

'Tis the Season for STEM Thinking



The holidays are exciting and greatly anticipated by people young and old. This time of year can be filled with memories that will last a lifetime. Don't get caught up in who's doing what and who's getting what and forget to enjoy the season. Here are some activities to create meaningful learning opportunities for the whole family. Keep this ancient Chinese proverb in mind: "The best time to plant a tree was 20 years ago. The second best time is right now." So set priorities, and plant a few trees this season.

Many have probably heard the acronym STEM, maybe from a child, in the grocery store line, or at the ball field; but few people understand what STEM means and the importance of a well-grounded foundation in STEM education. Jonathon Gerlach, an Albert Einstein Distinguished Educator, has written one of the most eye-opening articles concerning STEM in the *National Science Teacher Association Web News Digest*, "STEM: Defying a Simple Definition." Gerlach wrote, "On its surface, STEM is the acronym for science, technology, engineering, and mathematics. However, if you were to ask 10 different educators to define STEM, you would probably receive 10 different definitions." Gerlach concluded that for researchers, teachers, and those in the aerospace and construction industries—among many others—"STEM is about moving forward, solving problems, learning, and pushing innovation to the next level."

The following activities enhance STEM learning so that parents, grandparents, relatives, and volunteers can help young people become critical thinkers who can move forward, solve problems, and be innovators of tomorrow. Take time to question, listen, and discuss these activities and how they relate to everyday situations.

12 Days of Christmas STEM

Melted Crayon Ornaments

What young person doesn't like making Christmas ornaments? Make these unique ornaments using clear plastic or glass ornaments, Crayola® crayons (other crayon brands have too much wax), a hair dryer, and cotton gloves for safety. First, take the metal top off the ornament and drop bits of crayons inside. Place the top back on the ornament, and, with cotton gloves on, hold the top of the ornament and spin it while blowing it with a hair dryer. This activity shows how heat affects objects. A great question to ask is, "What did you observe happening to the crayons?" Answer: The heat caused the crayons to expand and take up more space. These ornaments make great holiday presents for family or community members. (<http://bit.ly/1zsbCYC>)

***Here is a poem you can attach to the ornament:**

**My crayons were broken,
and well beyond use.
So I decided to recycle,
and make something new.
We thought and thought
about what to do.
We made this Christmas
ball for you!**

Snowflakes

Mississippi accumulates only about a half an inch of snow each year. Many young people have never seen snow and do not realize every snowflake is different and also symmetrical. You can create one-of-a-kind snowflakes using recycled paper, craft sticks, or ivory soap. They are sure

to amaze everyone. After creating snowflakes, examine their features, talk about the lines of symmetry, and compare the different designs. Most importantly, ask questions and listen. There are many books about snow to pique young people's interest in math and science. A favorite for many is *Snowflake Bentley* by Jacqueline Briggs Martin. (<http://bit.ly/2ewnPyp>)

Christmas Lights

A holiday tradition for many families is looking at Christmas lights throughout the town. When you hear about 3-D glasses, you probably think of 3-D movies, but sliding on a pair of 3-D glasses while looking at Christmas lights is sure to create a "wow" moment. 3-D glasses cause light to separate. This is called *diffraction*. Ask young people to explain what is different about the lights when they are wearing the glasses. Ask them what changes they notice. Explain that diffraction simply means the separation of light. They are seeing the colors split apart.

Christmas Trees

Many young people love to have a Christmas tree of their own. They can create a tree using holiday-themed cups. This time of year, stores are filled with all kinds of Christmas cups—from simple red or green disposable cups to cups of all sizes and fun holiday patterns. Another option is to buy white cups and create unique designs on each one before building the tree. Stack the cups in a tree shape for a fun holiday decoration.

Marshmallows also can be used to create a Christmas tree for your child's room. Stack the marshmallows in a tree shape. Or you can make other shapes with the marshmallows. Some children might want to create ice palaces and igloos.

Young people can spend hours creating and exploring to come up with their perfect tree, igloo, palace, or something else! When they are finished, don't miss the opportunity to show your excitement for their creation while

questioning the design process. This is a great time to talk about why the design of the items is important. Talk about tall structures in your town (monuments, steeples, fire towers). Praise children for being able to create a structure just like the engineers who created the structures in your town.

Snowball Fun

Many children would be excited to hear someone ask, "Want to throw some snowballs?" Your child might not have heard of the word *catapult*. Explain that a catapult is a machine made to launch something. The catapult at this link is built with craft sticks, rubber bands, a milk top, and glue: <http://bit.ly/2gRTQiB>. Cotton balls can be used as your launch objects. Promote a love for science by asking about the design process. Allow children to redesign their catapult as often as they want and test their design by measuring how far the "snowballs" are projected. Again, take this opportunity to build confidence in children. Tell them how proud you are of them and their creativity in designing an engineering project. A fun book to check out at your local library is *Olympig* by Victoria Jamieson.

Tinkering Trees

Who would have thought of using nuts, bolts, and washers to make a Christmas tree? Have children search for random nuts, bolts, and washers, or ask a local body shop or hardware store for some assorted ones. Start with a bolt and have children add washers and nuts to form a tree shape. This activity is going to take some serious twisting and spinning. Children can paint their trees if they want. Ask your children about the design process. Notice if they thought to use the larger items first and continually size down.

Hot Chocolate Science

Science in the kitchen can open so many doors for exploration and communication while creating lasting memories. Hot chocolate is a favorite treat for many young

people, especially during the holiday season. Ask children to predict how long it will take for instant hot chocolate powder to dissolve in hot water. Use a timer to check their predictions. *The Sweet Story of Hot Chocolate* by Stephen Krensky is a fun book to read while sipping hot chocolate. Explore <http://bit.ly/2eHeG3I> for more activities and books related to hot chocolate.

Crystal Decorations

Children can begin exploring chemical reactions as early as preschool. Growing crystals is an exciting way to spark their interest in learning about chemical reactions. <http://bit.ly/2eH1f3F> includes step-by-step instructions from expert teachers to make borax crystals. This activity can be modified to make crystal stars, snowflakes, icicles, or other ornaments for the tree, all while discovering the magic of science at home.

Peppermint Oobleck

Oobleck is a mixture of cornstarch and water. It is very similar to slime. Mix a cup of cornstarch with ½ cup of water and add a few peppermints. Children can use their hands or a spoon to mix the oobleck until the peppermints dissolve. Ask children to observe as the peppermints melt and the mixture forms. This is a great opportunity to discuss solids and liquids and create a sense of wonder for science. Then, ask children to use their imagination to make oobleck creations. A great book to check out from the library is *Bartholomew and the Oobleck* by Dr. Seuss.

Snowman

Did someone say if there isn't snow, you can't build a snowman? Well, this activity is sure to prove them wrong. Using balloons, glue, and white yarn, children can build a snowman whether it's snowy outside or sunny and 75. Blow up three balloons, wrap white yarn around each balloon, and apply glue all over the yarn. Stack the balloons securely with the glue. After the glue is completely

dry, poke the balloons to pop them. You will be left with a snowman! Children can use their creative skills and add accessories to decorate their snowmen. Give young people the opportunity to share their design process. There are numerous books about snowmen, including *The Biggest Snowman Ever* by Steve Kroll and Oliver Wyman.

Candy Cane Challenge

The strength of a candy cane might surprise you and your children. Challenge them to predict how much weight a candy cane will hold. Hang a thick piece of yarn on the candy cane, and allow children to test different objects to see just how much weight a candy cane can hold. A classic book to check out after the candy cane challenge is *The Legend of the Candy Cane* by Lori Walburg.

Magic Christmas Milk

Magic Christmas Milk is a cool science experiment for young people to observe how liquids dissolve and color moves. Using milk, dish soap, cotton swabs, and food coloring, children can make fun, colorful designs and patterns. (<http://bit.ly/2dXI8Ej>)

Ornament Reactions

Children of all ages love to observe how things react. An inexpensive, fun activity is ornament reactions. To create this holiday wonder, you need baking soda, vinegar, food coloring, and a round ornament with a removable top. Open the top of your ornament, and add 2 tablespoons of baking soda and a few drops of food coloring; then, quickly add the vinegar. Be prepared to be an eye witness to an out-of-this-world reaction.

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By **Sonya Smith**, Extension Instructor, Center for Technology Outreach.



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