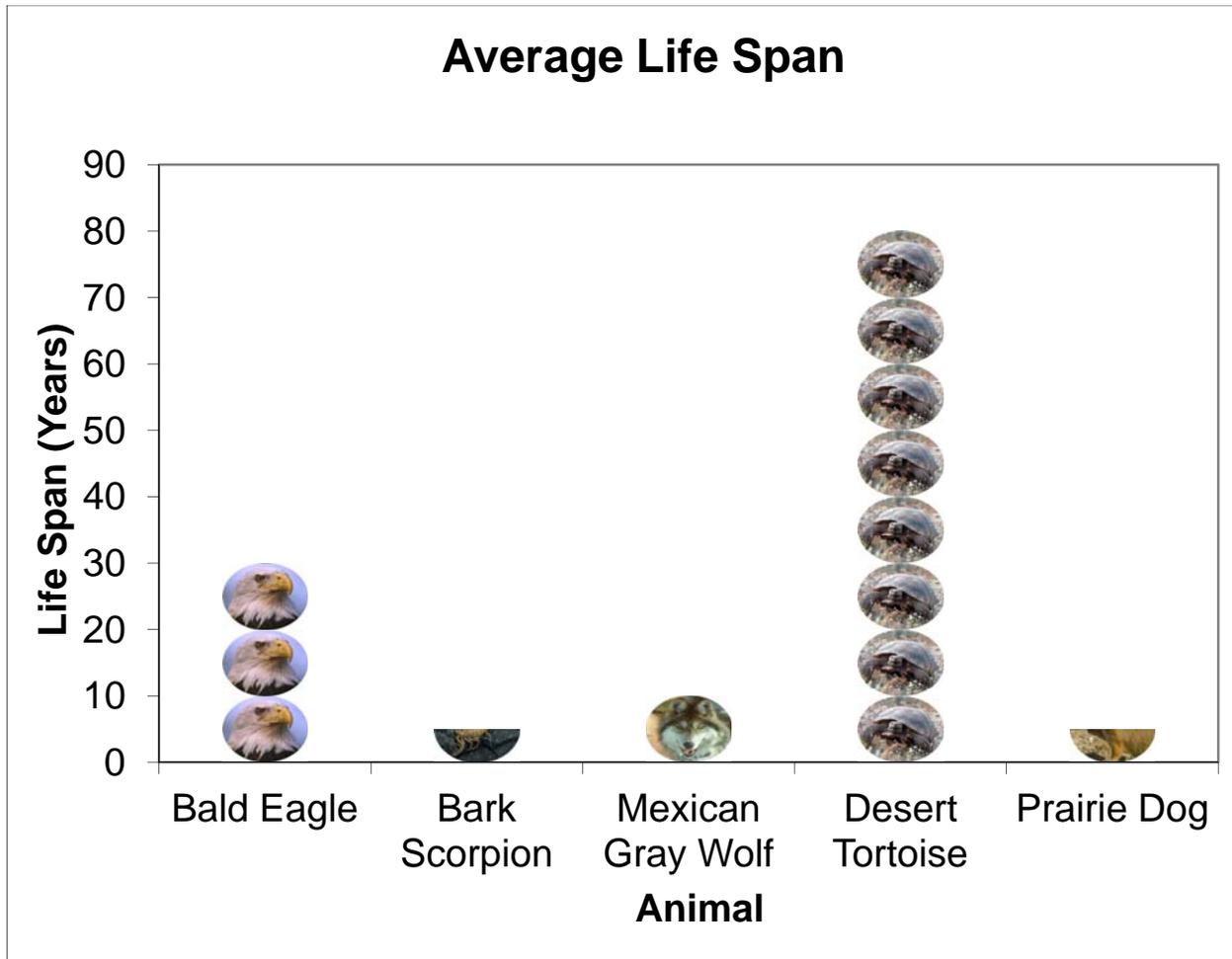
Average Life Spans of Common Arizona Mammals



Mammal	Life Span in the Wild (Years)	Life Span in Captivity (Years)
Mountain lion	10-15	18
Elk	15	26
White-tailed deer	8	Up to 17
Black bear	18	36
Desert bighorn sheep	10-12	24
Pronghorn	10	11
Javelina	7-13	21
Coyote	14	21
Kit fox	20	
Coati	12-15	17
Ringtail	16	
Raccoon	20	
Bobcat	32	
Bats	5-30	
Jackrabbit	13	
Cottontail	1-2	
Striped skunk	6	10
Pocket gopher	4-5	
Packrat	2-3	7
Kangaroo rat	9	
Shrew	1.5	

From Pinau Merlin's article "Longevity – The Long and Short of It," in the May/June 2005 issue of *Arizona Wildlife Views*

Sample Pictograph



Data for the pictograph was provided by the Phoenix Zoo (<http://www.phoenixzoo.org>) and the Arizona-Sonora Desert Museum (<http://www.desertmuseum.org>). Pictures were provided by the Arizona Game and Fish Department and the Arizona-Sonora Desert Museum.



Introductory Pictograph Lesson

Consider using this sample activity if your students need a more detailed introduction into pictographs prior to teaching the “Charting Animal Life Spans” lesson.

1. On the board, write down the following food types: pizza, hot dog, spaghetti, and fish. Leave some space beneath each one.
2. Inform the students that the class is going to have a vote. We want to know which food item is liked by the greatest number of people. Each person is going to get the opportunity to vote for one of the four foods on the board.
3. One at a time, call out the food and ask the students to raise their hand. Count the number of hands and write this number under the name.
4. When all students have voted, ask the class which food had the most votes. Which had the least?
5. Describe the purpose of graphing. Sometimes scientists use graphs and pictures to better understand numbers.
6. Ask the students to decide on an easy to draw picture that could be used to represent each of the items. Have a volunteer draw these pictures. Explain that each of these pictures will represent the number of students that voted for that food. Each picture may represent more than one person. Decide on how many students each picture will represent. Two would be a very good number. Ask the students what we would draw if there were only one person. If they do not come up with it on their own, guide them to the idea that we would draw half of the picture.
7. As a class, make a pictograph using the data and the pictures. Draw the x- and y-axes explaining that the food goes on the bottom while the numbers go on the side. Have a student draw the pictures while the other students count the number of pictures that are necessary.
8. When the all the food items have been drawn, discuss the pictograph. Which food had the most votes? Which had the least? Are these the same as we said before? What is the purpose of a pictograph?
9. Divide the class into groups of four students.
10. Explain that they will now have to make a new pictograph in their groups.
11. Pass out a bag of M & Ms to each group. Instruct them to make a pictograph showing the number of candies for each color.
12. Before beginning, brainstorm ways to complete this assignment. Make sure they are aware that they need to group the candies by color first.
13. Give the groups time to work on their pictographs. As they work, move around the room and talk to the groups. Ask them questions to make sure they understand how to interpret these graphs.



Relevant Picture Books

Although not required, it is recommended that students be introduced to the idea of life span by using a picture book. Below is a list of suggested titles along with a brief description. The first book is highly recommended and was used in the suggested procedures.

How Many Candles? by Helen Griffith

- A dog wishes to surprise his master with a cake for his tenth birthday. He is aware that this is seventy in dog years. He has several encounters with different animals, including a turtle that believes it is such a short time to a swarm of gnats that claim that nothing can live that long.

Helen the Fish by Virginia Kroll

- After a long life of three years, a goldfish dies. The child is made to understand that death is part of life and that life continues. Eventually, the child gets a fish for her friend.

Winter Fox by Jennifer Brutschy

- A little girl loses her bunny to a hungry fox. When she goes out with her father to hunt the fox, she realizes how thin and alone the fox is and asks her father not to kill it.

Gray Fox by Jonathan London

- This book follows the life of a fox from a young pup to his eventual death on the highway. Then, his own children grow up and go out into the world.

Tracks in the Sand by Loreen Leedy

- This book introduces children to the life cycle of sea turtles, from mating to egg develop and hatching.

Do you have other ideas for some related picture books? Send your suggestions to focuswild@azgfd.gov. We'll try to incorporate them into future versions of this lesson.