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STEM LEARNING ACTIVITY SAMPLE PACK

ALL AGES

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Welcome to the STEM Learning Activity Sample Pack

We hope that these specifically selected activities will provide an engaging, hands-on experience that helps your student discover more about Nature. The STEM Learning Activity Pack program invites children to play the role of a naturalist by learning the importance, history, and future of the natural world.

STEM is more than the sum of Science, Technology, Engineering and Math; it is an approach to learning that focuses on real-world problem-solving using an inquiry-based methodology and all of the problem-solving tools you have at your disposal.

STEM problem-solving tools include multifaceted collaboration, creativity, coding, digital agility, media literacy, critical thinking, global citizenship, and dynamic communication. Whether you call it STEM, STEAM, STREAM or something else — this conversation is about the skills we need today (and for the future!) in order to function effectively and thrive as workers, family members and citizens.*

We hope you enjoy your adventure!

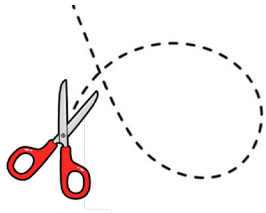
—The North Museum Education Team

*Courtesy of the Lancaster STEM Alliance

Activity 1

Insect and Spider Sorting

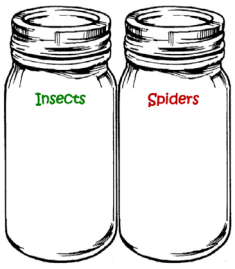
Let's collect some bugs, practice sorting and classification and count legs along the way!



1. Help your child cut out the different insects and arachnids on the next page.

2. Let's find a spider and count how many legs it has.

3. Next, let's find an insect and count how many legs it has.



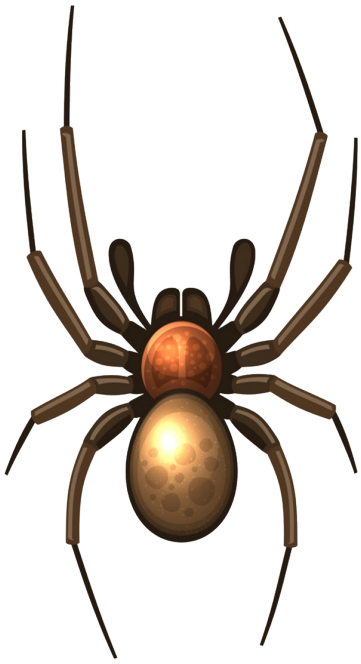
4. Place each with on the correctly labeled jar to sort them.

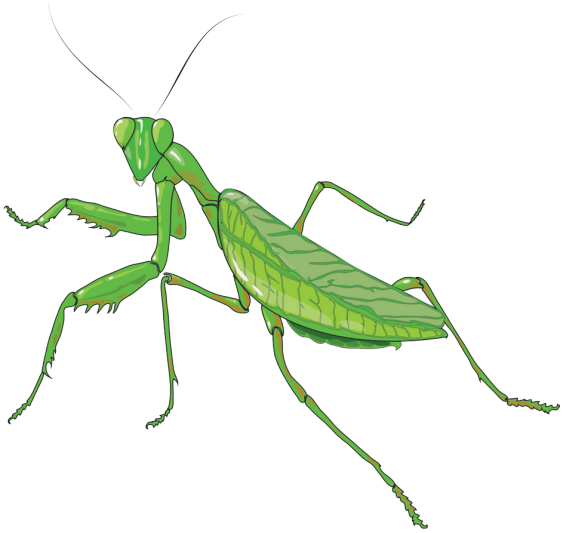
Now, let's find more! Have your child count legs on the remaining group to determine, is it a spider, or is it an insect!

Glue your answers on each jar for safe keeping.

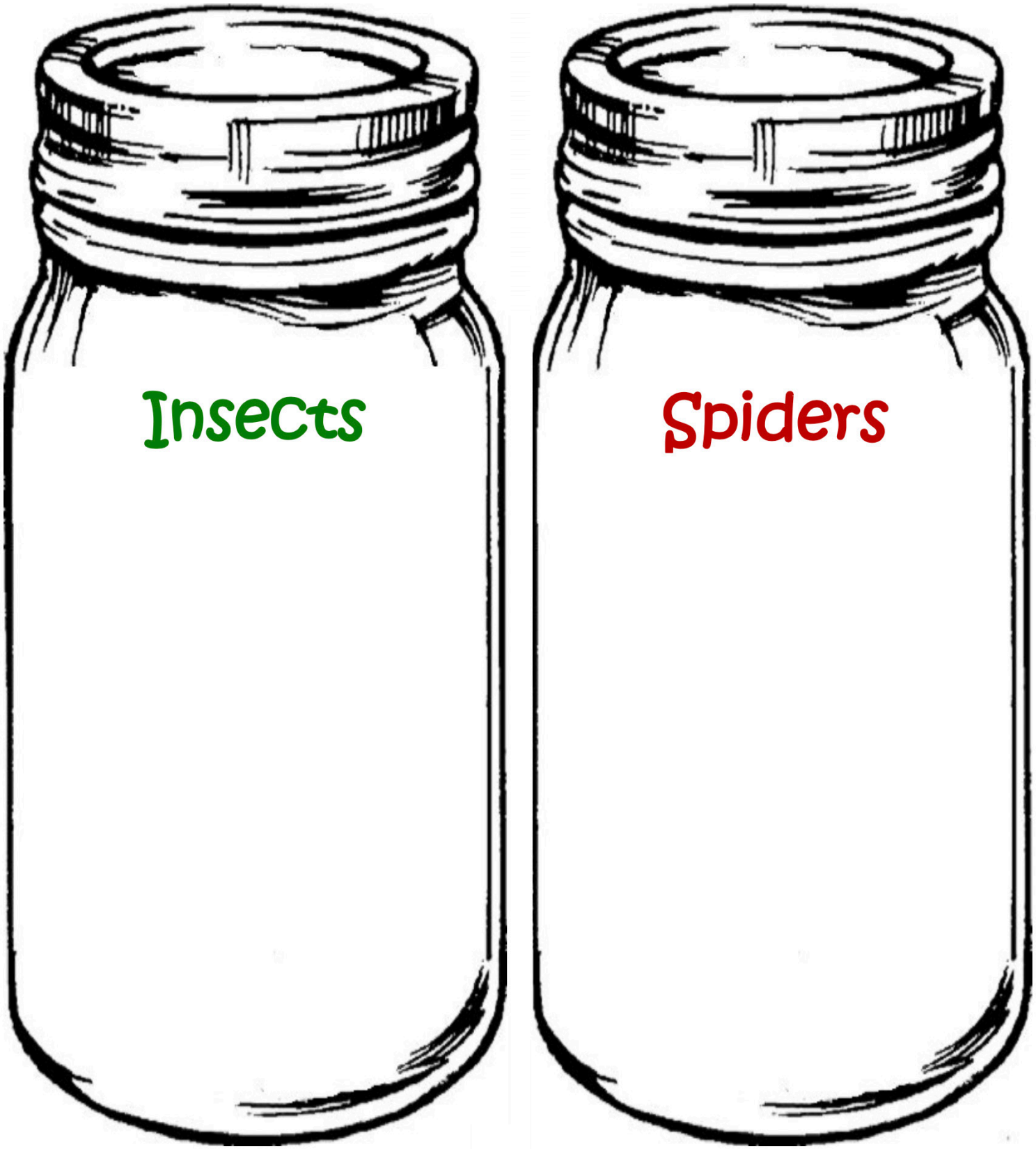
On a nice day, take a jar out into a grassy space and see if you can find spiders or insects in your backyard!

Insect and Spider Sorting



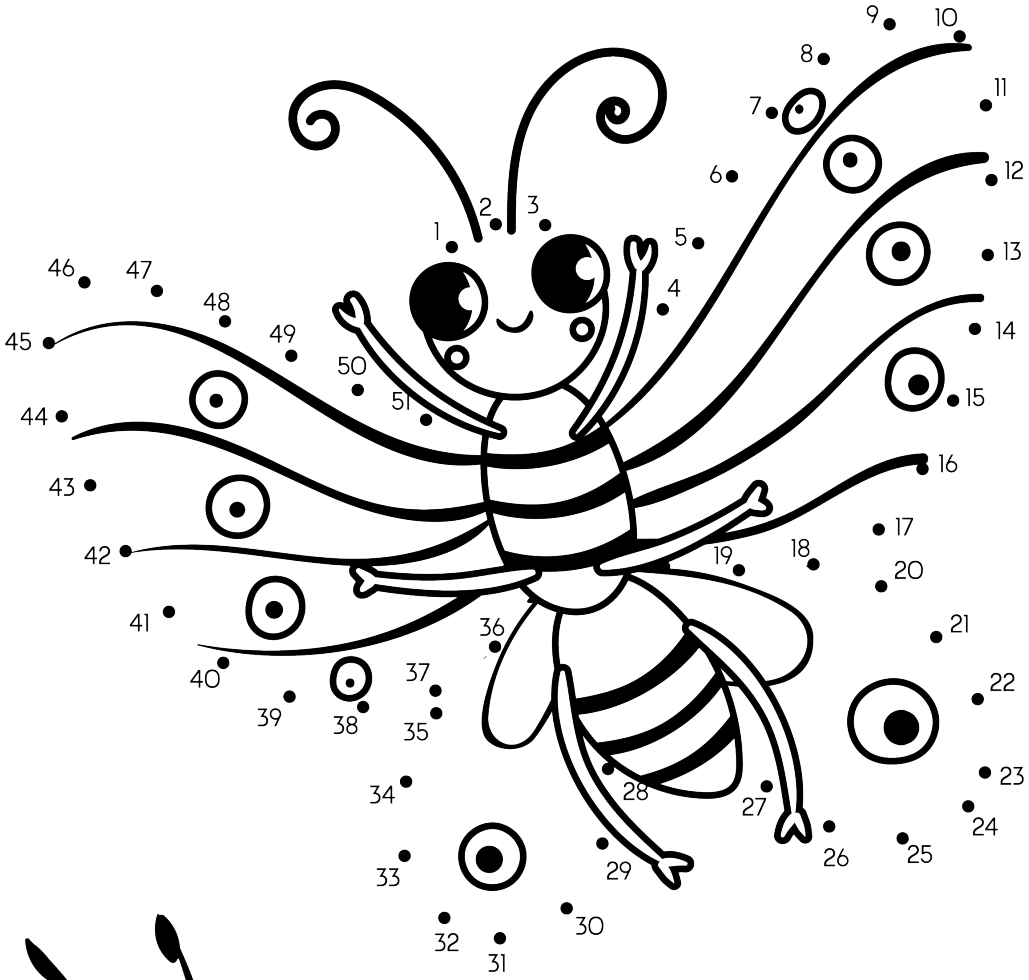


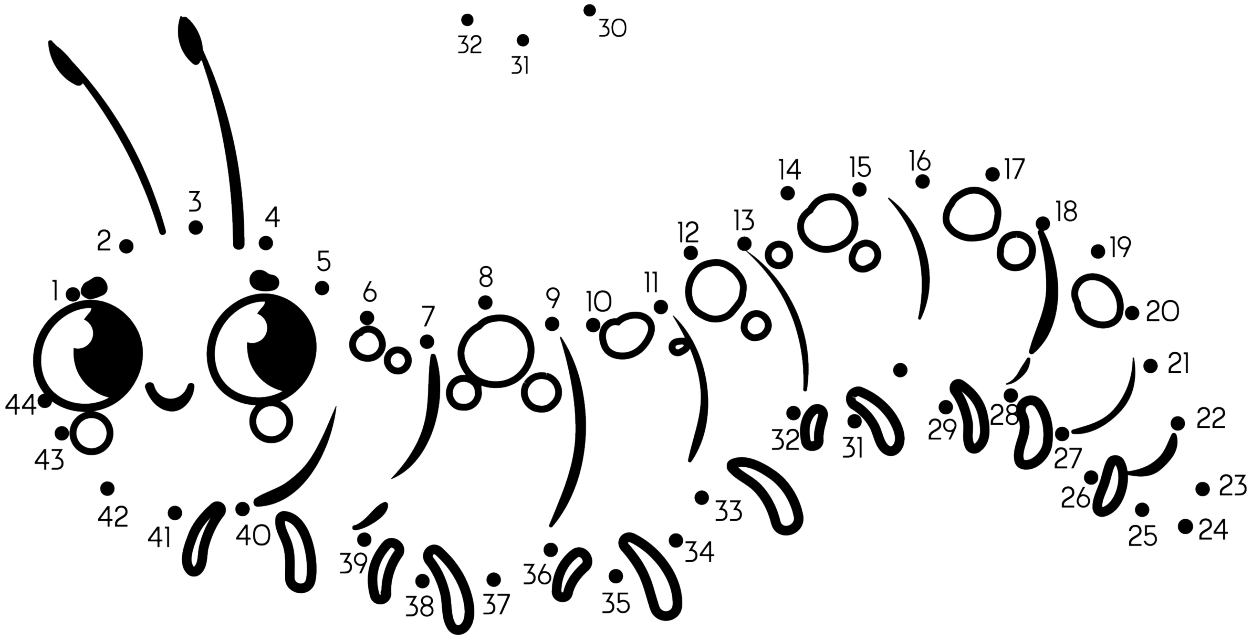
Insect and Spider Sorting



Bug Connect the Dots

What two creatures are hiding on this page? Connect the dots to find out!





Activity 2

Salt Water Density Experiment

Materials Needed:

- Small plastic jewels (Anything light and plastic would work like plastic bingo chips)
- Several clear cups full of water
- Salt
- Sugar
- Baking Soda

When you add salt to water it makes the water more dense. This means it gets heavier. Many objects that sink in fresh water will float in salt water!

Objects float in baking soda water because baking soda is a kind of salt. It dissolves in water to make the water more dense, just like table salt does. However, baking soda has another property that gave us a little bit of a surprise!

When baking soda dissolves in water some of it reacts to form carbon dioxide gas. If you look carefully you will see tiny bubbles rising from the bottom of the cup.
Adding just the right amount of baking soda can make the beads float in the middle of the glass. Try it out!

Salt Water Density Experiment

1. Dissolve 2 tablespoons of salt in one cup, 2 tablespoons of sugar in another cup, and 2 tablespoons of baking soda in a third cup. Be sure to leave one cup as plain, fresh water. (This is the controlled variable.)

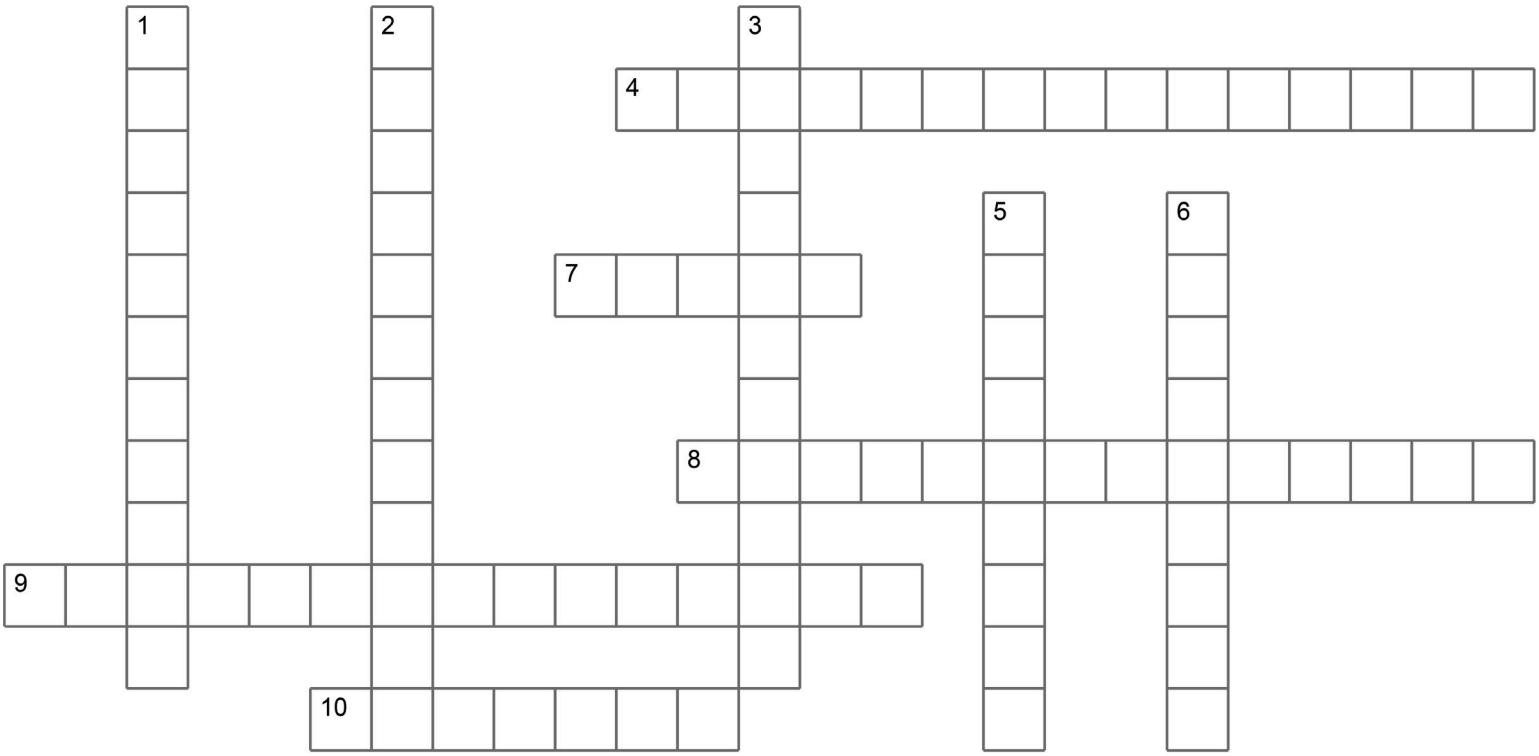
2. Have your child think about what might happen when they drop the jewels into each cup. Will the jewels sink or float? You may want to use a chart to write predictions and track your findings.

3. Next, one by one, add the beads to each cup and observe.

Which water mixtures were dense enough for the beads to float? Which mixtures saw them float? Ask your child to think about the reasoning beyond each result.

**Hint: You may need to add more salt/sugar/baking soda to the water, depending on what kind of jewels or food you are using in this experiment. Add enough that you can see some extra powder on the bottom of the cup. The salt water and baking soda water should make the jewels float. Read below to find out why!*

The Bird is the Crossword



ACROSS

4. One of the fastest birds
7. Birds build these in trees, on cliffs or on the ground
8. Grow in the wings and the tail
9. Birds bear their young in these
10. Fastest running bird, but cannot fly

DOWN

1. This bird's heart beats 1,000 times a minute
2. Grow close to the skin to keep birds from getting too cold or too hot
3. Scientific study of birds
5. Longest living bird - up to 60 years
6. Periodic passage of birds from one region to another for feeding or breeding

ornithology	flight feathers	peregrine falcon
migration	down feathers	albatross
hard-shelled eggs	ostrich	hummingbird
nests		

Activity 3

Paper Roller Coasters

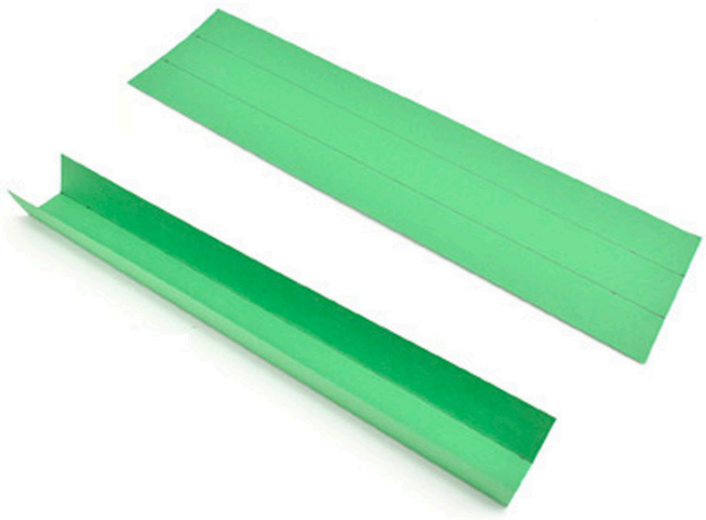
Materials Needed:

- Paper
- Tape
- Scissors
- Ruler
- Pencil
- Corrugated cardboard
- Marble

Prep Work:

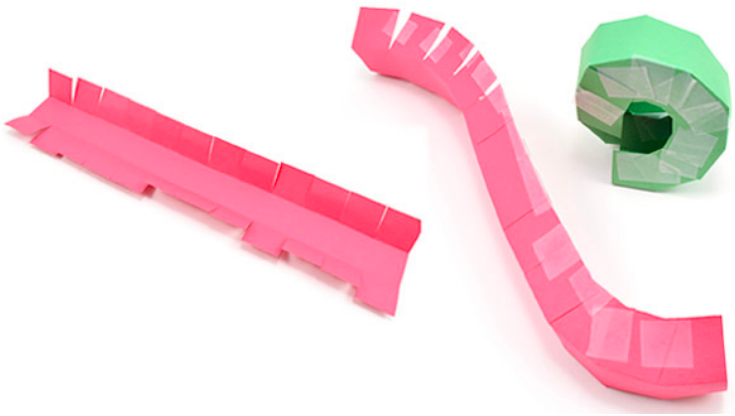
Before you try building an entire roller coaster, practice building the individual track segments. You can print the template on the following pages and cut out the pieces, or follow the instructions to draw your own with a pencil and ruler.

Paper Roller Coasters



To build a straight segment:

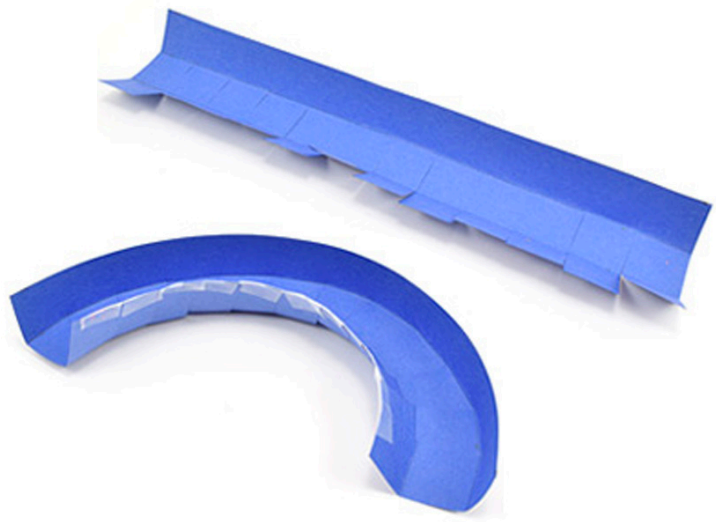
1. Cut a 7.5 cm (3 inch) wide strip of paper.
2. Draw two parallel lines that divide it into three 2.5 cm-wide strips.
3. Fold the two sides up 90 degrees along those lines to form walls.



To build a loop or a hill:

1. Cut a 7.5 cm (3 inch) wide strip of paper.
2. Draw two parallel lines that divide it into three 2.5 cm-wide strips.
3. Make marks every 2.5 cm along the long edges of the paper.
4. Cut inward 2.5 cm from these marks to form tabs.
5. Fold the tabs up 90 degrees.
6. Bend the track into the shape you want, and tape the tabs together to hold it in place. This step is easier with two people, one to hold the track in place and one to do the taping.

Paper Roller Coasters



To build a CURVE:

1. Cut a 7.5 cm (3 inch) wide strip of paper.
2. Draw two parallel lines that divide it into three 2.5 cm-wide strips.
3. Make marks every 2.5 cm along one long edge of the paper.
4. Cut inward 5 cm (2 inches) from these marks.
5. Fold up the uncut side of the paper 90 degrees to form a wall.
6. Fold up the tabs on the other side to form the other wall.
7. Since the bottom portion of the track is cut into segments, you can bend it horizontally to form a curve. Tape the tabs together to hold the curve in place.

To build a STRUT:

1. Cut a 6.25 cm (2.5 inch) wide strip of paper.
2. Draw four parallel lines that divide it into five 1.25 cm (0.5 inch) wide strips.
3. Cut inward 2.5 cm along these lines from one edge.
4. Fold along the lines to form a square shape (so two of the segments overlap), and use tape to hold in place.
5. Fold the tabs you cut at the end outward. This will allow you to tape the tabs flat to a piece of cardboard, so your strut can stand upright.

Paper Roller Coasters

Procedure:

1. Before you start building, plan out a design for your roller coaster. Draw your design on paper. Figure out how many supports and pieces of track you will need. Make sure your marble starts at the top of a hill.
2. Using a piece of corrugated cardboard as a base, assemble your track according to your plan. Tape the track segments together end-to-end to connect them.
3. Place the marble at the top of your track and let it go. Watch carefully.

? What happens? Does it make it the whole way through the track?

4. If the marble made it the whole way to the end, try making your track longer by adding more pieces.

? How long can you make your track before the marble comes to a stop?

5. If your marble didn't make it to the end, try to figure out why. Is there a spot in your track where the marble got stuck? Was the marble going too slow to make it through a loop? If necessary, make changes to your design, like making the curves more gradual or the starting hill taller, and try again.

HILL/LOOP

Cut along the solid lines and then fold along the dashed lines.

HILL/LOOP

HILL/LOOP

HILL/LOOP

Cut along the solid lines and then fold along the dashed lines.

SUPPORT

SUPPORT

CURVE

Cut along the solid lines and then fold along the dashed lines.

CURVE

SUPPORT

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ANIMAL SPOTLIGHT

RIVER TURTLE

In the movie *Frozen II*, Olaf tells the others that turtles can breathe through their butts. This is actually true! Eastern Snapping Turtles, Painted Box Turtles, and Fitzroy River Turtles along with many others can do this! It's called Cloacal Respiration. This helps certain species of turtles breathe while underwater if they are looking for food or hiding from predators.

FUN FACTS

- A turtle's shell is not only it's home, but also part of its body. Turtles can feel when you pet them on their backs!
- Turtles have existed for more than 215 million years.
- The largest turtle is the Leatherback Turtle. When fully grown, they can weigh over 2000 pounds!
- Turtles can detect the Earth's magnetic field and where the field lines cross. This especially helps the Leatherback Sea Turtle, which travels over 1000 miles to lay its eggs each year!
- Turtles live on every continent except Antarctica.
- Turtles do cry! It isn't because they are sad. They have a special organ in their eye that drains the salt from salt water after they drink it.

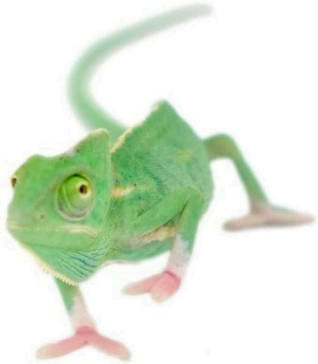
Fun Facts

Habitat

- Every organism has a unique ecosystem within which it lives. This ecosystem is its natural habitat. This is where the basic needs of the organism to survive are met: food, water, shelter from the weather and place to breed its young. All organisms need to adapt to their habitat to be able to survive.

- Another form of adaptation is BEHAVIOR. This means adapting to be able to survive the climatic conditions of the ecosystem, predators, and other species that compete for the same food and space. An adaptation is a modification or change in the organism's body or behavior that helps it to survive.

Adaptation



- Did you know that animals camouflage themselves so they can adapt to their environment? Adaptation can protect animals from predators or from harsh weather. Many birds can hide in the tall grass and weeds and insects can change their color to blend into the surroundings. This makes it difficult for predators to seek them out for food.

- Some adaptations of the crocodile include the ability to regulate its metabolism, its strong stomach, its armored body and its keen senses. These adaptations have allowed the crocodile to survive for millions of years as the closest creatures the modern world has to dinosaurs. The crocodile is a cold-blooded animal.

Fun Facts

Plants

- A plant is considered native if it has occurred naturally in a particular region, ecosystem, or habitat without human introduction. Exotic plants that evolved in other parts of the world or were cultivated by humans into forms that don't exist in nature do not support wildlife as well as native plants.

- Beans are not only some of the fastest growing seeds, but they're also some of the easiest seeds to grow as well, which makes them perfect for science projects. Beans don't even really need soil to grow. Students can simply put the beans in a plastic bag with a moist paper towel and see them grow, germinate and sprout in just seven to 10 days.

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