Little Scientists 2023

Image created by Deborah Parker

Activity Booklet

Storm in a Jar
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Painting a Coral Reef

A Little about our Science Dino…

Our prehistoric lab assistant this year is the ***triceratops***. They are known for their characteristic frill that could reach nearly 1 meter in diameter! They had one of the largest skulls of any terrestrial animal and a parrot-like beak they used to eat lots of delicious plants. Their three horns were used to defend themselves from attacks from predators. Triceratops fossils are usually found individually, suggesting they spent much of their lives alone. Would you have liked to be one of the Triceratops's companions?

Image created by Deborah Parker

More information about triceratops:
https://www.nhm.ac.uk/discover/dino-directory/triceratops.html

Snowstorm in a Jar

(Physics & Environmental Science)

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 water mixed 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 White Paint
- Water

Directions:

1) Fill ¼ 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

Slime

(Chemistry)

Description:

Slime is a fun, tactile way for students to be introduced to ***non-Newtonian fluids***. This slime recipe imitates a ***non-Newtonian fluid*** - a material that acts both as a liquid and a solid. Although technically a liquid, slime flows but can also bounce and stretch when squeezed and put under pressure. Let's see what happens when these materials mix!

Materials:

- Baking Soda
- Elmer's Glue
- Buffered Saline Solution (Simple Contact Lens Solution – essentially just pH balanced salt water)
- Bowl or Washable Tabletop
- Food Coloring (Optional)
- Apron (Optional)

Directions:

1) Pour one bottle of glue (½ cup) into a bowel or onto a washable surface.
2) If you would like to color your slime, stir some food coloring in the glue you would like to use. We found it easiest to add the dye to the glue while the glue is still in the measuring cup. You can use a finger to do this!
3) Put a couple drops of saline solution on your child's hands. This will help keep the glue from sticking to them.
4) Slowly add 1/3 cup of baking soda, encouraging the child to mix it together with their hands.
5) You may have to put a few more drops of saline solution on your child's hands as they mix in the baking soda.
6) Eventually the slime will form and will stick together well. More baking soda will make it grittier. More saline solution will make it firmer and less sticky.
7) Play with it! Roll it into a ball, squeeze it, stretch it, do whatever you'd like to!

Additional Resources:

- https://www.steampoweredfamily.com/activities/erupting-slime-a-slime-stem-activity/?fbclid=IwAR3Hmyr187OacS6Rs8i7-ZJTCF6jgMEUX7Voz84ZmCMXA3RON-Vof0mVxGU

Lung Model

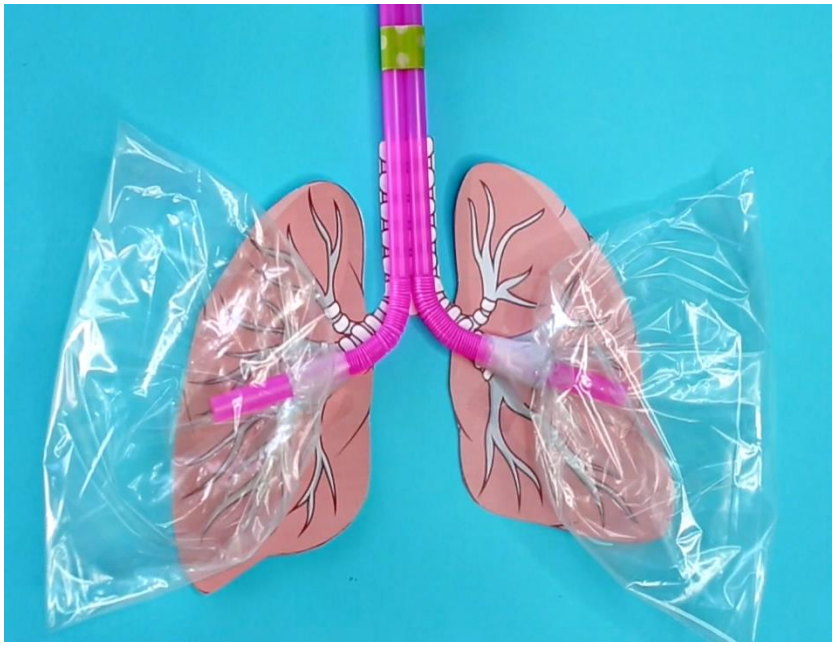
(Anatomy & Physiology)

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

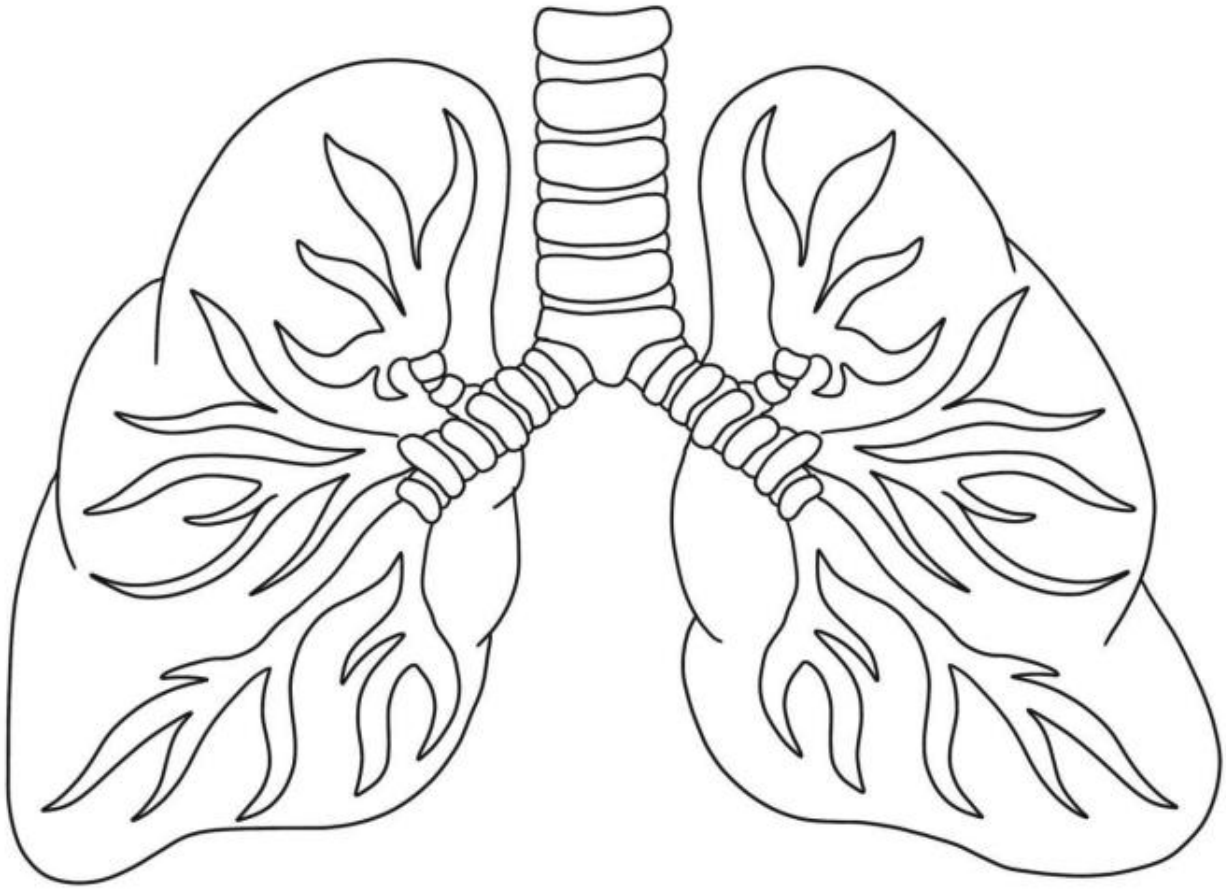


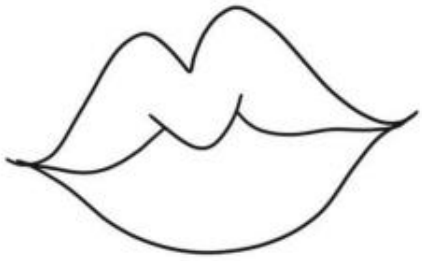
Directions:

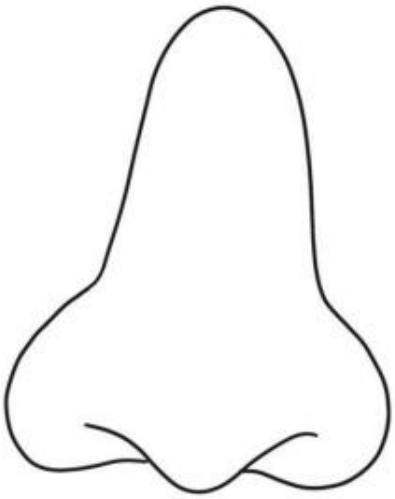
1) Print lung template and color using crayons or markers.
2) Cut lung template out.
3) Join both straws side by side using tape.
4) Use double sided tape to attach the lung template to the straws.
5) Cut the zipper part of the plastic bags out.
6) Tape the plastic bags to each lung. Make sure it's tight 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







Paint a Coral Reef

(Biology & Environmental Science)

Description:

Coral reefs are underwater structures made up of tiny animals called coral polyps. These live in big groups and stick to hard surfaces. Together, they create a bright and colorful ecosystem that provides food and shelter for many marine animals. Reefs are made up if a variety of shapes, sizes, and colors! Their characteristic bright colors come from a special alga called zooxanthellae that live inside the coral and provide them with food.

Coral Polyps

Materials:

- Paper
- Washable Paints
- Paint Brushes
- Cups of Water
- Paper Towels
- Apron (Optional)

Directions:

1) Get your materials together. Let's think, what is found in a coral reef? We can find a wide variety of organisms such as fish, crabs, algae, seahorses, sea turtles, corals, and many more!
2) Have some water nearby for your paint brushes. Remember to wash your brushes between each color.
3) Let's paint!
4) Give your coral reef some time to dry.

Additional Resources:

https://coral.org/wp-content/uploads/2022/10/Coral-Reefs-For-Kids-V4.pdf

Bath Fizzers

(Chemistry)

Description:

Bath fizzers are a fun way for kids to explore their tactile senses and make bathing a fun experience! When placed in water, bath bombs create a fizzling effect. This is due to a chemical reaction between the baking soda and citric acid. When dropped in water, these two chemicals mix and create a reaction that generates carbon dioxide gas in the form of lots of tiny bubbles. As they dissolve in water, they release the dyes that were added to them, making the water colorful!

Materials:

- 1 Cup Baking Soda
- ½ Cup of Citric Acid
- ½ Cup of Epsom Salt
- ½ Cup of Cornstarch
- 2 ½ Tablespoons of Almond Oil or Melted Coconut Oil.
- ¾ Tablespoon of Water
- 12-15 Drops of Essential Oil
- Bath Fizzer Molds (Ice Cube Tray could be an alternative)

Directions:

1) Mix all the dry ingredients together in a medium bowl.
2) Add food coloring as desired.
3) In a separate bowl, mix all the wet ingredients together.
4) Add the wet ingredients to the dry ones VERY slowly to avoid activating the citric acid.
5) Mix until combined, and the ingredients look like wet sand.
6) Add the mixture to the bath fizzer molds (or ice cube tray) and press tightly to achieve desired shape.
7) Store in an airtight container or wrap tightly in tinfoil to avoid mold.

Additional Resources:

- https://inspiredbycharm.com/diy-bath-bombs/

Yarn Skelton 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:

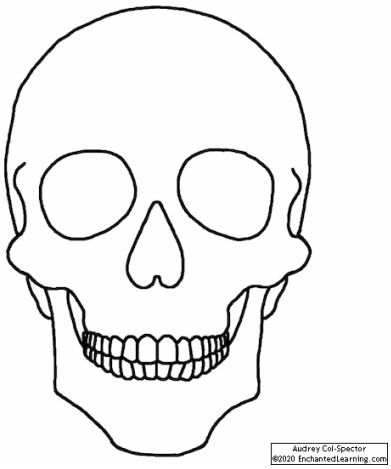
- Yarn
- Glue
- Construction Paper
- Skull template
- Skeleton outline (optional)

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.


Audrey Col-Spector
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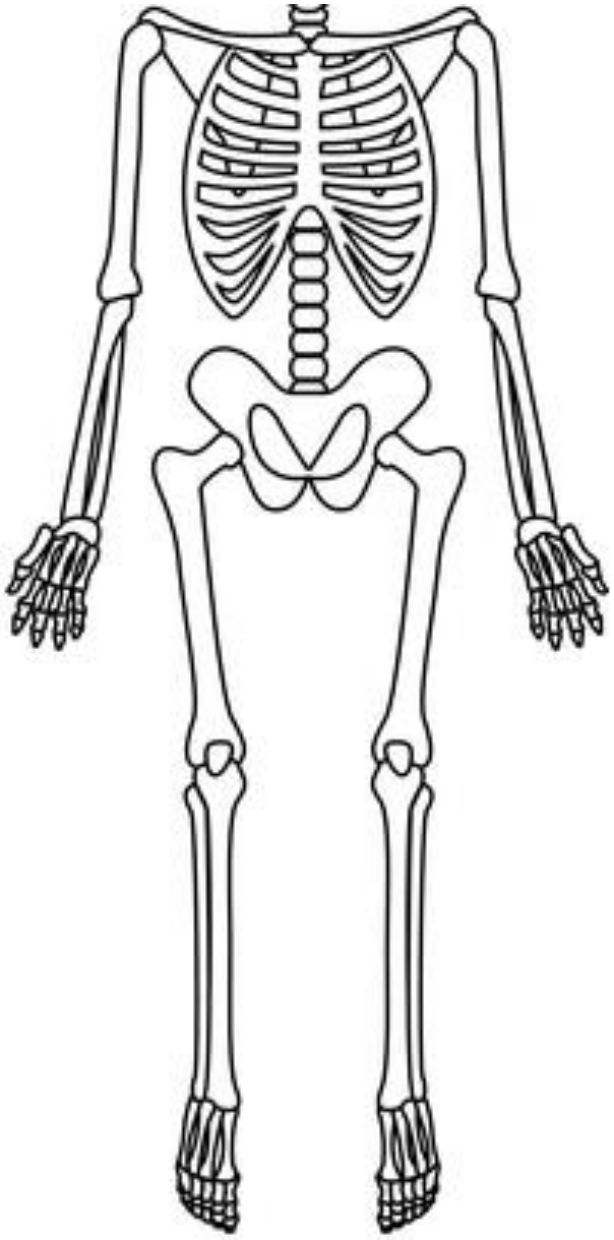
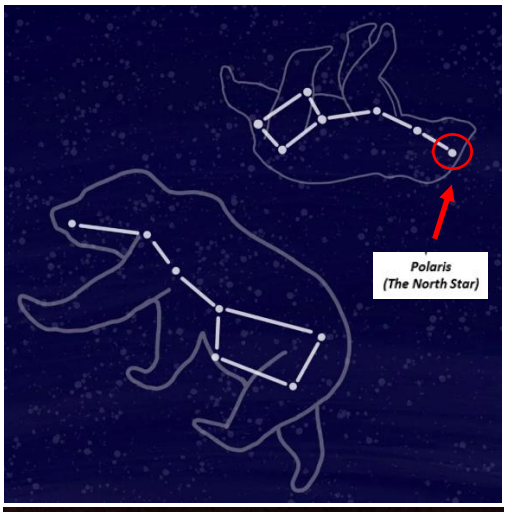


Star Jar

(Astronomy)



Description:

A ***constellation*** is a group of stars in the night sky that make up a recognizable picture or pattern. ***Constellations*** were used by ancient civilizations to orient themselves in their travels during the night. There are many popular ***constellations***, such as Orion ("The Hunter"), Ursa Major ("Big Bear" or "Big Dipper") and Ursa Minor ("Little Bear" or "Little Dipper"). Through this activity, kids will get to create their own night sky with their own choice of constellations!

Materials:

- 4 oz Mason Jar (Plastic or Glass)
- Dull knitting needle (a pencil can work)
- Electric Tea-Candlelight
- Glue (optional)
- Black Construction Paper
- Foam Board or Cardboard
- Constellation Template

Directions:

1) Either print our example winter constellations template (see attached) or draw your own star dots in a 7 ¾-inch X 2-inch area (adjusted as needed to fit your jar).
2) Cut the constellation sheet to size.
3) Place the constellation sheet on top of the foam board or cardboard.
4) Carefully poke holes on each star dot using a dull knitting needle. A pencil or pen may substitute. This should feel similar to popping bubble wrap!
5) Roll the constellation sheet to fit in the jar. Glue the end tabs together as needed.
6) Place the rolled sheet inside the mason jar.
7) Place the electric tea candlelight in the middle of the jar (inside the rolled-up construction paper sheet).
8) Turn the tea candlelight on and watch as the constellations light up! This works really well in a darkened room.

Additional Resources:

- https://skyandtelescope.org/interactive-sky-chart/ *(try Googling the drawings of the constellations you pick!)*

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!

Our Best Wishes,

- Little Scientists 2023 Interns Jenifer (Computer Science and Mathematics major) and Alison (Biology major)

Image created by Deborah Parker