

Why Ask Why? Cognitive Development

Do you ever hear children complain that “there’s nothing to do?” That’s GREAT! Cognitive Development is strengthened when children are allowed the opportunity to become unfocused or (*gasp!*) bored! Cognitive development requires thought and time for children to process the world around them. When children are shuffled from one activity to the next there is no time to slow down and think, problem solve for themselves, and develop their sense of wonder. Give the gift of time in your child care and be that place of wonder that they so desperately need!

Developing early thought processes with Who, What, Where, When, Why, How:

Instead of answering questions for children, ask **WH** questions to encourage their own personal line of thinking and logic. It’s journalism 101 from back in your high school years. The 5 Ws are questions whose answers are considered basic in information gathering and problem solving.

What happened? What did you try? What made you choose _____? What do you notice about _____? What do you think will happen if we _____? What do you need to do to be able to _____? What is the problem? How can you solve it? What happened first, second, last? How does this work? How can you/we _____?

These question starters focus on what is happening and what children are noticing and doing. They involve prediction, use knowledge of previous experiences to build from, and require time —these questions have **immediate and personal answers**, which makes learning meaningful.

“Wh” questions start a conversation. Educators can explore the answer alongside them.

SCIENCE*TECH*ENGINEERING*MATH

STEM learning takes place in early childhood programs every day. STEM is an inquiry-based approach involving:

S: sand, water, rocks, dirt, living organisms

T: wheels, pulleys, gears

E: Blocks, design structures

M: counting, matching, shapes, patterns, measurement

Variations: STEAM (Science, Tech, Engineering, Arts, Math) SEAL (Science, Engineering, Arts, Language)

Arts: Creative, open-ended art and design

Language: Communicate ideas, team collaboration, document learning, reading for information

Battery operated toys are 90% toy and only 10% child. They often tell the child how to play with it. Remember, the toy should not manipulate the child, the child manipulates the toy. Add child-directed toys and materials into your environment to encourage brain development and creativity. Ditch the flashing, beeping, primary color overloaded toys and opt for re-usable, recyclable, and up-cyclable materials. Such as:

Plastic containers and lids (yogurt, sour cream, cottage cheese, peanut butter, parmesan cheese shaker), cardboard boxes, coffee filters, yarn, straws, index cards, shoe boxes, poster board, flashlights, reusable shopping bags, paper lunch sacks, felt, tape, cotton balls, cups, bowls, cupcake liners, pipe cleaners, paper plates, magnets, envelopes, juice jugs, pitchers, aluminum foil, large and small craft sticks, cardboard, cardstock, paper tubes, paper towels, newsprint, jenga blocks, shower curtain rings, buckets, pine cones, sticks, large rocks, clay, dirt, egg cartons, milk cartons and jugs...

“Each time one prematurely teaches a child something he could have discovered for himself, that child is kept from inventing it and consequently from understanding it completely” (Piaget, 1970).

Why Ask Why? Cognitive Development Activity Ideas

Rain Cloud in a Jar *

Shaving cream
Food coloring/droppers
Small mixing bowls
Large mouth mason jars

Fill jars $\frac{3}{4}$ of the way with water. Fill the rest of the way with shaving cream. Leaving some holes on each side will make the experiment more successful. Mix blue food coloring into water to dilute and have children use droppers to suck up the water and squeeze the "rain" onto the clouds. As the clouds get heavy with rain, the blue food coloring will rain through the clouds of shaving cream.

Gumdrop Engineering Challenge*

The Challenge:

Using 10 gumdrops and 20 toothpicks, design a structure that can hold the weight of a medium weight book.

STEM Connections

Science & math = physics & shape comparison
Engineering & technology = load distribution & building structures.

The Big Ideas

Hints: Triangles are strong and large bases support more weight.

SOURCE: <http://thehomeschoolscientist.com/gumdrop-structures-engineering-challenge/>

Physics: Marshmallow Catapult *

4 Large marshmallows
7 Bamboo skewers
1 thin rubber band
Many mini marshmallows
1 plastic spoon
Tape

Using three skewers and 3 marshmallows, make a triangle for the base. Next, using three more skewers and one marshmallow make a pyramid above the base. There should be two skewers in each marshmallow at the base and three skewers in the top marshmallow connecting the pyramid.

To make the launcher, securely tape one skewer to the handle of the spoon. Put a thin rubber band around the top marshmallow. Slide the skewer with the spoon attached through the rubber band so that it laying supported by the rubber band. Connect the end of it on one of the marshmallows at the base. Place a mini marshmallow in the spoon, gently pull back, and release!

Source: <http://www.wikihow.com/Make-a-Marshmallow-Catapult>

Wash away the Germs: Pepper and Soap *

Discuss the importance of using soap for hand washing.

Materials: cereal bowl, water, pepper, liquid dish soap.

Sprinkle enough pepper in a bowl of water to cover the surface of the water. Explain that the pepper represents germs on your hands. In the center of the bowl add a few drops of dish soap and the soap will repel the pepper.

Patterns in Nature: Search for patterns in nature and take along a camera. Take close-ups of natural patterns and natural items that have grown into letters or shapes. Print your pictures and post them for further exploration.

"Learning that lasts requires that all 5 senses are engaged and that emotional connections are made."

Wizard's Brew

Baking Soda
 Food coloring
 Glitter
 Dish soap
 Vinegar
 Mason jar
 Small plastic containers
 Cake pan or cookie sheet

Place the jar on the cookie sheet. Fill the jar $\frac{1}{2}$ full with vinegar and add a few drops of one color of food coloring and a few shakes of glitter. Squeeze a couple of teaspoons of dish soap and stir. Add in a heaping teaspoon of baking soda, stir again, and watch it foam. Keep adding baking soda and vinegar when the foam starts to slow. To make it change colors, add a tablespoon of vinegar mixed with one color of food coloring into the middle of the brew every so often. The more the kids stir the mixture, the faster the reaction.

Swirling Rainbow Magic Milk *

Whole milk
 Small cereal sized bowl
 Food coloring
 Dish soap
 Q-tips

Simple chemistry, pretty result: Pour milk into the bowl, place 8-10 individual drops of food coloring into the bowl in random areas. Talk about colors. Dip the Q-tip into a small amount of soap and touch the Q-tip to the milk. The soap wants to join with the fat and protein in the milk, causing the colors to swirl and mix.

*Logic will get you from A to B.
 Imagination will take you
 everywhere. ~ Albert Einstein*

STEM Links and Resources:

More Than Counting: Preschool and Kindergarten by Sally Moomaw and Brenda Hieronymus

STEM Preschool Guide: <http://www.bostonchildrensmuseum.org/sites/default/files/pdfs/STEMGuide.pdf>

Loose Parts list: <http://www.morethanaworksheet.com/2014/09/07/build-your-stem-kits-at-dollar-tree/>

New ECIPS Guides: <http://education.state.mn.us/MDE/dse/early/ind/>

SCIENCE AND MATH ACTIVITIES:

http://www.kidspot.com.au/things-to-do/activities/make-your-own-quicksand?ref=collection_view%2Cscience-experiments

<https://www.pre-kpages.com/science-kids-exploring-ramps-friction/>

<http://littlebinsforlittlehands.com/simple-physics-activities-for-kids/>

<http://inspirationlaboratories.com/preschool-physics-experiments/>

<http://www.communityplaythings.com/resources/articles/2014/teaching-stem-with-ramps>

<http://illinoisearlylearning.org/tipsheets/physics-rolling.htm>

<http://www.education.com/activity/preschool/math/>

<http://www.getreadytoread.org/early-learning-childhood-basics/early-math/early-math-matters-a-guide-for-parents-of-preschoolers>

<http://www.notimeforflashcards.com/other-activities/math-activities>

Fairy Tale STEAM Challenge Activities for Preschoolers

Folk Tale	Challenge	Possible Loose Parts
*The Three Little Pigs	Design a home that will withstand the wind of the big bad wolf.	Fan, toothpicks, cardboard, Legos, gumdrops, paper plate, cardstock, sticks, tape, real straw, straws, rocks, clay
*Humpty Dumpty	Create a safe landing for Humpty Dumpty's crash	Hard boiled eggs, cotton balls, egg cartons, cardboard, fabric, cotton, fabric, containers with lids, foam, newsprint
*Jack and the Beanstalk	Design a parachute that will help Jack escape the Giant	Paper towels, newspaper, ribbon, yarn, dental floss, tape, paper punch, Lego Jack, tissue paper, coffee filters, thread, tape
*The Gingerbread Man	The Gingerbread Man needs a safe way to get across the river. Build a boat or raft to help him get to the other side.	Medium sized tub, water, pitcher, gingerbread cookies or crackers, tape, aluminum foil, craft sticks of all sizes, cardboard, straws, yarn
*The Three Billy Goats Gruff	Build a bridge to support the weight of all three goats and help them escape the troll.	Blocks, cardstock, poster board, ramps, paper towel tubes, masking tape, branch blocks, 3 goat figurines, straws, cardboard, clay
*The Little Red Hen	Hen's roommates are not helpful. Help her design a help wanted advertisement.	Poster board, magazine pictures, markers, crayons, construction paper, paint
Little Red Riding Hood	The wolf gains access to Granny's much too easily. Design a lock for Granny's door	Door knob, door, yarn, various household items
Goldilocks and the Three Bears	Goldi clearly needs rest following her active morning. Design a cozy bed for her, so Baby Bear can have his back.	Fabric, paper towel tubes, straws, craft sticks, cotton, various household items
Choose Your Own Adventure	Ask the children to share favorite family folk stories and create your own STEAM challenge activity!	

The Role of the Educator

Co-constructors: mentor/coach - guides, nurtures, asks questions, learns, hypothesizes

Researchers: learns, observes, revisits

Documenters: listens, records, displays, revisits

- Take pictures/record video throughout the process
- Jot down meaningful, direct quotes and actions objectively
- Children may draw pictures of their impression of the experience
- Collect examples
- Gather and construct a poster board or bulletin board for children to review and reflect on their learning, provide connections to past and plan future learning, and communicate with parents.