Let’s Talk About STEM

When the federal government launched its STEM initiative “Educate to Innovate” in 2009, the primary focus was on children in grades K-12. It wasn’t until 2011 (when preschool STEM education was introduced) that the government realized what most early childhood educator already knew—young children are natural explorers!

As young children observe their natural surroundings, exercise their fine and gross motor skills, or learn about healthy eating habits, they’re discovering SCIENCE. Their days are filled with TECHNOLOGY that can take the form of anything from a toothbrush to a smart phone. With every pillow fort and block tower they build they are practicing ENGINEERING. Many parents keep a treasured macaroni necklace tucked in a drawer, not even realizing their children were developing MATH skills as they counted out the beads and strung them in a repeating pattern.

Research suggests¹ that this natural, interactive method of learning STEM is really the most beneficial for students in the long term, so how can an educator focus this inclination for discovery on activities in the classroom? This guide provides four easy to implement activities that span every STEM subject. While the activities in this booklet are appropriate for preschool, teachers should feel free to adjust them based on their children’s individual differences.

Happy learning!

Children need STEM before they can bloom!

If you’d like to find out more about why STEM in the early childhood classroom is so important, check out “STEM is Essential for Kids to Bloom,” a great blog post by Hatch Early Learning’s Content Specialist, Jenne Parks.

About Hatch Early Learning

Hatch Early Learning; located in Winston-Salem, North Carolina; is an early childhood education technology and materials company. Since 1984 Hatch has been committed to taking the guesswork out of selecting developmentally appropriate technology and research-based products for early learners. To learn more, please visit www.hatchearlylearning.com or join the discussion on Facebook, Twitter, and LinkedIn.
The Power of “What”

As you start incorporating STEM into routine classroom activities, you may experience lots (and lots!) of questions from your children. It’s all part of the discovery process. So many questions may feel overwhelming, but don’t worry; you don’t have to know the answer to everything! One of the most exciting parts of teaching STEM is you get to ask great questions right along with your learners.

Try asking very open-ended questions. Try focusing on “what” questions as much as possible and try to ask “why” questions as little as possible. Asking “why” questions often implies that there is a correct answer while “what” questions keeps the conversation going and let you discover answers right along with your children. “What” questions draw attention to what’s happening, what’s being noticed, or what you’re doing — all easy questions to answer because the answer should be right in front of you! When answers come easily to both you and your children, everyone’s confidence grows. Additionally, asking insightful “what” questions help children develop important observation and communication skills.

Try “What” in Your Classroom Today!

What do you see happening? What’s changed?
What did you try? What do you think caused _____?
What things do you notice about _____? What could we do to make this different?
What is another way we could do this? What do you think _____ does?
What is the difference between _____ and _____? What do you think will happen when _____?
Science

Perhaps the easiest way to introduce science to young children is to explain, “Science is a way of thinking.” Discussing how scientists examine, experiment, and compare is only the first step! Personal safety, health and nutrition are also fundamental to the discipline. This activity explores proper nutrition by asking children to identify “Every Day Food” and “Sometimes Food.” It asks children to make observations about the food they eat, predict how that food might make them feel, and practice their fine and gross motor skills.

Materials

- “What’s On My Plate” activity page
- Newspapers and/or magazines with pictures of food (Grocery advertisements are great for this project.)
- Scissors
- Glue

Optional Materials

- Paper Plates
- Poster Board
- Chart Paper
- Markers

What’s On My Plate?

Before the Activity
Spend some class time discussing “Sometimes Food” and “Every Day Food.” Ask open-ended questions like “What kinds of food do you eat for breakfast?”, “What do you eat for dessert or special snacks?”, “What happens when you eat a lot of candy or sweet food?”

Individual Activity
1. Make enough copies of the “What’s On My Plate” activity page for each child in the class.
2. Pass out the newspaper, magazines, and scissors. Ask children to cut out all different types of food.
3. Pass out glue and activity page. Explain that the plate on the left is for “Every Day Foods” while the plate on the right is for “Sometimes Food.”
4. Help children paste food onto the correct side of the paper. Ask questions like: “What made you decide that cake is sometimes food?”
5. Have the children take home the activity page to share with the family!

Small Group/Center Activity
1. Glue paper plates to a piece of poster board and write above them “Everyday Food” and “Sometimes Food.”
2. Ask children to cut out pictures of different types of food.
3. Children work together to decide which side each piece of food matches, taking turns to glue the pictures of the food. Ask them about their decisions.
4. Display the posters in the class as reminders of good nutrition!

Large Group/Circle Time Activity
1. Cut out pictures of food ahead of time.
2. Draw a line down the center of a piece of chart paper. Label one side “Every Day Food” and the other side “Sometimes Food.”
3. Read a story like A Book of Fruit to introduce the topic of good nutrition.
4. Hold up each picture of food and ask the children to vote on whether they think it is “Every Day Food” or “Sometimes Food.” Ask them about their decisions.
5. Let the children take turns pasting it to the paper after the class has voted.
6. Hang the finished chart in the classroom as a reminder of good nutrition!
Technology

“Technology” includes any tool that helps make a task easier. Different types of technology go far beyond computers and smartphones, and we’re surrounded by it every day! This activity introduces a whole range of different technologies and promotes critical thinking skills while helping to build vocabulary.

Materials

- “Terrific Technology” icon cards

Optional Materials

- Felt board
- Adhesive Velcro dots/strips
- Whiteboard
- Adhesive magnetic strips

Terrific Technology

Before the Activity
Bring in examples of technology that the children may or may not be familiar with (ex: toothbrush, shovel, tablet computer, robotic vacuum cleaner, etc.). Ask the children to identify each object, what activity it might help with, and what the alternative would be if we didn’t have that technology.

Center/Small Group Activity
1. Print and cut out “Terrific Technology” icon cards and laminate them.
2. Pass out the cards and ask the children to identify the objects on each card. Guide them if necessary with open-ended questions about what they are observing on the card.
3. Once they identify the object, model saying the word, then ask them all to repeat the word with you.
4. Ask them to touch the word on the card and then the picture.
5. Children work together to match the technology with the object or activity affects.

Large Group/Circle Time Activity
1. Print and cut out “Terrific Technology” icon cards, laminate them.
2. If you use a felt board in your classroom, attach a Velcro strip to the back of the cards. If using a whiteboard, a piece of magnetic tape.
4. Take turns asking one child to place a task card on the whiteboard or felt board, and then asking the children which technology they think helps with the task or what item the technology is used with. Place the technology next to the activity or companion object.

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Engineering

Engineering is all about practical problem solving with innovation and construction! It’s important to make the distinction that although both engineering and technology are both about problem solving, the goal of engineering is to develop tools (technology) that help us every day. This multi-part activity introduces ramps and how they help objects move from one place to another.

Materials

- Two (2) foam pool noodles
- Box cutter/scissors
- Packing, masking, or duct tape
- Objects to roll (ex: cotton ball, crayon, bead, marble, paper clip, block, etc.)
- Chart paper
- Markers

Radical Ramps!

Before the Activity
Take the children on a walk around the school. Show them different ramps and ask them what problems ramps help to solve. Consider taking an empty cart or rolling chair to show the difference in effort needed to get something with wheels up stairs or over a curb versus a ramp.

Activity Phase 1
1. Cut the first pool noodle in half along the length of the noodle so that the center is visible. Cut the second noodle in half to create two smaller pieces, & then again along the length of the noodle. You have now made four ramps.
2. Use a piece of tape to attach the bottom of the ramp to the floor. Rest the top of the ramp against the wall or a bookshelf.
3. Either gather objects to roll down the ramp before hand, or let children find objects around the classroom. Write each object on the chart paper.
4. Hold up each object and ask the children whether they think it will roll or not. Take a vote. Ask them to explain their decisions.
5. After trying each object, ask questions such as, “What made this marble roll?”, “Why do you think the cotton ball didn’t roll?”
6. Record the results of which object rolled or didn’t roll on your chart paper.

Activity Phase 2
1. Referring to the chart paper, establish which objects will and will not roll. Ask the children, “What do you think will happen if we make the top of the ramp higher or lower?”
2. Experiment with the different rolling objects and different heights of the ramp.

Activity Phase 3
1. Attach the shorter ramp next to the long ramp. Ask the children which ramp they think will move an object more quickly.
2. Experiment with dropping the same type of object at the same time down each ramp to see which ramp is faster.
Mathematics

Mathematics may be at the end of STEM, but it’s at the heart of science, technology, and engineering! Young children who are just beginning to explore math concepts will be focused on sequencing (1, 2, 3, 4...), making patterns (1,2,1,2,1,2...), sorting objects, and discovering shapes, volume, and size. This two-part activity builds numeral recognition while children practice sequencing! The accompanying activity page encourages shape identification, sorting, and working together.

Materials

- “Five Little Rockets” poem
- Five (5) rocket cards
- “Five Little Rockets” shape sheet
- Crayons (suggested: primary colors)
- Glue
- Scissors
- Construction paper that matches the colors selected

Five Little Rockets

Before the Activity
Show children a video of a rocket launch with a count down. We like this video of Apollo 15 launching. Ask the children who they think is counting down, who might be in the space ship, and where they think the rocket is going. Explain the roles of mission control and astronauts. Ask questions like: “What do you think happens when they finish counting down?” Consider showing the class a map of the planets and asking them to count together how many planets there are in our solar system.

Large Group/Circle Time Activity
1. Print out and laminate the rocket cards.
2. Read the poem through once to the children, tracking the print.
3. Pass out the rocket cards to five volunteers who come up to the front of the group.
4. Have the class assist and make sure the children are standing in the correct sequential order. Ask the class to read the numbers on each rocket.
5. Tell the children that you are going to read the poem again, and when they hear their number at the beginning of a sentence, they should jump the number of times that is on their card and then sit down. When they hear “BLAST OFF!” they should all jump up again!

Center Time/Small Group Activity 1 (suggested: 3–5 students)
1. Make enough copies of the “Five Little Rockets” shape sheet to give to each child.
2. Ask the children to pick one crayon and color all the shapes on their page the same color.
3. Have the children cut out all the shapes. When they are finished cutting them out, ask them to place all the shapes in the middle of the table and mix them all up!
4. Hand out the construction paper, giving each child paper of a different color than the crayon they colored with.
5. Ask the children to sort through all the shapes in the color that matches their paper. Encourage the children to help each other find the shapes that go with each color of paper and to share the shapes.
6. Children glue the shapes to the paper in the shape of a rocket!
We hope these activities help you and your classroom of explorers to discover STEM! We also hope you’ll expand on these ideas and make STEM part of your daily routine. Just remember these helpful hints as you continue to grow STEM in your classroom:

- Try to ask as many open-ended questions as possible. When you ask questions about what children observe, there is no wrong answer! When children feel like an expert, their confidence grows.
- Much of STEM is about observing results. Observing how your children already interact with the world around them may lead to great questions or ideas for activities.
- Encouragement is key! As Thomas Edison once famously said, “I have not failed. I’ve just found 10,000 ways that won’t work.” Sometimes children will predict the wrong outcome or become discouraged when an experiment fails. Just remind them that STEM is about figuring things out and trying new ways of doing something.
- You don’t need to have designated STEM time during the day. With a little bit of creativity, STEM can be incorporated into most routine classroom activities.
- Be confident!

For more great ideas and activities like the ones found in this guide, check out our easy-to-use STEM kits. Designed with preschool classrooms in mind topics range from robotics, to civil engineering, to gravity!

Click on the picture to check out all of our unique STEM kits! Or, visit us online at: www.hatchearlylearning.com/stem-education-preschool
Don’t Forget Your Bonus Activities!

We had so many great STEM activities that we couldn’t fit them all in this guide! To access these great activities (plus even more printable tools to use in your classroom) click the banner now!

Received this activity guide via carrier pigeon or find it in a bottle by the sea (are you holding a paper copy of this eBook)? No worries! Next time you’re near a computer, visit: hatchearlylearning.com/stem-bonus-content
Sources & Resources

Sources

Books & Video Referenced

A Book of Fruit
Barbara Hirsch Lember
Ages 2–5
1994 Houghton Mifflin
ISBN: 0395669898

Imaginative Inventions
Charise Mericle Harper
Ages 3–6
2001 Little, Brown Books for Young Readers
ISBN: 0316347256

Launch of the Apollo 15 rocket in 1971
Click to play video with sound (31 seconds)
To watch on YouTube: youtu.be/gMe8T2FwXHg

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