Rockin' Rocks

Big Science Little Hands II: Community Connections

Together, the Nanaimo Science and Sustainability Society (NS3) and Science World BC worked with Early Childhood Educators to complement the original *Big Science for Little Hands* activity book, with additional hands-on science resource materials. Our goal is to make science fun, hands-on, accessible to educators and to provide examples on how to link science concepts to the local community. We hope that these resource materials complement what you are already doing and offer additional ideas for making local connections.

The activities described in this book were designed with the help of nine Early Childhood Educators on Vancouver Island. Activities were tested at 54 pilot programs with 484 young children.

Support for program development was provided by the Vancouver Foundation, Woodgrove Chrysler, Nanaimo Insurance Brokers and VMAC.

Special thanks to Lorna McCrae, Barb Mjolsness, Jen Borzel, Sheila Grieve, Shawna Hassard, Odette Herr, Chris Peters, Melissa Burke, Corinne Dunn, Carly Foster, Becky Manson and the staff at Ladysmith Friends and Family, for allowing the NS3 to test 54 pilot programs at their early childhood education centres and gather student feedback! Their participation was invaluable!

For more ideas and activities check out scienceworld.ca/bslh

Introductions—Introduction activities are low-preparation, low-mess activities that can set the stage for the topic to be explored and work well for large groups.

Explorations—Explorations are an opportunity to discover, explore and get little hands dirty. Explorations involve open-ended activities that are appropriate for smaller groups and have questions associated with them for enhanced learning.

Make This—Children take their experiences home for further exploration, with this make-and-take activity.

Community Connections—Connect your explorations to the environment around you! Community Connections provide guides on how to connect these activities to the world around you.

All Together—This group activity makes a great wrap up to your topic of exploration.

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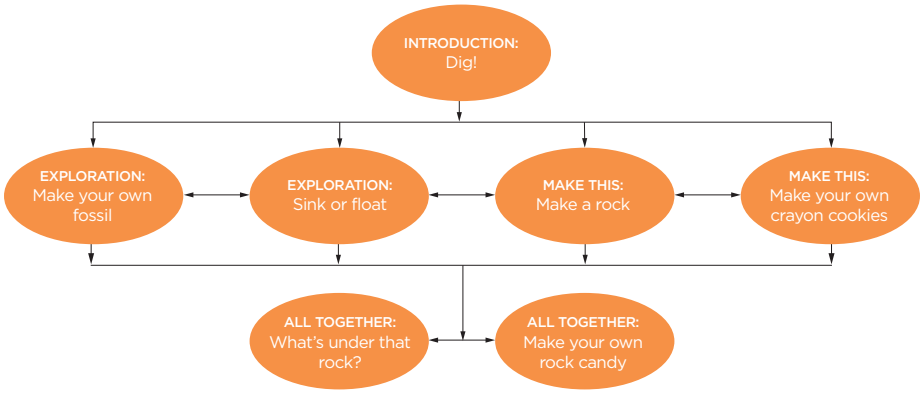
Rockin' Rocks

A path through Rockin' Rocks

Here's one possible way to put the activities in this resource together:

- Do an *Introduction* at circle time in a large group.
- Have the children try out the *Explorations* and *Make This* in smaller groups at stations around the room.
- Try *All Together* just before the end of the school day, or at the end of a few days on the topic.



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Big Science for Little Hands supports the learning goals outlined in the British Columbia Early Learning Framework, particularly those in the area of Exploration and Creativity.

To promote exploration and creativity, adults provide an environment where young children can do the following:

- Explore the world using their bodies and all their senses
- Build, create and design using different materials and techniques
- Actively explore, think and reason
- Identify and try possible solutions to problems in meaningful contexts and situations
- Be creative and expressive in various ways
- Develop a sense of wonder for natural environments
- Express a zest for living and learning

(BC Early Learning Framework: bced.gov.bc.ca/early_learning/)

Share with us!

Help us to improve Big Science for Little Hands by submitting feedback:
scienceworld.ca/bslh/feedback

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Rockin' Rocks
Introduction

Dig!

Evidence of plants and creatures that lived long ago can be found in fossils. Pretend to be palaeontologists and geologists as you search for fossils and rocks.

What you need

- Container to dig in (water/sand table or big plastic box)
- Material to dig through (pebbles, sensory beads, cornmeal or sand)
- Tools (little shovels, brushes, different size tweezers, various slotted spoons)
- Cups or containers for sorting
- Hidden objects (toy animals, toy dinosaurs, fossils from Make Your Own Fossil and rocks from Make a Rock activities)

Hint: A wide, shallow table on wheels is best for accessibility.

Hint: Sensory beads are often available at early education supply stores such as Constructive Playthings (constructiveplaythings.com).

Preparation

1. Set up the water table or container, filled with material of your choice, at a height appropriate for your group of children.
2. Mix in the objects so the children will have to hunt to find them.

Where to next?

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Rockin' Rocks
Introduction

Hands on

1. Use your hands or tools to try and uncover what is hidden in the box.
2. Try digging, sifting and sorting the sand.

Questions to ask

1. Can you identify objects using your sense of touch before seeing them?
2. What kinds of objects are easier to find?
3. Which tools are your favourite? Why?

What's next?

- Provide a key for children to classify their findings. Have children count their finds.

Community connections: Locate fossils in your community. Invite a geologist or palaeontologist from a local college or university to your class. Ask them to bring in rocks or fossils to show the children.

Vocabulary: fossil, tool, dig, guide, geology, rocks

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Make Your Own Fossil

Palaeontologists use fossils to learn about plants and animals that lived long ago. Fossils are rocks containing evidence of ancient life. Sometimes parts of a plant or animal are preserved. Some fossils are impressions, like footprints in the mud, that have turned into stone. In this activity you will make your own fossils by imprinting objects in playdough.

What you need

- 500ml flour
- 250ml salt
- 125ml–250ml cold water
- 15ml cooking oil
- 2 drops of food colour (optional)
- 250ml of sand
- Variety of objects for imprinting (leaves and shells)

Preparation

1. Mix the sand and flour together.
2. Add the wet ingredients and mix well.
3. Knead the dough until it forms a ball.
4. Store the dough in an airtight container or bag in the refrigerator.

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Rockin' Rocks

Exploration

Hands on

1. Make many small balls with the playdough.
2. Squish the balls flat.
3. Gently press your leaves or shells into the playdough.
4. Remove objects and observe the impression they leave behind.

Questions to ask

1. What's the difference between your leaf or shell and the impression left in your playdough?
2. What objects make good impressions? Which don't?

What's next?

- Let your "fossils" dry and use them in the Dig! activity.

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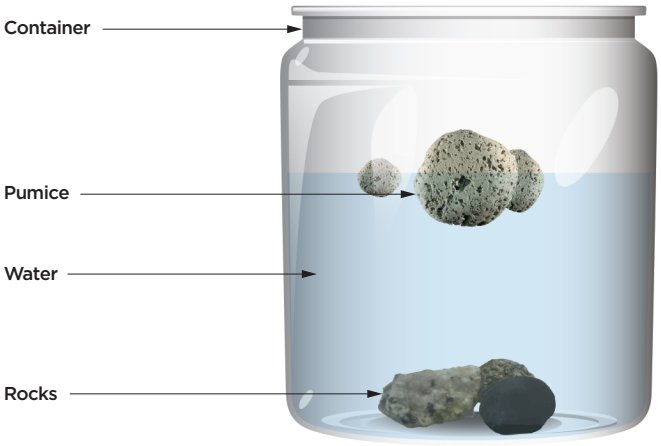
Exploration



Sink or Swim

Explore the density of rocks. Make and test predictions to discover if rocks will float or sink in water. Rocks will sink if they are denser than water and will float if they are less dense.

What you need

- Water
- Large container to hold water
- Collection of various rocks (including pumice)

Hint: Sometimes stores sell pumice stones in the bath section.

Hands on

1. Look at the collection of rocks. Hold them and feel them.
2. Make a prediction as to which ones will sink and which will float.
3. Test each rock by putting it in a container of water.
4. Observe what happens.

Hint: Examine the rocks with magnifying glasses. This will help children see the holes inside pumice that help it float.

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Rockin' Rocks

Exploration

Questions to ask

1. Do all the rocks feel the same? What is different about them? Which rocks are heavy and which are light?
2. What is your prediction: will this sink or float?
3. What is different about the rock that floats (pumice)?

What's next?

- Try to make the heavy rocks float, by attaching packing peanuts or other floating objects to them. Use a boat to float the rocks.
- Test floating and sinking with other collections of items, such as shells.

Community connections: Explore your local beach or even your backyard to find things that float and things that sink. Visit a lake or river and at the water's edge, observe what floats and what sits on the bottom.

Vocabulary: sink, float, heavy, light, weight, size, water, surface, bottom

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Crayon Cookies

Some rocks are formed when hot magma (molten rock) cools and hardens (classified as igneous rocks). Sometimes, sedimentary rocks get recycled into new rocks this way, in subduction zones. Make your own colourful crayon "recycled rocks," using the heat from the oven.

What you need

- Crayons—bits and pieces
- Muffin tins

Preparation

1. Place different coloured crayon bits in a muffin tin.

Hint: Use either foil or silicone liners.

2. Melt crayons at 200˚C for 5–10 mins.
3. Let cool before use.

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Rockin' Rocks

Make This

Questions to ask

1. What will happen when the crayons are heated?
2. How have the crayons changed in the oven? How do they change when they cool?

What's next?

- Use your crayon cookies to do leaf rubbings in the Leaf Rubbings activity from the Trees & Plants resource.

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Rockin' Rocks

Make This

Make a Rock

In nature, we can find rocks that are different sizes, colours, shapes and textures. Rocks get their colour from the minerals they are made of.

What you need

(Makes 18, 4cm rocks)

- 250ml flour
- 125ml salt
- 125ml warm water
- 250ml coarse sand
- Food colouring: 5 drops red, 3 drops blue, 3 drops yellow

Hands on

1. Collect rocks from around your school, home or community centre.
2. Describe the different rocks you see. What different ways can you sort or group them?
3. Make your own rocks:
   a. Mix all the ingredients together with your hands.
   b. Make rock-shaped lumps, of different sizes and textures.
   c. Set the "rocks" in a warm dry place for a few days, to dry thoroughly.

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Rockin' Rocks

Make This

Questions to ask

- What are the different colours you see in the classroom rocks?
- Describe the shapes and sizes of the rocks.
- What do the rocks feel like? Are they smooth or rough?
- How are the rocks you made similar or different from the classroom rocks?

What's next?

- Place a small toy dinosaur, shell, leaf or other object inside the rock before drying. The children can use a small hammer to crack it open to reveal the dinosaur.
- Use the rocks in the Dig! activity.
- Use your rock collection or your homemade rocks in Do You Know Your Rock? from "Super Sleuths" in the first edition of *Big Science for Little Hands* (scienceworld.ca/bslh).

Community connections: Look at the rocks that have been cut away alongside roads, or cliffs at the seaside. Do you notice any layers, patterns or colour changes? Is there a rock or fossil collectors club in your area? Invite them to visit your classroom to share their favorite finds. Ask them about geology hotspots in your area. Your local university or college may have maps on unique geology in your area.

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Rockin' Rocks

All Together

What's Under That Rock?

Rocks make up part of the ecosystem. In this activity, examine how rocks fit into your local ecosystems.

What you need

- Natural environment with rocks
- Magnifying glasses
- Kids tweezers
- Spoons
- Containers

Hands on

1. Go to a place outside with rocks.
2. Observe what type of environment your rock is in.
3. Use magnifying glasses, tweezers or spoons to observe the rock.
4. Gently turn over your rock.
5. Look at what is underneath the rock.
6. Place interesting things in your container, to show other children.
7. Remember to put everything back where you found it.

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Rockin' Rocks

All Together

Questions to ask

1. Describe what you see on and underneath a rock.
2. Count how many of one type of item you see.
3. Compare what is on top of the rock to what is underneath the rock.
4. Why is there a difference between what lives on the top and bottom of a rock?
5. How many of the rocks were covered by grass?
6. How many, just covered with dirt or small insects?

What's next?

- Try the same activity in different environments (e.g. forest, seashore).

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Make Your Own Rock Candy

Some rocks are formed when hot magma or lava from volcanoes cools into crystals. Other rocks are formed when water evaporates leaving behind crystals, like salt. Making rock candy allows children to observe the formation of crystals over several days.

What you need

- Wooden skewer or chopstick
- Clothespin
- 250ml of water
- 500ml–750ml of sugar
- Glass jar that is tall and narrower than the clothespin
- Large pot for boiling water
- Food colouring (optional)

Preparation

1. Clip the wooden skewer onto the clothespin so that it hangs down vertically inside the glass and is about 2.5cm from the bottom. The clothespin should keep the skewer from falling into the glass jar.
2. Remove the skewer and clothespin and put them aside for now.
3. Pour the water into a pan and bring it to boil.
4. Pour about 60ml cup of sugar into the boiling water and stir until the sugar dissolves.
5. Keep adding sugar until it will no longer dissolve and a saturated solution is made.

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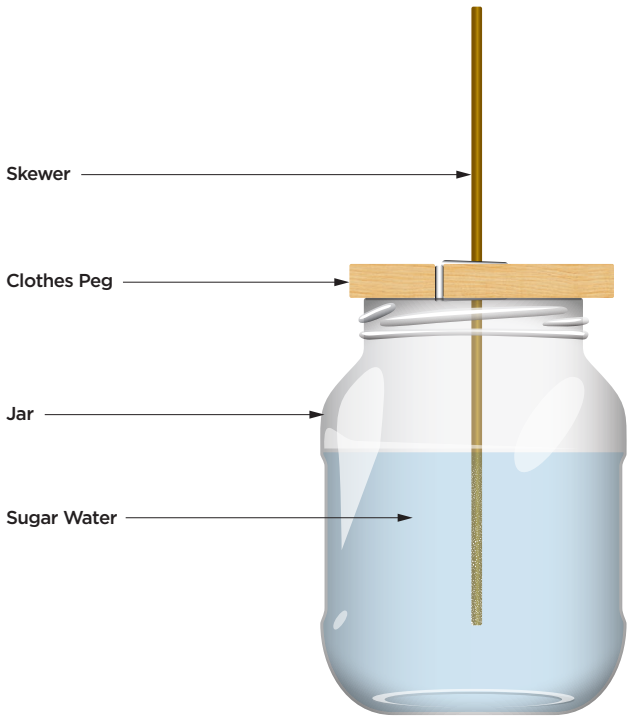
6. Remove the pan from heat and allow the solution to cool for at least 20 minutes.
7. While it is cooling, dip half of the skewer in the sugar solution and then roll it in some sugar to help start the crystal growth. Be sure to let the skewer cool completely so that sugar crystals do not fall off.
8. Pour the sugar solution into the jar almost to the top.



Hands on

1. Submerge the skewer into the jar with the cooled sugar solution.
2. Make sure thatthe skewer is hanging straight down the middle without touching the sides.
3. Allow the jar to fully cool and put it someplace where it will not be disturbed.
4. The sugar crystals will grow over the next 3–7 days. Make observations frequently.

Hint: To make coloured rock candy add food coloring to your sugar water. Enough food colouring should be added to make a dark solution.

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Questions to ask

1. What happens to the sugar when we add it to the hot water? What happens if we add the sugar to cold water?
2. Where are the crystals coming from and what are they made of?

What's next?

- Experiment with making other hard candies, like candy brittle or sponge toffee.
- Look at dissolving with Does it Dissolve? from "Mysterious Mixtures" from the first edition of *Big Science for Little Hands* (scienceworld.ca/bslh).
- Grow inedible crystals in Growing Crystals from "Size Matters" from the first edition of *Big Science for Little Hands* (scienceworld.ca/bslh).

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Rockin' Rocks

More Ideas

Teacher Resources

- *Rock* by Abby Colich
- *If You Find a Rock* by Peggy Christian
- *Rocks* by Picture Window Books
- *Rocks* by Cassie Mayer

Literature for Children

- *Stone Soup* by Lesley Sims

Online Resources

- Explore sinking and floating through multiple games and informative videos
  - *Sesame Street* (sesamestreet.org/parents/topicsandactivities/toolkits/stem#c2f7fa7f-e186-4188-a241-2344c1955c21).
  - *Peep and the Big Wide World* (peepandthebigwideworld.com/en/parents/activities/40/guessing-what-floats/).
  - *Mr. Rogers Neighbourhood* (pbskids.org/rogers/sink.html).

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A Rock Song

Tune: *Frère Jacques*

Rocks in my pockets,
Rocks in my pockets,
Big and small,
Big and small.
Shiny little pebbles,
Shiny little pebbles,
Found them all,
Found them all.

Little Pebbles (Poem)

One little, two little,
Three little pebbles.
Four little, five little,
Six little pebbles.
Seven little, eight little,
Nine little pebbles,
Ten pebbles rolling in the stream.
Lying on the beach.
Hiding underground.
Warming in the sun.

Notes for next time:

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