Thinking BIG Learning BIG

What Is Thinking BIG?

- Making small things BIGGER, child-sized.
- Making BIG things child-sized.
- Connecting all parts of the curriculum to immerse children in a topic.
- Including children's ideas and questions to build on their interests.
- Inviting children to observe, experiment, explore, create.

Why Think BIG?

- Easier to see, touch, investigate and do.
- Expands sense of what's possible.
- Enhances learning new concepts.
- Empowers children.
- Boosts cooperation.
- Strengthens school-home communication.

BIG Science

- Action engages kids. Wind blows. Balls roll.
- Activities stimulate natural curiosity.
- Inquiry promotes higher-level thinking.
- Topics connect math, literacy, language, and the rest of curriculum.

BIG Math

- Whole-body activities give a real feel for numbers.
- Gross motor games build math and physical skills.
- Children quantify observations.
- Graphing organizes information.
- Kids love BIG numbers: a hundred million thousand billion.

BIG Literacy

- Recording comments shows power of words.
- Labeling increases print awareness.
- Learning poems and songs boosts pre-reading skills.
- Acting out stories fully involves children.

BIG Language

- Increases vocabulary.
- Empowers speaking, reading and writing.
- Builds reading comprehension.
- Kids love BIG words like: Tyrannosaurus rex.

Activities meet national standards while children have fun.

Thinking BIG means Learning BIG

Thinking BIG, Learning BIG: Connecting Science, Math, Literacy and Language in Early Childhood, featuring activities from the Mountain View Parent Nursery School, is available from Gryphon House

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and visit: www.thinkingBIGlearningBIG.com

BIG BEGINNING:

Introducing Worms by Doing the Hokey Pokey

FOCUS AREAS

Science: studying characteristics of organisms

Gross Motor: wriggling and squirming like a worm

MATERIALS

Diary of a Worm by Doreen Cronin (optional)

Cardboard boxes large enough for children to wiggle through or a large sheet and low table or chairs to construct a tunnel

2 clear containers

2 real worms, each in a clear container

2 sheets of chart paper

Marker

2 hand stamps any shape

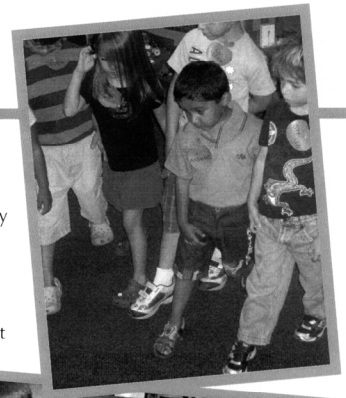
2 ink pads

PREPARATION

- Before group time, set up a tunnel of boxes in front of the area where you hold your gathering or make a tunnel by covering a low table and chairs with a sheet.
- Label one sheet of chart paper "What We Know About Worms" and the other sheet "What We Want to Learn About Worms."

WHAT TO DO

1. When you call the children for group time, invite them to pretend they are worms by wiggling through the tunnel. When all the children have squirmed and wiggled their way into the group area, tell them they are going to learn about worms.
2. Show the children the real worm in a clear plastic container. (If you and another adult each go around the circle in opposite directions, the children's waiting time is cut in half.)
3. Ask the children what they know about worms. Record the children's responses including the name of child after his response on the chart paper labeled "What We Know About Worms." Ask what they would like to find out about worms. Record their responses and names on the chart paper labeled "What We Want to Learn About Worms."
4. Tell the children they are going to compare being a person with being a worm. Stamp every child's right hand with a stamp. (Two adults going around the circle in opposite directions will cut waiting time.)
5. Do "The Hokey Pokey" slowly, taking time to make sure the children are using their right hand. Start by saying, "Show me your right hand, the one with the stamp." When it's time to put your left hand in say, "Do you know which hand is your left? It's the one that doesn't have a stamp, the one that's left."
6. Do the right and left foot slowly, reviewing how the right foot is on the same side as the right hand, the left foot is the one that's left. Continue with head and whole self.
7. Now talk about worms. "Do worms have a right hand or a left hand? Right foot or left foot?" Do "The Worm Hokey Pokey," an activity inspired by Doreen Cronin's book *Diary of a Worm*. Ask what worms can use to dance "The Hokey Pokey" (head, tail, whole self). Invite the children to pretend they are worms, placing their arms tight by their sides and their legs close together. If you like, you can all get down on the ground and put your heads together.
8. Remember not to clap after the last line of the song. If someone forgets, smile and ask, "Would worms be able to clap?"
9. Tell the children, "Now it's time to crawl out through the tunnel so we can learn more about worms."



A Note from the Author: The activities in this chapter are designed to build on each other. However, please feel free to choose those that meet the interests and abilities of your class. If parts of an activity seem like too much to do on a particular day, save them for a later time. Every class is different, even from day to day, and the activities are adaptable to meet the needs of your class.

BIG QUESTIONS FOR GROWING MINDS

Use the following questions to engage the children in a discussion about worms during group time or with an individual child during activity time:

- What does a worm look like?
- What would it be like to have a body without arms and legs?
- What would it be like to live in the ground?
- How do you think worms eat?

WORDS FOR BIG THINKING

Look for these words highlighted in italics throughout the activities in this chapter. Write the words out in large letters and introduce them a few at a time with the "**S**ay, **C**lap, **A**ct out, **D**o again" (SCAD) system. Using the words during activities and discussions will reinforce their meaning.

- Castings—worm waste
- Clitellum—the thick park of a worm's body that creates the egg sacks
- Experiment—test to find out something
- Fertilizer—something that improves the soil to help plants grow better
- Prediction—like a guess, what you think might happen based on what you already know
- Scientist—person who studies the natural world
- Segment—part of a body
- Tunnel—long passageway dug underground
- Wormlet—tiny worm

PHOTO TIP

You can record the children's explorations of worms by creating photo boards about hunting for worms, observing worms move, and making a giant worm. Look for close-ups of individual children and group shots that show children interacting. Also note vocabulary words and quotes from children to document the learning. Review the photo boards with the children as part of your assessment process.

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Who Has Touched a Worm? Introducing Graphing

FOCUS AREAS

Math: counting, comparing
Language Arts: identifying YES and NO

MATERIALS

Green sheet of paper
Red sheet of paper
Black marker
2 clipboards
Red yarn and green yarn
Scissors (adult-only)
Ruler
2 containers to hold yarn worms

PREPARATION

- Write the word YES in large letters across the top of the green sheet of paper. Write the word NO in large letters across the top of the red sheet of paper. Attach each sheet to a separate clipboard.
- Cut the red and green yarn into 4" pieces and place in two different containers. Make enough for each child to choose either color.

WHAT TO DO

1. At group time, tell the children they are going to find out how many people have touched a worm. Ask the children, "Who has touched a worm?" Tell the children who have touched a worm to put a finger on their nose. Offer them the container of green yarn pieces and invite them to choose one.
2. Ask, "Who has not touched a worm?" Tell those children to put a finger on their chin. Offer those children the container of red yarn pieces and invite them to choose one.
3. Tell the children they are going to make two long lines—one line of children who have held a worm and one line of children who haven't held a worm.
4. Hold up your YES and NO signs and then prop them on chairs. The children who have held a worm (and are now holding a green yarn worm) will make a line starting at the YES sign. The children who have not held a worm will make a line starting at the NO sign. If you have a small group and lots of space, the children could lie down head to toe and create two long worms on the floor. For young children, cut long lengths of green yarn and red yarn and place them on the floor for children to line up on.
5. Invite the children to count with you as you touch each child's hand (worm held out) in the two lines. Then go through the lines again and quickly write the children's names from each line on the corresponding sign as you invite each child to say his name.
6. After group time, do a small-group activity with the children to turn the results of the human graph into a graph on paper. See the following activity, Making a Graph.
7. The children can keep the yarn worms in their pockets or place them in their cubbies. They will use them in the following graphing activity.
8. After the children have had a chance to dig for worms or do other worm activities, make another human graph to see how many children have now held a worm. The children will be excited to see the difference. Then you can create a second graph on paper to show the change.

DISCUSSION STARTERS

Use these questions to spark children's thinking during and after the activity:

- Which line is longer—the one of people who have touched a worm or the one of people who have not touched a worm?
- Why do you think there are more people in the "have not touched a worm" line?
- If you have touched a worm, what did it feel like?

SKILLS ASSESSMENT

Use these questions to determine a child's abilities and understanding:

- Can the child count the number of children in each line?
- Does the child observe the difference in numbers between the two lines?

Making a Graph

PREPARATION

- Label one sheet of chart paper "Have You Touched a Worm?" and below that write "Before We Studied Worms." On the other sheet write, "Have You Touched a Worm?" and below that write "After We Studied Worms." Create two columns on each sheet of chart paper, one column labeled "YES" and the other labeled "NO." See page 301 in the Appendix for directions on constructing graphs.
- Cut the red and green construction paper into strips, about 3" long and 1" wide, one strip of each color per child.

WHAT TO DO

1. Use the graph labeled "Have You Touched a Worm? Before We Studied Worms" at activity time. Working with a small group of children, invite each child to match the color of his yarn worm to the color of a paper strip. The child then writes his name (or an adult writes it for him) on that paper strip.
2. The child glues the strip in the correct column, green = YES or red = NO, starting from the bottom of the poster sheet building the strips like a stack of bricks.
3. Show the children the YES and NO tally sheets with the children's names listed to compare with the graph you are constructing. Count the names and count the paper strips. How do they compare? (By the end of activity time the number of names on the YES and NO sheets should match the paper graph.)
4. Show the children the second graph "Have You Touched a Worm? After We Studied Worms" and tell them you will count again and make the second graph at the end of your worm study to see if the numbers have changed.

DISCUSSION STARTERS

Use these questions to spark children's thinking during and after the activity:

- How many strips are in the YES column? How many in the NO column?
- Which column has more?
- After the second graph is complete, ask how are the two graphs different? Have more people touched a worm now than when we started our worm study?

SKILLS ASSESSMENT

Use these questions to determine a child's abilities and understanding:

- Can the child print his name on the strip?
- Can the child accurately count the red and green strips?
- Can the child compare amounts?
- Does the child speculate about the reasons children may or may not have touched a worm?

FOCUS AREAS

Math: counting, exploring relationships among numbers, graphing, analyzing data, comparing, communicating results
Language Arts: labeling

MATERIALS

Tallies and names of the children from the human graphs showing who has or has not held a worm
Yarn worms from the previous activity
2 sheets of chart paper
Red and green construction paper
Scissors (adult-only)
Crayons or markers
Glue sticks

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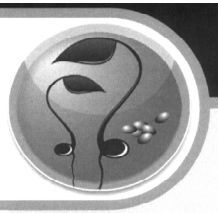
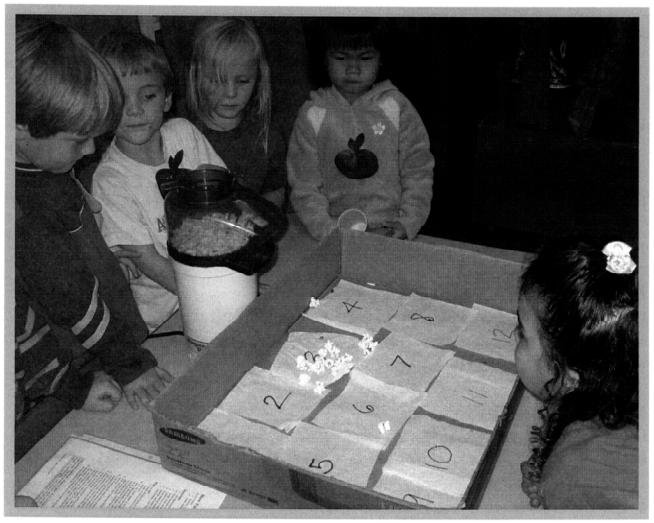
How Far Will Popcorn Fly?



TEACHER-TO-TEACHER TIP

Children love this activity because they get to eat the popcorn. Tell them ahead of time they will be able to eat some popcorn but they must wait until it is all popped so they can check their predictions; then you will gather the popcorn and pass it out. Make small batches so you can do multiple predictions. Also, it's easier for the children to count a smaller number of kernels. **Safety note:** The hot air popper will get hot! It's essential that children not touch the hot popcorn popper.



FOCUS AREAS

Science: observing, planning and conducting a simple investigation
Math: counting, estimating, measuring—distance and time

MATERIALS

Hot air popcorn popper
Plain popcorn seeds (not a microwave bag)
Large tray or clean shallow box
Large bowl to hold popped popcorn
Small paper cups to serve popcorn
Several paper napkins
Paper to record comments and predictions
Marker
1-minute sand timer

PREPARATION

- Cover the bottom of a large tray or clean shallow box with paper napkins unfolded. Number the squares of the napkin to create a grid.

WHAT TO DO

Note: Before this activity, have the children wash their hands because they will be eating the popcorn for a snack later.

1. Show a small group of children the popcorn kernels and ask if they know what the kernels are. Many children have never seen uncooked popcorn because they buy popcorn ready-made or microwave it in a bag. Invite the children to hold the kernels and squeeze them. Do they look and feel like popcorn? Ask, "What would these seeds be like to eat before they are popped?" Record the children's observations. Say, "These are not ready to eat yet."
2. Set a shallow box or tray on a table near an electrical outlet for the popper. Place the popper in front of the box and place the numbered napkin squares in the box to catch the popped corn. Ask the children on which numbers they think most popcorn kernels will land. Record their *predictions*, including each child's name, on a sheet of paper. (Most popcorn will land in front of the popper.)
3. Ask the children how long they think it will take for the popcorn to pop. Record their *predictions*.
4. Make half a batch or less of popcorn following the directions on the popper. Invite a child to start the sand timer. The children take turns flipping it and counting the flips until the popcorn finishes popping. While you are waiting, ask the children if they know what makes popcorn pop. (*Seeds* contain a little moisture. When heated, the water becomes steam, which puffs up the starchy interior. Eventually the outer *seed* coat bursts, sending the kernels flying.)
5. Record how long it takes for the first *seed* to pop and how long it takes for the rest of the batch to pop. Where do most kernels land? How many are on each square? Compare the results with the children's *predictions*.
6. Empty napkins of popped popcorn into the bowl to share. You can either serve it immediately or wait until lunch or snack time.
7. Make multiple small batches; ask for new *predictions* each time.

DISCUSSION STARTERS

Use these questions to spark children's thinking during and after the activity:

- How does this popcorn taste compared to popcorn you've eaten before?
- Did the popcorn land where you thought it would?

SKILLS ASSESSMENT

Use these questions to determine a child's abilities and understanding:

- Can the child make a *prediction* about where most of the popcorn will land after seeing the initial trial?
- Can the child make a *prediction* about how long it will take for the popcorn to pop after seeing the first batch pop?
- Does the child change his *prediction* based on experience?

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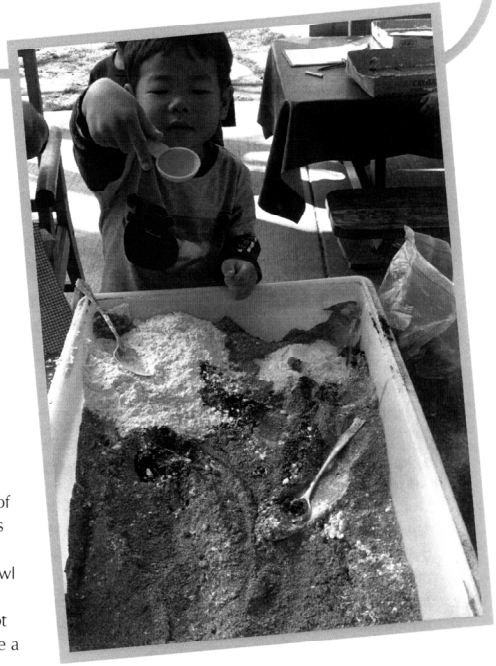
Make Pretend Moon Dust



FOCUS AREAS

Science: learning about the surface of the *moon*
Math: counting, measuring—volume, following a recipe
Language Arts: learning vocabulary
Sensory: feel of ingredients

MATERIALS

Chart paper
Marker
Assortment of 1 cup and ½ cup measuring cups
Spoons
Sturdy bowl or tub
Sensory table or other large flat container
Small rocks and pebbles (optional)
Toy *astronauts* and space vehicles (optional)
Variety of gloves, such as dishwashing gloves, so the children can pretend they are astronauts feeling "*moon* dust" **Note:** The gloves are an optional astronaut prop. "*Moon* dust" is safe for the children to handle without gloves.
Magnifying lenses

PREPARATION

- Ahead of time, ask a coffee shop to save used coffee grounds for you, the more the better. Dry out the grounds by spreading them out on cookie sheets in the sun or a 250° oven.
- Write the recipe on chart paper. Add illustrations of the ingredients or steps (optional).

WHAT TO DO

1. Invite a small group of children to take turns measuring the ingredients into a bowl or plastic tub. The measurements do not have to be exact. Use a variety of sizes of measuring cups to compare amounts: "How many of these smaller ½-cup measures will it take to fill this BIG 1-cup measure?"
2. The children take turns stirring with spoons and mixing with their hands. When mixed, add the "*moon* dust" to the sensory table.
3. Make as many batches as you need for your sensory table. Consider making additional batches for the following *crater experiment*. The mixture looks remarkably like the gray dust of the *moon*. The mixture compacts well and makes a nice squeaking sound when squeezed. The children enjoy adding "*moon* rocks" and *astronauts*.
4. Encourage the children to use magnifying lenses to examine the *moon* dust and *moon* rocks.

Moon Dust Recipe
For each batch you will need:

- 4 cups dried coffee grounds (Used grounds are free from some coffee shops)
- 4 cups cornstarch
- 2 cups sand

Measure ingredients and stir with spoons and hands.

DISCUSSION STARTERS

Use these questions to spark children's thinking during and after the activity:

- How does the "dust" feel?
- How does the "dust" sound when you squeeze it?
- What do you think it would feel like to walk in dust like this on the *moon*?

SKILLS ASSESSMENT

Use these questions to determine a child's abilities and understanding:

- Does the child note the difference between different size measuring cups?
- Does the child use the measurement vocabulary of *more than*, *less than*, *larger*, and *smaller*?
- Does the child use the sensory vocabulary of *soft*, *smooth*, or *powder*?

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Crater Experiment: How Do Craters Form?

FOCUS AREAS

Science: planning and conducting a simple investigation; using simple equipment and tools to gather data; learning about the position and motion of objects

Math: measuring—size, estimating

Language Arts: learning vocabulary

MATERIALS

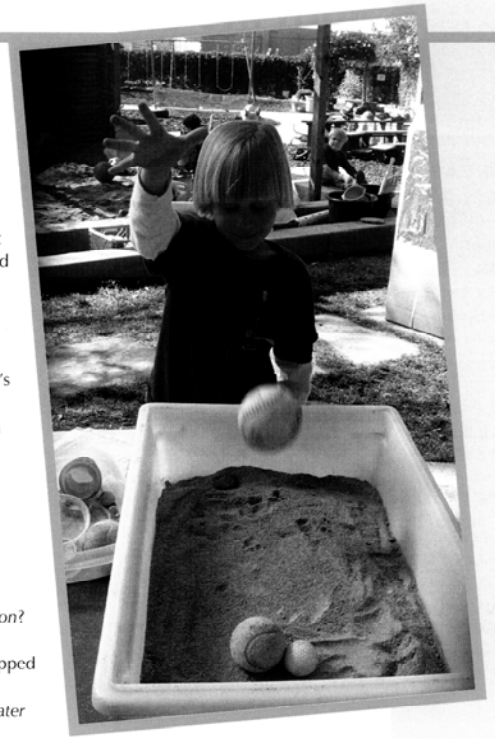
- Books with photo illustrations of the *moon* surface, (see Good Books for Facts and Fun on pages 222–224) or downloaded images from the Internet
- Prepared "*moon* dust" from the sensory table
- Assortment of marbles, golf balls, small stones, baseballs, and other balls
- Metal baking pans or plastic tubs, the larger the better
- Tongue depressors, craft sticks, or combs to smooth the "moon dust" surface
- Standard and nonstandard tools to measure, such as rulers and Unifix cubes
- Assortment of round plastic or metal lids in different sizes, such as lids from milk jugs and yogurt and deli containers, washed thoroughly

TEACHER-TO-TEACHER TIPS

- It's possible to do the *crater experiment* in the sensory table but children may approach the activity more scientifically if they work in metal baking pans or shallow plastic tubs.
- Children often hesitate to make *predictions* because they don't want to be wrong. You can encourage *predictions* by making one yourself that is not likely to happen, such as saying, "I think this tiny marble will make a huge *crater*, much bigger than the one the golf ball made. Let's see if that's what happens."

WHAT TO DO

1. Show a small group of children photos of the *moon's* surface.
2. Introduce the word *crater*. A *crater* is a bowl-shaped hole created when a chunk of rock from space crashes into a *moon* or planet. *Craters* can be as tiny as the size of your fingernail or as BIG as huge cities. Say and clap out the syllables, **cra**-ter. Say *crater* as you act it out with your whole body, standing up, then crouching down, and standing back up while moving your outstretched arm in a giant arc from shoulder height down to the floor and back up. (**Note**: This is not an ASL sign.)
3. Tell the children they are going to do an *experiment* to explore how *craters* are formed on the *moon*. Remind the children that an *experiment* is a test to see what will happen. When scientists do an *experiment*, they predict what they think will happen. This is called a *prediction*. (See pages 40–41 for signs for *experiment* and *prediction*). Say, "When we do the *experiments*, you can make *predictions* about what will happen when we make *craters* like the ones on the *moon*."
4. The children choose a marble, pebble, or ball. Ask, "What do you think will happen when you drop it in the *moon* dust? Will the dust fly out? What's your *prediction*? Try it."
5. How wide across is the *crater* that formed? The children measure the *crater* with a ruler or Unifix cubes. Invite them to compare the *crater* with an assortment of round plastic lids. Is the *crater* bigger than the milk cap? Smaller than the jar lid?
6. The children then smooth out the dust with a tongue depressor or craft stick and choose a different size "space rock." Ask the children to *predict* whether that object will make the same size *crater* or a larger or smaller *crater*. Then they drop their object. What happens? (For younger children, have them drop two different items and compare the *craters* before smoothing out the dust.)
7. What happens if they drop the pebble from a much higher distance? What about a closer distance?
8. What happens if the children make a deep pile of dust and then drop a rock into the pile?



MORE IDEAS

- Try dropping objects that are different shapes such as a key, a stick, and a crayon. What shape *craters* do they make?
- To be more scientific, use large cardboard blocks to keep the drop height consistent. The children rest their wrist on the top of a block and then drop the pebble. Stack two blocks for higher drops.

DISCUSSION STARTERS

Use these questions to spark children's thinking during and after the activity:

- What would it be like to climb in a BIG *crater* on the *moon*?
- What would it feel like to walk in *moon* dust?

SKILLS ASSESSMENT

Use these questions to determine a child's abilities and understanding:

- Is the child able to make a *prediction*?
- Does the child see a connection between the size of the object dropped and the size of the *crater*?
- Is the child able to compare the *crater* size with a lid?
- Does the child enjoy repeating the process of making *predictions* and testing them?

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