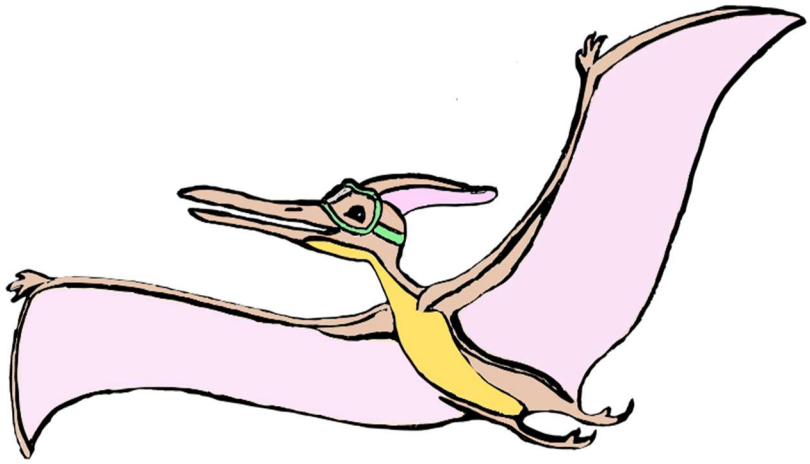
Little Scientists 2022

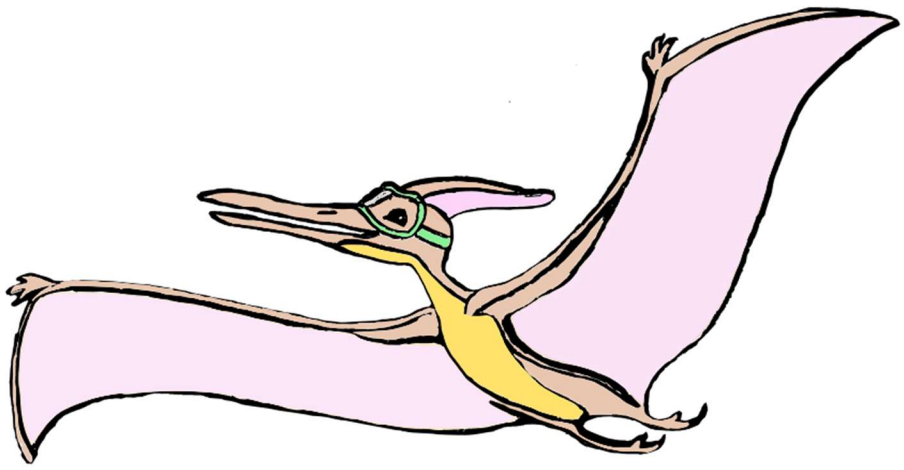


Activity Booklet

Bug Rocks
Density Globes
Film Canister Rockets
Slime
Moon Sand
Paper Chromatography
Paper Plate Dinosaurs
Paint a Plant
Toad Abodes

A Little about our Science Dino of 2022…

Our prehistoric lab assistant this year is a pterodactyl. Like many other dinosaurs, most pterodactyls were huge! The largest fossil ever found had a measured wingspan of 36ft. That's as long as a school bus! Yet, there have also been some pterodactyl fossils found that are as small as a sparrow. Do you think these small pterodactyls would have made great pets?



More information about Pterodactyl:

- https://kids.britannica.com/kids/article/pterodactyl/390080 .
- https://kids.britannica.com/students/article/pterodactyl/390692.

Bug Rock Painting

(Biology/Environmental Science)

Description:

Bugs like to live under rocks where it is cool, wet, and safe. Bugs are important. Many like to eat old things such as fallen leaves, which help turn the old leaves back into soil that new plants can use to grow. Many bugs also pollinate flowers which help create new plants. Let's paint a rock to look like a bug!

Materials:

- Rock
- Paint
- Paint Brush
- Cup of water
- Paper Towels
- Googly Eyes (Optional)
- Mod Podge (Optional)

Directions:

1) Pick a bug to paint. Try finding a bug in your backyard or look up pictures of bugs that live near you. You can also just make up your own bug too!
2) Paint your rock to make it look like the bug you chose.
3) Keep your rock inside or put it outside in your yard or somewhere in your neighborhood. You might get bugs living under your bug rock!
4) If you decide to place your rock outside, try painting a coat of mod podge (or something similar) on it so the paint doesn't wash away in the rain.

Additional Resources:

- https://www.seewhatgrows.org/kids-guide-beneficial-bugs-garden/

Density Globe Activity

(Physics)

Description:

Is it possible for liquids to stay separate? If they do separate, why? This activity lets children explore the effects of ***density*** - how compact a substance is - as they create their own density globes.

Materials:

- Vegetable Oil
- Water
- Alka-Seltzer tablets
- Glitter, Beads, or some other small item like tiny plastic fish (Optional)
- Food Coloring
- Jar of Some Kind

Directions:

1) Fill jar half full with water
2) Allow children to drop and mix 2-3 drops of food coloring in the jar
3) Fill a quarter of the jar with vegetable oil
4) Mix the water and oil and let separate
5) You can add glitter, beads, or some other small items and see what happens
6) Add an Alka-Seltzer tablet
7) Seal the jar and watch what happens!

Additional Resources:

- https://nubipro.blogspot.com/2016/05/how-to-make-easy-lava-lamp-homemade.html
- https://www.youtube.com/watch?v=ugzsjlBMmKI
- https://littlebinsforlittlehands.com/earth-day-science-activity-lava-lamp/

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 gases will be released and will build pressure within the canister. Eventually the trapped gases will result in blast off!

Materials:

- Film Canister
- Alka-Seltzer Tablet
- Water

Directions:

1) Pour about 5ml 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/

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

Paper Plate Dinosaurs

(Biology)

Description:

Dinosaurs are amazing! Let's make one of our favorite dinosaurs with a paper plate.

Materials:

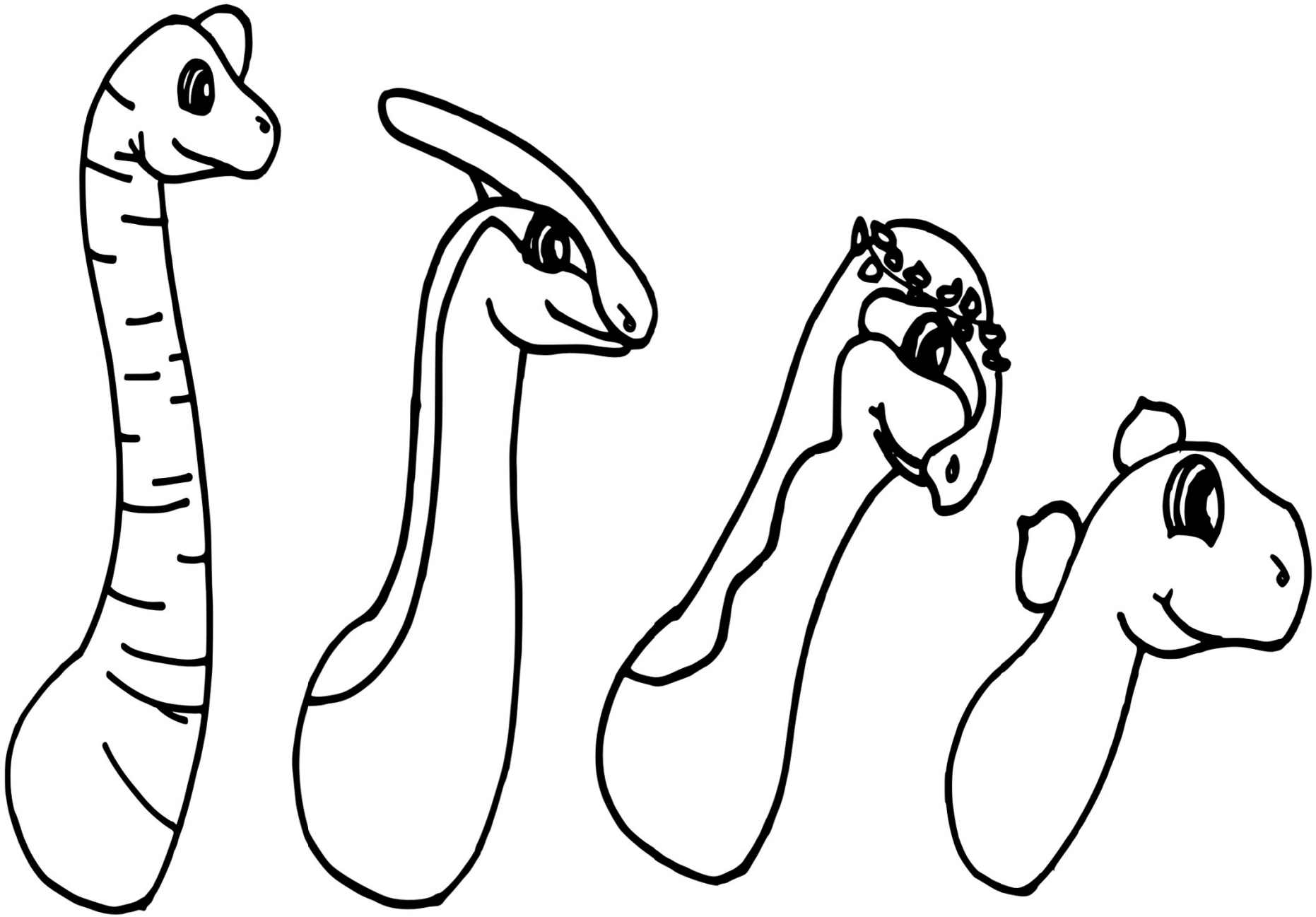
- Paper Plate
- Washable Paints
- Paint Brushes
- Cups of Water
- Paper Towels
- Scissors
- Glue or Stapler
- 2 Dixie Cups
- Cardstock or attached dinosaur template sheets (see next 2 pages)
- Googly eyes (Optional)

Directions:

1) Cut a paper plate in half
2) Paint the back of the paper plate any color you would like your dinosaur to be
3) Paint the dixie cups any color you would like the feet to be
4) While the paint is drying, decorate a head and some spines or a tail for your dino. You could use paint, markers, pencils, or whatever you'd like to!
5) Cut the head, tail, and spines
6) Cut two slits in-line with each other at the top of each dixie cup. Wedge the plate on the feet
7) Either glue or staple the head, tail, and spines
8) Enjoy your dinosaur!

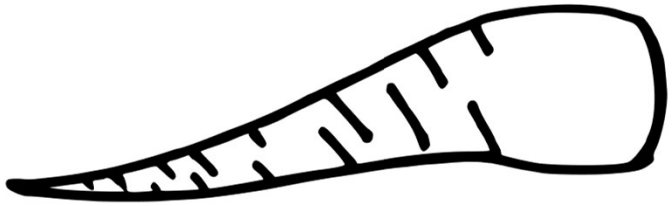
Additional Resources:

- https://www.pinterest.com/pin/670332725786482987/
- https://kids.nationalgeographic.com/animals/prehistoric



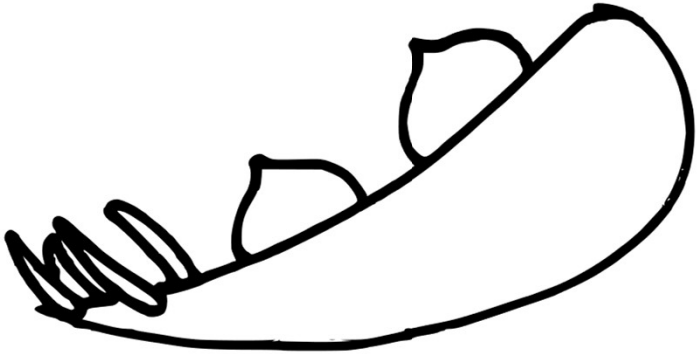
Brachiosaurus Parasaurolophus Pachycephalosaurus Stegosaurus

Brachiosaurus

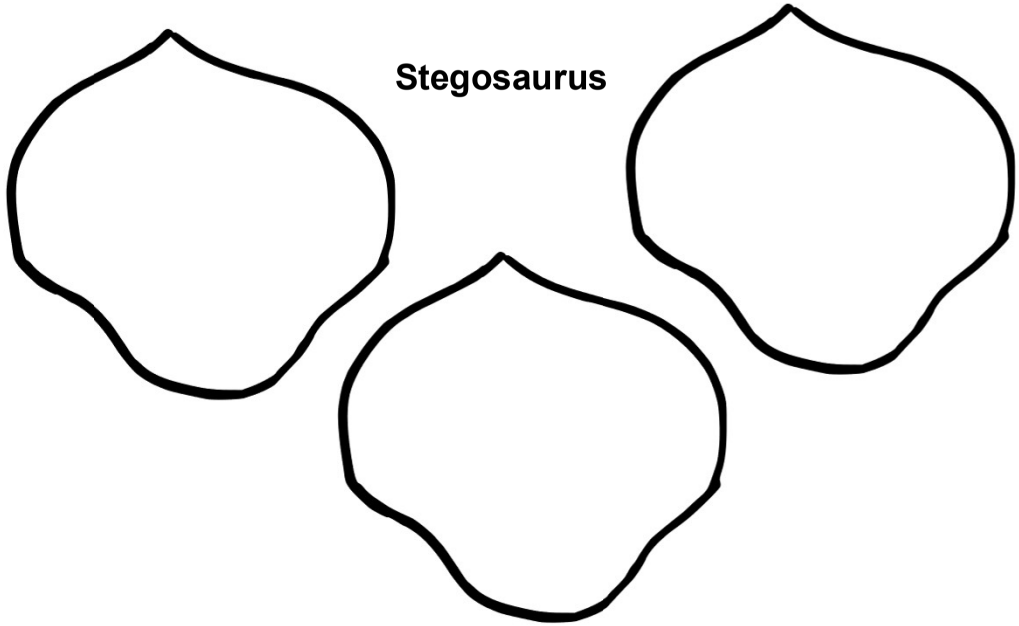


Parasaurolophus

Pachycephalosaurus



Stegosaurus



Paint a Plant

(Biology/Environmental Science)

Description:

Plants do so many wonderful things for us. They give us clean air to breathe, they provide food we can eat, they provide shade on a hot day, they feed lots of wild animals, and they do many more things. ***Native plants*** – or plants that have evolved to live in a certain place with no changes by us humans – are critical for healthy ecosystems. In Virginia, we are lucky to have a wide variety of native plants – dogwoods, redbuds, black-eyed susan's, phlox, yarrow, bee balm, azalea, and many others. Let's paint something we see outside!

Materials:

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

Directions:

1) Get your materials together. Let's think, what are some plants that you enjoy? Do you like flowers? Trees? Moss? Is there something fun growing outside your house, maybe in your backyard?
2) Have some water nearby for your paint brushes. Remember to wash your brushes between each color
3) Let's paint!
4) Leave your creation time to dry

Additional Resources:

- https://vnps.org/virginia-native-plant-guides/
- https://www.dcr.virginia.gov/natural-heritage/document/mtn-nat-plants.pdf
- https://www.plantvirginianatives.org/planting-natives-to-attract-pollinators-and-birds

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 filters (one per butterfly)
- Markers
- Mason jar (12oz or 16 oz)
- Water
- Binder clip
- Wooden pencil or craft stick
- Clothespin
- Pipe cleaners

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/

Moon Sand

(Chemistry)

Description:

This activity is a great opportunity for kids to explore their tactile senses by making their own moon sand. Like slime, moon sand is also a ***non-Newtonian fluid*** that acts like a viscous liquid and an elastic solid at the same time. Moon sand's unique ***viscoelastic*** properties allow it to act as a rubbery solid under stress or a slowly flowing semisolid in the absence of pressure, like sand!

Materials:

- ¾ cup baking soda or baking powder
- ¾ cup gluten free corn starch
- 1 cup vegetable oil
- Food coloring
- Zip lock bags

Directions:

1) Mix in the baking soda or powder in a large bowl with the corn starch
2) Add the vegetable oil ¼ cups at a time and mix to get the preferred texture
3) Explore the consistency of the sand; if it is too dry, a little more oil could be added
4) Have fun and try molding the sand into different shapes!

Additional Resources:

- https://sweetcsdesigns.com/homemade-moon-sand/

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/

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,

- Hailey (physics major) and Alison (biology major)
  Little Scientists 2022 Interns