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Word Problems: Length & Time

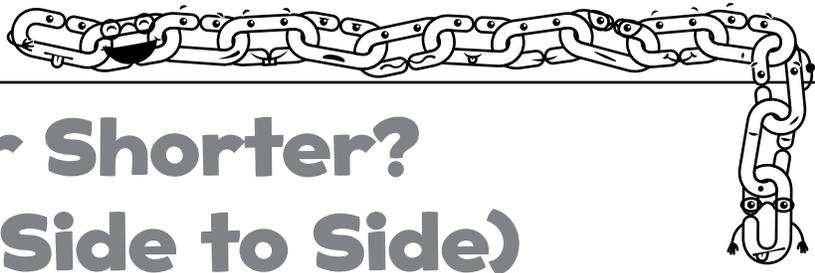
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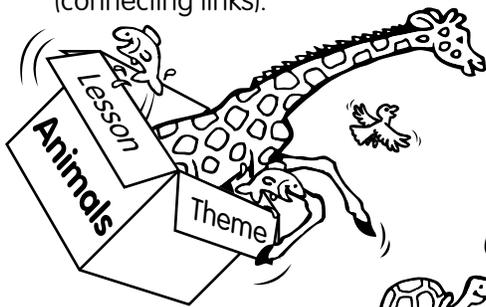
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Longer or Shorter? (Measuring Side to Side)

Content Goals

- Students will describe the measurable attribute of length using nonstandard units of measurement (connecting links).
- Students will compare and describe the length of two objects using nonstandard units of measurement (connecting links).



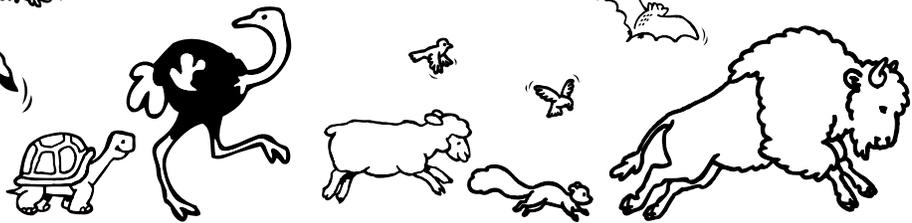
Manipulatives

- connecting links magnetic manipulatives (*teacher only*)
- connecting links (*15 links per student*)

Materials

- copy of *Animal Cards* (page 27)
- copies of the *Learning About Length Activity Board* (page 28)
- copies of the *More Measuring* sheet (page 29)
- copies of the *Too Many Tails!* activity sheet (page 30)
- copies of the *Runaway Dogs!* assessment (page 31)

Let's Talk!



Step 1: Before beginning the lesson, print and cut out the *Animal Cards* (page 27). Have students sit in a circle. Get them talking about animals. Tell them your favorite animal. Give reasons why that animal is your favorite. Then go around the circle and have students say what their favorite animal is and give one reason why it is their favorite.

Step 2: Hold up the "mouse" card for students to see. Ask students, "What kind of animal is this?" Then hold up the "cat" card. Again, ask them what kind of animal it is. Next say, "Let's compare these two animals. How are they alike? How are they different?" Guide students as needed with questions, such as: Which one has fur? Which one has a tail? Which one squeaks? Which one meows? Which one is smaller? Which one is bigger?

Step 3: Hold up the "cat" and "crocodile" cards. Ask students "Which animal is big? Which animal is small?" Hold up the "elephant" and "crocodile" cards. Ask, "Which is the bigger animal: an elephant or a crocodile?"

Step 4: Place all four animal cards on the ground. Stand up and stretch out one of your arms (horizontal to the ground). Tell students, "Look at my arm. It goes from my shoulder to my wrist. That is how long it is. That is the *length* of my arm. Do you think your arm is longer or shorter than mine? How do you know?"

Step 5: Place the four animal cards on the floor. Say, "Let's place these animals in order from shortest to longest." Work as a class to put the animals in order (mouse, cat, crocodile, elephant). Ask students the essential question. Write it on the board. Tell the class they are going to be learning how to measure the lengths of different objects.

Essential Question

Why do we measure things?

Rules Reminder

Remind students that they must follow the rules when working with manipulatives. Read the rules aloud before distributing the manipulatives. (See page 155.)





All Together Now!

Note: Before beginning the lesson, adhere the adhesive magnets to a chain of 5 links and a chain of 10 links. You will need one magnet on the first and last link in each chain.

Step 1: Distribute copies of the *Learning About Length Activity Board* (page 28) to students. Give each student 15 unchained links. Have them place the links above their activity boards. Tell students not to touch them again until you tell them to.

Step 2: Tell students to count out 5 links and show them how to hook them together. Have them place the chain of 5 links on their activity board. Ask students, "How many links do you have left above your boards? Count them!" (10) Have students make a chain out of the remaining 10 links. Tell students to place both chains above their boards.

Step 3: Re-create the *Learning About Length Activity Board* on the classroom board. To help you create the correct length of the lines, see the chart below.

1st line = 2 links	2nd line = 5 links	3rd line = 2 links	4th line = 3 links	5th line = $\frac{1}{2}$ link	6th line = 1 link
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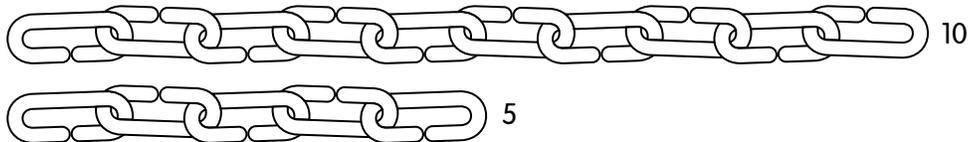
Tell students to look at the first two lines on the activity board. Point to them on the classroom board. Ask, "Which line is longer?" (*bottom*) Say, "But how do we know for sure that this bottom line is the longer line? What can we do to make sure we are correct?" Explain that we can measure the two lines to be sure that we know which one really is the longer line.

Step 4: Talk about measuring with students. Ask, "How do we measure how heavy something is? What tool do we use?" Talk briefly about how we use scales to measure weight. Next, ask, "How do we measure temperature? How do we tell if something, such as the weather, is hot or cold?" Talk briefly about thermometers. Then ask, "How do we tell what time it is? What tool helps us know what time to go to school?" Talk briefly about how clocks and watches help us keep track of time. Lastly, ask students, "What if I want to know how long an object is? What tool could I use to measure its length?" Talk about rulers and measuring tape. You may wish to pass these items (ruler and/or measuring tape) around the classroom for students to explore.

Step 5: Explain to students that you can also measure length using "nonstandard units." Nonstandard units can be things like pencils and paper clips, or hands and feet. Tell students that they will be learning how to measure and compare objects by using the connecting links.

Step 6: Use the magnets to place the 5-link chain and the 10-link chain on the board horizontally, with the 10-link chain on the top. Ask, "Which chain is longer?" Students may say the top one because it looks longer. Ask students, "But how do we know for sure?" Direct students toward the idea of counting the links.

Step 7: Count out loud the number of links in the top chain. Write 10 on the board. Then count out loud the number of links in the bottom chain. Write 5 on the board. Ask students, "Which number is the greater number?" (10) Say, "10 is greater than 5. So, we know that this chain (the top chain) is longer than this chain (the bottom chain) because it has more links."

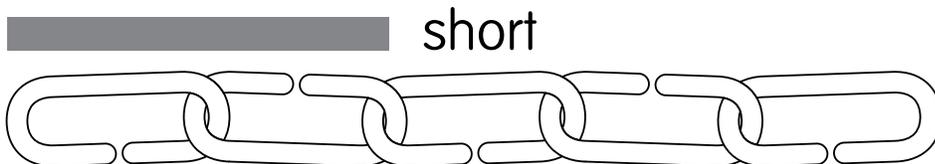




All Together Now! (cont.)

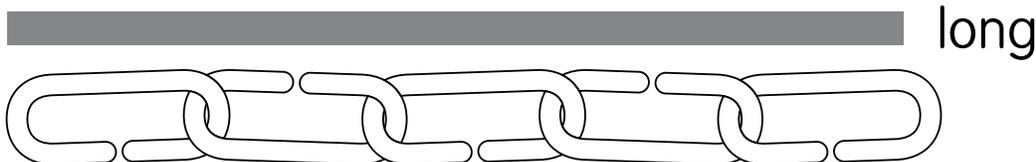
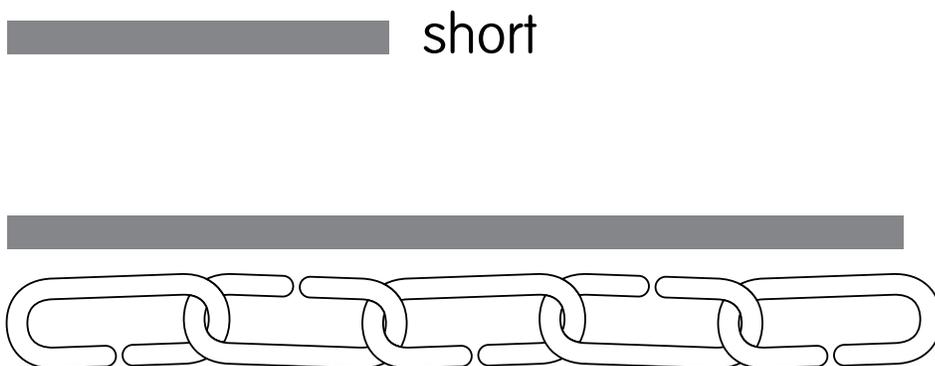
Step 8: Remove the chains from the board. Hold up the 5-link chain. Tell students, “We are going to use this chain of 5 connecting links to measure the lines on our activity boards.” Have students place the 5-link chain below the “short” line at the top of their activity boards. Do the same on the classroom board using the magnetic chain.

Step 9: Show students how to line up the first link as close as they can with the start of the line. Instruct them to straighten out the chain by pulling on the first and last link at the same time.



Step 10: Ask students, “How long is this line? How many links?” Explain to students that the line is about 2 links long. It is about the same length as 2 links in the chain.

Step 11: Ask students, “Let’s use the same chain to measure the line below. Let’s see how many links long that line is.” Have students move the chain below the “long” bottom line. Again, instruct them to line up the first link as close as they can to the start of the line and to straighten out the chain by pulling on the first and last link at the same time. Demonstrate this on the board using the magnetic chain.



Step 12: Ask students, “How long is this line? How many links?” Count each link out loud. (5) Say, “This line is about 5 links long. The line above it is about 2 links long. Now we can compare the lines. We can say the top line is a short line. The bottom line is a long line. Or we can say that the top line is *shorter than* the bottom line. We can also say the bottom line is *longer than* the top line. We know this is true because we measured both lines with our connecting links.”

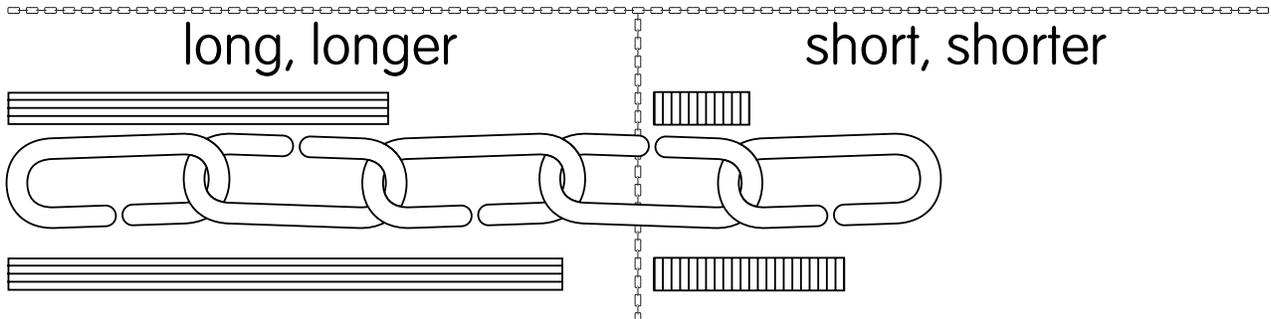
Step 13: Say, “Let’s measure some more lines.” Direct students’ attention to the section in the bottom-left corner of the activity board. Say, “Look at these two lines. One is long, but the other is longer. Which one do you think is the longer line?” Students will most likely suggest the bottom one. Say, “Let’s make sure by using our connecting links to measure each line.”





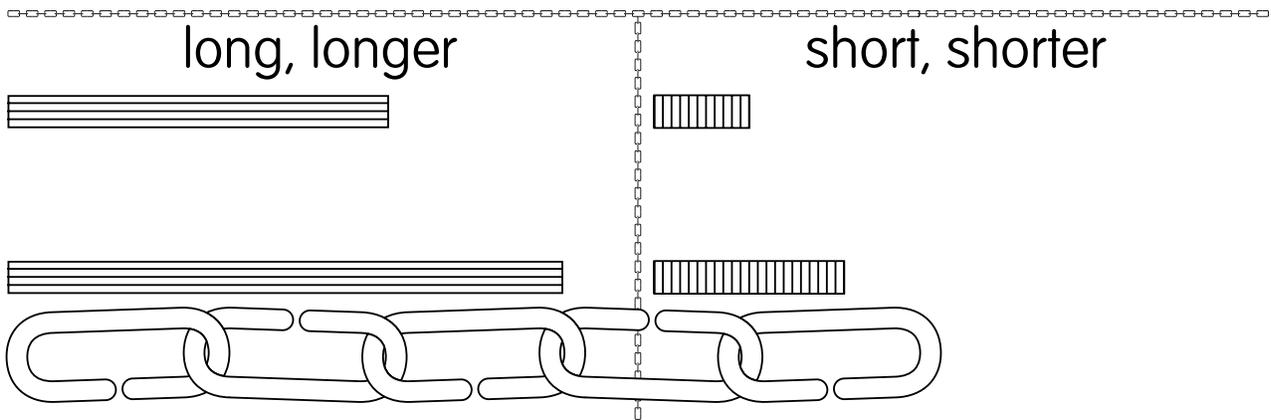
All Together Now! (cont.)

Step 14: Have students place the 5-link chain below the top line. Remind them to line up the first link as close as they can with the start of the line and to straighten out the chain by pulling on the first and last link at the same time. Do the same on the board using the magnetic chain.



Step 15: Ask students, "How long is this line? How many links?" Count out loud each link. (2) Say, "This line is about 2 links long. Now let's measure the line below it."

Step 16: Have students move the chain below the bottom line. Do the same on the board using the magnetic chain. Ask, "What do we need to do to the chain before we count the links?" Remind students about lining up the first link as close as they can to the start of the line and straightening the chain by pulling on the first and last link at the same time.



Step 17: Ask students, "How long is this line? How many links?" Count out loud each link. (3) Say, "This line is about 3 links long. The line above is 2 links long. So, which line is longer? How do we know?" (The bottom line because it is 1 link longer than the top line.) We can say the top line is *long* but the bottom line is *longer*.

Step 18: Direct students' attention to the section in the bottom-right corner of the activity board. Ask, "Look at these two lines. Would you say these lines are long or short?" Students should suggest that the lines are short, especially when compared to the other lines they have already measured on the board.

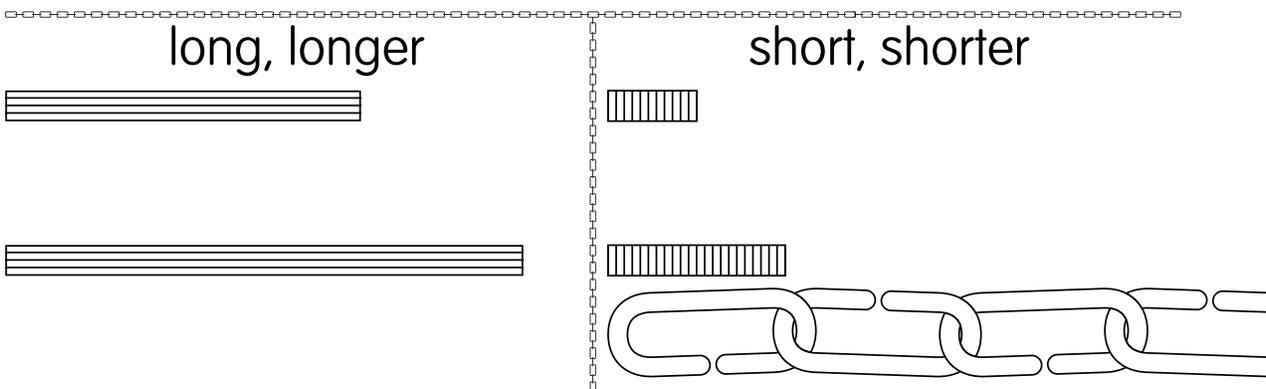
Step 19: Say, "Let's measure these lines to find their lengths. We'll start with the bottom one. What should we do first?" Students should suggest lining up the first link as close as they can with the start of the line and straightening the chain by pulling it.



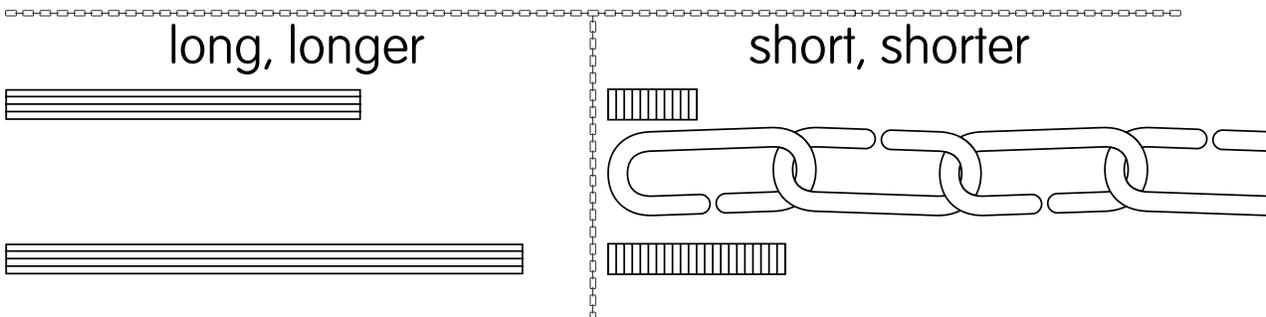


All Together Now! (cont.)

Step 20: Using the magnetic chain on the board, line it up below the bottom line. Ask students, "How many links long is this line?" *(about 1 link long)*



Step 21: Have students move the chain up to measure the line above. Remind them to line it up and pull the chain straight. Do the same on the board using the magnetic chain. Ask students, "What is the length of this line?" Explain to students that this line is *less than*, or *shorter than*, 1 link. It is not even 1 link long. It is about half of 1 link.



Step 22: Ask students, "What can we say about these two lines?" *(The top line is shorter than the bottom line. The bottom line is longer than the top line. The bottom line is short. The top line is shorter.)* Discuss as a class the different ways to compare and describe the lines.

Step 23: Say, "Let's measure something longer than all these lines. Let's measure the length of your activity board. Line up your chain at the bottom of your board. How long is your board?" Students should note that the chain is not long enough to measure the activity board. Ask, "Do we have a longer chain that we could use to measure our activity boards?" Have students place the 5-link chain above their boards and line up the 10-link chain at the bottom of the board. Remind them to pull it tight.

Step 24: Ask, "About how long is your activity board?" Students should say "About 8 links long."

Name: _____

Learning About Length Activity Board

_____ short

_____ long

long, longer short, shorter





Teamwork Time!

Step 1: Review the *Working as a Team* rules (page 156) with students. Place students in small groups. Teams will need one set of chains (one 5-link chain and one 10-link chain) and one copy of the *More Measuring* sheet (page 29).

Step 2: Tell students, "I want you to work with your team to measure the length of the line of animals at the top of the sheet. How many links long is it?" Allow teams some time to measure the line of animals. Call on a group to give the answer and explain how they measured it. (*about 7 links long*) Ask them which chain they used: the 5-link chain or the 10-link chain. Why?

Step 3: Tell students, "Now I want you to work with your team to measure the length of the bird from one wing tip to the other wing tip." Allow teams some time to measure the bird. Call on a group to give the answer (*about 4 links long*) and explain how they measured it. Ask them which chain they used: the 5-link chain or the 10-link chain. Why?

Step 4: Students may complete the following task outside on the playground or inside the classroom. Tell students you would like them to walk around with their teammates and find and collect objects that are *less than* 1 link long, about 4 links long, about 8 links long, and *more than* 10 links long. Have them check off the boxes at the bottom of the *More Measuring* sheet as they find the objects. When teams have gathered their objects, have them share them with the class.



You Can Do It!

Step 1: Distribute copies of the *Too Many Tails!* activity sheet (page 30) to students. Tell students they will need to use their connecting link chains to help them find the length of each animal's tail. Have students complete the activity sheet independently.

Step 2: When students have finished, go over the answers as a class. Ask students if they had any trouble using their connecting link chains. Ask if they used the long chain or the short chain. Why?



Show What You Know!

Distribute copies of the *Runaway Dogs!* assessment (page 31) to students. Tell students they will not be using their links with this sheet. They will be cutting out the chain on the bottom of the sheet and will use that to measure. Explain that they will still need to line up the links carefully, but they will not have to pull them to straighten them out. Read the directions aloud for students.



Put It in Words!

Read the prompt aloud.

Pretend you have a pet mouse. You want to make your mouse a bed out of a tissue box. But you are not sure if the bed will be long enough. What can you do to make sure the bed is longer than the mouse?

Have a class discussion on measuring length. Talk about how you would need to measure the length of the mouse and then the length of the tissue box. You would need to make sure the length of the bed is *longer than* the length of the mouse. Write the following sentences on the board. Have students copy them in the math journals included in the student workbooks.

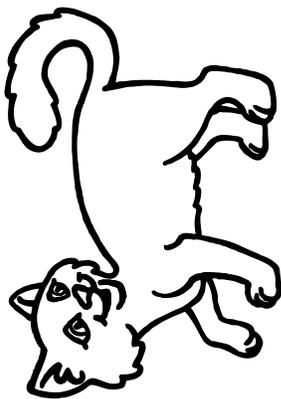
I can measure length.

I measure from one end to the other.

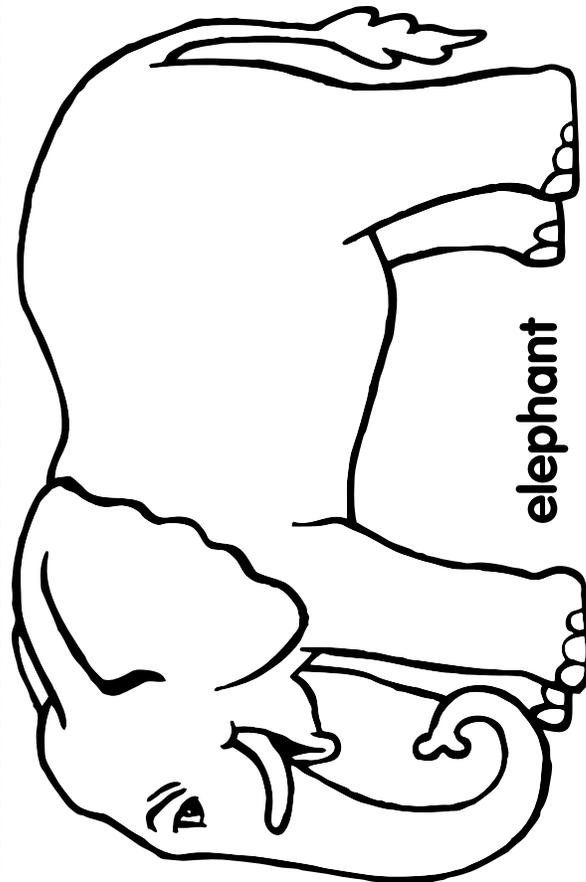
I can count the links.



Animal Cards



cat



elephant

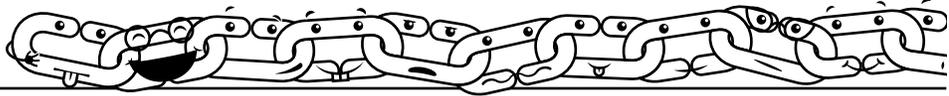


mouse



crocodile





Name: _____

Learning About Length Activity Board

 short

 long

long, longer

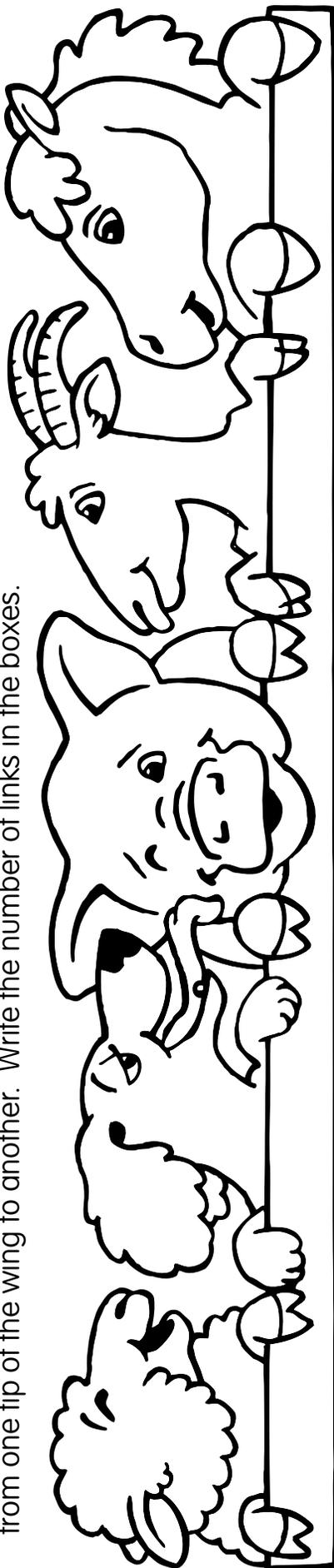
short, shorter



Name: _____

More Measuring

Directions: Use your chains to measure the line of animals from beginning to end. Then measure the length of the bird from one tip of the wing to another. Write the number of links in the boxes.



animals

bird



Directions: Find objects that are about the same number of links listed below. When you find an object, put a check mark in the box. Then place the item on your desk or draw a picture of it on the back of this sheet.

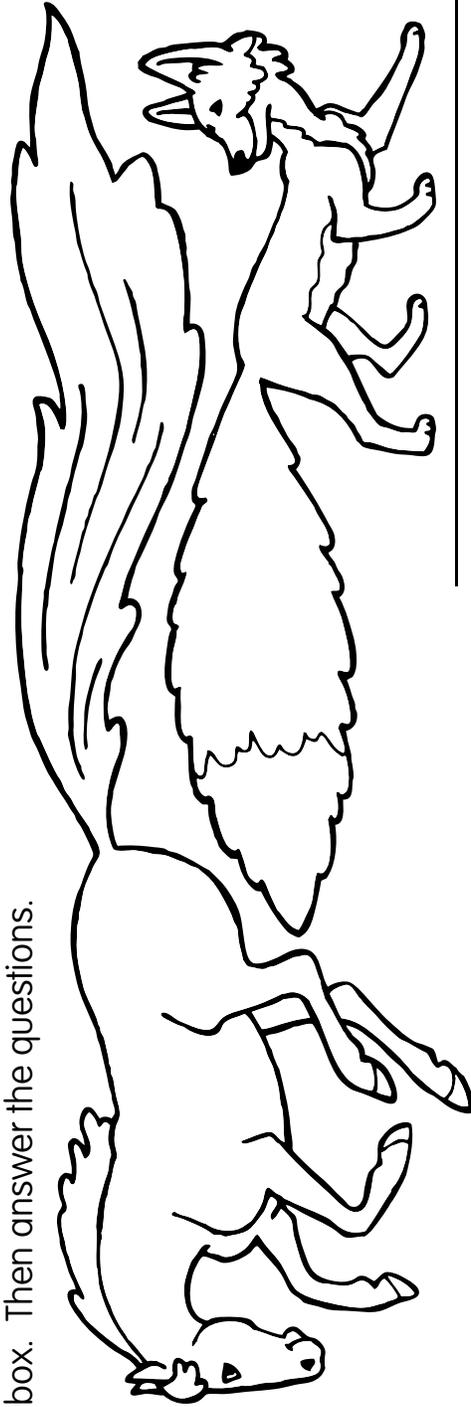
 less than 1 about 4 about 8 more than 10



Name: _____

Too Many Tails!

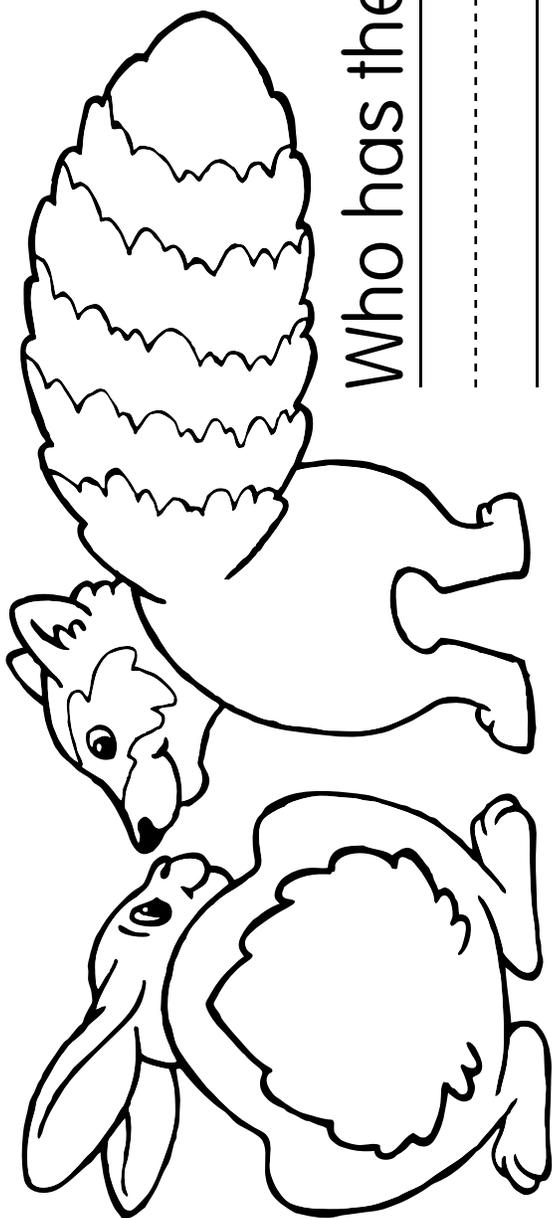
Directions: Use your chain links to measure each animal's tail. Write how many links long each animal's tail is in the box. Then answer the questions.



horse

fox

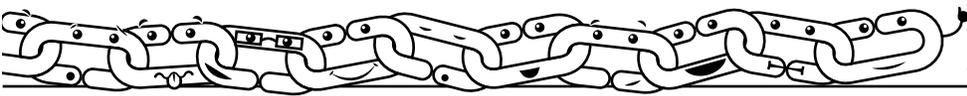
Who has the longer tail?



raccoon

rabbit

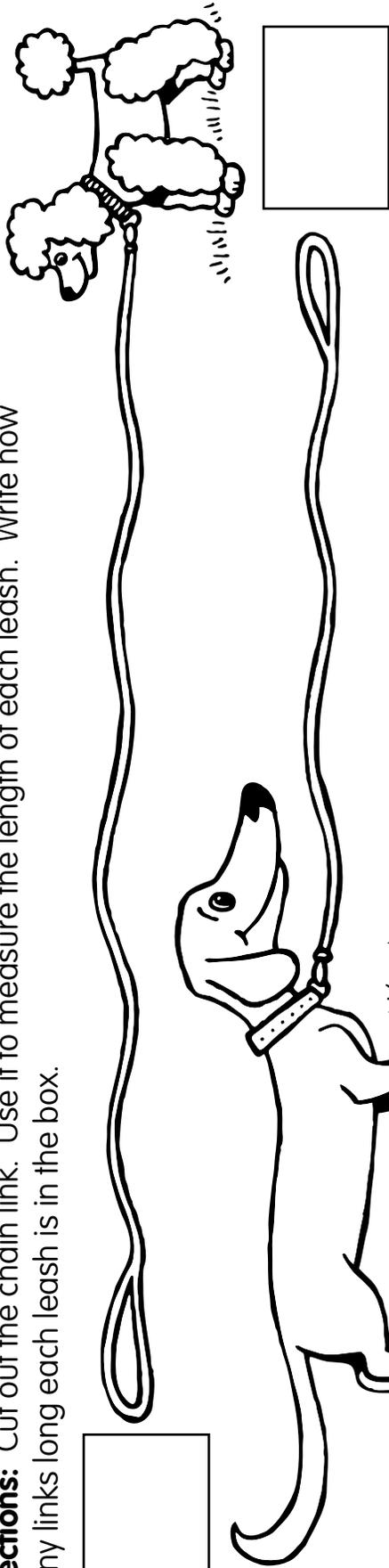
Who has the shorter tail?



Name: _____

Runaway Dogs!

Directions: Cut out the chain link. Use it to measure the length of each leash. Write how many links long each leash is in the box.



Directions: Use the chain links to measure the length of each doghouse. Write how many links long each house is in the box in the roof.

