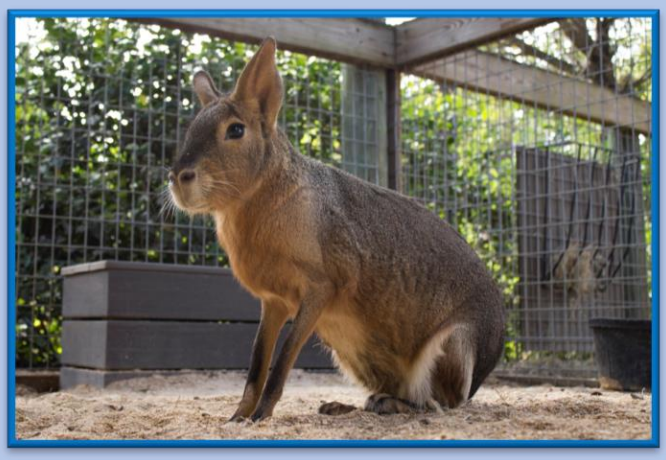
BREVARD ZOO

At Home Science – Laws of Motion

Science for Families: using what you have at home

The Patagonian Cavy, also known as a Patagonian Mara are found in the deserts, shrubs, and grasslands of Argentina. He may look like a rabbit, but he is actually, the fourth largest rodent in the world!

Cavies have long, strong back legs which are used to take off, running at speeds up to 20 – 30 mph. They are able to run, walk, hop, and jump. All of which, will aid him in escaping predators.



Fun With Learning

Newton's Third Law of Motion

For every action (force) there is an equal and opposite reaction (force).

Example: If your legs are bent and squatting like a rabbit or frog, you can apply an action (force) to the ground with your legs. The reaction (force) from the ground will send you high into the sky!

Challenge: Using a measuring tape, measure 6 ft along the ground. Although, you cannot jump 6 ft in the air, you can use your legs to jump as far as possible. Challenge yourself to jump as far as a Cavy can high!

Cool Science

Let's make hopping bugs!

Materials are: clothespins (any size), and markers. Design a bug, using your markers. Don't forget to give him bug eyes and if you want, add legs using pipe cleaners or construction paper. These are mine. Now, let's get hopping! Place your bug on a flat area, use your finger to press down the open side while you slide your finger off. How high did your bug fly? How does Newtons Third Law apply?

Give it a try!

Scientists use Newton's Laws of Motion to launch rockets here on the Space Coast

Materials are: any empty plastic bottle (Dawn, soda, or water bottle), paper, and markers or crayons. Decorate and design your paper. Roll it into a tube that fits snuggly over the top of your bottle and tape it together, making a rocket. Cut out a circle with a slit cut half-way to make a cone. Tape. Add plenty of glue to the top edge of your tube. Place cone on top. Let this dry. Place rocket on top of bottle and squeeze hard. Explore and redesign your rocket to discover what will make it fly the highest.

Got vinegar and baking soda? Give this one a try! https://www.ingridscience.ca/node/70 Adult and safety goggles are a must! I've done this one myself and I found it works best to turn it around and make the cork your rocket. Try it both ways and discuss Newton's 2nd Law of Motion!

Visit brevardzoo.org/be-outside-with-brevard-zoo.org for weekly activities

BREVARD ZOO

At Home Science - Buoyancy

Science for Families: using what you have at home

Buoyancy
Just like Finley, and the bone, Some objects float while others sink? Why? Does size matter?

Buoyancy is the opposite of gravity and is the force pushing objects up. Gravity pulls objects down while buoyancy forces objects up. When an object sits on water, the water pushes underneath creating an upward force.

Finley is much bigger than the bone! So why does he float and the bone sink? What makes Finley buoyant?

Fun With Learning

Sink or Float
Check out the Let's Get Outside activity in this weeks' Be Outside with Brevard Zoo. After finding objects on your nature walk, separate into those you think will float and those you think will sink. Test to see if you were right. If you were incorrect, discuss why.

Brain Teaser
How about a grain of sand? Sink or Float? Give it a try! Hint: It's all about density.

Challenge: Using a lemon or an orange, place them in a clear bowl full of water. What happens? Your challenge is to make the lemon or orange sink! If you are successful, what was it that changed? How did you change the buoyancy?

Cool Science

Buoyancy and Density
We've learned about buoyancy and you've played with density. What is density? Some objects are tightly packed with molecules while others are loosely packed with molecules. Tightly packed objects are dense and will sink in water and loosely packed are not dense and will float in water. Otter fur is super dense, but it allows air to be trapped within the fur. Due to this air and their lung capacity they are extremely buoyant. The size does not matter. So, the question to ask, is can buoyance change due to the liquid we use?

Give it a try!
Materials: the objects you collected on your nature walk, water, salt water, oil, milk, or other liquids you'd like to try. Pour liquids into separate glasses. Try your objects. Which ones floated? Which one's sank. Make a chart to compare the buoyancy of the different liquids.

Simple Science – Density Rainbow Water
Materials: 4 clear glasses, food coloring, water, sugar, ¼ measuring cup, 1 Tbl measuring spoon, tall clear jar or glass, squirt bottle (optional).
Add ¼ C water to each container (#1 – 4). Keep these containers in a line.
Containers:

1. Add 4 Tbl sugar and stir to dissolve. You may need to zap it in the microwave for 15-20 seconds to dissolve. Add 2 drops of green food coloring
2. Add 3 Tbl sugar and dissolve. Add only 1 drop of yellow food coloring.
3. Add 2 Tbl sugar and dissolve. Add 2 drops of blue food coloirng
4. Add 1 Tbl sugar and dissolve. Add only 1 drops of red food coloring
5. Starting with #1 water, slowly add each color to a tall clear container. If you have a squirt bottle this will work best. If not, pour slowly, using the back of a spoon to slow the pour into the container.

Visit brevardzoo.org/be-outside-with-brevard-zoo.org for weekly activities

BREVARD ZOO

At Home Science – Birds & Biomimicry

Science for Families: using what you have at home

I hope you enjoyed meeting Beni, our Blue Throated Macaw! Those beautiful feathers assist these parrots in their daily to search for food. Their tail feathers are even used as a brake to slow down in flight.

The flight of birds has fascinated people for centuries. Many, including Leonardo Di Vinci in 1485, were sketching and designing devices for humans to fly like birds. In early 1920's George White, began experimenting with bird-like flight. He was an inventor and an aviator. For six years, he experimented and secretly made 21 flights. In 1928, after successful flights in Cocoa, St Augustine residents witnessed him successfully fly a moving wing, foot-propelled ornithopter on the beaches of St. Augustine.

Fun With Learning
Up, Up, and Away – Thrust, Lift, Drag, and Gravity of Paper Airplanes
Thrust, lift, drag, and gravity allow paper airplanes to fly. These are the same forces which allow real planes to fly. The thrust of a paper airplane is your hand pushing the plane forward. The air flowing under and over the wings is the lift. Curved wings of a real airplane allow the air to flow faster above the wing and slower below the wing, creating lift. Air pushing back against your paper airplane, slow it down. This is drag. The weight of your plane affects flight, due to gravity.
Materials: paper, a few fold designs, paper clips (optional). Start designing and folding! There are many websites which will help you with new designs. I tried this one. It truly is the best and very easy! Measure to find out how far yours will travel. Mine flew 17 feet!
https://www.instructables.com/id/how-to-make-the-fastest-paper-airplane/

Cool Science – a lesson tying into our cancelled program, "Birds, Birds, Birds".
Biomimicry is taking what we learn from nature to solve human problems. From sharks to kingfishers to humpback whales, engineers have been solving problems through the study of nature. Check these and more out! https://www.digitaltrends.com/cool-tech/biomimicry-examples/

What can we learn from feathers? Not all feathers are alike.
Take a look around your yard, go on a nature walk to look for feathers, or google bird feather. *Remember collecting bird feather of native birds is illegal in the US.* Take a picture or better yet, take the time to sketch the feather. It doesn't have to be perfect. Identify what type of feather you have found – wing, down, tail, contour, semiplume, filoplume, or bristle. If you have a microscope or a magnifying glass, use this to sketch a close look at the feather barbs. Learn more about identifying these feathers here: https://askabiologist.asu.edu/explore/feather-biology

How do feathers help us solve human problems? We already learned about wings and the ornithopter, but how can feathers help us solve human problems? Have you ever run your fingers along the edge of a feather and to watch it unzip and then pull itself back into a zipper line again? Scientists are studying this feather feature to possibly make a better velcro.
https://www.sciencedaily.com/releases/2019/01/190116150632.htm

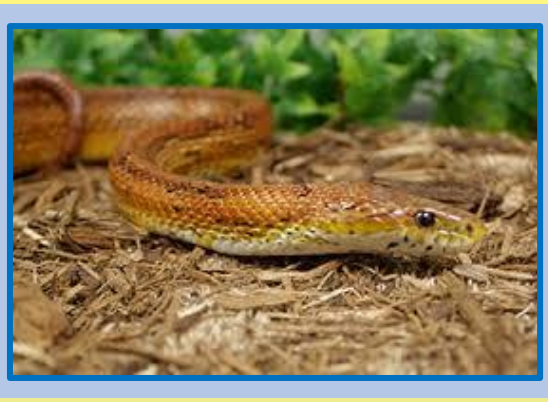
Visit brevardzoo.org/be-outside-with-brevard-zoo.org for weekly activities

BREVARD ZOO

At Home Science - Trees

Science for Families: using what you have at home

Forest habitats are home to many animals, including the red rat snake. Red rat snakes and other animals depend on the forest for food, water, and shelter. Even though you may not live in a forest, they are vital to our lives. Forests help prevent soil erosion and flooding, they produce oxygen, and take in carbon dioxide, reducing climate change. There are many threats to the forests around the world. These include deforestation, insects, invasive plants, climate change and forest fires.



Dendrochronology is the science of tree rings. Trees can provide snapshots of past climate conditions. Scientists study the color and tree ring width to better understand the past climate in a local area. What can we learn from a tree? Years with lots of rain will produce the biggest tree rings!

Challenge:
Count the ring to find out how many years old this tree was.
Hint: One dark ring + one light ring = one year.

Cool Science

Now we know how to count the rings of a cut tree to find out the age, but do you know the rest of the story? What can we learn from a tree?

Years with lots of rain will produce the biggest tree rings!

Narrow rings are not always a lack of sun or water. A forest fire may have damaged the tree and slow its growth. Destruction of leaves by insects or fungi can have the same effect. After several years, the tree may gain strength and returned to normal growth.

Narrow rings may show a tree had a rough time during its first years because it was crowded and didn't get enough sunlight. Maybe someone helped it by cutting the large trees around it to give it more sunlight. Those rings would become wider.

Let's give Dendrochronology a try! Use this tree ring to decipher how the climate and events affecting its life. Or Draw a tree cookie showing and labeling different events during the life of a tree.

This is a great link with diagrams for kids which will help with understanding the study of tree rings. https://climatekids.nasa.gov/tree-rings/