Size Matters:

Science for 3–5 year-olds

Big Science for Little Hands

SCIENCE WORLD BRITISH COLUMBIA

AT SCIENCE WORLD, we know that early childhood educators are already providing many opportunities for young children to explore their world. We hope that these resource materials complement what you are already doing and offer additional ideas to inspire further exploration.

The activities have been designed for experiential learning. The intent is for children to experience each concept rather than simply talking about it. Each activity can serve as a starting point for further exploration.

The activities are divided into the following categories:

Introductions—These could be used to set the stage for the topic, or to find out how much the children already know. They're low-preparation, low-mess activities for a large group to do together.

Explorations—These require a bit more set-up and clean-up. They work best with small groups of children. They're intended to be open-ended, with a teacher or other adult available to pose questions and expand the activity as required.

Make This—These explorations result in a product that children could take home or display.

All Together—This big whole-group activity would make a great wrap-up to the topic.

Connections—Ideas for extending the topic in cross-curricular ways.

You know your group best! There is no perfect way to order or arrange these activities. They could be combined into a whole day on a theme, or taken one at a time over several weeks. Please pick and choose, expand or contract as makes sense for your group of children.

Topics Now Available

Round the Circle

Activities to explore round things, things that roll, and things that spin.

Wet & Dry

Activities to explore being wet and dry.

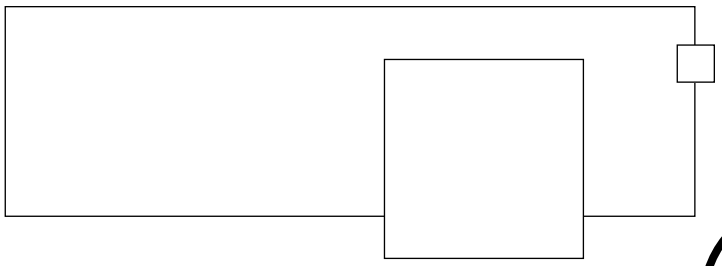
Sticky Stuff

Activities to explore stuff that sticks.

Size Matters

Activities to explore things that get bigger and smaller.

Check for more resource packages coming soon at www.scienceworld.ca/preschool.html



We gratefully acknowledge the financial support of the Province of British Columbia through the Ministry of Education.

January 2009

Size Matters: Introductions

Big Science for Little Hands

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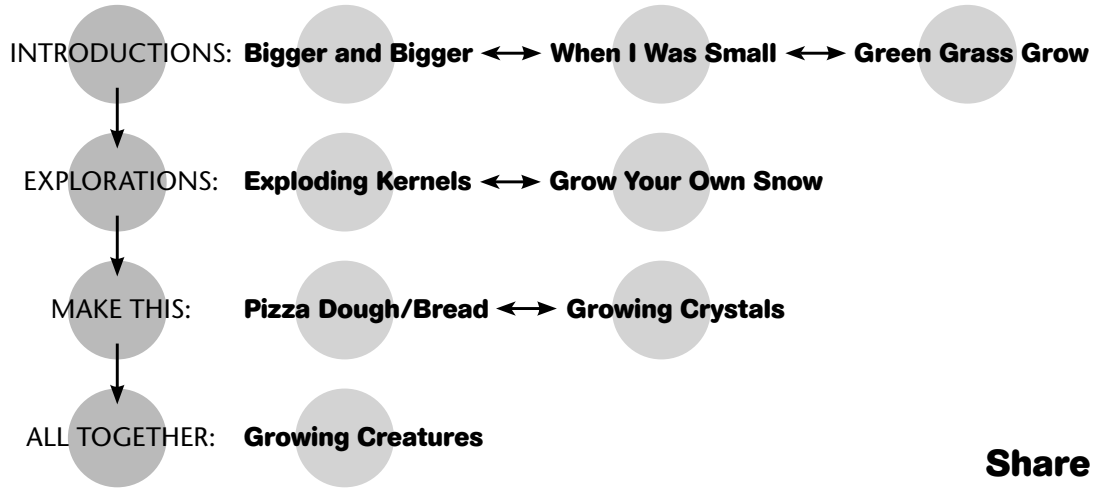
A Path Through 'Size Matters'

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

Do one or two **Introductions** at circle time in a large group.

Have the children try 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 of size.



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 a variety of ways
- develop a sense of wonder for natural environments
- express a zest for living and learning

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

Thank you to the children and families around British Columbia who assisted with the testing of the activities in this package.

Share with us!

Please send us your feedback, suggestions and ideas. Email bslh@scienceworld.ca or visit www.scienceworld.ca/preschool.html and fill in an online survey.

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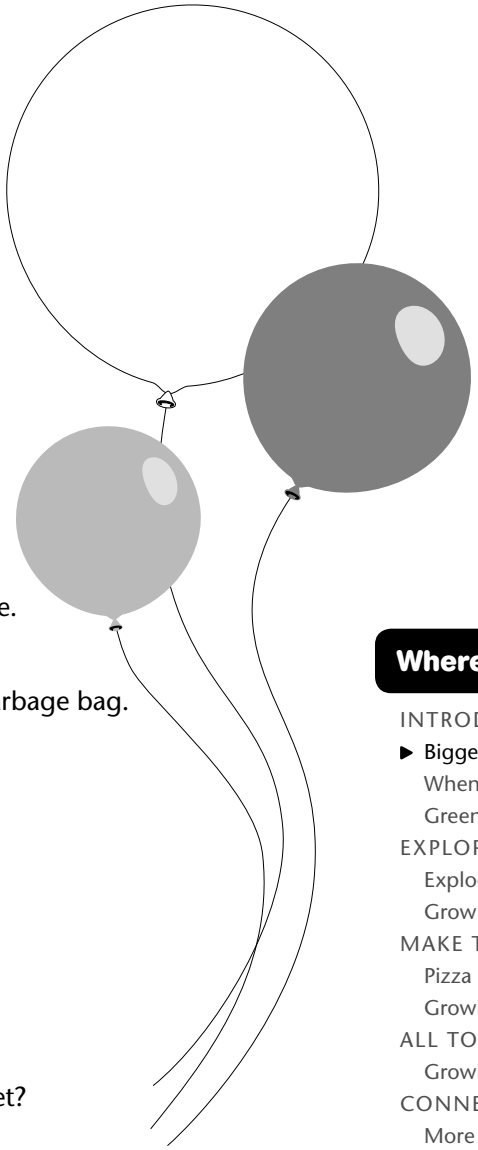
Bigger and Bigger

Explore what it means for something to grow.



What you need

- ○ Balloons
- ○ Balloon pump (optional)
- ○ Clear garbage bag

Hands on

1. Observe a uninflated balloon.
2. Add a small amount of air to the balloon. Observe.
3. Continue to add air to the balloon. Tie.
4. Inflate 10 balloons and put them inside a clear garbage bag. Compare them to 10 uninflated balloons.

Questions to ask

- What's happening to the balloon?
- What is making it get bigger?
- Is there 'more' balloon?
- Will the balloon get bigger and bigger forever?
- What other things do you know that grow?
- How many balloons would it take to fill up a closet?

Notes for next time

Where to next?

INTRODUCTIONS
▶ Bigger and Bigger
When I Was Small
Green Grass Grows
EXPLORATIONS
Exploding Kernels
Grow Your Own Snow
MAKE THIS
Pizza Dough/Bread
Growing Crystals
ALL TOGETHER
Growing Creatures
CONNECTIONS
More Ideas

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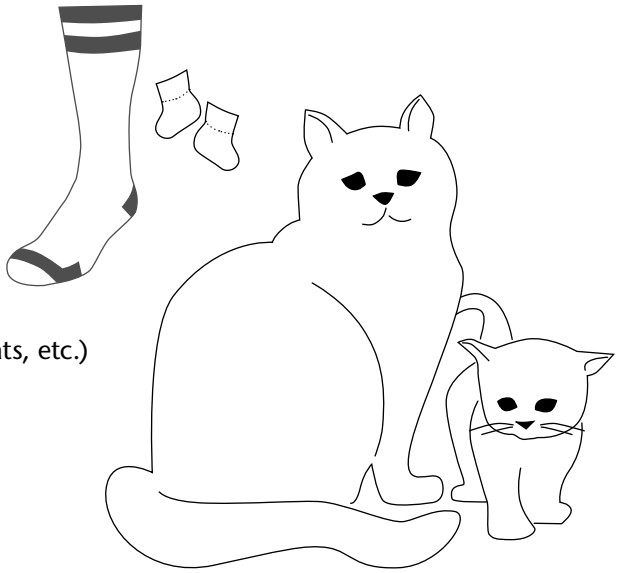
When I Was Small



Children reflect on how much they have grown and how much growing they still have to do.

What you need

- ○ Baby socks, kid's socks and adult socks (or shoes, hats, etc.)
- ○ Baby photos and current photos of children
- ○ Pictures of baby animals and adult animals

Hands on

1. Compare the baby items to the adult items.
2. Compare the baby animals to the adult animals.

Questions to ask

- How are these things the same? How are they different?
- What has changed?
- Do we get bigger and bigger forever?

Notes for next time

Where to next?

INTRODUCTIONS
- Bigger and Bigger
- ▶ When I Was Small
- Green Grass Grow

EXPLORATIONS
- Exploding Kernels
- Grow Your Own Snow

MAKE THIS
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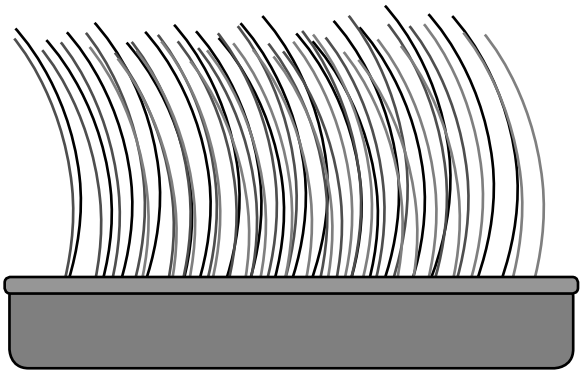
Green Grass Grows

Grow some grass from seed!



What you need

- ○ A shallow pan (lasagna dish or baking pan)
- ○ Soil
- ○ Grass seed
- ○ Water

Hands on

1. Fill the pan with soil.
2. Spread seed.
3. Water.
4. Leave in a sunny spot for a few days to grow.
5. Take pictures or measure the grass each day to record its growth.

Questions to ask

- What is coming out of the soil? Where did it come from?
- How tall will it grow?
- What will happen if we cut it?

What next?

- Take turns trimming your grass (a good way to practice with scissors). Measure it to see how quickly it grows back.
- Make grass-head people from a nylon stocking or using an egg shell.
- Compare grass seeds to other seeds, and how grass grows to how other plants grow.

Notes for next time

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Exploding Kernels

Popcorn has more starch than other kinds of corn, and a very precise amount of water, it also has a hard outer shell. When popcorn is heated to more than 170° Celsius, the pressure inside the kernel gets very high, preventing the water from turning to steam. Eventually the pressure becomes so great the hard shell breaks open, then the water turns to steam and expands by 1500 times. Each grain of starch blows up like a balloon, and then quickly solidifies into a unique shape.

Hint:

Glue 10 unpopped and 10 popped kernels to a piece of paper to see how much space they each take up.

What you need:

- Raw popcorn kernels (one or more brands/varieties)
- Hot air popcorn popper
- Paper
- Glue
- Pencil or crayons

Hands on:

1. Examine the kernels. Observe their size, shape, texture and colour.
2. Choose a number of kernels to experiment with (e.g. 10, 25, etc.). Count out that number of kernels from one type of popcorn.
3. Predict (guess) how many of your kernels will pop.
4. Pop your corn: put your kernels inside the popcorn popper and plug it in. Make sure there is a bowl under the spout of the popper to catch the popped kernels. Wait a few minutes until the kernels are popping less then once every 30 seconds, then unplug the machine. **CAUTION! HOT**!.
5. Remove any remaining kernels from the machine. Observe your popped and unpopped corn. Count the number of popped and unpopped kernels.

Where to next?

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Exploding Kernels (con't)

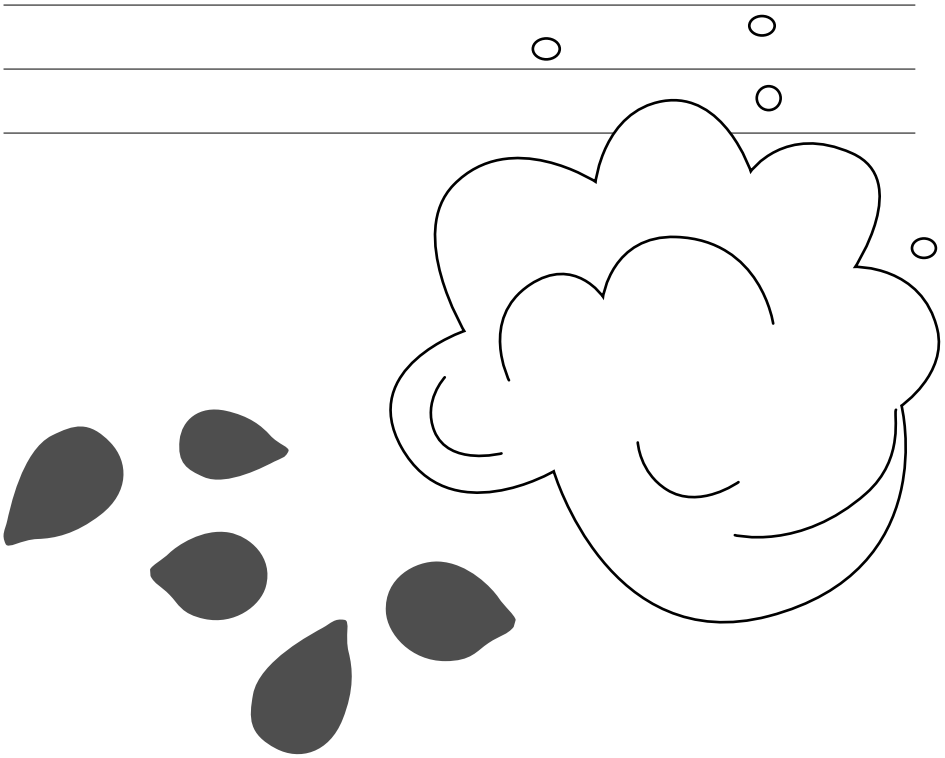
Questions to ask:

- How many kernels do you think will pop (all, some, none)?
- How have the kernels changed after being put in the popcorn popper? Compare the popped kernels and the unpopped kernels.
- What is happening inside the machine?
- Can you find the kernel cover (hull) on the popped pieces of popcorn?
- Where did all the white stuff come from?
- Why did some of the kernels not pop? Was your prediction correct?

What next?

- Try again with a different variety of popcorn but the same number of kernels.
- Try the same variety of popcorn and a different number of kernels.

Notes for next time



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Grow Your Own Snow

Instant Snow is a fun substance that expands before your eyes and transforms from a white powder to a fluffy snow-like material. It is a super-absorbing polymer, similar to what you would find inside a diaper.

***Hint:**

Instant Snow Powder can be purchased from: www.teachersource.com http://boreal.com

What you need:

- ○ Clear plastic container
- ○ Stir stick
- ○ Instant Snow Polymer*
- ○ Water (optional: add a small amount of food colouring)

Hands on:

1. Put 2 or 3 scoops of instant snow powder into a clear container.
2. Observe the powder (caution: keep powder out of your eyes!). What does the powder look like? What does it feel like? Does it remind you of anything?
3. Add a small amount of water (about 10 mL) and watch closely. Repeat.
4. Add water gradually and stir to mix until a 'snowy' substance is created.
5. Play with your snow! Caution: too much water will turn your snow to slush.

Questions to ask:

- What do you think will happen when we add water? Will it: dissolve/disappear, react/bubble, change colour, or expand?
- Where did the water go? What does our powder look like now? What does it remind you of? How does our snow feel? How much water can we add? Can you make a snowman from your instant snow?

What next?

- Allow the instant snow powder to dry out for a few days and then it can be used again.
- Dissect a diaper to find similar stuff inside. How is it different from Instant Snow?

Where to next?

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Pizza Dough/Bread

Bread is light and fluffy thanks to the bubbles yeast makes in the dough.

What you need:

- ○ 1 cup hot tap water
- ○ 3 cups flour
- ○ 0.5 tsp salt
- ○ 2 tsp olive oil
- ○ 1 package yeast (or 1 oz fresh) and extra
- ○ 1 tsp sugar

Song:

Knead, knead, knead the dough
Then we let it rise.
Yeast makes it grow and grow
Right before our eyes.

Hint:

Once you've mixed the ingredients, you can divide the dough among the children so that each child kneads their own 'bun'.

Hands on:

1. Measure and mix all the ingredients together in a large bowl.
2. Put the extra yeast in a clear container with some water and a bit of sugar.
3. Knead the ball of dough with your hands. Sing the lyrics above to the tune of *Row, Row, Row Your Boat*.
4. Allow the kneaded dough to rest in a warm place for 10–30 minutes.
5. Observe your dough. Observe the yeast in the container.
6. Bake dough at 230°C (450°F) for 15–20 minutes or until golden brown.

Questions to ask:

- Why does the dough get bigger?
- What is happening to the yeast?
- Where do the bubbles come from? What would happen to our bread if bubbles didn't appear?

Notes for next time

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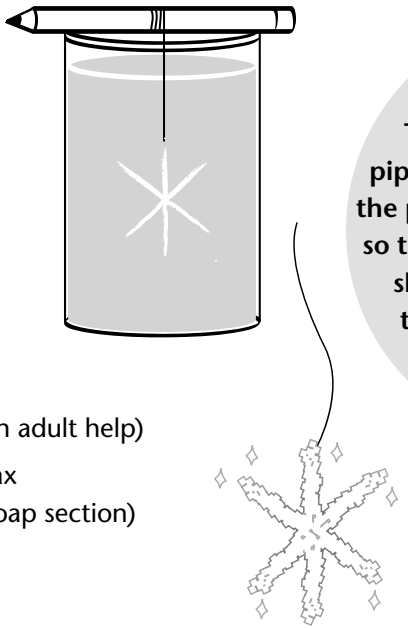
Growing Crystals



Grow your own sparkly crystals.

What you need:

- ○ String
- ○ Wide-mouth heat resistant container (jar)
- ○ White pipe cleaners
- ○ Hot water from a recently boiled kettle (with adult help)
- ○ Epsom salts (available at drugstores) or Borax (available at grocery stores in the laundry soap section)
- ○ Pencil

Hint:

To make a snowflake, cut pipe cleaners into thirds. Twist the pieces together in the center so that you have a six-sided star shape. Wrap string around the outer edges to form a snowflake pattern.

Hands on:

1. **CAUTION! HOT!** Mix Borax or Epsom salts into hot water one spoonful at a time. Stir until dissolved (keep adding until there is powder settling on the bottom of the jar that won't dissolve).
2. Bend a pipe cleaner into star, heart or any other shape you like.
3. Set the pencil across the mouth of the jar with the pipe cleaner shape suspended and hanging inside (see diagram).
4. Wait overnight. By morning, the pipe cleaner shape will be covered with shiny crystals. Hang in a window as a sun-catcher or use as a wintertime decoration.

Questions to ask:

- Where does the salt/borax go when we mix it with water? Can we get the powder back out again?
- How does your shape look after a few hours? After sitting all night? Where did all those crystals come from? How big a crystal can we grow?

What next?

- Try growing crystals from the other material listed above. How are they the same/different?
- Try adding food colouring to your solution.

Where to next?

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Growing Creatures

Use a superabsorbent toy that expands in water to observe growth over several days.

Hint:

In a daycare or preschool setting, begin this activity on a Monday so that the growth can be observed over a full week. Growing can take up to 10 days, shrinking may take as long as 20 days.

What you need:

- ○ Growing creature (available at dollar stores and toy stores)
- ○ Large clear container (aquarium, plastic storage bin, etc.)
- ○ Water

Hands on:

1. Observe your creature.
2. Place your creature in a container full of water.
3. Observe daily for about a week (refer to instructions on package).
4. Once maximum size is reached, remove creature from water and place on newspapers out of direct sunlight.
5. Observe daily.

Questions to ask:

- What kind of creature do we have? How big is it? What other things are about the same size as our creature?
- What will happen if we put our creature in water?
- What is happening to our creature? What other things are about the same size as our creature now?
- What will happen if we take our creature out of the water? Is it changing size? Is it getting bigger or smaller? Will our creature get back to its original size?

What next?

- Keep track of the creature's size by tracing it on paper. Older children could weigh the creature using a balance each day.
- Try other growing creatures. Grow several creatures at once and compare if they grow at the same rate

Where to next?

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More Ideas

Songs, rhymes, circle games about things that grow

- *The Green Grass Grew*
- *Johnny Appleseed*
- *On Top of Spaghetti*
- *When I Was One*
- *Biscuits in the Oven*

Growing snacks

- Popcorn
- Pumpkin, sunflower or other types of edible seeds
- Bread

Children's books about size and growing

- *The Tiny Seed* by Eric Carle
- *Zach's Alligato*r by Shirley Mozelle
- *Pumpkin Circle* by George Levenson
- *Guess What's Growing Inside This Egg* by Mia Posada
- *Popcorn* by Elaine Laundau
- *Growing a Rainbow* by Lois Ehlert
- *Titch* by Pat Hutchins
- *Dandelion Adventures* by L. Patricia Kite and Anca Hariton
- *George Shrinks* by William Joyce
- *The Boy in the Drawer* by Robert Munsch

Resources for teachers

- *Growing Creatures* by Anne Linehan and Betsy Franco (ISBN 1-56785-040-5)
- *A Head Start on Science* by William C. Ritz (ISBN 978-1-933531-02-1
- *Science Play* by Jill Frankel Hauser (ISBN 1-885593-20-1)

Where to next?

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