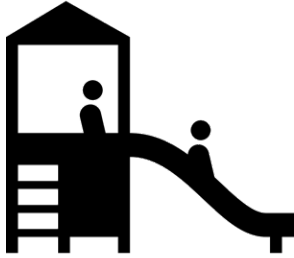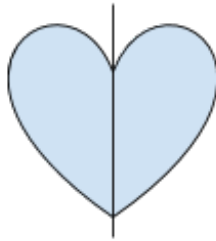# Can You Play with Math?

Playground

Math is everywhere. Including the playground! One math idea we can explore is **symmetry**. What is symmetry? When you divide an object in half and both pieces are mirror-images of each other that is called **bilateral symmetry**. When you turn an object around its center and the object lines up with itself that is called **radial symmetry**.

This heart has bilateral symmetry. It can be divided in half and the halves are mirror images of each other.
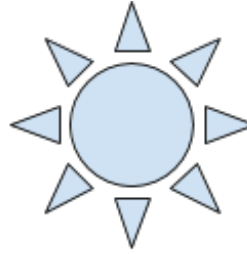
This sun has radial symmetry. It can be rotated and line up with itself multiple times.

1. Look for the large structures that look like giant turtle shells. Draw a turtle shell below. What kind of symmetry does the turtle shell have?

2. Look for the giant shade structures shaped like flowers and butterflies. What kinds of symmetry do they have?

*Every child* is a STEM child. *Every space* is a STEM space.

3. Find 3 other examples of symmetry in the playground area and around the Zoo. Label which ones are man-made and which ones are natural. Draw your findings below:

| Example 1	Example 2	Example 3

Are radial and bilateral symmetry the only types of symmetry you can find?

Look for angles in the playground. Angles are formed by two lines that meet in a point. We use a tool called a protractor to measure angles. You can make your own protractor to estimate some of the angles around you.
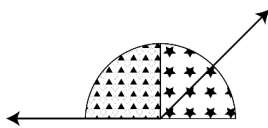
Tip: to make your own protractor, find 2 straight edge items, like pieces of paper, or sticks. Look at the protractor diagram provided to engineer your own tool.
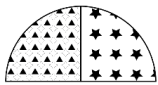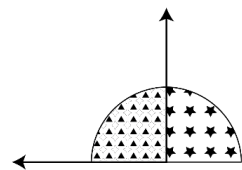
Line up the bottom edge of the protractor and the bottom edge of the angle.
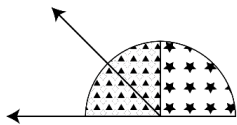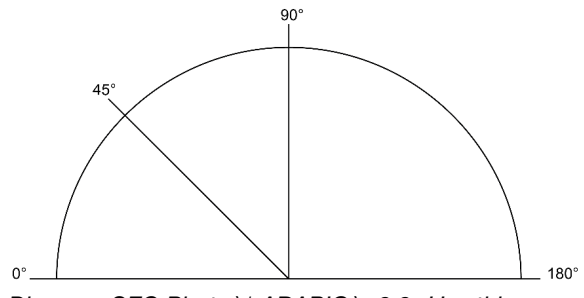
If the angle takes up less than half of the protractor, it is an **acute** angle. Acute angles are **less** than 90 degrees.

If the angle takes up more than half of the protractor, it is an **obtuse** angle. Obtuse angles are **greater** than 90 degrees.
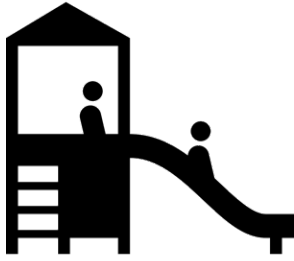
If the angle takes up exactly half of the protrac- tor, it is **right** angle. Right angles are **exactly** 90 degrees.

4. Use your protractor to estimate some of the angles you see around you. They can be obtuse or acute or even right angles. What angles can you find in the Lacerte Family Children's Zoo?

| Real World Object	Natural or man-made object?	Angle Measurement	Type of Angle (Right, Acute, or Obtuse)
Tree Branch 1	*natural*		
Tree Branch 2			
Slide	*Man-made*		
Your choice			
Your choice			

Can You Play with Math?
Playground
Note: You can make copies on overhead transparencies from the attached file, or you can use protractors provided by the Zoo.

Math is everywhere. Including the playground! One math idea we can explore is **symmetry**. What is symmetry? When you divide an object in half and both pieces are mirror-images of each other that is called **bilateral symmetry**. When you turn an object around its center and the object lines up with itself that is called **radial symmetry**.

1. Look for the large structures that look like giant turtle shells. Draw a turtle shell
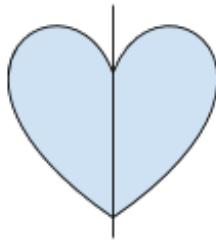
This heart has bilateral symmetry. It can be divided in half and the halves are mirror images of each other.
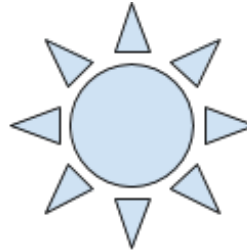
This sun has radial symmetry. It can be rotated and line up with itself multiple times.

below. What kind of symmetry does the turtle shell have?
- *The turtle shells have bilateral symmetry*
- *The flower shade structure has radial symmetry*
- *The butterfly shade structures have bilateral symmetry*

2. Look for the giant shade structures shaped like flowers and butterflies. What kinds of symmetry do they have?
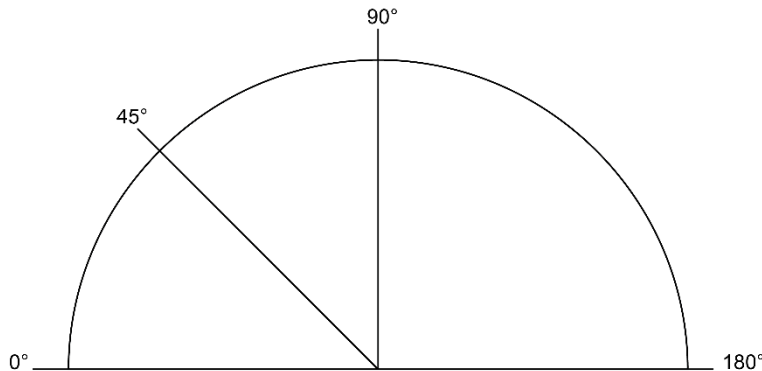*The flower structures have radial symmetry. The butterflies have bilateral symmetry.*

3. Find 3 other examples of symmetry in the playground area and around the Zoo. Label which ones are man-made and which ones are natural. Draw your findings below:

Example 1 The eggs in the bird's landing case have radial and bilateral symmetry Natural	Example 2 Spider web climbing structure has symmetry Man-made (inspired by nature)	Example 3 The slide can be divided in half and has bilateral symmetry Man-made

Look for angles in the playground. Angles are formed by two lines that meet in a point. We use a tool called a protractor to measure angles. You can make your own protractor to estimate some of the angles around you.

Tip: to make your own protractor, find 2 straight edge items, like pieces of paper, sticks, or some leaves. Look at the protractor diagram provided to engineer your own tool.

Join us in *Creating a Better World for Animals*. Give wild animals a space to play by adding a bug house or toad abode to your yard.

Every child is a STEM child. Every space is a STEM space.

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4. Use your protractor to estimate some of the angles you see around you. They can be obtuse or acute or even right angles. What angles can you find in the Lacerte Family Children's Zoo?
   ● *Answers will vary*
   ● *Most 90-degree angles are found on man-made structures*

Real World Object	Natural or man-made object?	Angle Measurement	Type of Angle (Right, Acute, or Obtuse)
Tree Branch 1	*natural*		
Tree Branch 2			
Slide	*Man-made*		
Your choice			
Your choice			

Protractor Resource

Use this protractor to help you find and measure angles all throughout the Dallas Zoo
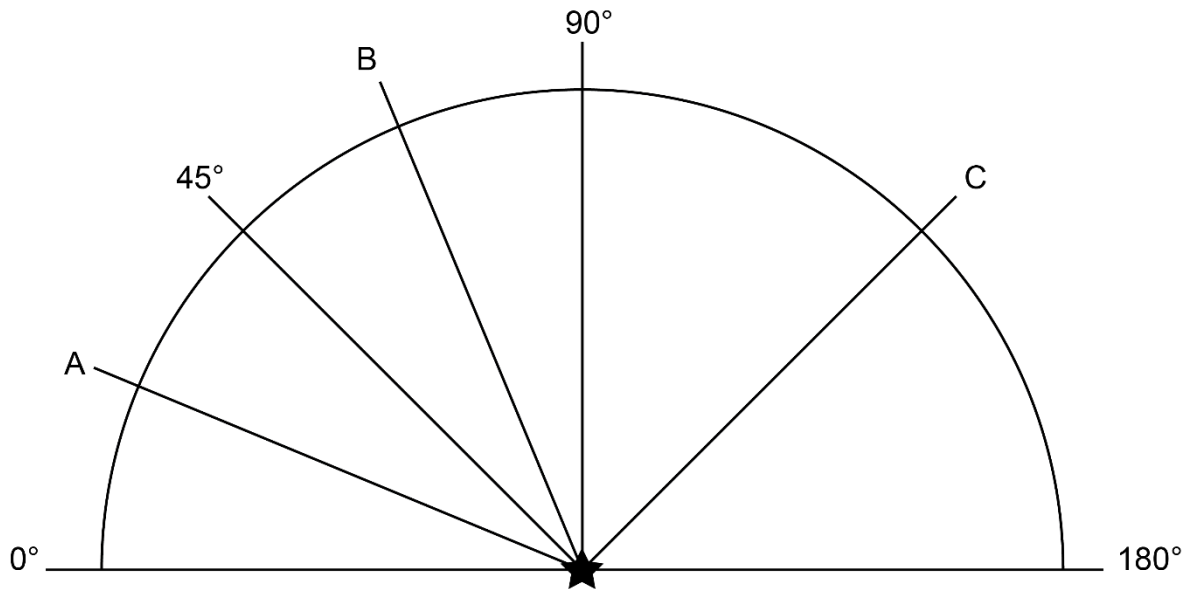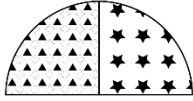

Create your own protractor by labeling the remaining angles (A, B, & C) with the correct degree measurement.
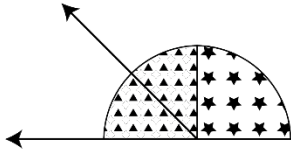
Hints: 45° is half of 90°. Angle A is half 45°. Angle B is halfway between 45° and 90°. Angle C is halfway between 90° and 180°.

and elsewhere. Make sure the point of the angle matches up with the star on the protractor. You can cut or tear out the protractor to make it easier to use.
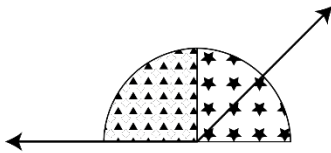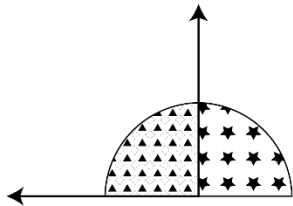
Using a Protractor

Line up the bottom edge of the protractor and the bottom edge of the angle.

If the angle takes up less than half of the protractor, it is an **acute** angle. Acute angles are **less** than 90 degrees.

If the angle takes up more than half of the protractor, it is an **obtuse** angle. Obtuse angles are **greater** than 90 degrees.

If the angle takes up exactly half of the protractor, it is **right** angle. Right angles are **exactly** 90 degrees.