THIRD GRADE MATH

Area & Perimeter Unit

Hands-On Lessons

Worksheets

Games

Assessments

Perimeter Exploration

Object
Length
Width
Perimeter

Object
Length
Width
Perimeter

Object
Length
Width
Perimeter

Different Manipula...

Design a Carnival Guide

- Ferris Wheel-area of 16 square units
- Carousel-area of 14 sq. units
- The Sizzler of 10 sq units
- The Fun House-perimeter of 10 units
- Tilt-a-Whirl-perimeter of 8 units
- Arcade-area of 9 square units
- Concession Stand-Area of 4 sq. units
- Ticket Book-perimeter of 12 units

Add Two More Items

A-
p-

A-
p-

Design a Carnival

Today you are going to design your own carnival. However, there are some requirements you must follow. Be sure to pay careful attention to the perimeter and/or area of each of the carnival. You may add your own details and decorations after you add the buildings. Be sure to label everything.

Teacher Notes

I sincerely hope that you and your students enjoy this area and perimeter unit! The unit was originally designed around the Common Core Standards, but you should find the content useful in any third grade classroom. In this unit you will find performance tasks to conceptually teach place value through the workshop model, as well as work station activities and games for review.

I have included a suggested pacing guide below. I like to supplement my math workshop lessons with a variety of skill practice sheets, games, etc. You may use this pacing guide to ensure you teach the concept, including a performance task and including a concept specific game. Even if you choose to not implement math work stations, I think you will find the games useful in any setting! As always, feel free to contact me if you have any questions. ashleigh_60@hotmail.com

Unit at a Glance

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Pattern Block Perimeter

Skill: Find the Perimeter | Perimeter Game

Skill: Perimeter Models | Class Garden

Skill: Draw the Perimeter | Perimeter Exploration

Skill: Find the Missing Side | Edible Area and Perimeter

Skill: Perimeter Practice |
| Lesson 6 | Lesson 7 | Lesson 8 | Lesson 9 | Lesson 10 |
| Pentomino Perimeter & Area

Skill: Find the Area | Area and Perimeter Puzzles

Skill: Area Models | Spaghetti and Meatballs for All

Skill: Draw the Area | Area and Perimeter Task Cards

Skill: Find the Missing Side | Design a Carnival

Skill: Area Practice |
| Lesson 11 | Lesson 12 | Lesson 13 | Lesson 14 | Lesson 15 |
| Ordering Rectangles

Skill: Find the Area and Perimeter | Using Different Manipulatives

Skill: Area and Perimeter Sort | Area is Additive

Skill: Perimeter and Area Word Problems | Area & Perimeter Game

Skill: Area is Additive | Area and Perimeter Robot |

DETAILED PACING GUIDE

Pattern Block Perimeter

Materials
- Large piece of white construction paper
- Pattern blocks
- Student recording sheet

Part 1
- Have students find the perimeter of each of the pattern blocks using the side of the square as 1 unit.
- Have students complete the student-recording sheet.

Part 2
- Give students time to make any design out of pattern blocks. All of the pattern blocks should be connected.
- Then have students trace their design on the white construction paper.
- Show students how to find the perimeter of shapes assuming that one side of the square equals 1 unit.
- Give students time to find the perimeter of their design using the side of the square as 1 unit and have them record the perimeter on their construction paper.

Name _____ Date _____

Pattern Block Perimeter

Pattern Block	Perimeter

Name _____ Date _____

FIND THE PERIMETER

Perimeter:_____

Perimeter:_____

Perimeter:_____

Perimeter:_____

5ft.

5ft.

Perimeter:_____

Perimeter:_____

5ft.

11ft.

20ft.

5ft.

Perimeter:_____

Perimeter:_____

DAY 1

Perimeter Game

Materials
- one die and square tiles for each pair of students

Directions
- Students should roll the die and take that many tiles.
- Arrange the tiles to make a polygon.
- Find perimeter. Do not take apart the shape, because you will be adding on to the figure.
- Continue rolling. After each new roll, add the tiles to your current shape and find the new perimeter.
- If you roll a number that will take you ABOVE 24, you may move that number of tiles in your shape.
- The first person with a perimeter of exactly 24 wins.
- Have students discuss what they noticed when you were doing this activity.

Name _____

Perimeter Models

Model 1:   Model 2:

Draw and label four rectangles with a perimeter of **24**

Model 3:   Model 4:

Model 1:   Model 2:

Draw and label four rectangles with a perimeter of **16**

Model 3:   Model 4:

DAY 2

Class Garden

Materials:
- grid paper-optional
- color tiles-optional

Preparation:
- Show students the Study Jams video on area and perimeter to provide additional background instruction on area and perimeter. This will allow students to focus on problem solving.

Task
- Students will determine how many different rectangles they can draw with a perimeter of 34 units. Some students may need to use grid paper for this assignment, while other students may need the support of color tiles.
- After building the rectangles, students will answer three problem solving questions involving perimeter.

Name_____ Date_____

Class Garden

Mr. Perry's class decided to plant a garden. His students wanted to build a fence around the garden to keep out rabbits. The students have 34 feet of fence. How many different ways can the students make a garden that measures 34 feet around? Draw each rectangle and label the sides. You can use grid paper to help you with this task.

1. How is it possible for different shapes to have the same perimeter?

2. As the perimeter increases, what patterns do you notice about the dimensions of your rectangles?

3. Can the same number of color tiles create shapes with different perimeters?

Name_____ Date_____

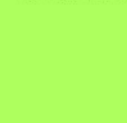## DRAW THE PERIMETER

Perimeter=12 units

Perimeter=14 units

Perimeter=24 units

Perimeter=12 units

Perimeter=26 units

Perimeter=32 units

Perimeter Exploration

Materials
- rulers
- Perimeter Exploration recording sheet

Mini Lesson
- Make sure students are familiar reading a ruler. In this activity, students will measure to the nearest inch or centimeter. As an extension you may have students measure to the nearest half or quarter inch, but this will require students to be able to add fractions.

Lesson
- Students should identify six different rectangular objects.
- Students will use their rulers to measure the length and width of each of those items.
- Have students record the measurements on the Perimeter Exploration recording sheet.

Closing
- Have students share which items they measured and the perimeter of those objects. If there are other students who measured that same object, have students compare their results.

Name _____ Date_____

Perimeter Exploration

Object _____	Object _____
Length: _____	Length: _____
Width: _____	Width: _____
Perimeter: _____	Perimeter: _____
Object _____	Object _____
Length: _____	Length: _____
Width: _____	Width: _____
Perimeter: _____	Perimeter: _____
Object _____	Object _____
Length: _____	Length: _____
Width: _____	Width: _____
Perimeter: _____	Perimeter: _____

Name _____ Date_____

Find the Missing Side

Find the measure of the missing side of each figure.

_____ ft.
8ft.
P=34 feet

5ft.
_____ ft.
P= 42 feet

2ft.
_____ ft.
P=20 feet

_____ ft.
11ft.
P=36 feet

3ft.
_____ ft.
P=24 feet

6ft.
_____ ft.
P=16 feet

2ft.
_____ ft.
P=12 feet

35ft.
_____ ft.
P=100 feet

Edible Perimeter and Area

Materials
- Individual packs of Cheeze-It crackers or other foods packaged as squares (Starbursts)
- Student recording sheet

Mini Lesson
- In this activity, students will manipulate squares to modify the area and perimeter of a given shape. Allow students to explore with the squares before introducing the formula for finding perimeter and area.

Activity
- Before beginning the activity, have students clean the top of their desk and wash their hands.
- Call out the following measurements and have students build shapes with their Cheeze-Its.
  - perimeter of 4
  - area of 1
  - perimeter 16
  - area 4
  - perimeter 8
  - area 9
  - perimeter 12
  - area 15
- After students build their shapes, they should draw a picture of each image on their recording sheet.
- Students may build rectangles or irregular polygons.
- Discuss how the different measurements can be built in many different ways.

---

Name _____ Date _____

Edible Perimeter and Area

Record the area and perimeter of each design you create. Draw a picture of each polygon.

DAY 5

Name _____ Date _____

Perimeter Practice

Show how you found the perimeter of the rectangles below.

3 in. / 7 in.	4 in. / 12 in.	9 in. / 6 in.

1. I have a rectangle. It is 7 inches long and 4 inches wide. What is the perimeter of my rectangle? _____

2. How do you use addition to find the perimeter of a rectangle? _____

3. If a square has a perimeter of 24 inches. How long are its sides, and how do you know? _____

4. Describe perimeter in your own words. _____

Pentomino Area and Perimeter

Materials
- Pentominos
- Student recording sheet

Mini Lesson
- Have students look at the common attributes of the pentomino (each piece has an area of 5 square units and all sides meet to form a right angle).
- Students should notice that all of the pieces have a perimeter of 12 units with the exception of one shape that has a perimeter of 10 units.

Activity
- In each box on the recording sheet, students choose three pentominos and create a polygon.
- Students trace their polygon in the box.
- Students F=find the area and perimeter of each polygon.
- They should write how they found the area and perimeter of they polygons.
- Have students explain what they noticed about the areas and perimeters of the polygons.
- Using 3 pentomino pieces, have students find the longest perimeter they can make.
- Using 3 pentomino pieces, have students find the largest area they can make.

DAY 6

Name _____ Date _____

Pentomino Perimeter and Area

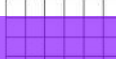In each box below cut out and glue three pentominos to create a polygon.
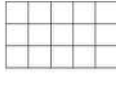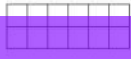
Polygon A	Polygon B

Polygon C	Polygon D

	Polygon A	Polygon B	Polygon C	Polygon D
Perimeter				
Area				

Name _____ Date _____

FIND THE AREA

Area: _____   Area: _____

Area: _____   Area: _____

4ft.   12 ft.
5ft.   4ft.
Area: _____   Area: _____

15ft.   20ft.
4ft.   4ft.
Area: _____   Area: _____

Area and Perimeter Puzzles

Materials
- Area and Perimeter Puzzles (one set for each group)

Mini Lesson
- Review how to determine the perimeter and area of a polygon. Show how to find the perimeter and area by counting, adding (perimeter) and multiplying (area). This task will also allow students to find the missing side length, as well as solve perimeter and area word problems.

Prep
- Laminate and cut out the puzzle pieces. If this is a center activity, you may only need one set per class. If this is a whole group lesson, have students work in groups and cut out one set for each group.

Activity
- In this task, students will match three puzzle pieces. In some puzzle pieces, students will be told the area or the perimeter. In other puzzle pieces, students will be given the missing side length. Students should match that information with multiple models of that area, perimeter, or missing length.
- Students do not have to record their answers for this activity.

8 units
sq. units
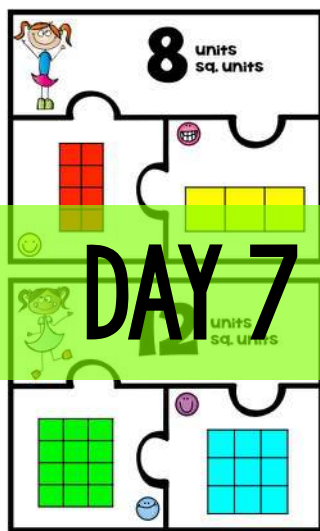
DAY 7

Area Models

Name _____

Model 1.   Model 2.

Draw and label four rectangles with an area of
12

Model 3.   Model 4.

Model 1.   Model 2.

Draw and label four rectangles with an area of
20

Model 3.   Model 4.

Spaghetti and Meatballs for All

Materials
- Spaghetti and Meatballs for All by Marilyn Burns
- 8 Colored tiles per group

Mini Lesson
- As students manipulate the squares, they will discover that when two separate squares (tables of four) are rearranged into a rectangle, two seating spaces are lost where the squares are joined together. Students may recognize that as the perimeter gets smaller, the rectangle gets closer and closer to a square.

Lesson
- Read Spaghetti and Meatballs for All.
- After reading the book, discuss changes in area and/or perimeter caused by the moves.
- Have students pretend they are planning a party for 18 people. They have six square tables they can use, but they don't have to use all of them. Each table seats four, one on each side.
- Students work with a partner to decide on a seating arrangement that is best for the party.
- Have students draw a picture of the table arrangement and label each place to show who will be sitting there.
- There should be no empty seats, and there must be at least one grown-up at each table.
- Describe what happened to the perimeter as tables were pushed together.
- The written explanation should be easily understood.
- Have students find the perimeter of their design using the side of the square as 1 unit and have them record the perimeter on their construction paper.

Spaghetti and Meatballs for All

Pretend you are planning a party for 18 people. You have six square tables you can use for the party, but you don't have to use all of them. Each table seats four, one on each side. You may put some of the tables together:

- Work with a partner to decide on a seating arrangement that is best for the party.
- Draw a picture of the table arrangement.
- There should be no empty seats, and there must be at least one grown-up at each table.
- Find the perimeter of the design using the side of the square as 1 unit and record the perimeter and area for the design.

Draw a picture of your design.

Describe what happened to the perimeter as tables were pushed together.

DAY 8

DRAW THE AREA

Name _____   Date _____

Area=12 units   Area=14 units

Area=9 units   Area=24 units

Area=200 units   Area=320 units
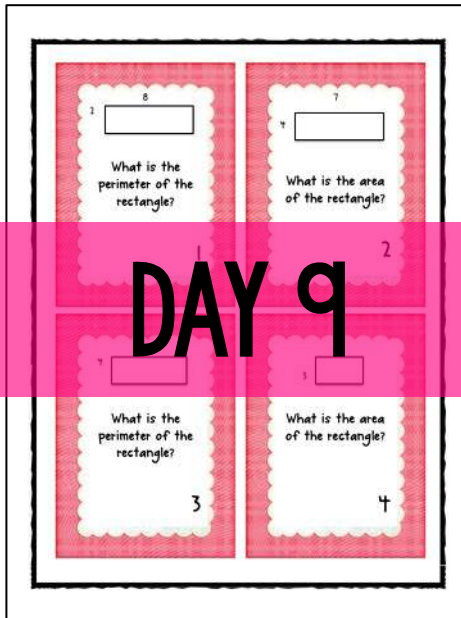
Area and Perimeter Task Cards

Materials
- Task Cards (I typically print my task cards on card stock and then laminate them to ensure that they last for several years)
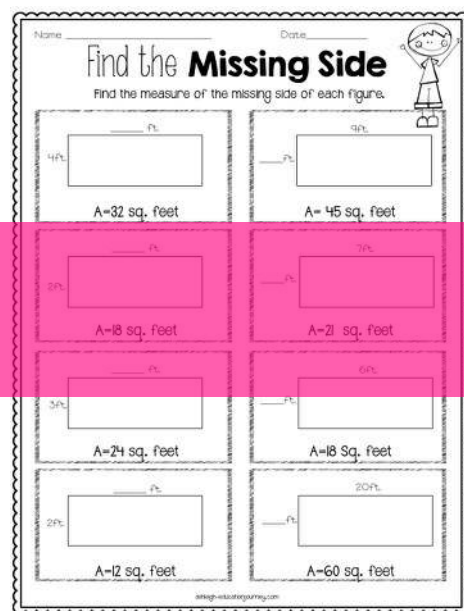- Student Recording Sheet (optional)

Notes
- This is a great activity to include in students' math work stations or math centers.
- This can also be completed as a whole-group activity, but it may be beneficial to print out two sets of task cards. It will also be important to remind students to only use each card once if there are two sets.

Lesson
- Students should select one task card and answer the perimeter or area question on the task card.
- Students should record their answers on the student recording sheet.

What is the perimeter of the rectangle?

What is the area of the rectangle?

What is the perimeter of the rectangle?

What is the area of the rectangle?

DAY 9

Find the **Missing Side**

Find the measure of the missing side of each figure.

4 ft.
A=32 sq. feet

9 ft.
A= 45 sq. feet

2 ft.
A=18 sq. feet

7 ft.
A=21 sq. feet

3 ft.
A=24 sq. feet

6 ft.
A=18 sq. feet

2 ft.
A=12 sq. feet

20 ft.
A=60 sq. feet

Design a Carnival

Materials
- Design a Carnival recording sheet

Notes
- This is a great activity to include a little art and creativity for students! Encourage students to slow down and do their best work, because this can make an adorable hallway display.

Lesson
- In this activity, students will design their own carnival.
- The recording sheet includes the area or perimeter of eight rides that must be included in the carnival.
- As an extension, students may add two of their own additional items.
- After students complete drawing out the carnival, they may add their own details and decorations.
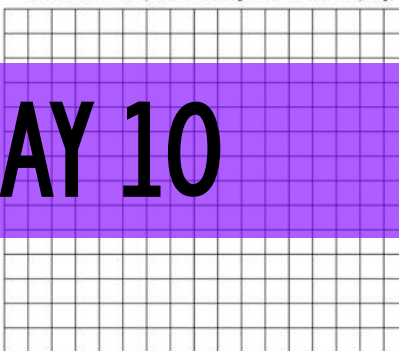- Have students label each ride and building.

Design a Carnival Guide

- Ferris Wheel-are of 16 square units
- Carousel-area of 14 sq. units
- The Sizzler of 10 sq. units
- The Fun House-perimeter of 10 units
- Tilt-a-Whirl-perimeter of 8 units
- Arcade-area of 9 square units
- Concession Stand-Area of units
- Ticket Book-perimeter of units

Add Two More Items

_____
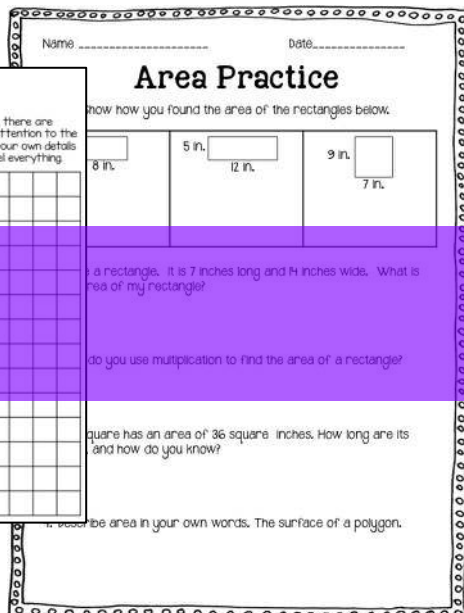A-_____
P-_____

_____
A-_____
P-_____

DAY 10

Design a Carnival

Today you are going to design your own carnival. However, there are some requirements you must follow. Be sure to pay careful attention to the perimeter and/or area of each of the carnival. You may add your own details and decorations after you add the buildings. Be sure to label everything.

Area Practice

Show how you found the area of the rectangles below.

8 in.

5 in.
12 in.

9 in.
7 in.

a rectangle. It is 7 inches long and 4 inches wide. What is rea of my rectangle?

do you use multiplication to find the area of a rectangle?

quare has an area of 36 square inches. How long are its and how do you know?

area in your own words. The surface of a polygon.

Ordering Rectangles

Materials
- Ordering Rectangles recording sheet
- Construction Paper
- Scissors
- Glue

Notes
- In this task, students will be required to draw rectangles with a given perimeter. Some students may confuse perimeter and area when they measure the sides of a rectangle and then multiply. When they do this, they think the attribute they find is length, which is perimeter.

Lesson
- Have students work with a partner.
- Assign each pair of students a perimeter: 12, 18, 24, 34, and 36.
- Have students draw all the rectangles they can with the same perimeter on the grid paper.
- Students should find the area and write it inside the rectangle.
- Then have students cut out the rectangles and order them from smallest area to largest area and glue them on construction paper.
- Once students finish the task, post the students' work so that students can see several different examples of rectangles with the same perimeter arranged in order by area.

Name _____ Date _____

Ordering Rectangles

Use the dotted paper below to draw all the rectangles you can with a perimeter of _____. Find the area of each rectangle and record it inside the rectangle. Cut out the rectangles and order them from smallest area to largest area. Glue them on construction paper.

Name _____ Date _____

Find the Area and Perimeter

Area:_____ Perimeter:_____   Area:_____ Perimeter:_____

Area:_____ Perimeter:_____   Area:_____ Perimeter:_____

Area:_____ Perimeter:_____   Area:_____ Perimeter:_____

DAY 11

Using Different Manipulatives

Materials
- Using Different Manipulatives recording sheet
- Cm cubes
- Color tiles
- Any third manipulative

Notes
- In this task, students will work with irregular polygons. Students must understand that the surface of the polygon must be covered with the manipulative to find its area. Make sure students know the correct name for each manipulative.

Lesson
- Have students work with a partner.
- Students should use the first manipulative to determine the perimeter of both polygons and record their measurement on the recording sheet.
- Students should repeat the step with the second and third type of manipulative.
- Then, students should answer the questions on the student recording sheet.
- By the end of the task, students should understand that the smaller the size of the manipulative or unit of measurement, more of that manipulative will be needed to cover the polygons.

Name _____ Date _____

Using Different Manipulatives

Use three different manipulatives to find the surface area of each polygon. For example, on your first measurement you may want to use centimeter cubes, and then choose a different manipulative on your second measurement and then another manipulative on your third measurement.

	Unit of Measure manipulative 1:	Unit of Measure manipulative 2:	Unit of Measure manipulative 3:
Polygon 1	Area:	Area:	Area:
Polygon 2	Area:	Area:	Area:

What polygon has the largest area? _____

What is the difference between the largest polygon and smallest polygon? _____

How did you find the area? _____

How did the size of the manipulative effect the area of each polygon? Why? _____

Name _____ Date _____

PERIMETER AND AREA SORT

Cut out each of the squares below and read the descriptions to sort them into two groups perimeter and area. Glue each of the squares down in the correct column.

AREA	PERIMETER

A farmer wants to build a fence around her garden.	Mrs. Jones wants to lay carpet on her living room floor.	length times width	A student wants to glue ribbon around the edges of a card.
Mr. Brow plans to cover his lawn with grass seed.	Mrs. Smith is going to hang wallpaper border.	A painter is planning to paint an entire wall.	length plus length plus width plus width
A seamstress needs 24 square feet of material.	Mr. Meyers needs to cover his bulletin board with paper.	A gardener wants to place rocks around the edge of a pond.	How many feet of baseboard will I have to clean?

DAY 12

Area is Additive

Materials
- Area is Additive recording sheet

Notes
- In this task, students will work to determine the area of regular and irregular polygons. Students will problem solve to determine that rectangles and polygons can be broken into smaller rectangles and polygons and those areas can be added together. Students should connect this to the distributive property.

Lesson
- There are two parts to this task. In the first part, students will show two different ways to break an irregular polygon into two rectangles. Students should find the area of each smaller rectangle and add the areas together for the total area.
- Students should discuss how this relates to multiplication.
- In the second part to the problem, students will break apart a grid into two different sections. This will allow students to continue to develop an understanding of the relationship between area and multiplication.

Name _____ Date _____

Area is Additive

Show how to break the rectangles up into two smaller rectangles. Show two different ways.

5 ft

4 ft

3 ft

2 ft

5 ft

4 ft

3 ft

2 ft

Charlie found the rectangle's area using the following equation: $8 \times 7 = a$
Frank found the area by adding the products of the following equations:
$2 \times 7 = a$ and $5 \times 7 = b$

Whose equation(s) will find the correct area of the rectangle? Explain

---

Name _____ Date _____

area and perimeter word problems

I have a large brown box. The box is 12 yards long and 4 yards wide. What is the area and perimeter of the box?

One side of the rectangle is 6 cm. The area is 48 square centimeters. How long is the other side? Use drawings, words, and numbers to show your thinking.

Draw two rectangles with an area of 36 square centimeters and label the sides of the rectangle. Then, find the perimeter of each rectangle.

answers will vary

ex: 9x4
6x6

Draw two different rectangles with a perimeter of 24 and label the sides of the rectangle. Then, find the area of each rectangle.

answers will vary

DAY 13

Name _____

AREA and PERIMETER

Use a paperclip and pencil to make a spinner. Spin the spinner two times. Draw a rectangle with the length and width of the numbers spun. Find the area and perimeter of your rectangle. See how many rectangles you can draw on one page.

2 4 5 6 7 3

Name _____ Date _____

AREA IS ADDITIVE

Find the area of each polygon.

10 in.

12 in.

8 in.

20 in.

A= _____ sq. units

A= _____ sq. units

9 in.

8 in.

7 in.

A= _____ sq. units

A= _____ sq. units

8 in.

5 in.

12 in.

5 in.

7 in.

A= _____ sq. units

A= _____ sq. units

DAY 14

Perimeter and Area Robot
Teacher's Guide

Overview:
This can be a fun culminating hands-on task for students at the end of the area and perimeter unit. This task will require students to remember the difference between area and perimeter and will allow students the opportunity to construct squares and rectangles with a specific perimeter or area. This assignment should not be done at the beginning of the unit, because students will need to have experience finding and building area and perimeter before beginning this task.

Materials:
- Large sheet of construction paper for each student.
- Grid paper (cm squares or cm squares) for each student.
- Scissors & Glue
- Student directions.

Mini Lesson:
Review with students the concepts of area and perimeter. Using a sheet of grid paper, model how to build a rectangle or square with a perimeter of 12, and then model how to build a rectangle or square with an area of 12. Be sure to demonstrate how there is more than one way to build the squares and/or rectangles. Also, be sure students are not confusing area and perimeter. Then, distribute the student direction sheet and discuss the directions together.

Work Time:
Students may work with partners, in a group, or individually to complete this task. In this task they are to build a robot that has a specific area or perimeter requirement for each body part. Students should use a sheet of grid paper to build each body part and then cut the body part out. Students should glue their robot down on a large sheet of construction paper. (Make sure students understand left and right.)

Closing:
Select two or three students to share their robots with the class. Be sure to allow students to show HOW they found the perimeter or area of the squares and rectangles. Also be sure to allow students to see how the shapes can look different, even though they have the same perimeter or area.

Differentiation:
Version 1-Perimeter Only
Version 2-Area Only
Version 3-Perimeter and Area Mixed
Version 4-Students draw a robot and find the perimeter and area.

Greetings,

You have been selected for a TOP SECRET mission from NASA to create a robot that will land on the moon. You will be designing a robot who will be sending the United States very important information, and it is very important you submit your best work. The robot must have certain measurements of perimeter and area for it to be able to survive on the moon. Please create your robot using grid paper. You will cut out the grid paper and glue it to a large piece of construction paper to create your robot. Remember~the measurements must be EXACT!

NASA Design Team

Head-**Perimeter** of 24 cm

Neck-**Perimeter** of 10 cm

Body-**Perimeter** of 48 cm

Left Arm-**Perimeter** of 20 cm

Right Arm-**Perimeter** of 24 cm

Left Leg-**Perimeter** of 42 cm

Right Leg-**Perimeter** of 40 cm

Left Foot-**Perimeter** of 12 cm

Right Foot-**Perimeter** of 8 cm

Version 1

Greetings,

You have been selected for a TOP SECRET mission from NASA to create a robot that will land on the moon. You will be designing a robot who will be sending the United States very important information and it is very important you submit your best work. Use the grid paper below to draw a robot. Then, use the squares find the area and perimeter of the robot.

NASA Design Team

The total area of my robot is _____

The total perimeter of my robot is _____

Version 1
Perimeter Only

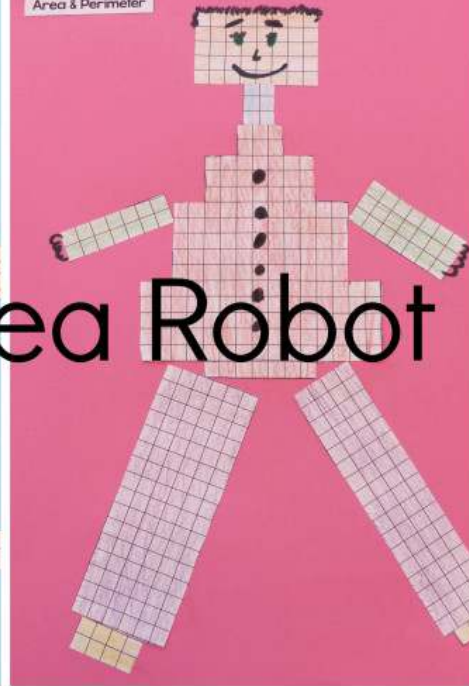**Version 2**
Area Only

Version 3
Area & Perimeter

Perimeter and Area Robot