Christian Kids Explore Science

Experiment Step-Outs

By Maureen Spell and Bright Ideas Press

When Bob and Maggie Hogan began homeschooling their children there were few resources at their disposal. They began developing their own curriculum and over time it has blossomed into a wonderful blessing for all homeschoolers. Bright Ideas Press offers Christian-oriented and affordable products that fit into the hectic life of homeschoolers.

> "The team at Bright Ideas Press prays that their products and resources will not only simplify lives but also inspire, encourage, and enable parents to effectively educate their children. "

Their Christian Kids Explore Science curriculum include lessons, coloring pages, experiments, reviews, and supplemental book lists! It presents science is easy to manage lessons that can be taught to multiple grade levels simultaneously.

> *My daughter (5th grade) absolutely loves this CKE science program and I wish we had the time to do it every day as well. Between MOH and CKEB, I have never seen her so "in" to any particular academic subject. These were the best decisions I think I have ever made in regards to curriculum choices.*
>
> - Robin

These experiments and demonstrations were taken directly from the various Christian Kids Explore Science books. Maureen Spell completed these activities with her children and has provided a write up with photographs so that parents can see the types of projects students will do in this wonderful series! Maureen Spell is a Christian, homeschooling mother of 6 with ten years of home schooling experience. She regularly blogs about home education and curriculum at Spell Outloud.

We hope you enjoy this eBook! If you have any questions about these experiments, Bright Ideas Press or our curriculum please contact us at:

http://www.brightideaspress.com 877.492.8081

Christian Kids Explore Science Experiment Step-Outs

Completed by Maureen Spell

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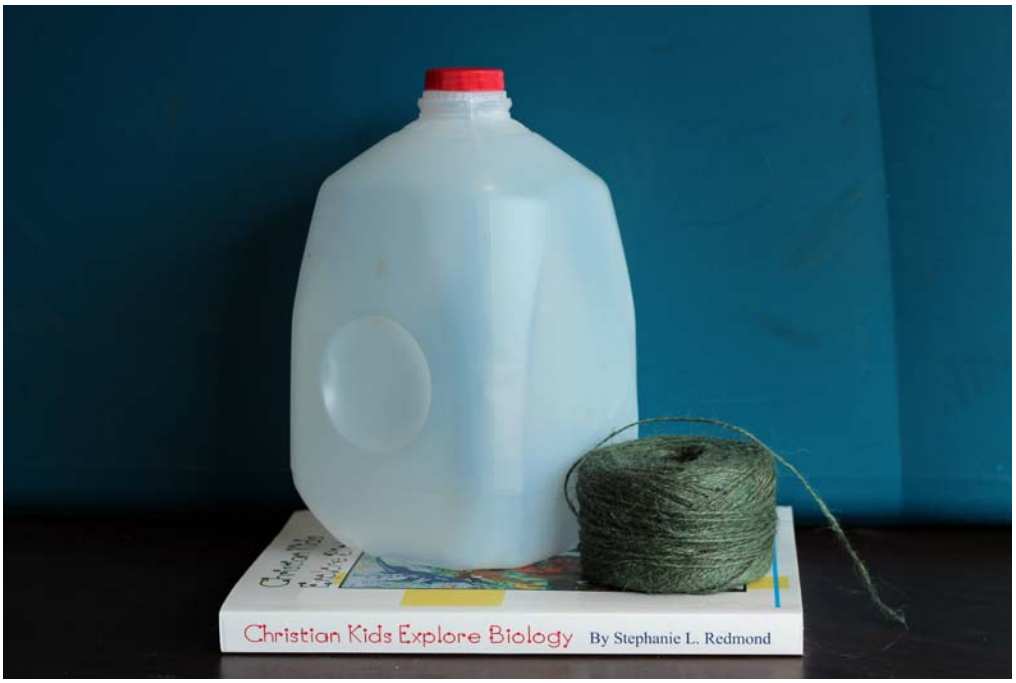
Christian Kids Explore Science E-Book

Make a Birdhouse

Christian Kids Explore Biology by Stephanie L. Redmond

During our spring nature walks we make it a game to see if we can spy any birds' nests. It's fascinating to see where birds pick to make their homes and how they design and create these nests. My children and I decided to make a birdhouse and see if any birds would choose it as their home.



Supplies:

- a clean, plastic milk jug
- twine or string
- a sharp pair of scissors
- hay, straw, dried moss, pine needles, or grass

First cut a large hole in the side of the jug. You might need to use an Exacto-knife to puncture the plastic. Once there is a slit, continue cutting the large circle with scissors.

Walk around your yard or neighborhood looking for dry moss, straw, pine needles, dry grass, or other materials to line the nest. Avoid using dryer-lint because if it gets wet, it hardens. Place the nesting materials in the bottom of the plastic jug.

Tie the twine around the handle of the jug. Hang high enough in a tree where the birds can be protected from animals and people.

Now the hard part. Wait and see if a bird adopts your birdhouse as its home. In order to encourage the birds, you might have some nesting materials such as straw and twigs nearby. We also placed a food-source and a birdbath just a short flight away from our birdhouse with the hope of convincing a pair that this house was prime real-estate.

Feed the Birds Activity

Christian Kids Explore Biology by Stephanie L. Redmond

When we visit our local nature center, my kids immediately head toward the bird observatory. This room has windows that overlook an outdoor area with multiple bird feeders and a pond. They excitedly point to various birds as they fly in for a snack. We could hang out in that room for hours just observing the birds and marveling at God's creativity.

My children and I decided to set up our own bird observation room at home. We created birdfeeders to hang in the small tree in front of our house. From our living room we could easily see if our winged friends came to visit. You can create a birdfeeder too with just several easy-to-find supplies.

Supplies:

- several pinecones
- peanut butter
- twine or yarn
- birdseed
- knife, spoon or craft stick to spread the peanut butter

First tie a long piece of twine or string to the top of the pinecone. Then spread peanut butter all over the pinecone. This can get a little messy, so it is a good idea to have wet-wipes on hand.

Pour some birdseed on a paper plate.

Once the pinecone has enough peanut butter over the surface, roll it in the birdseed.

Your birdfeeder is now complete! All you have to do is find the perfect place to hang it. Try to hang the feeder where it is somewhat protected from the elements and easy to observe.

Keep records and observe which birds (or squirrels) come to visit and how long the birdfeeder lasts.

My children eagerly waited at the window each day to see if any birds enjoyed their homemade snacks. When the birdfeeders were consumed (or taken by squirrels) the children easily created new ones with the left-over supplies. This was an easy nature activity to implement in our school that helped us focus on God's wonderful creation.

Additional Note: *If you do this activity in a group setting, please be sure there are no children with peanut allergies.*

Make a Butterfly Life-Cycle Mobile

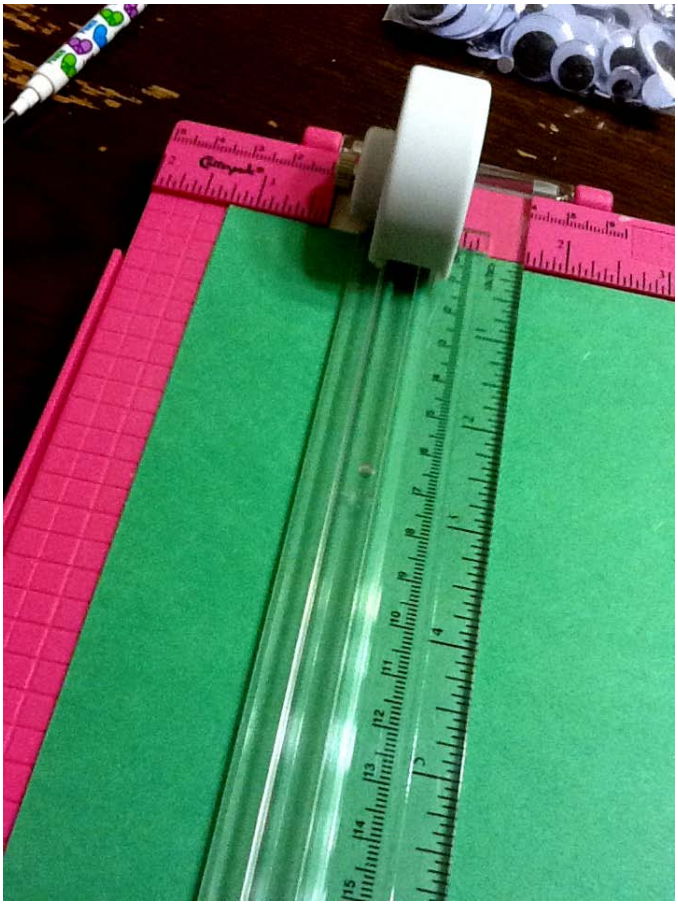
Exploring Creation with Biology by Stephanie L. Redmond

From egg, to caterpillar, to chrysalis to butterfly---the **life cycle of the butterfly** is a fascinating process. Children of all ages love to observe and see this amazing cycle of change. Here is a wonderful craft to teach and review the stages of a butterfly.

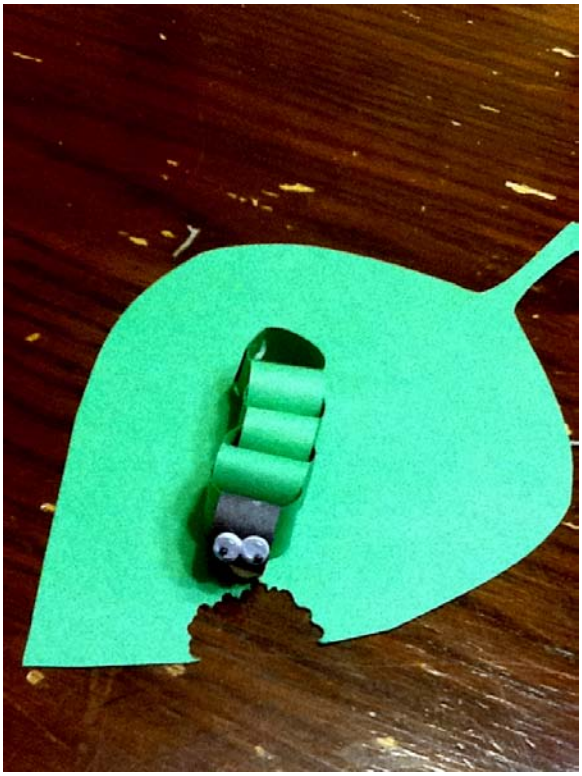
Supplies:

- green, black, and white construction paper
- patterned paper
- googly eyes
- toilet paper tube
- glue
- scissors
- hole punch
- coat hanger
- stapler
- pipe cleaner

The first stage in the butterfly life-cycle is the egg. Cut out a leaf-shape from green contruction paper. Use a hole punch to punch several white circles. Glue the white circles onto the green leaf. This represent butterfly eggs.



Next cut five or more strips out of green construction paper. Cut one strip from black construction paper. My strips were about 3" long by 1/4" wide. Feel free to make them bigger if you have smaller children. The bigger the strips, the easier to make a caterpillar chain.



Link the strips of construction paper together to form a chain. Secure each end of the chain with a dab of white glue. For fun we added google eyes and placed our caterpillar on a leaf. Using a hole punch, we punched an area on the leaf to make it appear like the caterpillar was eating.

After the caterpillar eats and eats, it is time to form the chrysalis. Take the toilet paper tube and pinch the top of the tube together and staple. Do the same to the bottom of the tube.

Finally the caterpillar emerges from the chrysalis as a beautiful butterfly! There are various butterfly crafts that would work for this step of the project. We decided to create a patchwork butterfly out of pattern paper.

First trace a butterfly shape on to white cardstock or construction paper. Then cut small squares of pattern paper. Spread glue over the surface of the butterfly body and place the squares on top being sure to cover all the white.

Once dry, trim any of the overhang from the body. Add a black body, two eyes, and pipe cleaner antennae.

Once all the components are created, add a string to each piece. Tie to a hanger in the correct life-cycle order. Our mobile did not balance perfectly at first. To fix that I created a title over the side of the hanger and placed some sticky tack under it until the mobile balanced.

When we see this butterfly mobile hanging in our room, we are reminded of God's wonderful design. He's so creative!

Edible Sedimentary Rock

Christian Kids Explore Earth & Science by Stephanie L. Redmond

Sedimentary rocks are formed when loose sand, mud, and gravel are deposited from moving water. These particles build up in layers and harden together. Creating an edible sedimentary rock is both a tasty and visual way to learn about these special rocks.

Ingredients:

- 1 stick of butter, softened
- 1/4 cup powdered sugar
- 1 teaspoon vanilla
- 1 cup all-purpose flour
- 1 1/4 cups sugar, granulated
- 1 cup whipping cream
- 2 sticks butter, sliced into 8 slices each
- 1 cup toasted nuts of your choice (mixed nuts is recommended)
- 6-ounce package of semisweet chocolate chips

Make the Crust:

First cream together softened stick of butter and 1/4 c. powdered sugar. Add 1 tsp. vanilla and mix. Gradually add 1 cup of flour until well incorporated.

Pour the crumbly crust mixture into an 8x8 pan.

Press firmly into the bottom of the pan. Use flour on your hands if the mixture is a little sticky. Bake at 325 degrees for 25 minutes. The crust should be golden brown.

Make the Caramel:

In a medium skillet, cook the granulated sugar over medium heat until it is caramel colored. Lower the heat and slowly add 2/3 cup of whipping cream and stir to combine.

Add the remaining butter, 4 pieces at a time. Stir well after each addition. Mixture should be smooth.

Remove from heat and let cool for 10 minutes.

Put it Together:

Measure 1 cup of mixed nuts and pour into a plastic bag. Use a rolling pin to crush them into various sized pieces.

Spread the nut mixture over the top of the cooked crust.

Pour caramel over the nuts and let cool.

Add the Chocolate

Place the remaining whipped cream in a glass bowl. Microwave on High for 1 minute.

Add 1 cup (6 ounces) of chocolate chips, and let sit for 2 minutes.

Whisk the chocolate and cream together until smooth.

Pour over the cooled caramel mixture. Spread the chocolate to edges of the pan. Cover and place into the refrigerator. When layers are firm, the bars can be cut.

This project was a big hit with my children because they could eat their schoolwork. Before tasting, we looked at the different layers in the bar and discussed how this cookie was similar to sedimentary rocks. This sure beat doing a worksheet and it was an opportunity to create a fun science memory too.

Make a Tornado In a Bottle

Christian Kids Explore Earth & Space by Stephanie L. Redmond

We did an easy experiment to demonstrate the spiral movement of a tornado and how it carries debris. Here is what you need for creating a tornado in a bottle:

Supplies:

- 2 2-liter bottles clean and dry.
- modeling clay
- duct tape
- water
- small bag of metallic confetti or glitter

First take the clay and roll it about the width of a finger. Press it around the whole opening of the bottle. In this picture, my son is just starting to roll it up on the bottle. It eventually covered past the blue ring. *If you are tempted to substitute Playdough for clay--don't. We did that the first time and it does not seal but rather disintegrates when the water washes over it.*

Fill the bottle about 3/4th full of water. Then pour in the confetti or glitter.

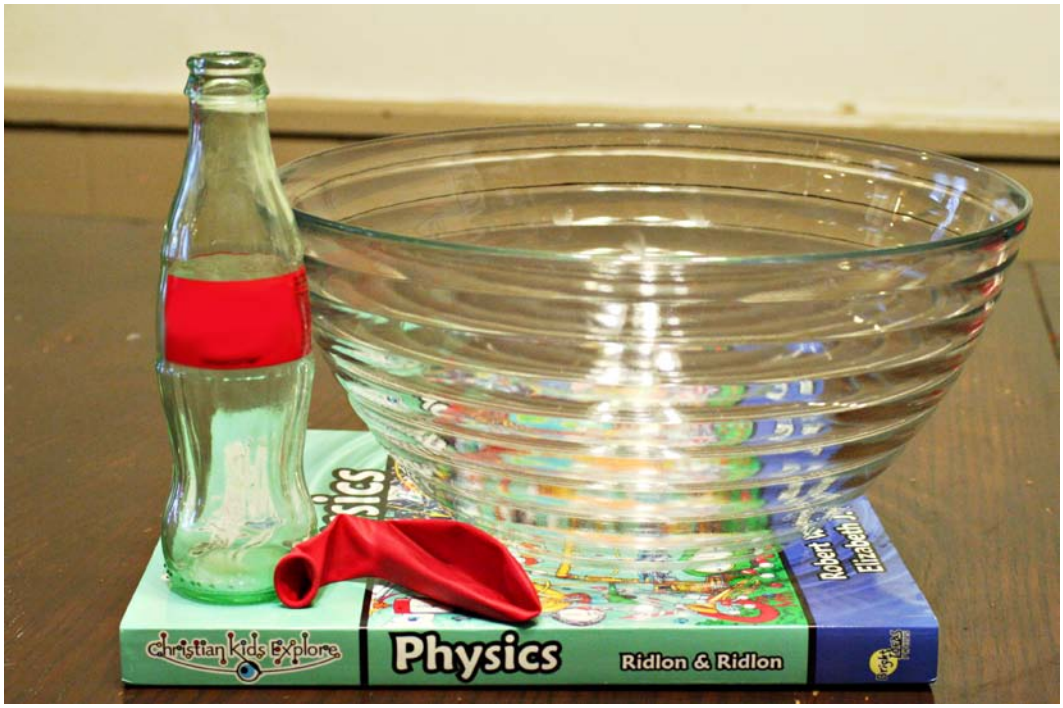
Put the second bottle on top of the first. Duct tape the two bottles together.

Place the bottle on a cookie sheet or tray just in case the seal doesn't work. Then flip the bottle upside down and watch your tornado swirl.

As simple as this project was to make, it interested all of my kids ages 3yrs. - 13yrs. After watching the "debris" swirl around several times, we talked about what we should do in case of a tornado. We reviewed where to go in our house and what to do if we weren't home when the siren went off.

Testing Charles's Gas Laws

Christian Kids Explore Physics by Robert W. Ridlon, Jr. and Elizabeth J. Ridlon



Supplies:

- 1 - glass bottle with a narrow neck
- 1 - balloon
- 2 quart saucepan or bowl
- water

Place the bottle in the refrigerator for at least an hour. Right before an hour is up, fill your pan or bowl about 3/4 full with hot tap water. Take the cold bottle out of the refrigerator and place a balloon over the opening.

Place the cold bottle in the bowl with the hot water. Be sure to hold the bottle upright so it won't tip.

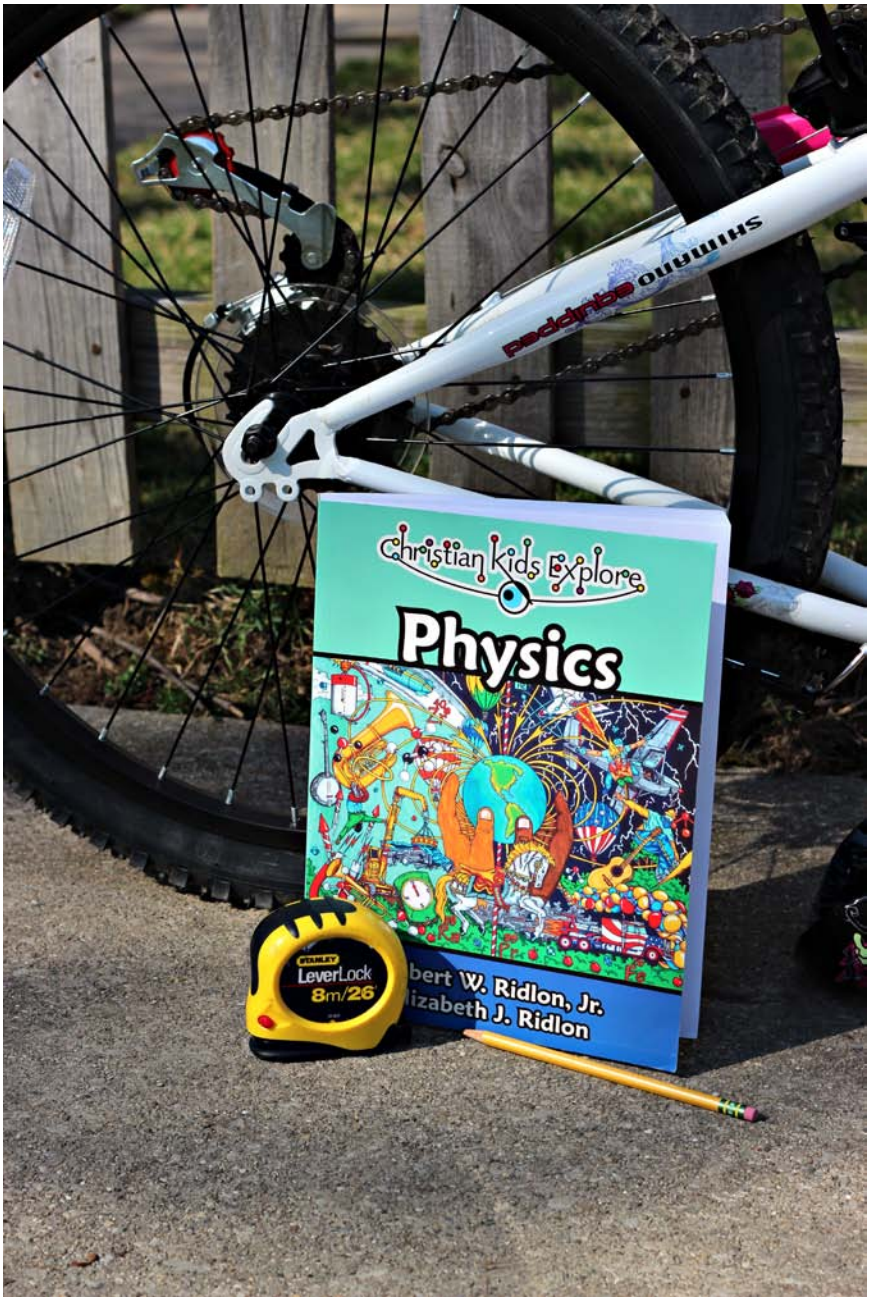
You will notice the balloon starting to fill up. Why? According to Charles's Law, if the temperature is increased, the volume will increase.

When we first read about Charles's law in the book, my children were a bit confused. It finally clicked when we did the hands-on experiment and they could see for themselves the law in action. Though sometimes it seems like experiments are big messes and an extra thing to do, I have found my children learn as much or more by doing hands-on projects than by reading about it in a book alone.

Calculating Bicycle Wheel Speed

Christian Kids Explore Physics by Robert W. Ridlon, Jr. and Elizabeth J. Ridlon

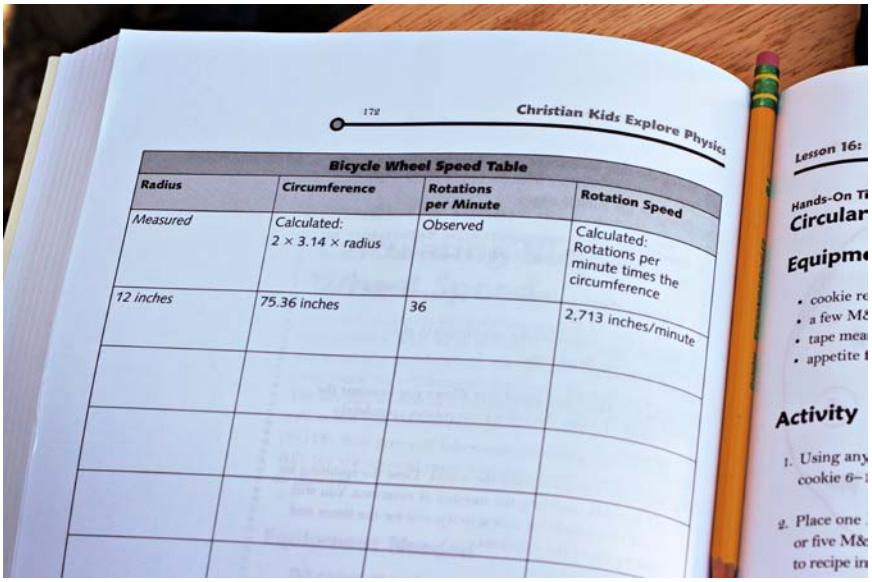
Get your fast gym shoes on--we're calculating the speed of a bicycle wheel. This hands-on activity illustrates motion in a circle.



Supplies:

- bicycle
- stopwatch
- tape measure
- data sheet

First turn the bicycle upside-down so that the wheel can be spun around without hitting anything. Next take the tape measure and find the radius of the wheel. We measured from the center bolt to the outside edge of the wheel.



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Bicycle Wheel Speed Table

Radius	Circumference	Rotations per Minute	Rotation Speed
Measured	*Calculated: 2 × 3.14 × radius*	*Observed*	Calculated: Rotations per minute times the circumference
12 inches	*75.36 inches*	*36*	*2,713 inches/minute*

Lesson 16:

Hands-On T
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Equipm
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- appetite

Activity

1. Using any cookie 6–
2. Place one or five M& to recipe in

Print the worksheet titled “Bicycle Wheel Speed Table”, located at the end of this project. Write the radius in the correct column. Now it's time for a little math. Calculate the circumference of the wheel. The formula is **2 x pi x radius= circumference (pi = 3.14)**. Add the circumference in the correct column on the sheet.

At this point you will need an additional helper. One person will spin the bike wheel and the other will time. When spinning the wheel, either use the tire valve or the reflector (if your bike has one) as the reference point. When the tire valve or reflector goes one time around, that is one rotation. Don't spin it so fast that you can't tell whether or not it has completed a rotation, and don't spin it too slow where the wheel stops rotating before 15 seconds are up. Spin it just right.

The person timing will set the timer for 15 seconds. The person spinning will spin the wheel and count how many times the wheel goes around in that time-frame. Once that is done, take the number of rotations and multiply that by 4. This will give you the number of rotations for a full minute. Add that data to the chart.

Now comes more math. The point of this activity is to calculate the speed of a bicycle wheel. So far we know how many rotations in a minute, but we don't know how fast. In order to find the speed of the wheel, multiply the number of rotations by the circumference:

#r**otations x circumference = rotation speed**

Try it several more times and record the data. Compare your results. What would happen if you tried this experiment with a smaller bike tire? or a larger tire?
At first glance the math can be a little intimidating, but if you take it step-by-step, it is not very difficult at all. This activity was a wonderful way to review some math concepts and do a little problem-solving at the same time. Besides reviewing motion in a circle concepts, this experiment showed my kids that math and science really do go together.

Bicycle Wheel Speed Table			
Radius	**Circumference**	**Rotations per Minute**	**Rotation Speed**
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12 inches	75.36 inches	36	2,713 inches/minute

Building Atomic Models

Christian Kids Explore Chemistry by Robert W. Ridlon, Jr. and Elizabeth J. Ridlon

When discussing things we can't even see or imagine such as protons, neutrons, and electrons, building a model is a hands-on way to teach about these substances. For this demonstration, students will build a lithium atom out of Styrofoam balls.

Supplies:

- 7 Styrofoam balls that are 2 inches in diameter
- 3 Styrofoam balls that are 1 inch in diameter
- toothpicks
- 3 straws
- 3 different colors of paint: red, blue, and yellow
- foam paintbrush

First paint 3 of the 2-inch balls blue. These will represent protons. Then paint 4 of the 2-inch balls yellow. These yellow balls will represent neutrons. Last paint 3 of the 1-inch balls red. These will represent electrons.

Put the blue and yellow balls together using toothpicks. Try to make it so there are no gaps between the balls.

It was hard to not have any gaps, but we tried.

In reality the electrons are moving around the nucleus, but for sake of ease, the electrons in our model will be added to the end of drinking straws. This demonstrates that the electrons are away from the nucleus. Add a red ball to the end of a drinking straw. Poking a hole in the ball with a pencil first made it easier to add the straw. Then stick the opposite end of the straw into your nucleus. Do the same with the other two red balls. Now you have a lithium atom model.

With the simplest of materials, and a little time, my children were able to have a better understanding of protons, neutrons, and electrons.

Chemical Reactions Experiment

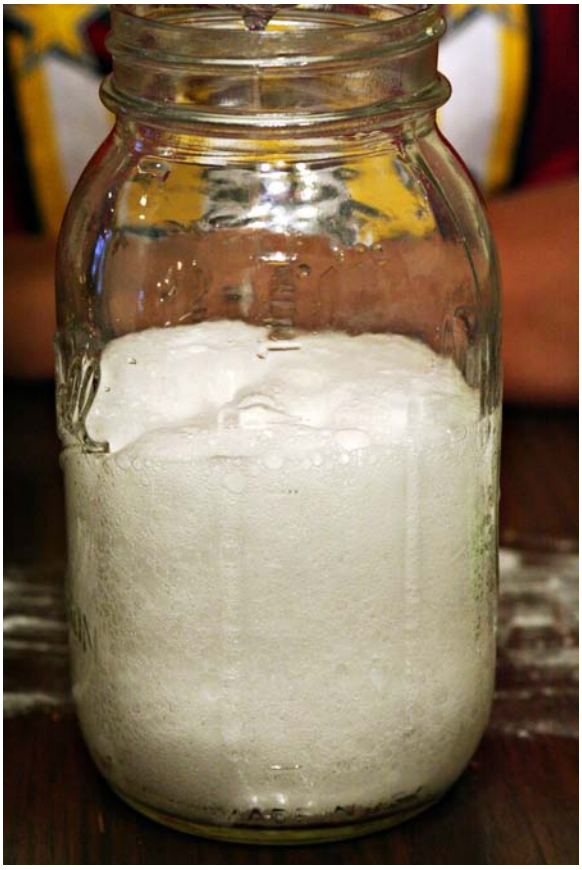
Christian Kids Explore Chemistry by Robert W. Ridlon Jr. and Elizabeth Ridlon

Sometimes the simplest of ingredients help demonstrate advanced concepts. When learning about chemical reactions in the Christian Kids Explore Chemistry book, students were introduced to chemistry equations. This experiment takes one of those written equations off the paper and places it in real life. The best part is that this experiment involves everyday materials that are safe to use.

Supplies:

- baking soda
- white vinegar
- glass jar
- measuring spoons

First add 4 Tablespoons of baking soda into the glass jar.



Then pour 100 milliliters of vinegar in the jar (I found that a canning jar had this unit of measurement listed on the side.) Immediately a chemical reaction will occur between the vinegar and the baking soda.

While observing the reaction, I asked what the bubbles were in the bottle. This reminded me of a similar experiment that shows that the bubbles are a gas.

First fill a balloon with about 2-3 Tablespoons of baking soda. Then fill a glass bottle with about 1 cup of vinegar. Fit the balloon over the opening and hold up straight so the baking soda falls into the bottle.

The same chemical reaction occurs as the first experiment, but with the addition of the balloon, we can see that a gas is released during the chemical reaction.

A pretty cool way to blow up a balloon!

Now when my children see this:

$CH_3OOH + NaHCO_3$

⇩

$NaO_2CCH_3 + CO_2 + H_20$

it will mean more than just letters and numbers. That's the beauty of hands-on experiments.

A Sediment Shake

Creation Science by Robert W. Ridlon, Jr. and Elizabeth J. Ridlon

One of our favorite family treats are homemade milkshakes. We scoop ice-cream into the blender, pour in some milk, and crushed cookies or candy. Press stir on the blender and viola: a yummy, homemade milkshake. This activity is a shake too---but it's not very tasty. It will however, demonstrate how sedimentation works.

You can probably find most of the supplies for this activity around your home and backyard.

Supplies:

- a glass jar with a lid
- 3 T. sand
- 3 T. soil (not potting soil)
- several small stones or pebbles
- a small green leaf
- water

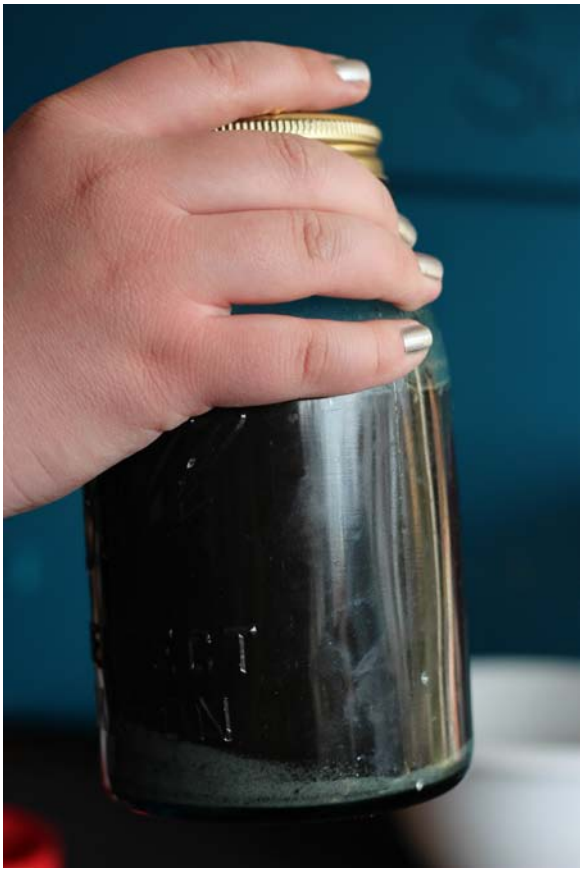
The stones should be less than 1/2 inch in diameter and the leaf should be no more than 3 inches across. Our pebbles might have been a little over that, but it was close enough.

Now for the shake ingredients! Pick sand, soil, or stones as your first layer. We added 3 tablespoons of soil first.

Then add 3 tablespoons of sand.

Then add the stones. It doesn't matter what order you place these materials, but make sure you write down the original arrangement of layers.

Place the leaf last so it is on top of all the materials.



Next add water so the jar is about 3/4ths full. Place the lid on tight and hand it to one of your students. Have them shake, shake, shake, the jar for 15 seconds.

We were surprised at how dark the water got after we finished shaking everything up. We tried to see where our leaf ended up, but couldn't. We also were surprised that the sand settled to the bottom so quickly!

We placed our jar on the table and went back to doing other schoolwork. After 3 hours we checked on our sediment shake again. We could see a new layer of dirt on top of the sand, but the water was still very, very, murky. We still could not locate the leaf.

After 3 - 4 days, the water was fairly clear. Our leaf was partially buried under the layer of dirt. The stones must have been buried in the sand and dirt because we could not see them. When we first started this experiment our layers were soil, sand, and stones. At the end we had sand, stones, and soil. Everything was rearranged.

This activity made my children and I think more deeply about the effects the Great Flood had on the landforms of the earth. From our little experiment in a jar, it took days for things to settle down and that was only after a few seconds of shaking. The layers of sediment though, started forming right away. It quickly covered the bottom of the jar. We could easily see how animals or plants could have been covered with sediment during The Great Flood and fossilized.

Make a Fossil

Creation Science by Robert W. Ridlon, Jr. and Elizabeth J. Ridlon

Fossils are fascinating. Whenever one of my children happens to find one it becomes an instant treasure. After learning that some fossils are created from sediment, we made our own version of sediment fossils out of clay.

Supplies:

- air-dry clay
- waxed paper
- various objects from nature such as twigs, leaves, shells, pinecones

This activity has two parts: creating a mold and then creating a cast. *It will take at least two days to complete.*

Spread a piece of waxed paper onto a table or counter. Take a small lump of clay and flatten it. Don't make it too thin though. Place the clay over a nature object, such as a leaf. Press down firmly.

Flip the clay over and carefully remove the object.

Admire the lovely imprint and set aside to dry overnight.

Go ahead and try several different objects.

We used leaves, shells, twigs, and pinecones..

Once the clay mold is dry, place a new piece of air-dry clay over the mold. Press firmly. Be careful as the mold can easily crack.

Carefully lift up the wet clay and set aside to air-dry. You now have a mold and a cast!

When we did this, our leaf should have been pressed a little more deeply into the clay. While drying, the leaf mold was a little too delicate and cracked. This is also why you need to do more than one imprint. The shell mold worked best for us. Once the flowers start blooming, we are planning on trying again with various flowers and leaves. It was amazing to see some of the intricate designs in nature carried over to the clay. What a wonderful hands-on way to grasp how some fossils are made.