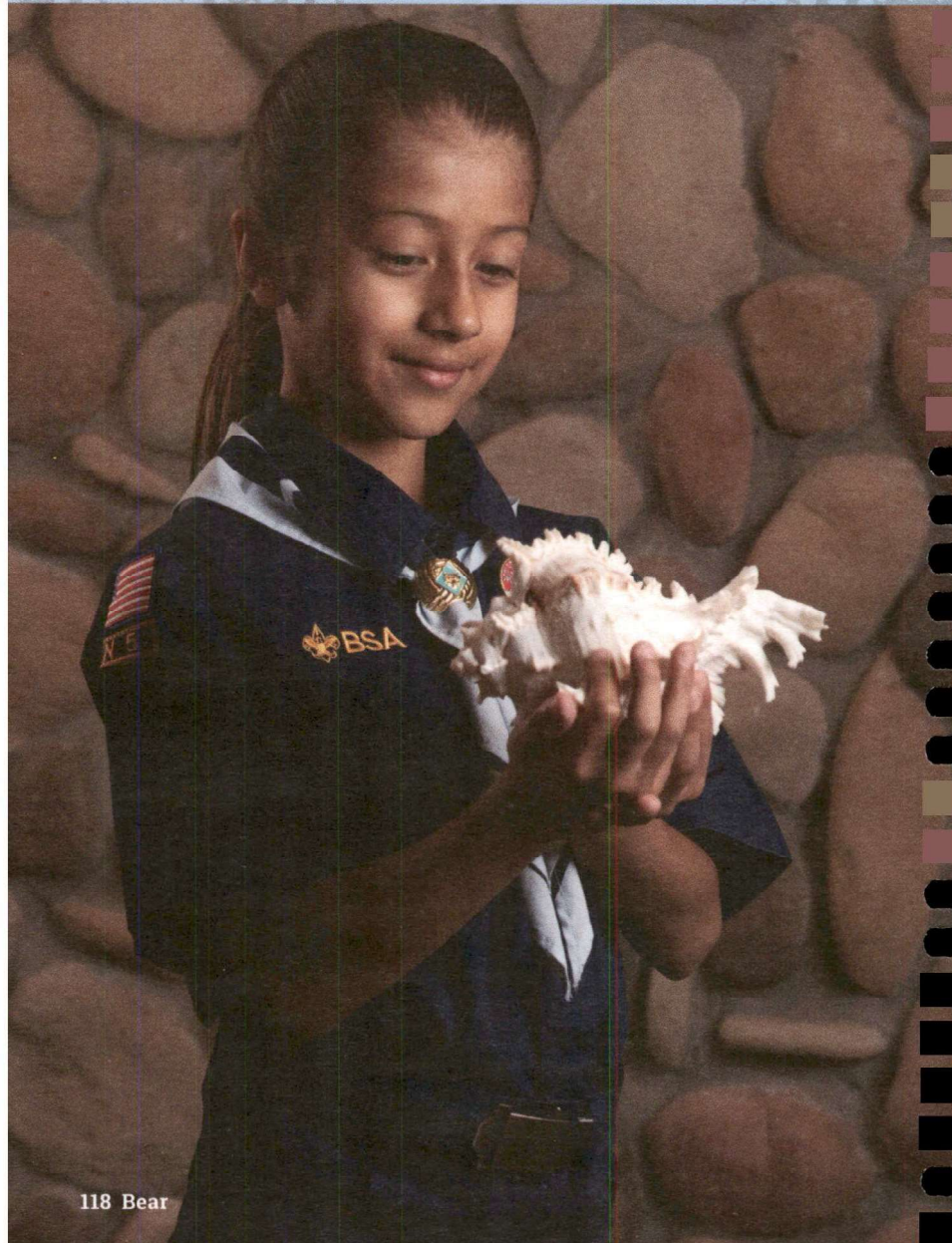
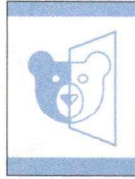


BALANCING BEARS

ELECTIVE ADVENTURE



SNAPSHOT OF ADVENTURE



You are probably familiar with a basic math problem like $3 + 2 = 5$. Mathematicians don't call these problems; they call them equations. The equal sign means that the expressions on the left side and right side of the equal sign are the same, or you could think of them as being balanced.

Math doesn't always involve adding and subtracting numbers. Finding patterns in things is the first step in becoming a mathematician. After spotting a pattern, a mathematician uses the math tools to find a way to recreate that pattern. In this Adventure, you'll have fun making "trail mix math." Then, you'll look to nature and discover a world of mathematics called symmetry in which things are balanced.

REQUIREMENTS

1. Make trail mix using trail mix math.
2. Identify an animal that has a pattern to its physical appearance. Investigate how the animal uses its pattern.
3. Find examples of bilateral symmetry in nature.
4. Find examples of radial symmetry in nature.



- Elective Adventure
- Scan for this Adventure page

REQUIREMENT 1

Make trail mix using trail mix math.

The fun thing about trail mix is that you can make your own based on the foods you like. Some people like just three ingredients for their trail mix, some like six, and some may like more. Creating a good trail mix is about balance.

The original trail mix is called GORP, which stands for Good Old Raisins and Peanuts. This trail mix, created by hikers, is a favorite because the raisins and peanuts are easy to keep. The raisins give sugar for quick energy, and the peanuts give protein for longer-term energy and salt to help replace the salt your body loses when you sweat.

If trail mix only has sugary items, then it is only going to give you quick energy, and if your trail mix only has the protein, you will miss out on a needed boost for climbing a hill.

Time to make trail mix using trail mix math! Your trail mix will be divided into six parts or sixths. Each of the six parts must be equal. Together, your six parts will make a whole.

To make sure your trail mix is balanced, you're allowed one type of cereal, two items that are sweet, two items that are salty, and one type of nut. If you're allergic to any of these ingredients, you should make a substitution.





Cereal

$\frac{1}{6}$

+



Sweet

$\frac{2}{6}$

+



Salty

$\frac{2}{6}$

+



Nut

$\frac{1}{6}$

There are six parts to your trail mix and only one part is the cereal, which means that one-sixth of your trail mix is cereal. One part out of the six parts makes the fraction $\frac{1}{6}$. The top number is the numerator (one part cereal), and the bottom number is the denominator (how many parts make up the whole). All the parts or fractions must equal the whole.

Make your trail mix, and as you're eating it, can you write the fractions for each ingredient of your trail mix?

My whole trail mix = $\frac{6}{6}$

Type of cereal (_____) = ____ / ____

Sweets (_____) = ____ / ____

Salty (_____) = ____ / ____

Nuts or other (_____) = ____ / ____



1

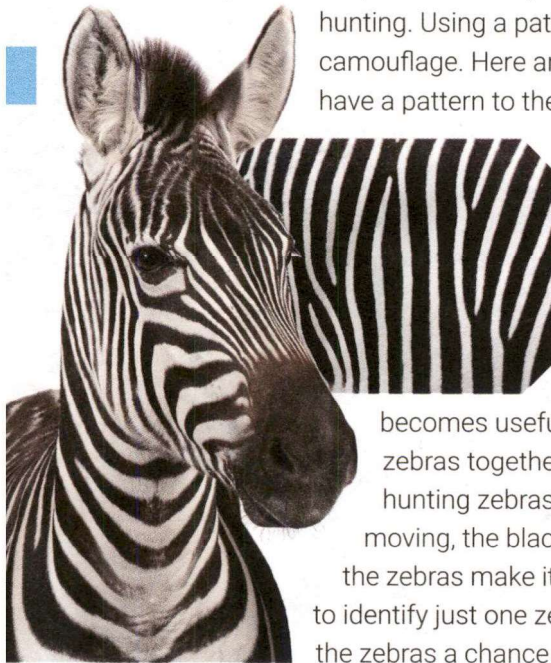
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REQUIREMENT 2

Identify an animal that has a pattern to its physical appearance. Investigate how the animal uses its pattern.

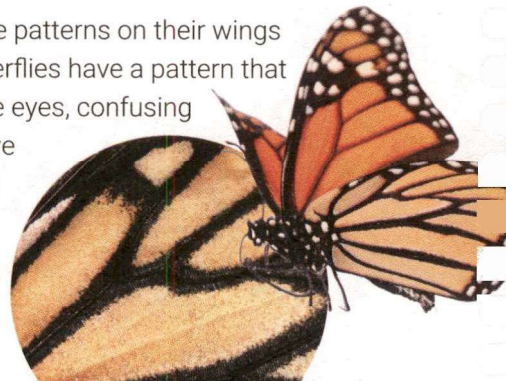
A pattern is when a design is repeated. Animals may have patterns to protect themselves by hiding or confusing predators. Animals may also have patterns to help them hide as they are hunting. Using a pattern to hide is called camouflage. Here are some animals that have a pattern to their physical appearance.



Zebras – The zebra has black and white stripes that repeat all over its body. These stripes are not very helpful to just one zebra. The pattern

becomes useful when there are several zebras together. When a predator is hunting zebras and the zebras start moving, the black and white stripes on all the zebras make it difficult for the predator to identify just one zebra. This confusion gives the zebras a chance to run away.

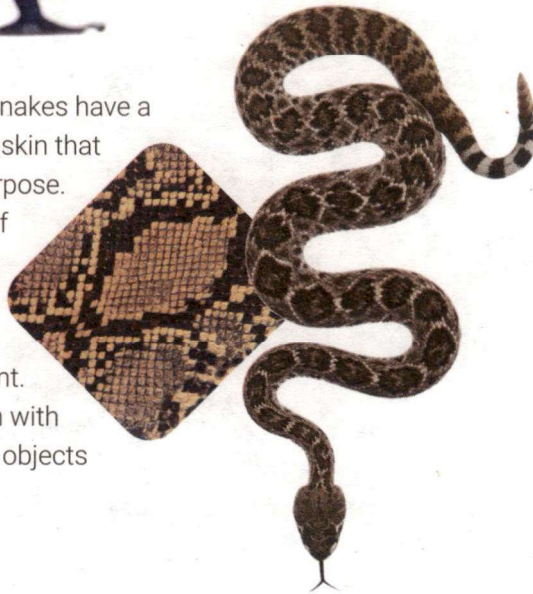
Butterflies – Butterflies use the patterns on their wings for different things. Some butterflies have a pattern that makes them look like they have eyes, confusing predators. Other butterflies have patterns that look like tree bark so they can hide from birds that may eat them.





Poisonous Dart Frogs – The poisonous dart frog has very colorful patterns that are different from its surroundings. Instead of using patterns to hide, the poisonous dart frog uses its patterns as a warning. Eating the frog for most animals can make the animal sick or could even kill it. The color of the poisonous dart frog also tells how poisonous they are.

Rattlesnakes – Rattlesnakes have a distinct pattern on their skin that serves an important purpose. The alternating bands of color, typically brown or gray and black, help to camouflage the snake in its natural environment. This allows it to blend in with rocks, leaves, and other objects on the ground.



Date _____

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REQUIREMENT 3

Find examples of bilateral symmetry in nature.

Imagine you place a mirror halfway across something and then look at its reflection in the mirror. Does the object look the same in the mirror as it would without the mirror? That is bilateral symmetry. The word bilateral has the prefix "bi" in it, which means two. Bilateral symmetry means you can find two identical parts on either side of an invisible line down the middle.



A banana has bilateral symmetry. If you cut a banana in half long ways, from top to bottom, each half looks the same. However, if you cut the banana in half across the middle the top has a stem and the bottom half does not.

Sometimes it's easy to spot bilateral symmetry in nature; other times you may have to change the way you look at things. Take a look at some plants and animals to see if you can find bilateral symmetry.



Date

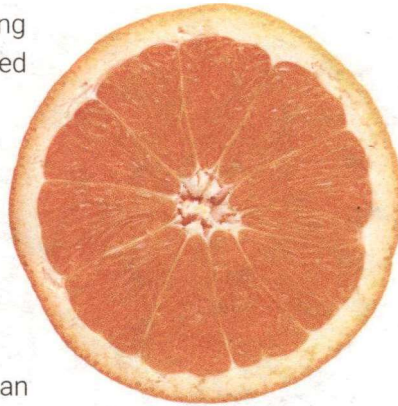
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REQUIREMENT 4

Find examples of radial symmetry in nature.

Radial symmetry is when something has an identical part that is repeated around a circle or radius. The first clue to finding something that has radial symmetry is that it will be round in shape.

An orange has radial symmetry. Like the banana, you have to cut the orange a certain way to see the symmetry. Cutting an orange in half, side to side, you'll see that the orange has sections that repeat themselves. Each orange piece has seeds, flesh, and skin. If you cut an orange from top to bottom you don't see the radial symmetry.



Date _____

Adult's Signature _____

