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STEM SHOWCASE PASSPORT



Organized by Village Edu

"Education should be actionable"

Go to each station and interact with the displays, collect the stamp for every page to be able to enter a raffle!

My name is

_____.

My favorite animal is

_____.

My favorite subject in school is

_____.

Leopard Gecko

Fun facts:

- Known being gentle and having smiling faces.
- Originate from the rocky deserts of the Middle East and India.
- Store fat and nutrients in their tails as an emergency source of energy.
- Can detach their tail .

STAMP

How do geckos stick to surfaces and climb?

Step 1: Gecko Feet Aren't Sticky Like Tape

- A gecko's feet don't use glue, suction cups, or slime.
- Each foot is covered with millions of tiny hairs called setae (say: SEE-tee).

Step 2: Tiny Attractions Between Atoms

- Everything around us is made of atoms.
- When the tiny tips on a gecko's foot get extremely close to a wall, the atoms in the foot and the atoms in the wall attract each other just a little bit.
- These tiny attractions are called **van der Waals forces**.

Think of it like:
One tiny magnet = very weak.
Many tiny magnets = Much stronger

Van der Waals forces work in a similar way:
One attraction is tiny → Millions of attractions together are strong enough to hold the gecko.



Honeybees

Fun facts:

- Honeybees live in colonies with one queen running the whole hive.
- Worker honeybees are all females and are the only bees most people ever see flying around outside of the hive.
- Europeans first introduced honey bees to North America in the 1600s.

STAMP

Why is a honeybee honeycomb a hexagon?

Step 1: Bees Don't Start With Hexagons

- Honeybees don't actually build perfect hexagons at first.
- Instead, they make small round tubes (like tiny cylinders) out of warm beeswax.

Step 2: The Wax Softens and Changes Shape

- The bees keep the wax warm with their bodies.
- As the soft wax presses against neighboring cells, the round tubes get squeezed together.
- This naturally changes them into hexagons.

Think of it like:

Blow lots of bubbles together.
One bubble = Round
Many bubbles together = They squish into shapes with flat sides.

Honeycomb works the same way, creating hexagons that use the least amount of wax while holding the most honey.



Diabolical Ironclad Beetle

Fun facts:

- They are mostly solitary and tend to live in hot, dry regions.
- They can survive for months without food or water.
- These beetles are so tough that you can run over them with a car, and they will walk away unbothered.

STAMP

How are ironclad beetles so uncrushable ?

Step 1: Their Shell Is Built Like Armor

- An ironclad beetle has an incredibly tough outer shell.
- The shell is not just thick, it has special puzzle-like connections called sutures that lock the shell together and immediately break when under pressure. Later they simply reseal when the pressure goes away.

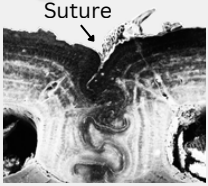
Step 2: The Shell Spreads Out the Force

When something tries to crush the beetle, the sutures and tiny holes in the shell help spread the force across its whole body.
Instead of one spot breaking, the pressure is shared everywhere.

Think of it like:

One stick = Easy to snap.
Many sticks woven together = Much harder to break.

The beetle's shell works the same way by sharing the force instead of letting it stay in one place.



Morpho Butterfly

Fun facts:

- Morphos are very strong fliers. They can be found from sea level up to about 1400 meters high.
- They are diurnal, which means they are active during the day.
- If a caterpillar feels threatened, it can release a bad-smelling fluid that smells like old, rotten butter.

STAMP

Why do Morpho Butterflies look blue?

Step 1: Their Wings Aren't Actually Blue

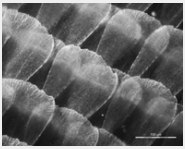
- Morpho butterflies don't have blue pigment in their wings.
- Instead, their wings are covered with tiny microscopic layers of scales that are too small to see.

Step 2: The Tiny Scales Reflect Blue Light

- When sunlight hits the wing, the tiny layers bounce blue light back to our eyes.
- Other colors are scattered or absorbed, so we mostly see blue.
- This is called structural color because the color comes from the wing's structure, not from paint or pigment.

Think of it like:
A CD or soap bubble changes colors when light shines on it.

The butterfly's wings use light in a similar way to create their bright blue color.



Water Strider

Fun facts:

- Since mosquito larvae breathe through a snorkel that they poke through the surface of the water, the water striders can grab them by the snorkel and eat them.
- Depending on their environment water striders can develop wings.

STAMP

How does a water strider walk on water?

Step 1: Water Has a Stretchy Surface

- Water molecules stick to each other.
- This creates a thin "skin" on the surface called surface tension.

Step 2: The Water Strider Doesn't Break the Surface

- A water strider has long legs covered with tiny hairs that spread out its weight.
- Because its weight is spread over a large area, the surface tension can support it.

Think of it like:
A paper clip can float carefully on water.
If you poke the water too hard, it sinks.

The water strider is light enough and spreads its weight out enough that the water's surface holds it up.



Vampire Bat

Fun facts:

- Along with flying, vampire bats can run, jump, and hop with great speed, using their chest muscles to fling themselves skyward.
- Vampire bats do not suck blood. They make a small incision and lap up the blood of their hosts.

STAMP

How do vampire bats see in the dark?

Step 1: They Don't Rely Only on Their Eyes

- Vampire bats can see, but their eyes aren't what help them most at night.
- Instead, they use their excellent hearing and large ears to understand what's around them.
- They “yell” and listen for how the sound bounces back to determine what structures may be around them.

Step 2: They Listen for Their Prey

- Their sensitive ears can hear tiny sounds made by animals.
- They also use special heat sensors on their noses to find warm places where blood flows close to the skin.

Think of it like:
Closing your eyes and listening for someone walking nearby, or yelling and listening for the echo.



Vampire bats use their hearing and heat sensors to find food in the dark.

Termites

Fun facts:

- The total weight of all the termites in the world is more than the weight of all the humans in the world.
- Termites have wings that they shed once they have found a good place to build a nest.
- Ants are both predators and competitors of termites.

STAMP

How do termites get energy from eating wood?

Step 1: Wood Is Hard to Digest

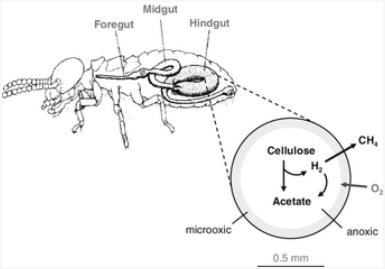
Wood is mostly made of a tough material called cellulose.
Most animals can't break cellulose down by themselves.

Step 2: Tiny Helpers Live Inside the Termite

Termites have millions of tiny microbes living in their stomachs.
These microbes break the cellulose into simple sugars that the termite can use for energy.

Think of it like:
Imagine having tiny chefs inside your stomach. The chefs chop up tough food into small pieces that are easy to eat.

The microbes do the same job for termites, helping them get energy from wood.



Chameleons

Fun facts:

- Their tongues that can stretch up to twice their body length.
- They have independently rotating eyes that allow them to see 360 degrees.
- Their feet are basically two large toes, they have thee fingers on one side and two on the other however they are mostly fused.

STAMP

How do chameleons change color?

Step 1: Chameleons Don't Just Have Different Colored Skin

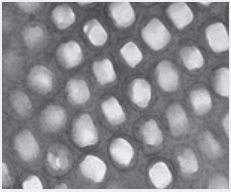
- Many people think chameleons simply add or remove pigment.
- Instead, they have special cells in their skin filled with tiny crystals.

Step 2: The Tiny Crystals Change How Light Reflects

- When the chameleon changes the spacing between the crystals, different colors of light are reflected.
- This makes the chameleon appear different colors.
- Chameleons change color to communicate, regulate body temperature, and sometimes camouflage.

Think of it like:
A CD changes colors when you tilt it.
The light stays the same, but it reflects differently.

A chameleon's skin works in a similar way.





Last but certainly not least...

To find the last stamp and complete your passport:

Follow the Think Big Discovery Trail



Stop by the Discovery Zone, and see where your curiosity takes you. Build. Explore. Create. Think Big!

Snowy Owl

Fun facts:

- They are among the heaviest owls in North America, weighing up to 6.5 lbs.
- Unlike most owls, they are diurnal, meaning they actively hunt during the day.
- A single adult will eat 3 to 5 lemmings every single day.

STAMP

How do owls fly so quietly?

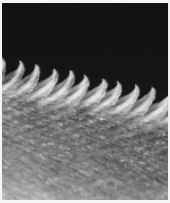
Step 1: Owl Feathers Are Different

- An owl's feathers aren't smooth like most birds.
- The edges of their feathers have tiny comb-like fringes that break up the air as they fly.

Step 2: The Feathers Reduce Noise

- Normally, air rushing over wings creates turbulence, which makes sound.
- The owl's special feathers spread the air out into smaller, gentler streams, making much less noise.
- This helps owls sneak up on their prey without being heard.

Think of it like:
Waving a stiff piece of paper through the air makes a loud "whoosh."
Now imagine using a soft brush instead—the air moves more gently and makes much less noise.



An owl's feathers work in a similar way, helping it fly almost silently.

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Get ready to Fizz, Pop, & BOOM!

Join us for the Think Big Fizz, Pop, Boom **LIVE SCIENCE LAB** featuring The Science Guys of Baltimore!

Friday, September 25 | 3:00–3:30 PM
On Stage at The Great Frederick Fair
Watch science come to life with exciting experiments, surprising reactions, and hands-on STEM fun for kids and families.

Keep Discovering! | 4:00–5:00 PM
Follow the Amazon Discovery Trail to the Think Big Discovery Zone, where The Science Guys will continue the fun with interactive activities.
Explore pollinators, plants, STEM, robotics, coding, and the LEGO Speed Ramp!
See the show. Follow your curiosity. Keep exploring. Think BIG! 💡



STEM Showcase Passport

Great Frederick Fair 2026

"Education should be actionable"