NON-BORING NONFICTION

Easy - Fun - Inexpensive

Support recent nonfiction kids' books by hosting hands-on programs.

Presented by Mary Boone
author of BUGS FOR BREAKFAST

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Yes, This Matters!

There was a time when nonfiction was straightforward and, perhaps, a little boring. Well, I'm here to tell you: Those days are long gone. But getting young readers engaged in nonfiction can still be a challenge. No more!

This handout features 10 recent nonfiction kids' books and provides an easy-to-replicate hands-on activity to go with each one. Some of the projects have been around for decades, but I've put a spin on them that makes them even easier to do. Material lists and step-by-step instructions are included. Slight adjustments can be made depending upon the age of participants. You can even make them into family activities. Perhaps you'll want to tie these activities to special celebrations, such as National Environmental Education Week in April, World Oceans Day in June, or National Aviation Day in August.

Yes, some kids go to schools where experiments like this are conducted on a regular basis. Others have parents who take them to science centers or museums. Most kids, however, are not that lucky.

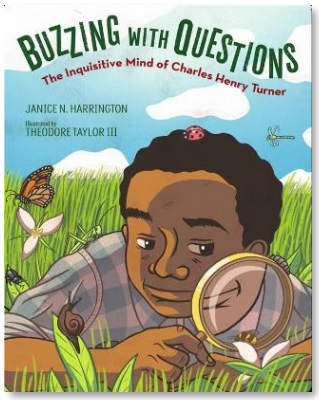
Your hands-on program about sound waves or edible insects could be what it takes to get a child interested in reading nonfiction (YAY!) or science (YAY!) Or, it could be what makes them start wondering about the world around them (That's worthy of a DOUBLE YAY!)

Librarians are already doing so, so much. I know that. But this is the kind of work that can change lives.

Trust me, young readers will be forever grateful.

– Mary Boone

Buzzing with Questions: The Inquisitive Mind of Charles Henry Turner



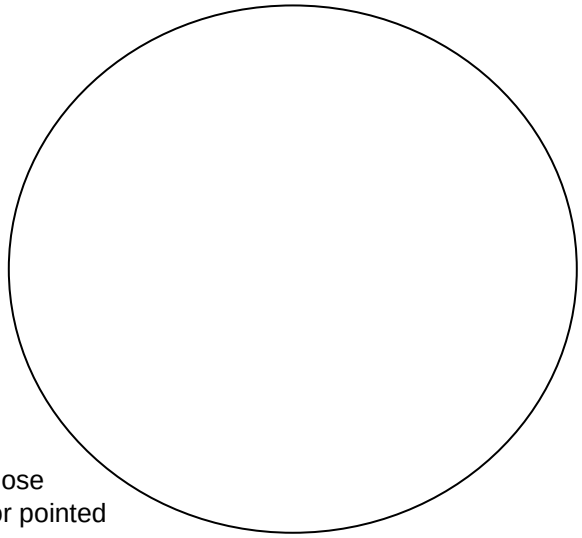
Written by Janice N. Harrington, illustrated by Theodore Taylor III. Released November 2019 by Calkins Creek/Boyds Mills. Picture book biography. ISBN 978-1629795584.

Charles Henry Turner was a curious child whose teacher encouraged him to "go and find out" the answers to his many questions – specifically about nature. He LOVED to study insects and birds around his neighborhood. He attended college when most colleges didn't accept African Americans. He became a top entomologist, known for his studies of bees, ants, and spiders.

Hands On Activity: Make Your Own Magnifying Glass

Materials & Tools Needed:

Cardstock scrap	Empty, clean, clear plastic bottles
Permanent markers	Hot glue gun and glue sticks
Scissors	Tub of water



Do ahead:
Using the template on this page, create some cardstock circle patterns.
Assign several adult or older teen helpers to staff several hot glue stations.

And then:
Ask participants to use a marker to draw around the circle pattern and onto the bottle. They need TWO circles. Encourage them to choose a part of the bottle with no pattern. The "shoulder" of the bottle is often the best spot because it's naturally curved.
Using scissors, participants should cut out their circles, staying as close to the marked lines as possible. *An adult may need to use a knife or pointed scissors to break through the plastic so kids can cut.

Once both circles are cut out, participants match up their circles with curved sides out. They'll be convex – like an M&M candy. Then, onto one of the glue stations.

Volunteers will run a thick bead of hot glue around the edges of the plastic circles, leaving an inch open. Be careful not to miss a spot. Allow the glue to dry for 30 seconds before handing back to participants.

Participants take their glued circles to the tub of water. Lower the circle into the water so the open, unglued spot is toward the top. Gently squeeze the circles; release to let water flow in. You want the circle container to be as full as possible without overflowing.

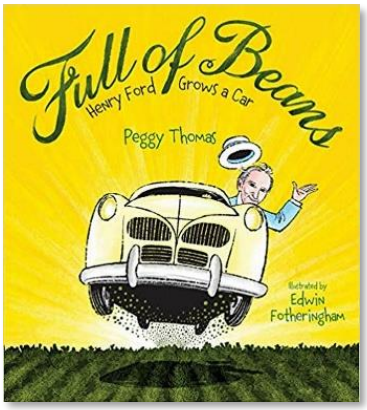
Wipe off excess water and head back to the glue station.

Volunteers glue the remaining part of the circles closed.

Participants can use their DIY magnifying glasses to examine anything they want: Plants, text in books, their shoestrings, etc.

Follow-up:
Encourage participants to experiment with their magnifying glasses. Have them look through them with both eyes open and then with one eye closed. Have them hold it at various distances from their eyes. What can participants notice about a leaf using their magnifying glass than they couldn't see without it?

Full of Beans: Henry Ford Grows a Car



Written by Peggy Thomas, illustrated by Edwin Fotheringham.
Released October 2019 by Calkins Creek. Informational picture book.
ISBN 978-1629796390

Most people know about Henry Ford's famous Model T, but this book focuses on his determination to battle The Great Depression by finding new uses for farm crops. He built a lab and hired researchers who developed soybean-based paint, fabric and – Yes – a lightweight plastic that could be used to make cars.

Hands On Activity: Let's Make Soy Plastic

Materials & Tools Needed:

Cornstarch	Microwave
Soybean oil	Water
Resealable plastic sandwich bags	Eyedropper
Liquid food coloring	Tablespoon measuring spoon
Small cookie cutters	Small paper plates

Do ahead:
Set up stations for sandwich bags, cornstarch, soybean oil, water. Depending upon age of participants, you may want to assign a volunteer to the cornstarch, oil, and water stations to help with measuring. Move microwave to an accessible spot. Assign a volunteer to operate the microwave.

And Then:
Have participants start by opening their sandwich bag. They will move from station to station, gathering:

- 2 tablespoons cornstarch
- 5 drops soybean oil
- 2 tablespoons water

Participants then seal their bags and knead the until ingredients are thoroughly mixed.

Participants open their bags and add 3 to 4 drops of food coloring to their dough.

Reseal seal bags. Dough should be kneaded until color is incorporated.

Open the seal on one corner of the bag – just an inch or two.

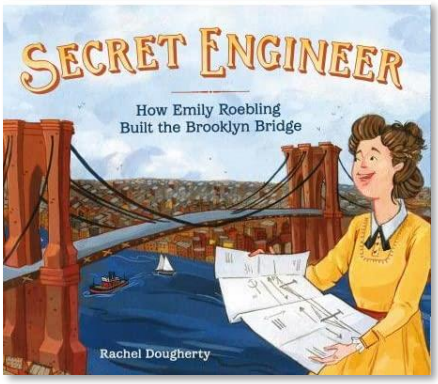
Microwave bag and contents for 30 seconds on high. Have an adult or older teen volunteer assist. Bag will be HOT and must be handled with care.

When cool enough to handle, participants can remove the cornstarch/soy oil mixture and see what shapes they can form, or they can cut shapes using small cookie cutters.

Shapes can be transported home on small paper plates. Depending upon thickness, shapes will harden in 24 to 48 hours.

Follow-up:
You just made a bioplastic. Bioplastics are plastic materials produced from renewable sources, such as vegetable oils, straw, or sawdust.
Can you think of advantages and disadvantages of bioplastics?

Secret Engineer: How Emily Roebling Built the Brooklyn Bridge



Written and illustrated by Rachel Dougherty. Released February 2019 by Roaring Book Press/Macmillan. Picture book biography. ISBN 978-1250155320

Emily Roebling's husband had been hired as the chief engineer working to build the Brooklyn Bridge. He worked long and hard but soon became so ill he couldn't even travel to the construction site. For more than 10 years, Emily was his go-between, bringing daily plans to the work site and reporting progress back to her husband. She taught herself to interpret equations and drawings, and she was able to answer workers' questions. In 1883, to calm the public's fears, she proudly took the first trip across the bridge.

Hands On Activity: Bridge Building Challenge

Materials & Tools Needed:

Plastic straws (not the bendy kind)
Masking tape
2 paper cups, each filled with 100 pennies
Scratch paper
Pencils
Scissors
Ruler
"Award" certificates

Do ahead:

Create a simple illustration showing the 6 basic bridge forms: beam, truss, arch, suspension, cantilever, and cable-stay. OR, find pictures of bridges using each of these forms.

And Then:

After reading *Secret Engineer*, show participants the basic bridge forms. Then show them a picture of the Brooklyn Bridge. It's a combination of two bridge forms. Can they figure out which? (Answer: Cable-stayed and suspension)

Tell participants about the bridge challenge they're about to take on:

Working alone or in a small group, they're going to build a bridge using only straws and tape.
The bridge can be any form or combination of forms.
Straws can be cut to any length.
The bridge platform must be at least 4 inches long and 2 inches off the ground or table surface.
The bridge must be strong enough to hold a cup filled with 100 pennies.

Encourage participants to sketch out a plan before they start building. After which bridge form are they going to model their design?

As building begins, make yourself available to answer questions, offer advice, and generally cheerlead.

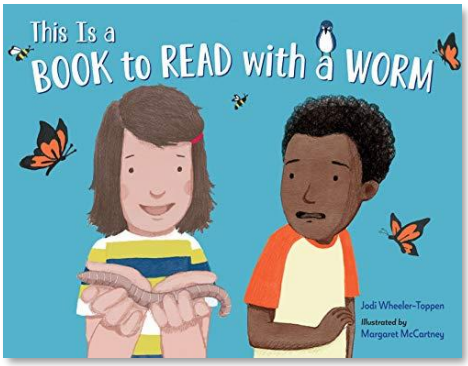
As each bridge is completed, "test" it by seeing if it's strong enough to hold the cup of pennies. If it's not, send designers back to the drawing board. If it is, challenge participants to design a bridge that can hold 2 cups of pennies at the same time. If older participants finish early, ask younger participants if they'd like help.

Award certificates to all participants. You can honor them in categories such as: sturdiest bridge, bridge most like to withstand a hurricane, best-looking bridge, tallest bridge, longest bridge, etc. Be creative!

Follow-up:

Which bridge design held up the best? Which was the worst? Why?
What design concept or shape did the most and least successful bridges follow?

This Is a Book to Read with a Worm



Written by Jodi Wheeler-Toppen, illustrated by Margaret McCartney. Released March 2020 by Charlesbridge. Nonfiction picture book. ISBN 978-1580898973

With the aid of this book – and a worm – young readers can become scientists, asking and answering questions about earthworms. Readers learn to think like a scientist and handle living things with care.

Hands On Activity: Get Up Close with a Worm

Materials & Tools Needed:

Worms (you can purchase these from a bait shop)
Spray bottles filled with water
Paper towels
Resealable sandwich bags
Flashlights (cell phone flashlights will work)
Rubbing alcohol
Cotton swabs
Paper
Tape
Clean single serve water bottles, tops cut off
Bag of soil
Aluminum foil
Handwashing station or sanitizing hand wipes

Do ahead:

Gather additional WORM -themed books to display. Some possibilities:

- *Wiggling Worms at Work* written by Wendy Pfeffer, illustrated by Steve Jenkins
- *The Worm Family Has Its Picture Taken* written by Jennifer Frank, illustrated by David Ezra Stein
- *Wiggling Earthworms* by Laura Hamilton Waxman
- *Worm Loves Worm* written by J. J. Austrian, illustrated by Mike Curato

And Then:

The great thing about this book is it basically leads you through the hands-on activities, step by step. Yes, it's that easy. But very few kids are going to have had the opportunity to actually try these things in a class filled with 30 students so, let's experiment at the library!

I suggest you spread participants out at tables and work through each activity as it's mentioned. A couple of helpers will make this go smoother. One person can read, then you'll take a break to do/try what's described.

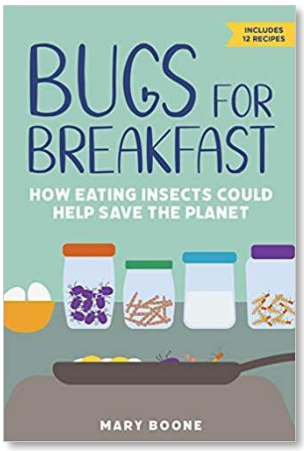
Before you even start reading, give each participant a paper towel and have them spray it with water. Then give each child a worm and a sandwich bag. As you read, take breaks so participants can really observe their worms. Who has an adult worm? Who has a kid worm? Can everyone find their worm's head?

Distribute flashlights. What do worms do when light is shined on them? Distribute cotton swabs dipped in alcohol. Have participants smell them first. Then see how the worms react to the alcohol smell. Just before participants head home, give them each a single-serve plastic bottle with the top cut off and a sheet of aluminum foil. Let the kids fill the bottles ¾ of the way up with soil (add water if the soil is dry). Deposit the worms and cover the container with foil – top, bottom, and sides.

Follow-up:

Read the last section of the book with participants and tell them they're going to take home their worms and check in the morning for tunnels. If you dug up the worms, tell participants they can deposit their worms in a nearby flowerbed. If you purchased fishing worms, ask them to give their worm to a fisher friend.

Bugs for Breakfast: How Eating Insects Could Help Save the Planet



Written by Mary Boone. Released October 2021 by Chicago Review Press. Middle-grade nonfiction. ISBN 978-1641605380

This book is all about entomophagy, the practice of eating insects. People have been doing it for centuries, but there's new interest in the practice in Western cultures because the world's population is growing and feeding all those people is a real concern. This book touches on topics including: agriculture, sustainability, climate change, water scarcity, world hunger, and world cultures.

Hands On Activity: Try It, You May Like It

Materials & Tools Needed:

Store-brand nacho cheese tortilla chips
Cricket chips (try Chirps)
Store-brand soft chocolate chip cookies
Cricket protein cookies (try Chirps or Cricket Flour)
Colored cupcake wrappers
Paper
Pencils
Whole roasted insects, optional

Do ahead:
Divide cookies and chips into sample-size portions; use the different colors of cupcake wrappers to divide the cricket protein snacks from the non-cricket snacks.

And then:
As participants arrive, talk to them about edible insects. Tell them one out of every four people in the world routinely eats insects. You may want to use a map and info from the book to indicate which types of insects are being eaten in which region.

There is now a movement in Western culture to introduce more edible insects into our diets. Why do participants think that is happening? *To feed a growing world population; it takes less space and fewer resources to grow insects than cows or pigs; they're nutritious; they're delicious.*

****Students with shellfish allergies should not taste the samples and should take care handing the samples. Insects have exoskeletons – just like shellfish. If you have an allergy to shellfish, you may also be allergic to insects. Exercise caution.*** ***

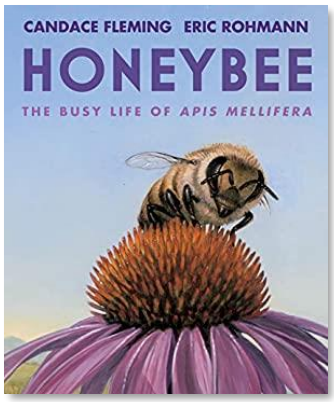
Hand out paper and pencils.

Beginning with the chips, ask participants to record their findings regarding the chips' appearance, texture, smell, and finally taste. They should complete observations about one sample before trying the second. Repeat this process with the cookie samples.

Gather participants to ask which samples they think contained crickets and which did not. How did they reach their conclusions? Did they rely on visual and olfactory inspection as well as taste and texture? If you want, you can also have participants sample whole roasted insects. Can they taste a difference between mealworms and crickets, for example?

Follow-up:
Crickets can be ground into a fine powder and incorporated into many types of recipes. What other products could insect powder be added to? Have students think about the foods they eat. Have each participant draw a picture or write a recipe showing how they'd add insects to a favorite food. Kraft Mac & Crickets anyone?

Honeybee: The Busy Life of Apis Mellifera



Written by Candace Fleming, illustrated by Eric Rohmann. Released February 2020 by Neal Porter Books/Holiday House. Nonfiction picture book. ISBN 978-0823442850

Worker honeybees are the stars of this lyrical picture book, as readers learn about the role they play in the colony. From cell preparation and queen tending, to comb building and honey curing, young readers will follow along the bees' life cycle.

Hands On Activity: See Like a Bee

Materials & Tools Needed:
Flashlights – at least one per 2 participants (cell phone flashlights will work)
Several rolls of transparent tape
Blue and black markers (standard student markers, whiteboard markers, or permanent markers)

Do ahead:
Set up a dark area with several items participants can examine with and without their "bee filters": A colorful painting, a flower, a stack of books, overripe bananas, salt.

And then:
As participants arrive and settle, read *Honeybee: The Busy Life of Apis Mellifera*. Participants will learn a lot about bees. Share these additional bee facts:

- Bees have five eyes, two large compound eyes, and three simple eyes called ocelli.
- Bees see the world differently than humans do.
- Their eyes include three types of photo-receptors, which can see blue-green and blue violet colors. Bees cannot see the color red.
- They are able to recognize ultraviolet light which humans can't. Distribute flashlights. Have participants place a small piece of tape across the lens or bulb,

Use blue markers to color the tape so there are no clear parts.

Add a second piece of tape on top of the first. Color this second piece with a purple marker.

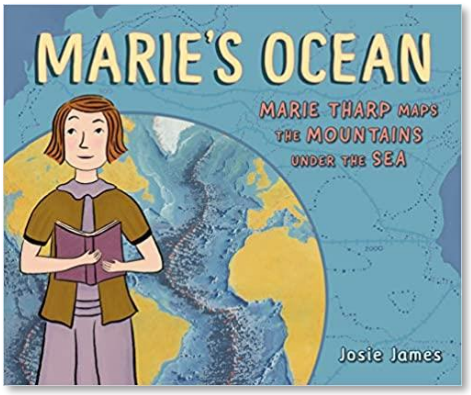
Add a third piece of tape. Color this piece purple.

Repeat this sequence until you have a dark indigo light coming through. It may take as many as 4 to 5 layers of blue and 8 to 10 layers of purple, depending on your markers and the brightness of your flashlight. (You can substitute tiny pieces of blue and purple gel filters for the tape and markers, if you want. This change makes this a terrific Stop-And-Try-It activity at a community event.)

Go into the dark area you set up and have participants use their ultraviolet flashlights to examine colors and objects.

Follow-up:
Gather participants. Recap: Very few humans can see ultraviolet light, so when we see flowers, we're seeing them differently than bees do. Flowers actually have patterns of UV within their petals that attract bees and point them to their nectar and pollen.

Marie's Ocean: Marie Tharp Maps the Mountains Under the Sea



Written and illustrated by Josie James. Released September 2020 by Henry Holt and Co. Picture book biography/graphic novel format. ISBN 978-1250214737

This book, in graphic novel format, tells the story of Mary Tharp, a geologist and oceanographic cartographer. Working in a field where women were limited in what they were allowed to do, Marie used her knowledge of math and geology to translate sonar data and create revolutionary maps of the ocean floor.

Hands On Activity: Let's Map the Ocean's Floor

Materials & Tools Needed:

Small cardboard boxes
Clay
Wooden Skewers
Rulers
Graph paper
Tape
Color pencils

Do ahead:
Cover the bottom of each cardboard box with clay, creating valleys and mountains as you go. Allow the clay to dry completely. Tape a sheet of graph paper (squared as much as possible) to the top of each box. You'll want enough boxes so that no more than three participants have to share.

And then:
Once participants have gathered, read *Marie's Ocean: Marie Tharp Maps the Mountains Under the Sea.* Discuss the fact that Marie never got to go down to the bottom of the ocean. But she was able to use sonar readings to create the first maps of the ocean floor.

Divide participants into small groups. Give each group a covered cardboard box, a skewer, a ruler, colored pencils, and a sheet of graph paper. Explain that they are going to pretend the skewers are sonar.

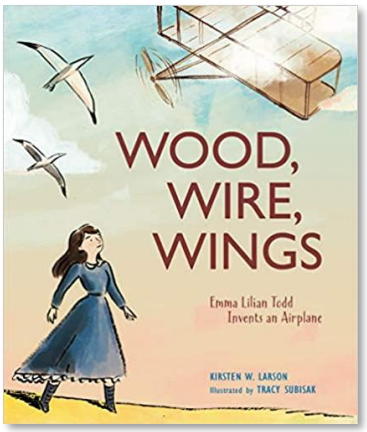
Each group should use the ruler and colored pencils to create measurement marks on their skewer.

As a group, they can use their skewer to make 12 probes through the graph paper (which represents the ocean's surface) to the clay (which represents the ocean floor). They should observe how deep each skewer goes before hitting the bottom. Each time the probe is inserted, the group should write down their measurement on their extra sheet of graph paper.

As each group completes their probing and measuring, they should use a dark purple pencil to color the areas they think are deepest. The tallest mountains they measured should be colored red. Once they've colored the highest and lowest areas, they can take the covers off their boxes. How accurate is their representation of the ocean valleys and mountains?

Follow-up:
Gathering discussion: Was mapping something you couldn't see difficult? Why is it important for us to know what the ocean floor looks like?

Wood, Wire, Wings: Emma Lilian Todd Invents an Airplane



Written by Kirsten W. Larson, illustrated by Tracy Subisak. Released February 2020 by Calkins Creek. Picture book biography. ISBN 978-1629799384

This picture book biography explores both the failures and successes of self-taught engineer Emma Lilian Todd as she tackles one of the greatest challenges of the early 1900s: designing an airplane. The story follows Emma from her curiosity-filled childhood to her career as a clerk at the U.S. Patents Office. She knew many of the patents being filed were for planes that couldn't possibly fly – so, she set out to design one of her own.

Hands On Activity: Paper Airplane Flying Competition

Materials & Tools Needed:
Paper (several colors will make it even more fun)
Pencils

Ahead of time:
Familiarize yourself with how to make a very basic paper airplane so you can lead participants through their first series of folds. You may also want to print out several sets of folding instructions for additional types of paper airplanes.

And then:
Start by distributing paper to all participants. Encourage them to follow along as you work step-by-step to fold a basic paper airplane. Ask everyone to write their name on their plane so they can keep track of it.

Once everyone's first plane is complete, gather them for flying. Give everyone a couple of tries to fly their plane. What might make their plane fly faster? Further? Higher?

Head back to your folding stations. Offer that you have instructions for other plane designs or participants might want to come up with their own design. Give everyone time to fold. Have participants write their names of their planes.

Head back to the flying station (outdoors, down a hallway, from a balcony – perhaps you'll want to try several different locations). Have participants fly their planes one at a time, calling out the best qualities of each: Good looking design, fast-flier, curviest flight, etc.)

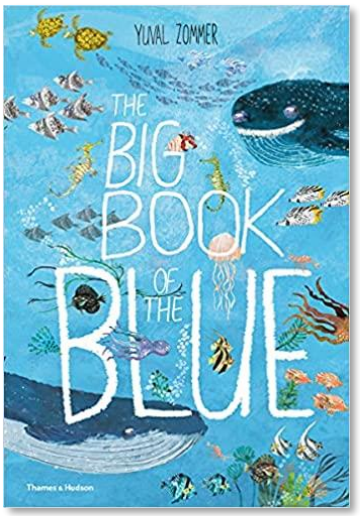
Head back in for one last folding session. What improvements can they make to their first two designs?

For your last flying session let participants bring all three of their planes. Before each participant launches his/her planes, ask them to guess which will fly furthest or highest. Let them fly and see if they're correct.

Follow-up:
This truly is the simplest hands-on activity, but kids love it. You can make it even more fun by offering airplane stickers or certificates to those whose planes fly a specified distance.

Before ending the event, gather participants to ask: Did anyone's plane crash? Did anyone have a plane that was kind of a dud? Talk about how not all designs are successes. Remind participants that learning from those duds helps make a better product the next time around.

The Big Book of The Blue



Written and illustrated by Yuval Zommer. Released June 2018 by Thames & Hudson. Nonfiction picture book. ISBN 978-0500651193

This oversized picture book gives young readers a look at plants and animals that live in our oceans. It explores the underwater world thematically, looking at animals in danger, learning how to spot creatures at the beach, and discovering how to do our part to save sea life. Readers will learn how different types of animals are able to breathe underwater and the different families to which they belong.

Hands On Activity: Ocean Zones in a Jar

Materials & Tools Needed:

Clear single-use 16 oz. bottles w/ lids
Food coloring
Light corn syrup
Vegetable oil
Dish soap
Water
Rubbing alcohol
Measuring cups
Funnels
Masking tape
Permanent markers
Printout showing zones

Ahead of time:

Post printout showing ocean zones. Pre-mix pitchers or jugs of colored liquid representing each zone:

- Trench: Corn syrup (tinted black)
- Abyss: Dish soap (tinted purple)
- Midnight: Water (tinted dark green)
- Twilight: Vegetable oil (tinted dark blue)
- Sunlight: Rubbing alcohol (tinted light blue)

Recruit an adult or older teen volunteer to staff each pouring station. It may be helpful to label pitchers and/or pouring stations.

And then:

After reading *The Big Book of Blue*, give each participant a clean, clear bottle. Tell them they're going to go from station to station (in order) to gather the liquids that represent each ocean zone.
Have volunteers measure one-third cup liquid for each participant. (Adjust amount if using smaller bottles.) Older participants may be able to pour their own. Younger kids will likely need help.

Once all bottles are filled and lids are screwed on tight, distribute strips of masking tape and markers so participants can label each zone in their bottle.

Follow-up:

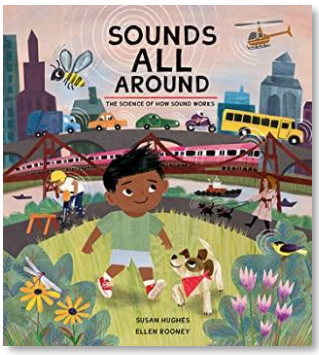
Gather participants to review what might live in each zone (check back on page 54 of the book for a reminder).

How do you think the animal life varies from zone to zone?

Why would some creatures prefer the dark bottom of the ocean?

Why do others need to live near the top?

Sounds All Around: The Science of How Sound Works



Written by Susan Hughes, illustrated by Ellen Rooney. Released May 2021 by Kids Can Press. Nonfiction picture book. ISBN 978-1525302503

This book helps young readers understand sound and its role in our lives. Text explains how sound happens, how we hear it, what makes some sounds loud and some soft, what makes some high-pitched and some low-pitched. The book addresses the many ways humans and animals use sound to communicate and discusses sounds that occur naturally and those created for specific purposes.

Hands On Activity: I Can See Sound

Materials & Tools Needed:

Large glass or metal bowl
Plastic wrap
Rubber band large enough to fit around bowl
Sprinkles (rice also works!)
Recorder, drum, or other instrument
Phone or another way to play music
Cookie sheet or tray

Ahead of time:

This activity can be demonstrated for a large group and then replicated with smaller groups. If you plan to have participants try this themselves, be sure to gather extra bowls and other supplies.

And then:

Explain to participants that sound waves can come from many sources but the sounds are all transmitted the same way – through vibrations. When a sound is created it causes molecules close to the sound source to vibrate. When one molecule vibrates, it causes the molecules touching them to vibrate too. This continues, from one molecule to the next, passing the energy on as it goes in the form of a wave. We're going to see those vibrations in action today.

Start by stretching a piece of plastic wrap tightly across the top of the bowl. If the wrap doesn't cling to the bowl, use a rubber band to secure it. Adjust it so it is as flat as possible – no wrinkles!

Set the bowl on a cookie sheet (in case you need to capture escaped sprinkles). Carefully spread a spoonful of sprinkles across the plastic wrap.

Have someone stand very near the bowl. Without touching it, play a few notes on the recorder or drum. What happened? Try another instrument. What happens if you play music further away from the bowl?

Play some music through your phone or other device. Start quietly, then make the music louder. What happens to the sprinkles? Can you make the sprinkles move by humming, singing, or clapping near the bowl?

Follow-up:

Gather participants to talk about what they all saw – the differences in what happened according to what types of sounds were being made. Remind them that sound travels as waves. In this experiment, the sounds they made created sound waves that reached the bowl, disturbed the particles of the plastic wrap, which created vibrations, which caused the sprinkles to move. Cool science!