Tips for Successful Family STEM Nights

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A Family STEM Night is an evening of hands-on science, technology, engineering, and math activities for students and families to complete together. It might revolve around a theme such as space or the environment or include a range of activities covering different STEM topics and careers.

Tip 1: Get Support

- Local engineering or oil/gas companies for sponsors, volunteers, or providing raffle prizes
- High school service clubs to provide volunteers
- Parent volunteers (PTO) to help prepare activities, fundraise, and support event logistics
- Junior high or High school STEM clubs such as robotics that can bring demonstrations or volunteer at a station
- Local STEM professionals can volunteer to support students in hands-on STEM stations.

Tip 2: Choose Engaging Activities

- Choose 6 - 10 stations that can be spread throughout the cafeteria or gym depending on expected participation. You may also wish to do 1-2 activities in each teacher's classroom if space allows.

Recommendations for Stations

- Quick, hands-on activity that can be completed in under 10 minutes
- Accessible to all ages and ability levels
- Opportunity to design and build not make a pre-packaged craft
- Requires only a short list of readily available materials
- Wide range of topics covered to cater to a range of student and family interests
- Try for a **mix** of engineering design challenges, science experiments, math activities, programming and robotics games, and team-building challenges.

Not Recommended for Stations

- Talks or presentations - you may want to have a kick-off talk, but keep it short
- Overly time-consuming or extensive activities with multiple steps
- Same type of activity for all stations

Station Suggestions to Get You Started

1. Augmented reality coloring activity using the Quiver app

- Students choose a coloring page centered around a STEM topic such as a rocket or parts of a cell.
- After coloring, they use the free Quiver app, to bring the drawing to life with augmented reality.
- The app even includes interactive features where students can zoom into drawings, click on different parts to learn more, or play a trivia game.
- Free 7-day trial

2. Explore the Universe with Sky View app (see this link for a review)

- Discover planets and satellites in the night sky - even indoors.
- Available free on Apple and Android tablets, students find the Moon, International Space Station, Hubble Telescope, and the planets in our Solar System.

3. Mini Marshmallow (or Pom Pom) Shooter

- Cut off bottom of paper cup and stretch a 12-inch or 15-inch balloon across. Hold balloon in place with duct tape. Place mini marshmallow or pom pom against balloon, pull back and release.

4. Maker Space: Loose Parts Explorations

- Cardboard tubes, packaging
- Spoons, colanders, sifters,
- Seashells, stones
- Scarves, ribbon
- Sticks, pinecones, leaves, tree cookies (rings)
- Fabric and wooden balls
- Empty spools, corks, jar lids
- Craft sticks, clothespins, pipe cleaners
- Baskets, bags
- Wooden hoops, hula hoops

5. Investigate How a Pulley Works

- Stack up 4-5 heavy books. Tie together with rope, leaving 6 feet rope dangling.
- Have children try to lift books over their heads by pulling up on the rope.
- Loop the rope over a doorknob. Children take turns pulling down on rope to raise the stack of books.
- Ask: Does it seem easier to lift the books now than it did to push them up with their hands or pull them up using the rope? Why?
- Ask: Where can we put the rope if we want to raise the books over our heads?

Outdoor Challenges with Pulleys

- Can you imagine the climbing toy is a tall mountain? Mountain climbers on the top of the mountain ran out of supplies. Can you make a pulley to lift buckets of imaginary food and water to them?
- How many bucket-loads do you think it will take to return all the sticks, rocks, and other found materials you used to represent the mountain climbers' supplies back to the playground. Predict first then check to see if you are close.

6. Observational Drawings

- Provide clipboards, fun paper, paints, markers, crayons
- Provide interesting items: worms, natural items, real animals (live or frozen/stuffed)
- Prompt child to notice and to wonder then draw

7. Tower Building

- Families compete to build tallest tower. Provide index cards, 1 foot of masking tape for each team. Set a 10-minute timer or let teams build as long as they want. Measure and record top heights on a leaderboard for a school-wide competition.

8. Makey Makey

These little circuit boards bring together coding, invention, creativity, and electronics. Just plug into any computer, and with no software download required, watch as your students turn conductive items (PlayDoh, oranges, pencil lead) into a controller that replaces a keyboard or mouse!

9. Take Apart Center

- Families donate an old, unused computer.
- Children take it apart using real tools, goggles, and containers to hold small parts.
- Children pop the keys off the keyboard using a screwdriver as a lever.
- Once they deconstruct the computer and keyboard, the children sort the pieces and parts.

- Parts go to the art area for repurposing.
- Children safely use a low-temp glue gun to transform the keyboard keys, screws, ribbons, and wires into works of art.

10.Tinfoil Boats

- Provide sheets of aluminum foil, a shallow tub of water, and flat-sized marbles (or other heavy manipulatives). Students shape foil into boat and count as they place marbles on top to see how much weight their boat can hold.

11. Number Bond Bracelets

- Have students each make a bracelet with a target number of beads. You must limit the beads to just one color so that color does not become a sorting rule and interfere with children's abilities to "see" the many ways to break the number into number bonds. As students manipulate the beads to see the number bonds, you may wish to record them in a list. During the discussion, challenge the children to come up with some systematic way of ensuring that they find all of the number bonds before moving on to the next target number.

12. Code n' Go Robot Mouse

- Set up 3-4 sets. Can you the maze pieces provided in the kit or students can create their own. Set 10-minute timers.

13. Osmo Coding Game

- Setup 3-4 tablets with the game loaded. Set 10-minute timers.
- Make sure the game is in a well-lit room, and station volunteers know how to reset after each user.

14. Coding with PBS Kids Scratch Jr

- PBS website provides detailed instruction cards and challenges related to PBS Kids programs like Nature Cat and Ready Jet Go.

Tip 3: Logistics

STEM Family Nights will vary depending on school culture and family engagement. In general, a STEM Night should not exceed more than 90 minutes.

- **Is transportation an issue for students?** If so, start immediately after school.
- **Will food be provided?** Try a carnival style theme with a food truck serving kettle corn and icees.
- **Do families need to RSVP?** Consider an open, come-and-go event for families.
- **How will you promote the event?** Announcements, fliers, calls and texts to parents, emails. The biggest draw might be promotion by teachers, especially promises of free STEM materials and books.
- **Space considerations?** Spread the stations across the cafeteria plus a few classrooms or library. Outside works, too!
- **Passports** Participants receive the passport at the start of the night and get stamps for each completed activity. Passports can be redeemed for a treat or later for special STEM material or book.
- Provide extra **seating** for elderly or young children.
- Have a **free-play area** with large blocks for toddlers.
- Make a **diagram** or map of activities and present to administration and custodial staff.
- Create a **welcome area** with sign-in sheets and STEM Passports.
- Post **directional signs**.
- Make sure each station has complete and clear **directions**.
- **Refreshments**: Students can be rewarded with a food ticket upon completing a set number of activities. 2 stamps = food ticket
- **Raffle tickets** can be another incentive for participation. Give out free books from Scholastic book orders for prizes, dollar store finds, etc.

For additional ideas, contact Carrie!