

Grade 4
Animal and Pet Care
Mathematics Lesson Day 1
“Perimeter or Area?”

Rationale

- ✚ Students often confuse when it is appropriate to determine the perimeter and when it is appropriate to determine the area. This lesson serves as a reminder of the situations in which one or the other is needed.

Goals

- ✚ To recognize and understand the difference between perimeter and area
- ✚ To be able to use dimensions to solve for area and vice versa
- ✚ To be able to use the formulas for area as needed when solving word problems
- ✚ To introduce the concept of scale

Standards

- ✚ **4.MD.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- ✚ **MP.5** Use appropriate tools strategically.

Objectives

- ✚ Students will recognize when and how to apply the formula for perimeter or area.
- ✚ Students will apply the area formula for rectangles.
- ✚ Students will develop a basic understanding of the concept of scale.
- ✚ Students will practice multiplication skills.

Materials

- ✚ *Perimeter or Area?* individual warm-up activity sheet
- ✚ *Pet Palace* group activity sheet
- ✚ Construction Paper
- ✚ Graph Paper
- ✚ Rulers
- ✚ Pencils
- ✚ Scissors
- ✚ Tape or glue

Procedure

- ✚ Tell students that this week is all about animals and pets! One very important part of having a pet is having the proper space for the pet to live, rest, and play. Often we need

to find two different measurements, perimeter and area, to determine the size of a space. To remember what perimeter and area are, we are going to create a live model.

- ✚ Ask for 10-12 volunteers. These volunteers will represent “perimeter.” On a carpet or clean surface, ask these volunteers to form a rectangle, holding hands (either 3 students on each long end and 2 students on each short end, or 4 students on each long end and 2 students on each short end). Ask for 2-3 additional volunteers. These students will represent “area.” They will lay on the floor in the rectangle, filling the inner space.
- ✚ Ask students that based on this visual, what is perimeter (the distance around a closed figure)? Based on this visual, what is area (the space occupied by the closed figure)? Point out that the word perimeter can be a reminder: “peri” means “around” and “meter” is a measure of length.
- ✚ Have students spend 4-6 minutes working on the *Perimeter or Area?* warm-up activity sheet.
- ✚ Review the warm-up activity, discussing other times when it may be important to find the perimeter (building a fence) or the area (total space needed for an animal, amount of ground cover needed) of an area for pets or other animals.
- ✚ Distribute the *Pet Palace* group activity sheet. Have students work in pairs on the Activity of the Day. Instructions are included on the Activity Sheet.
- ✚ Have students complete the multiplication chart as their “exit ticket.”

Teacher & Teachers’ Aide Observations During the Group Activity

- ✚ As you walk around ensure that students are using the graph paper as a basis for measuring.
- ✚ Note if the students are able to determine the dimensions for the area and if they are avoiding 1 as a factor.
- ✚ Ensure that all students are using tools appropriately.

Assessment

- ✚ Students’ models should correctly represent the actual dimensions.
- ✚ Students should have correct dimensions for the area.

Follow Up

- ✚ Students can continue this same activity by measuring a space in the classroom for a new class pet. They can research a type of class pet, the space needed for the pet’s cage, and the space needed for the pet’s supplies. Then they construct a model of the classroom, with the class pet area accurately identified.

Individual Warm-Up Activity

Fill in the blanks.

1. When trying figure out how much carpet you will need to cover the floor of a dog house, you are solving for _____.
2. When trying to determine how much fencing is needed to enclose your pet's pen, you are solving for _____.
3. The formula used to solve for area of a rectangle is _____.
4. The formula used to solve for perimeter of a rectangle is _____.
5. What is the area of a playpen that has the dimensions of 3 feet by 5 feet? _____
What is the perimeter? _____

Warm up activity

Answer Sheet

Fill in the Blanks.

1. When trying figure out how much carpet you will need to cover the floor of a dog house, you are solving for area.
2. When trying to determine how much fencing is needed to enclose your pet's pen, you are solving for perimeter.
3. The formula used to solve for area of a rectangle is length x width.
4. The formula used to solve for perimeter of a rectangle is s + s +s +s or 2s + 2w.
5. What is the area of a playpen that has the dimensions of 3 feet by 5 feet? 15 square feet
What is the perimeter? 16 ft

Pet Palace Group Activity

You have permission to get a new pet! Using construction paper, you must make a model of an outdoor pen for your new pet. Follow the steps below.

1. Decide what kind of pet you would like to have; you may choose a dog, cat, snake, or lizard.
2. Choose a name for your pet.
3. To create the outdoor pen, refer to the following chart for the amount of room each pet requires.

Pet	Room to Roam
Dog	36 square feet
Cat	24 square feet
Snake	18 square feet
Lizard	16 square feet

4. First, figure out the actual length and width of the pen for your chosen pet. Then create a model by using the graph paper to measure. Let each square on the graph paper represent 1 foot. Mark the correct length and width on the construction paper.
5. Use the ruler to draw the outline of the pen and cut it out. Label the dimensions of the real pen. When you have completed this step, show your teacher your work.
6. As the summer winds down, you realize that your pet will need to move indoors. You want to keep your pet in your room. Your parents say you can as long as you can prove to them that your pet's pen will fit in your room once it is moved indoors.
 - a. Your bedroom is 12 feet by 16 feet. It contains a bed that is 3 feet by 6 feet and a dresser that is 2 feet by 4 feet. Create a model of your bedroom using the same method that you used to create the pen. Make a model of your room. Cut out shapes to represent the furniture in it. Now, see if the pen fits inside your room.
 - b. Determine if the pen will fit in your room.
 - i. If it fits, GREAT!
 - ii. If it doesn't fit, then you have some work to do. Rearrange some or all of your furniture to make room. Design a model of the new arrangements to present to your parents.

Name: _____

“Exit Ticket”

Complete the following multiplication chart as a review of your multiplication tables.

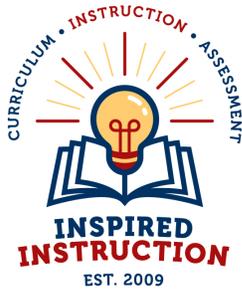
 1	2	3	4	5	6	7	8	9	10	
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

“Exit Ticket”

Answer Sheet

Complete the following multiplication chart as a review of your multiplication tables.

 1	2	3	4	5	6	7	8	9	10	
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	32	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100



Grade 4
Animal and Pet Care
Mathematics Lesson Day 2
“The Dog House”

Rationale

- ✚ The Common Core State Standards for fourth grade call for students to apply the formula for the area of a rectangle in real world situations. This lesson provides students with this opportunity.

Goals

- ✚ To be able to apply the formula for the area of a rectangle
- ✚ To be able to use dimensions to solve for area
- ✚ To be able to use the formulas for area as needed when solving word problems

Standards

- ✚ **4.NBT.5** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- ✚ **4.MD.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- ✚ **MP.5** Use appropriate tools strategically.

Objectives

- ✚ Students will apply the area formula for rectangles.

Materials

- ✚ *Dog House Match Up* Group Activity
- ✚ Calculators (for checking work only)
- ✚ *Dogs, Dogs, Everywhere!* Individual Activity

Procedure

- ✚ Divide students into groups of 3. Tell students that today they have started a new job! They have begun working at a local pet store, and they are in charge of helping customers pick out the right dog houses for their dogs. First, they will need to figure out the area of each dog house at the store. (They can use calculators to check their work.) Then they can decide which dog house will be best for each dog.
- ✚ If needed, provide a review of multiplication of 2 2-digit numbers, although students should be able to choose the method they use for the activity.
- ✚ Review the group activity once all groups have completed it.
- ✚ Distribute the *Dogs, Dogs, Everywhere!* extended constructed response item to be completed individually.

Teacher & Teachers' Aide Observations During the Group Activity

- ✚ Ensure students are using a valid approach to multiplying the two two-digit numbers to find area.
- ✚ Ensure students are using the proper formula for finding area.
- ✚ Listen for students using the following terms with precision: inches, area, length, width, and square inches.

Assessment

- ✚ The *Dogs, Dogs, Everywhere!* individual activity will serve as the assessment for this lesson.

Follow Up

- ✚ If there is computer access, students can look up additional dog houses online to find other dog houses that would fit the customers' needs.
- ✚ ***For tomorrow's lesson, please ask students to bring in any small animal figurines or toys they may have at home. (Zhu Zhu pets, Squinkies, small rubber snakes or insects, etc)

Dog House Match-Up **Group Activity**

Directions: You work at a local pet store, selling dog houses. When customers come in and tell you what kind of dog they have, you must match them up with the right size dog house for their dog.

Read the information about each customer and his or her dog. Using the information on the Dog House Match-Up cards, find the area for each dog house, choose the best dog house for each dog, and write the letter of the dog house next to each customer's information. In some cases there may be more than one best choice.

1. Mrs. Brown has come into your store, looking for a dog house for her beagle Snoopy. Snoopy is a medium sized dog. **Best dog house(s):** _____

2. Mr. Harvard is looking for a dog house for his Boston Terrier, Princess. Princess is a small dog. **Best dog house(s):** _____

3. Timmy is interested in a dog house for his collie, Lassie. Lassie is a large dog. **Best dog house(s):** _____

4. Ms. Smith asks you for information about a dog house for Tiny, her golden retriever. Tiny is a large dog. **Best dog house(s):** _____

5. Mr. Price has a Chihuahua named Molly. Molly needs a new dog house, and she is a small dog. **Best dog house(s):** _____

6. Mrs. Darling is looking forward to buying a dog house for her cocker spaniel Lady. Lady is a medium dog. **Best dog house(s):** _____

Dog House Match-Up
Group Activity

<p>Dog House A Advantek Mountain Cabin Dog House Small-28”L x 32”W Area: _____ square inches</p>	<p>Dog House B Advantek Mountain Cabin Dog House Medium-32”L x 39”W Area: _____ square inches</p>
<p>Dog House C ASL Solutions Dog Palace 48”L x 32”W Area: _____ square inches</p>	<p>Dog House D Eco-Concepts Insulated Canine Cottage 44”L x 36”W Area: _____ square inches</p>
<p>Dog House E Our Pet’s Tuff-N-Rugged Dog House 45”L x 32”W Area: _____ square inches</p>	<p>Dog House F Precision Pet Outback Country Lodge Small-28”L x 30”W Area: _____ square inches</p>
<p>Dog House G Precision Pet Outback Country Lodge Medium-30”L x 35”W Area: _____ square inches</p>	<p>Dog House H Outdoor Oasis Dog House 25”L x 27”W Area: _____ square inches</p>

Dog House Size Recommendations

Small Dogs (5-20 pounds): 700-1000 square inches

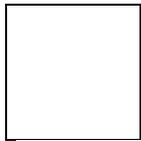
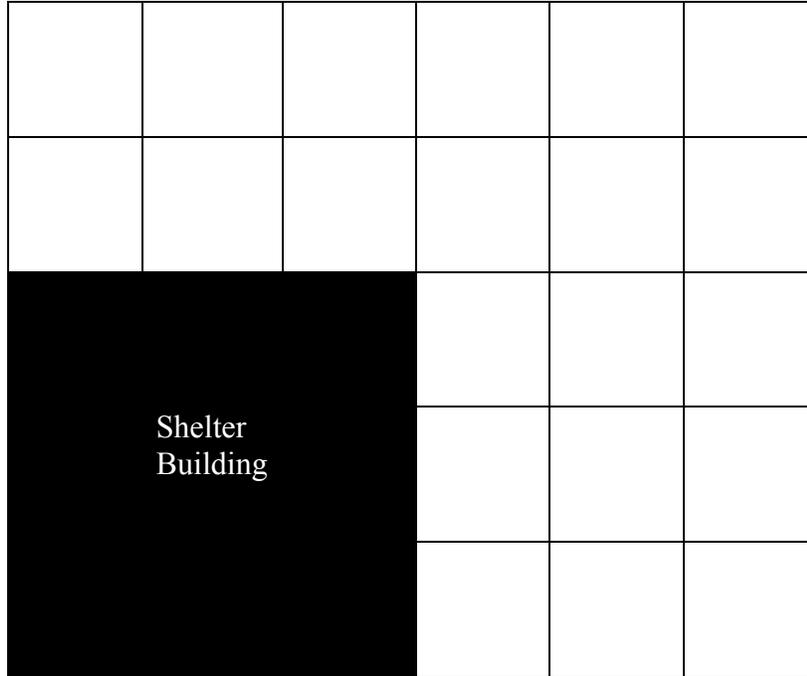
Medium Dogs (20-60 pounds): 1000-1300 square inches

Large Dogs (60-90 pounds): 1300-1600 square inches

Dogs, Dogs, Everywhere!

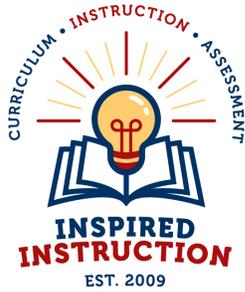
Individual Activity

A local animal rescue group is building a new shelter for dogs. The grid below represents the yard and the building.



Represents 100 square feet

- How many square feet is the shelter building?
- How many square feet is the entire property?
- If there can be one dog for every 50 square feet, how many pets can they keep in the shelter building?



Grade 4
Animal and Pet Care
Mathematics Lesson Day 3
“Plot the Pets”

Rationale

- ✚ Line plots are useful tools for organizing and displaying data. When students are able to use them with real data from real life situations, it provides them the opportunity to gather, plot, and interpret data and use it to solve problems.

Goals

- ✚ To collect and display data
- ✚ To use data to make decisions and solve problems

Standards

- ✚ **4.MD.4** Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.
- ✚ **MP.5** Use appropriate tools strategically.
- ✚ **MP.6** Attend to precision.

Objectives

- ✚ Students will be able precisely measure small objects to $\frac{1}{8}$.
- ✚ Students will be able to construct a line plot and represent collected data.
- ✚ Students will be able to analyze data and use it to problem solve.

Materials

- ✚ Assortment of small animal figurines and toys (brought in by students)
- ✚ Pencils
- ✚ Rulers
- ✚ *Plot the Pets* data recording sheet and activity sheet
- ✚ Individual Assessment

Procedure

- ✚ Divide students into groups of 3 or 4.
- ✚ **“This week we have been talking about animals and pets. Today you brought in some animals from home, and we are going to use them to help us with our lesson today.”**
- ✚ Give each group a data recording sheet and rulers. Be sure that each group has a few animals to measure. Give the groups approximately 7 minutes to measure their animals and record the data.

- ✚ Once 7 minutes have past, groups should leave the animals in place and rotate to another set of animals. They should take 7 minutes to measure those animals, and then rotate again. Continue to rotate until all groups have measured all animals.
- ✚ Before moving on, spend a few minutes reviewing all measurements to ensure accuracy.
- ✚ Draw a line plot on the board (this can be done while the students are working on their measurements). The line plot should have points in $\frac{1}{8}$ increments.
- ✚ One at a time, invite students to come to the board and plot the measurement of one of the animals from their group. Continue this until all animal measurements have been plotted.
- ✚ Discuss the results of the measurements, and whether a line plot was the best way to display the data. What other graphs or charts may have been more effective? Why?
- ✚ After the discussion, students should return to their groups and use the line plot to answer the questions on the group activity page.

Teacher & Teachers' Aide Observations During the Group Activity

- ✚ Provide guidance to those students who may need assistance using the ruler to measure to $\frac{1}{8}$ inch.
- ✚ What for, and acknowledge, students using precise language when discussing measurements.

Assessment

- ✚ Students will complete the attached individual assessment.

Follow Up

- ✚ Students can use line plots to compile other pet-related data, such as the ages of the pets owned by students in the classroom or how many pets each student has. They can use this to answer questions about pet ownership in their class.

Plot the Pets
Group Activity

Today your class measured the lengths of different animal figures and toys and plotted the information on a line plot. Use the line plot to answer the following questions.

1. Which animal had the shortest length, and what was the length?

2. Which animal had the longest length, and what was the length?

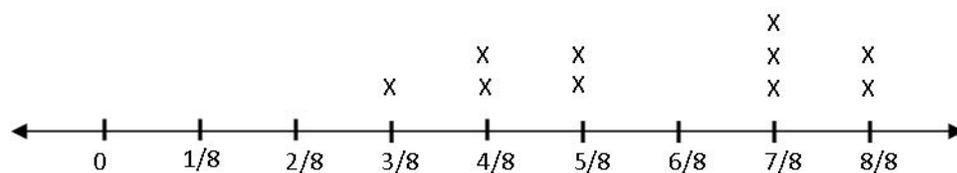
3. What is the difference in length between the longest and shortest animals?

4. If you laid each of the animals end to end, what would the total length of all pets be?

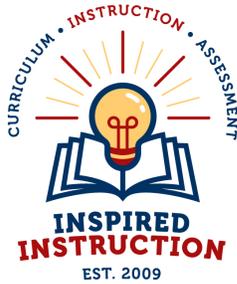
5. How did the line plot help you answer these questions?

Individual Assessment

After the heavy rain the other day, you and your brother found some worms outside. You were curious about why they were all different lengths, so you decided to measure them. The line plot below shows the length of all the worms measured, in inches.



- ✚ How many worms did you and your brother find? How do you know?
- ✚ How many worms measured $\frac{1}{2}$ inch long?
- ✚ What is the difference between the length of the longest worm and the length of the shortest worm?



Grade 4
Animal and Pet Care
Mathematics Lesson Day 4
“Best Pets”

Rationale

- ✚ The intent of this lesson is for students to incorporate a variety of skills in a meaningful way to problem solve.

Goals

- ✚ To be able to use dimensions to solve for area and vice versa
- ✚ To be able to use the formulas for area as needed when solving word problems

Standards

- ✚ **4.MD.2** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- ✚ **4.MD.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- ✚ **MP.3** Construct viable arguments and critique the reasoning of others.

Objectives

- ✚ Students will conduct effective, targeted research to gather data.
- ✚ Students will make decisions based on gathered data.
- ✚ Students will apply the area formula for rectangles.
- ✚ Students will use addition, subtraction, multiplication, and division to solve problems.

Materials

- ✚ Computers with internet access
- ✚ Pet store sales flyers
- ✚ Assortment of books about various common pets
- ✚ *Best Pet* activity sheet
- ✚ Construction paper
- ✚ Markers or crayons

Procedure

- ✚ Tell students to end the week-long Animal and Pet Care unit, today they will be thinking about the best kinds of pets.
- ✚ Ask students, “What makes a pet the best for a particular person?” They may answer size, the type of animal, how much space the animal needs, how much the animal costs, if it needs to be trained, if it’s messy, etc. Make a list of their answers on the board.

- ✚ Tell students that today they will be given an animal, and they have to research the animal to determine if it might be the best pet for someone. They can use the information on the *Best Pet* activity sheet to guide their research. They will use what they've learned about area and the four operations to help them.
- ✚ Finally, students will create an advertisement that represents the data they gathered, along with a recommendation for their pet.

Teacher & Teachers' Aide Observations During the Group Activity

- ✚ Provide guidance to students who are doing an internet search, to ensure they are staying on task and looking at relevant websites.

Assessment

- ✚ Assessment will be the completion of the poster with all the information necessary to demonstrate the pet as a "best pet."

Follow Up

- ✚ Students can brainstorm a list of other times it would be important to use math to try to convince someone of something (buying a particular item, shopping at a certain store, signing up for an activity or sport, getting a pet).

Best Pets

Group Activity

Directions: Your group has been given a pet to research! You are going to find out what is needed to take care of this pet: what accessories it needs and what space requirements it has. Once you have learned all this information, you will determine the type of family who your pet would be best for.

Type of Pet: _____

What size area does this pet need to live? _____

<u>Pet Care Item</u>	<u>Source</u>	<u>Quantity</u>	<u>Cost</u>
Food			
Bedding			
Toys			
Other Needs			
Other Needs			
Other Needs			

Once you are done researching your pet, consider the type of family who your pet would be best for. Think about the size of the family's house and yard, how much money the family is willing to spend on a pet, and whether the family would want a cuddly animal or an exotic one. Make a poster "selling" your pet to that family!