K-G2 Basic

G4-G7 Advanced

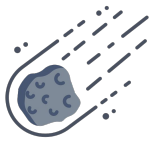
Helping With Math

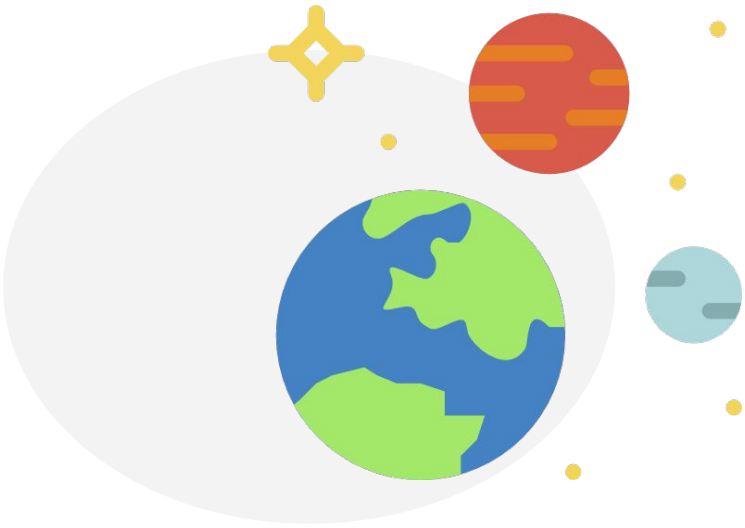
GRADES

Problem Solving:
Geometry and Measurement

Suitable for students
aged 4-12

Let's celebrate the World Space Week!





This pack is suitable for learners aged 4 to 12 years old or kindergarten to 7th graders. The content covers fact files and relevant basic and advanced activities of geometry and measurement topics that aim to develop and strengthen the learners' problem-solving skills.

Problem Solving As a Mathematics Skill

Problem-solving skills refer to the ability to identify a problem, determine its origin, and figure out all possible solutions to solve the problem. These are also a set of skills where you could formulate a variety of unique ways to solve a problem.

IMPORTANCE OF PROBLEM-SOLVING SKILLS

Mathematics aids us to understand the world and to provides an effective way of building mental discipline. Math encourages logical reasoning, critical thinking, creative thinking, abstract or spatial thinking, problem-solving ability, and even effective communication skills.

Problem solving...

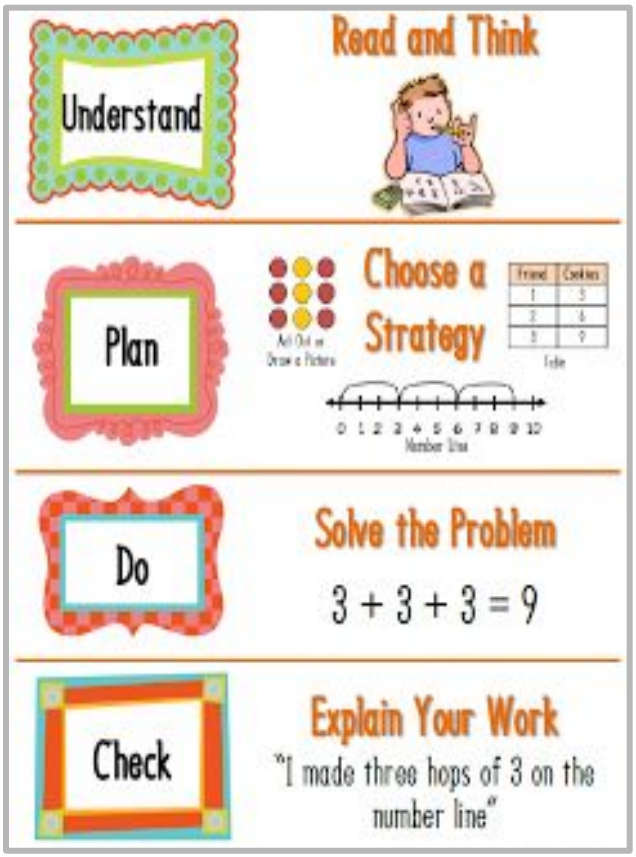
- plays a significant factor in mathematics and should have a critical role in the mathematics education of K-12 students.
- enhances a generic ability to solve real life problems and apply mathematics in real life situations.
- makes students to believe in their ability to think mathematically. They will appreciate that learning math means finding the solution to a problem.

Where can we apply problem-solving skills?

- in managing your finances
- in shopping for the best price of goods
- in preparing/cooking food
- in figuring out distance, length, or weight
- in generating more than one solution/alternative
- in making the best decision/option
- in predicting possible outcomes

PROBLEM-SOLVING STRATEGY

George Polya's Problem Solving Technique

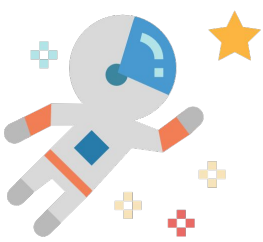


Step 1:
- ❏ Do you understand all the words in the problem?
- ❏ What are you asked to find or show?
- ❏ Can you state the problem in your own words?
- ❏ Are the details enough for you to find the answer?

Step 2:
- ❏ Is it possible to use guess and check technique?
- ❏ Can you eliminate possibilities?
- ❏ Which plan will work? Which plan will not work?
- ❏ Will I use addition or subtraction?

Step 3:
- ❏ What is the equation?
- ❏ What will be the next step?
- ❏ Can you prove your solution?

Step 4:
- ❏ Can you check if your answer is correct?
- ❏ Does everything turn out well?
- ❏ What are the steps that worked and didn't work?



SAMPLE/APPLICATION

Basic Examples:

1. In one of your science classes, your teacher asked the class to draw a spaceship. Your teacher tells you this: you must include a three-sided and five-sided polygons in your design." Which polygons is she referring to?

Let's answer this problem using Polya's Problem Solving Techniques

Step 1: *Understand: What are you asked to find?*

Answer: You are asked to determine the type of polygon that your teacher is referring to.

Step 2: *Plan: Will I review the properties of basic shapes?*

Answer: Since the problem is asking for the type of polygon, look back what are the properties/characteristic of the different polygons.

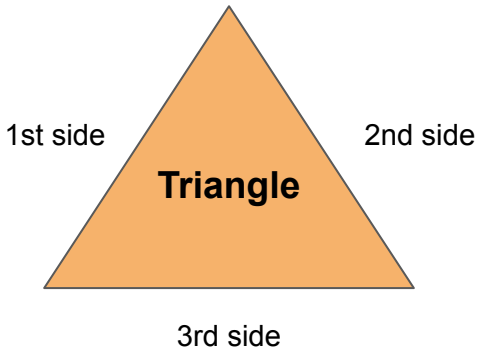
Step 3: *Do: The properties of basic shapes.*

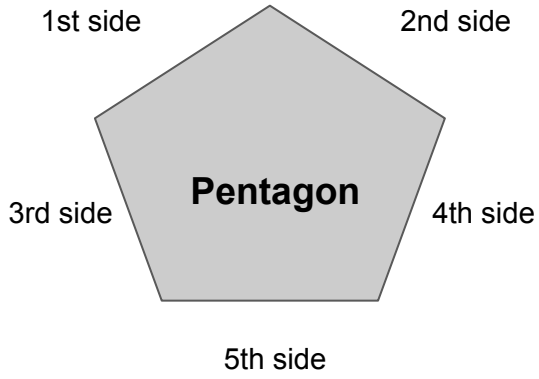
Answer:

- A triangle is a polygon with three sides.
- A pentagon is a polygon with five sides.

SAMPLE/APPLICATION

Step 4: *Check: Can you check if your answer is correct?*





Advanced Example:

2. Neil is asked to create a drawing of planet Neptune. He would like to start with a circle whose radius is 6 inches. Given this, calculate the area and circumference of Neil's drawn circle.

Step 1: *Understand: What are you asked to find?*

Answer: You are asked to calculate the area and circumference of the given circle.

SAMPLE/APPLICATION

Step 2: *Plan: What formula should I use to compute for the area and circumference of the circle?*

Answer:

Formula: **$A = \pi r^2$**

Where r is the radius of the circle

- Area of a circle refers to how much space the circle takes upon a surface.

Formula: **$C = 2\pi r$**

- Circumference of a circle is considered as the perimeter of a circle.
- It is a distance around a circle or what we call the arc length.

Step 3: *Do: Solve for the circumference and area of the given circle.* (let π = 3.14)

To compute for the circumference,

r = 6 in

$C = 2\pi r$

$C = 2\pi$ (6 in)

$C = 12\pi$ in

C = (12)(3.14) in

C = 37.68 in

To compute for the area,

r = 6 in

$A = \pi r^2$

$A = \pi(6 \text{ in})^2$

$A = 36\pi$

$A = 113.04 \text{ in}^2$

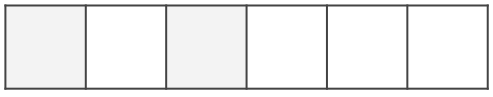
Step 4: *The answers are* **37.68 in** *and* **113.04 in^2**

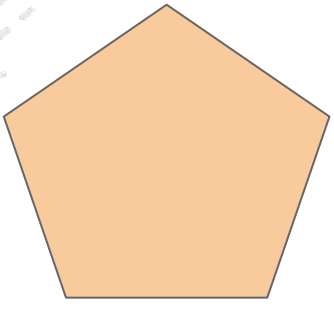
TABLE OF ACTIVITIES

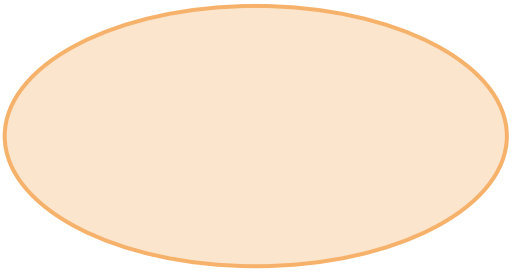
THE MYSTERIOUS PLANET

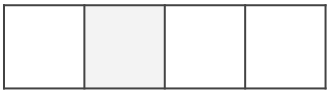
K - G2
Basic

Help Neil solve this math problem. Identify the name of each shape and let their letters form the name of the mystery planet.









What are the letters of the shaded tiles? From them, what is the name of the mysterious planet?

_____

THE EIGHT PLANETS

K - G2
Basic

The following are the eight planets in the universe. The problem here is: what should be the arrangement (smallest to largest) of these planets based on their sizes? Write 1 to 8 for your answers.

☐ Earth

☐ Jupiter

☐ Neptune

☐ Saturn

☐ Mars

☐ Mercury

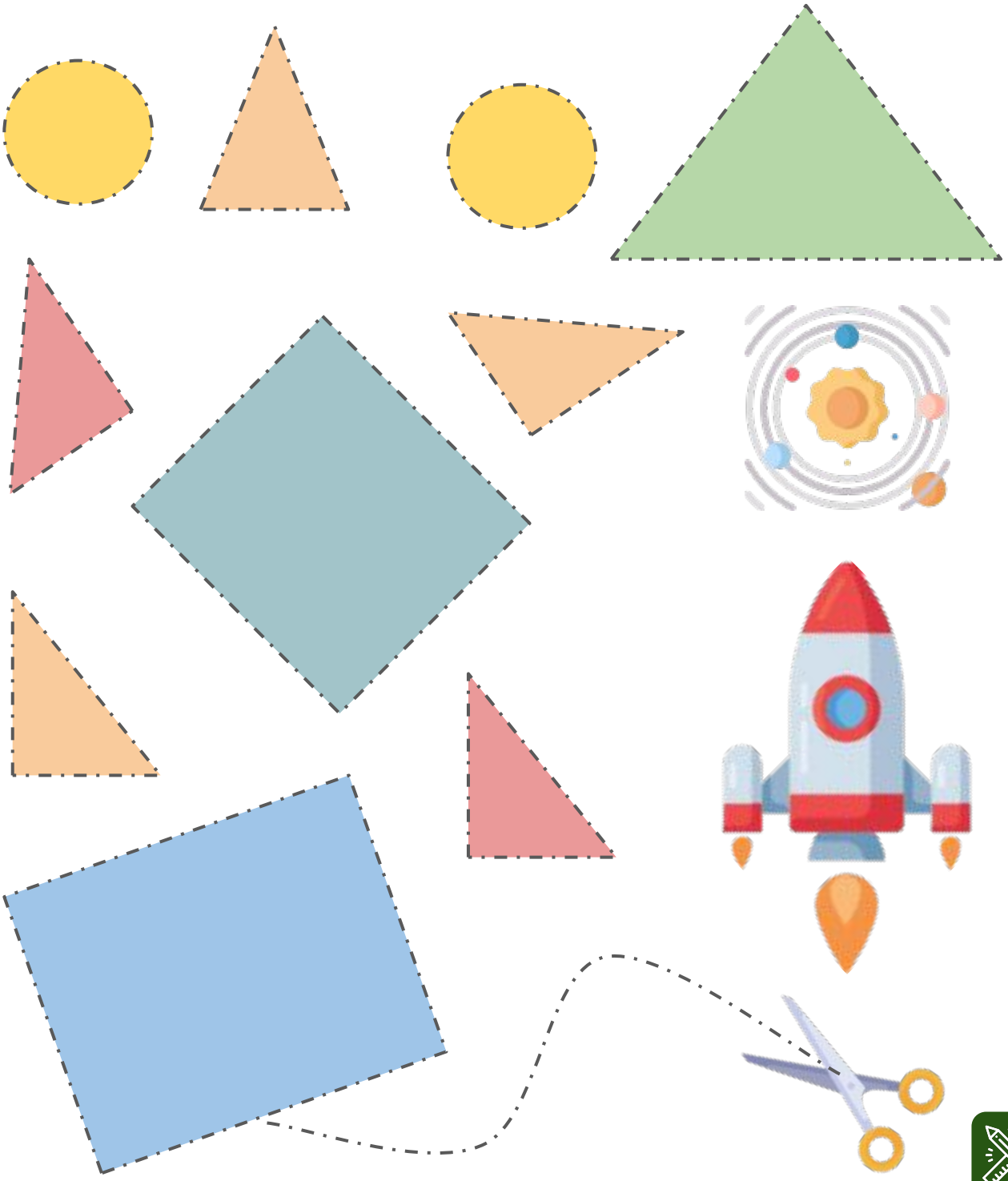
☐ Venus

☐ Uranus

MY D.I.Y. ROCKET

K - G2
Basic

Want to solve some sort of puzzle pieces problem? Do it so that you can create your own rocket and travel the universe! Cut and paste these shapes and form your own rocket.



E-V-M PLANETS

K - G2
Basic

Look at the given table below about the temperature in planet Earth, Venus, and Mercury. After that, answer the following word problems.

Name of the Planet	Temperature
Earth	15 ℃
Venus	464 ℃
Mercury	167 ℃

1. Among the three featured planets, which is the coldest planet? Why?	Solution and answer:
2. Which one is to be categorized as the “hottest planet” in the solar system? How did you come up with the answer?	Solution and answer:
3. What is the difference, in temperature, of the hottest and coldest planet?	Solution and answer:

THE EARTH'S TEMPERATURE

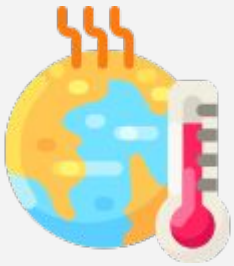
K - G2
Basic

Read and understand some basic facts about space. After that, solve each using the Polya's technique in solving problem.

1. For the past years, the Earth's average temperature is 15 ℃. Due to the global warming caused by climate change, some areas have reached 18 ℃. How much is the gap of the recorded temperature?

Solution:

Solution:



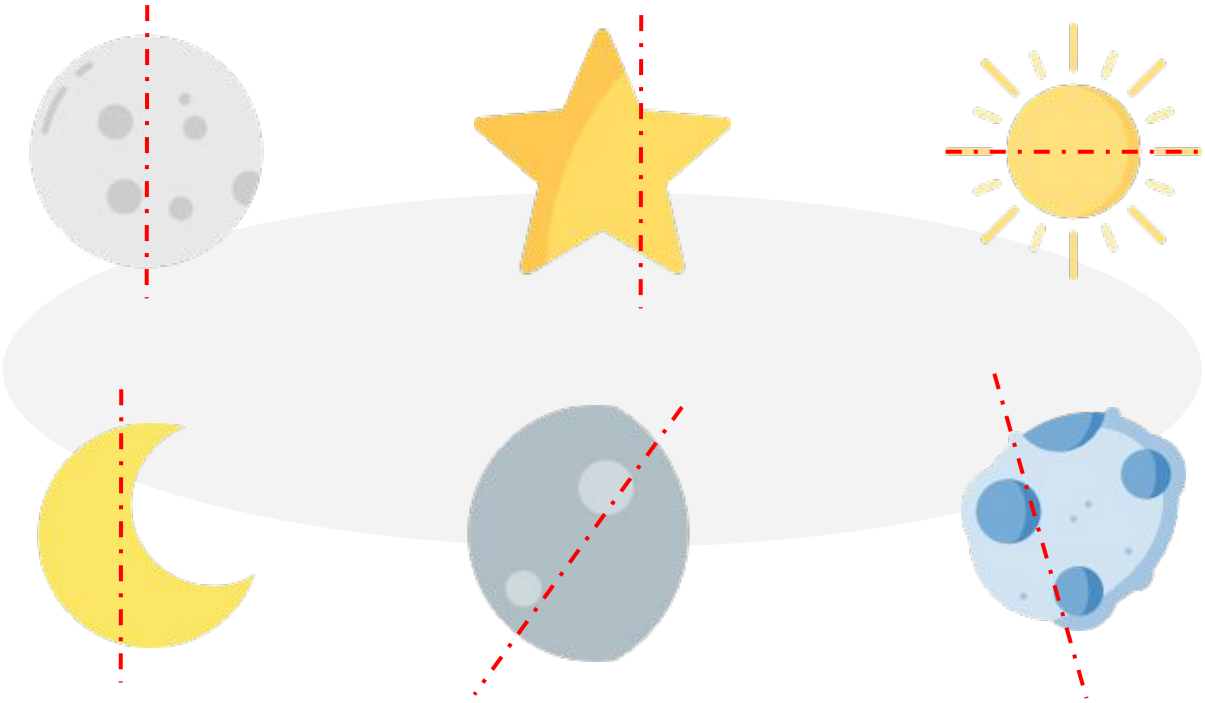
2. In 2015, the recorded average temperature in Antarctic Peninsula is from 5 ℉ to 36 5 ℉. How much is the difference of the two temperature records?

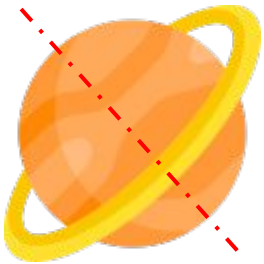
Solution:

SYMMETRICAL CELESTIAL BODIES

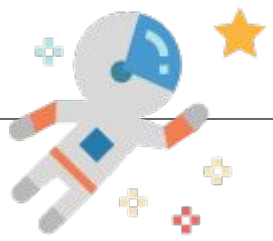
G4-G7 Advanced

Examine each picture below. A line is drawn on each image. Can you tell if the produced images are symmetrical or not?





Based on the images above, which among them are symmetrical? How do you say so? When do we say that a shape/image is symmetrical?



MOON REPLICAS

G4-G7
Advanced

To celebrate World Space Week, the 6th graders would like to create different moon replicas. Refer to each situation below and help these learners, like you, solve for the circumference. Note: π = 3.14.

1. Neil traced a circle in a cardboard to create a moon replica. He was able to measure the radius of the circle and found out that it was 5.5 in. What is the circumference of this circle?

2. Another circle was traced to create a larger moon than the previous one. When Neil asks his classmate about the radius of the circle, his classmate said, “the radius of this circle is three less than twice the previous radius.” Compute for the circumference of the larger circle.

Which three planets have the most number of moons?

1. _____

2. _____

3. _____

ASTEROID IMPACTS

G4-G7 Advanced

Given below are the top 2 largest asteroid impacts on Earth. On each event, compute the circumference of the created impact.

1. Vredefort Crater

Asteroid impact date: Estimated 2 billion years ago

Location: Free State, South Africa

Specs: Also known as the Vredefort Dome, the Vredefort crater has an estimated radius of 118 miles (190 kilometers), making it the world's largest known impact structure. This crater was declared a UNESCO World Heritage Site in 2005.

2. Sudbury Basin

Asteroid impact date: Estimated 1.8 billion years ago

Location: Ontario, Canada

Specs: The Sudbury Basin is considered one of largest impact structures on Earth, with an estimated diameter of 81 miles (130 kilometers). Dating back 1.8 billion years, it is also one of the oldest known impact structures in the world.

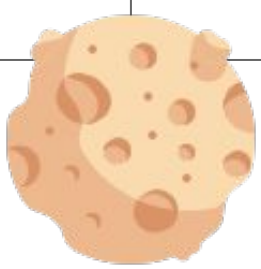
Source: https://www.nationalgeographic.com/

THE AREAS OF THE PREVIOUS SPACE EVENTS

G4-G7 Advanced

Look back at the two previous activities. Can you compute for their area? Show it below.

1.	2.
3.	4.



ASTEROID IMPACT SEARCHING

G4-G7
Advanced

Asteroids do not care whether they will hit the Earth or not. That is why your task today is to search five asteroid impacts on Earth. List down when and where did it happen then complete the table below.

Basic Details about the Asteroid impact (include the diameter of the impact)	Circumference	Area

ANSWER GUIDE

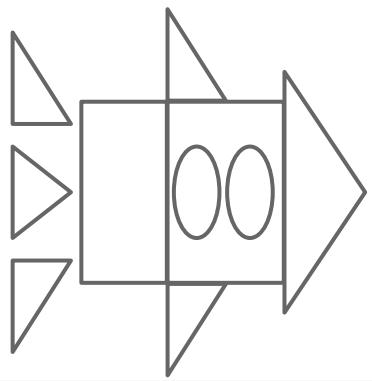
Activity 1

Square Rectangle Pentagon Oval VENUS

Activity 2

Smallest to largest planets:
Mercury, Mars, Venus, Earth, Neptune, Uranus, Saturn, and Jupiter
or 4, 8, 5, 7, 2, 1, 3, 6

Activity 3



Activity 4

1. The coldest planet is the Earth because it has the lowest temperature reading among them.
2. The hottest planet is Venus because it has the highest temperature reading.
3. The difference of the hottest and coldest planets in terms of temperature is (464 - 15 = 449 ℃)

Activity 5

1. The gap is 3 degree Celsius
2. The difference is 30 degree Fahrenheit

Activity 6

The symmetrical images no. 1, 3, 5, and 7. Symmetrical images are produced if they are the mirror images of each other.

ANSWER GUIDE

Activity 7

1. 34.54 in 2. 50.24 in

Activity 8

1. 1193.2 km 2. 408.2 km

Activity 9

1. 95.26 sq. in
2. 201.54 sq. in
3. 113678.9 sq. km
4. 13304.53 sq. km

Activity 10

Answers may vary.

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