

Little Scientists 2024



Image Created by Shauna Shepard

Activity Booklet

Film Canister Rockets
Gache
Lung Model
Paper Chromatography

Pipette Rockets
Storm in a Jar
Toad Abodes
Yarn Skeleton Model

A Little about our Science Dino of 2024...

Our prehistoric lab assistant this year is a ***Tyrannosaurus Rex*** (T-rex). A baby T-rex like our mascot would have been about the size of a turkey, but an adult T-rex had a massive body, very sharp teeth, and the strongest bite of any land animal ever! Like many other dinosaurs, T-rex was huge, up to forty feet long, and had a brain about twice as large as other dinosaurs, so it might have been more intelligent than other dinosaurs. T-rex are thought to have been fierce hunters, but scientists also think they were social animals that lived and hunted in groups. Scientists have known about T-rex for about a hundred years, and the most complete fossil was found in South Dakota in the 1980s. You can see this fossil, nicknamed Sue, at the Field Museum in Chicago.



Image Created by Shauna Shepard

More information about T-rex:

<https://kids.nationalgeographic.com/animals/prehistoric/facts/tyrannosaurus-rex>



Film Canister Rockets

(Chemistry)

Description:

Children will be exploring the chemical reaction between a **solute** - a substance that dissolves, and a **solvent** – a substance that dissolves the solute. In this activity, we will dissolve an Alka-Seltzer tablet (our solute) in water (our solvent). As the Alka-Seltzer tablet dissolves, carbon dioxide gasses will be released and will build pressure within the canister. Eventually the trapped gasses will result in blast off!

Materials:

- Film Canister
- Alka-Seltzer Tablet
- Water

Directions:

- 1) Pour about 5 ml of water into a film canister
- 2) Place half an Alka-Seltzer tablet into the canister
- 3) Quickly snap on lid (tightly) and place upside down on the ground
- 4) Move back quickly and wait for blast off!



Additional Resources:

- <https://sciencebob.com/build-a-film-canister-rocket/>



Gache (pronounced “Gack”)

(Chemistry)



Description:

Gache is a fantastic opportunity for students to be introduced to non-Newtonian fluids and polymers. Each child will mix together two parts glue and one part liquid starch to form a goopy mass of slime. This slime imitates a non-Newtonian fluid, or a material that is neither a true liquid nor a true solid. Although technically a liquid, gache both flows but can also bounce and stretch. This is the result of mixing the polymer, glue, with liquid starch. A polymer is really long chain of repeating complicated structures that form a molecule. Typically they are found in materials such as plastic, rubber, and wood. Let's see what happens when these materials mix!

Materials:

- Aprons
- Liquid Starch
- Glue
- Bowl
- Food Coloring (Optional)

Directions:

- 1) Place two portions of glue in a bowl ($\frac{1}{2}$ cup recommended)
- 2) Incorporate one portion of liquid starch and mix ($\frac{1}{4}$ cup)
- 3) Add 2-3 drops of food coloring to the slime mixture
- 4) See how far you can stretch your creation!
- 5) Refrigerate at home to keep it ready for continued play



Lung Model

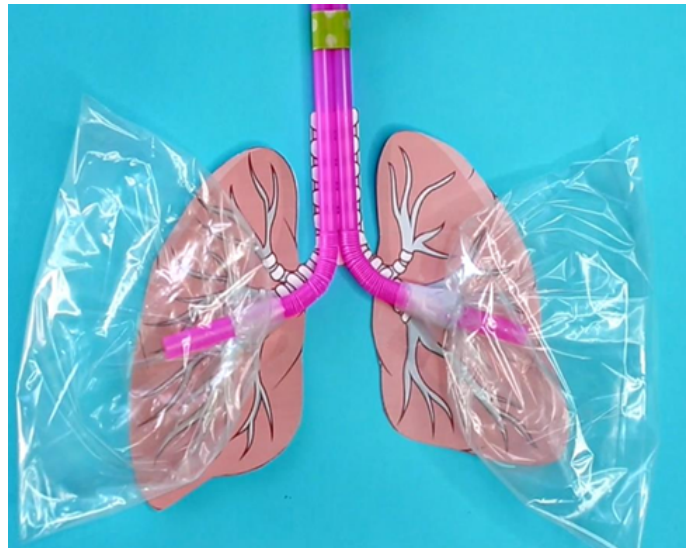
(Anatomy & Physiology)

Description:

Lungs are organs in our chest that allow our body to take in oxygen from the air. Our lungs also help us remove carbon dioxide from our body, which is a waste gas that can be toxic. Our lung's intake of oxygen and removal of carbon dioxide is called gas exchange. In this activity, kids will get to build their own lung model and explore the mechanisms through which our lungs exchange gas.

Materials:

- 2 Long Bendable Straws
- 2 Plastic Bags
- Printable Lung Template
- Tape
- Double-Sided Tape
- Scissors
- Crayons and/or Markers



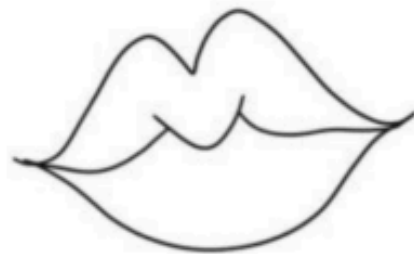
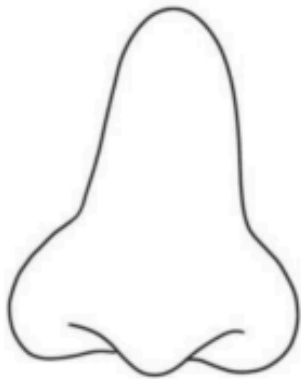
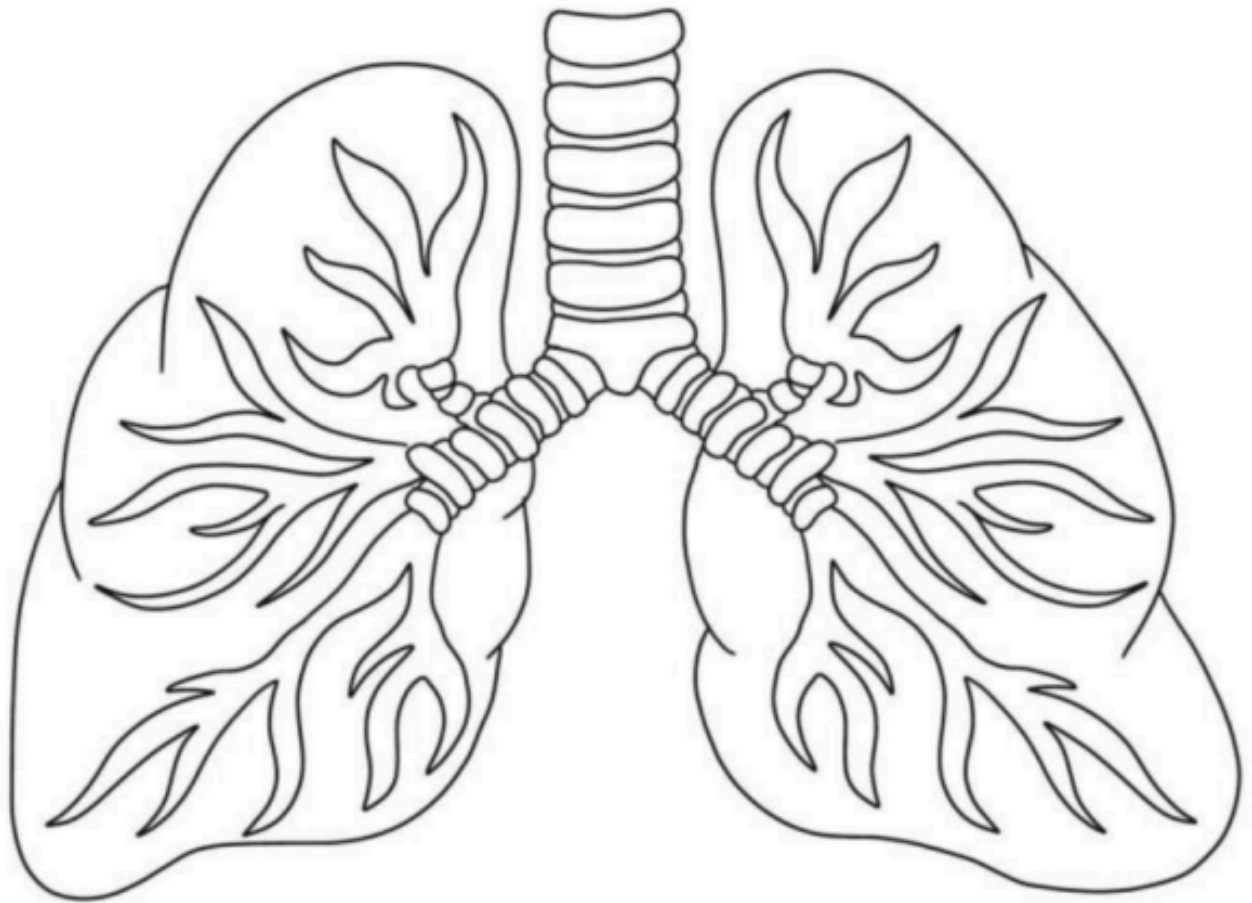
Directions:

- 1) Print lung template and color using crayons or markers.
- 2) Cut the lung template out.
- 3) Join both straws side by side using tape.
- 4) Use double sided tape to attach the lung template to the straws.
- 5) Cut the zipper part of the plastic bags out.
- 6) Tape the plastic bags to each lung. Make sure it's tight so no air escapes.
- 7) Blow and watch the lungs expand!

Additional Resources:

- <https://www.hellowonderful.co/post/how-to-make-a-lung-model-with-kids/>
- <https://www.rvu.edu/ut/wp-content/uploads/2020/10/Lung-Craft-for-Kids.pdf>





Paper Chromatography

(Chemistry)

Description:

Paper chromatography is a technique used to separate mixtures using a **solvent** - a liquid that dissolves **substances**. In this activity, water acts as the solvent and the marker ink acts as the mixture. There is a **stationary phase** in which the mixture particles don't move, and a **mobile phase** in which the particles move. The stationary phase is the filter paper, and the mobile phase is the water. The different colored ink particles travel at different speeds as the water moves through the paper, creating a fun tie-dye effect!

Materials:

- Coffee Filter
- Markers
- Mason Jar (12 oz or 16 oz)
- Water
- Binder Clip
- Wooden Pencil or Craft Stick
- Clothespin
- Pipe Cleaner

Directions:

- 1) Use some markers to draw rings around the coffee filter.
- 2) Fold the coffee filter in half three times and clip it at the top with a binder clip.
- 3) Place a pencil or craft stick through the gap between the binder clip and the filter.
- 4) Fill a mason jar with water so that only the tip of the filter paper touches the water.
- 5) Using the pencil/craft stick, balance the filter paper on the mason jar so the tip of the filter paper barely touches the water.
- 6) Leave the filter paper there until it is completely soaked in water and the colors have migrated to the top (about 10-15 minutes)
- 7) Remove the filter paper from the mason jar, take off the binder clip, unfold the filter paper, and let it dry for 10-15 minutes.
- 8) Pinch the coffee filter paper through the center using a clothespin.
- 9) Shape a pipe cleaner in the shape of antennae and pinch it in the center with the pipe cleaner.

Additional Resources:

- https://www.123homeschool4me.com/butterfly-craft-for-kids_16/



Pipette Rockets

(Physics)



Description:

This activity allows children to explore the concept of **pressure** - a force exerted on a surface. In this case, the buildup of air pressure in a straw against a rocket with a pipette attached will result in a launch. What fun rocket design can you make?

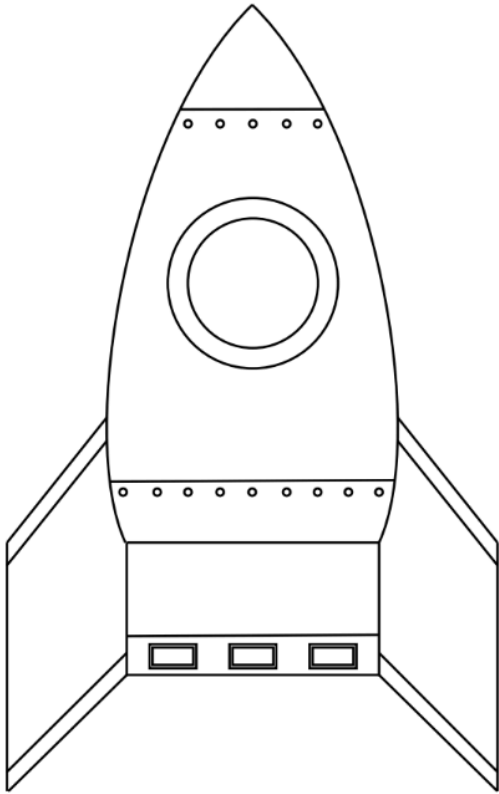
Materials:

- Straws
- Tape or Glue Dots
- Plastic Pipettes (Or straws with a larger diameter than the other set of straws)
- Markers, crayons, or colored pencils
- Scissors
- Rocket Template

Directions:

- 1) Print out Rocket Template and Color
- 2) Cut out the rocket.
- 3) Cut the bottom off a plastic pipette and attach it to the back of a rocket using tape or glue dots a) (If using a larger straw instead of a pipette, be sure to cut the straw to fit the rocket and seal one end with tape).
- 4) Slip a straw into your pipette and have fun!





Storm in a Jar

(Physics & Environmental Sciences)

Description:

Is it possible for liquids to stay separate? If they do separate, why? This activity allows children explore the effects of **density** - how compact a substance is. Since oil is less dense than water, the paint sinks to the bottom, while the water remains on top. When an Alka-Seltzer tablet is added, carbon dioxide gas is made. The bubbles filled with carbon dioxide gas push the water and paint mixture upward, but the oil applies pressure downward and pushes the mixture back down creating a snow effect!

Materials:

- 4 oz Mason Jar (Plastic or Glass)
- 1 Alka-Seltzer Tablet
- Baby Oil
- 1 Teaspoon of White Paint
- Water

Directions:

- 1) Fill $\frac{1}{4}$ of the mason jar with water.
- 2) Add a teaspoon of white paint and mix it.
- 3) Fill up the rest of the mason jar with baby oil and let the water and paint mixture settle to the bottom.
- 4) Break up an Alka-Seltzer tablet and drop the broken-up pieces one at a time into the jar.
- 5) Watch as a “snowstorm” unfolds inside the jar!



Additional Resources:

- <https://www.mombrite.com/snowstorm-in-a-jar>



Toad Abodes

(Biology & Environmental Sciences)

Description:

Like the plants we painted, animals can also be *native* to an environment. One particularly helpful fellow is the American Toad. Toads are indicators that your garden or backyard is incredibly healthy. They also help eat really gross bugs. Toads need shelter from the hot Virginia weather in the summer, which not all backyards offer. Terracotta pots can create cool, wet spots to help protect them from the summer heat. Let's make a toad abode!



Materials:

- Paper Plate or a Washable Surface
- Terracotta Pot
- Washable Paints or Stickers
- Mod Podge
- Paint Brushes
- Cups of Water
- Paper Towels



Directions:

- 1) Get your workspace ready. Have water for your paint brushes and some towels if things get messy.
- 2) Think. Would you like your abode to be upright or on its side like in the image above? Once you've decided this, decorate however you'd like to!
- 3) When you are done decorating, paint a heavy coat of mod podge on your pot. This will keep your decorations from fading in the rain and weather.
- 4) After your pot has dried, set it up in your garden. Maybe a toad will live in your abode!

Additional Resources:

- <https://www.gardeningknowhow.com/special/children/garden-toad-house.htm>
- http://www.biokids.umich.edu/critters/Anaxyrus_americanus/



Yarn Skeleton Model

(Anatomy)

Description:

The collection of bones in an animal's body is called a **skeletal system**, or **skeleton**. Mammals, birds, reptiles, amphibians, and fish all have skeletal systems. The human skeletal system has over 200 bones. The hard, stiff bones of the skeleton support the whole body. The skeleton helps protect the soft organs inside the body and it works with the muscles to allow the body to move in many ways. In this activity, kids will get the opportunity to create a skeleton model of their animal of choice using yarn!

Materials:

- Yarn
- Glue
- Construction Paper
- Skull template
- Skeleton outline (optional)

Directions:

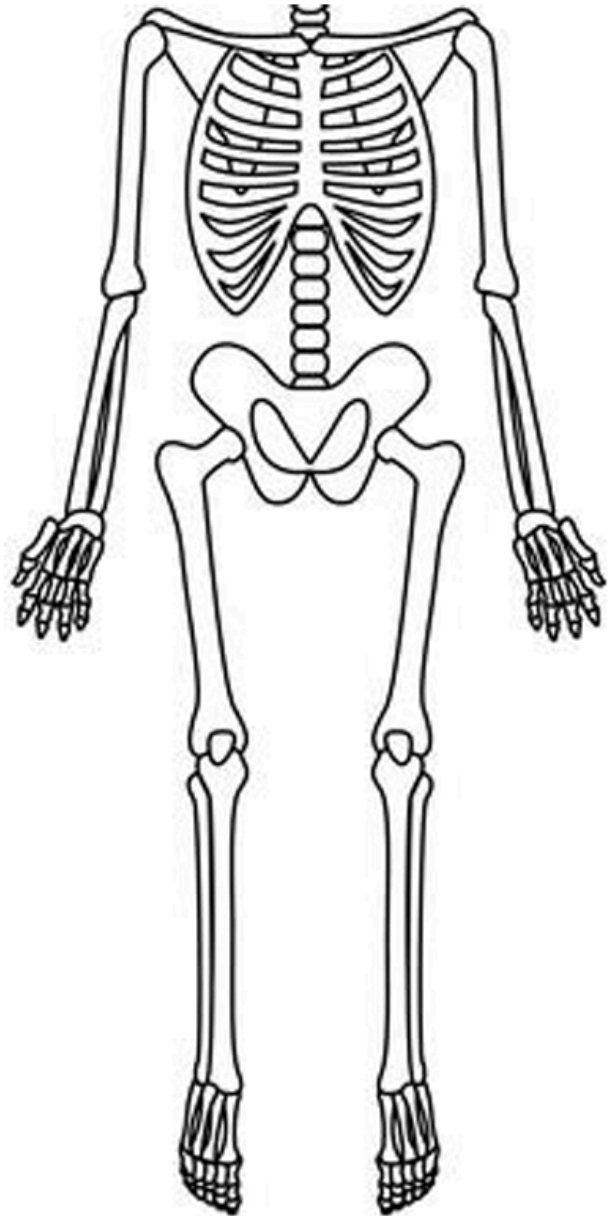
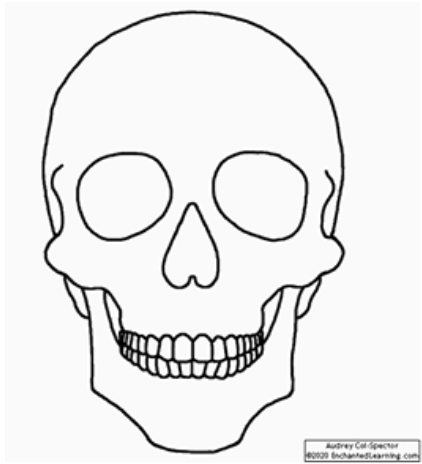
- 1) Obtain yarn color of choice.
- 2) Cut the yarn into small pieces varying in size.
- 3) Cut the skull template and glue it towards the upper middle section of the construction paper.
- 4) Start gluing the pieces of yarn starting from the skull until you form a skeleton!
- 5) You may find it useful to print out the outline of a skeleton (human or animal) for your child to be able to trace or reference.



Additional Resources:

- <https://www.mombrite.com/human-body-activities-and-experiments/>
- <https://kids.britannica.com/kids/article/skeletal-system/353778#:~:text=The%20human%20skeletal%20system%20has,allow%20the%20body%20to%20move.>





Author's Note:

Thank you so much for spending time looking through this booklet! Stay tuned to <http://randolphscience.org/> for updated event information, video resources, and more. This booklet will also be posted to the website. We have really enjoyed compiling these activities and look forward to seeing everyone at the next Randolph College Science Festival!

Best Wishes,

- Iyania Corbett (Environmental Studies major)
Little Scientists 2024 Intern

