

EXHIBIT HALL

ACTIVITY GUIDE



Recommended for grades 1 -4

Younger learners may need help from an adult to complete some challenges.

Signs can help you answer questions!



Xylophone

Pick one of the songs to play with the mallet. Play the song a few times to try and memorize the notes or play faster. *Was it easier to play after you practiced a few times?*

Whisper Tube

Stand at one end of the tube and have a partner stand at the other. Talk (not yell) and listen to one another. *Could you hear the other person?*

Position yourself so that you can see the other person as they talk. *Do you hear the sound right away or is there a delay?*

What is the speed of sound?

Bongophone and Boomwhackers

Try hitting the drum heads of the Bongophone to hear the different notes. Notice that there are two red tubes. *Which red tube is playing the higher note?*

Play the Bongophone notes from lowest to highest.

What is sound made up of?



Light It Up

Press the buttons to power each type of bulb. Observe the voltmeter. *Which light bulb uses the most power?*

The least?

Magnetic Sculpture

Stack the hex nuts on the horn magnet. *How many could you get to stick together? (hint: try stacking them vertically)*

Are the hex nuts magnetic?

As you stack the hex nut, does the magnetic force grow stronger or weaker the higher you go?

Circuit Bench

Use the metal bars and crank to power one of the device or rows of lights. *Draw the circuit you created below:*

What particle is responsible for energy?

Crank Power

Supply power to all five devices at once. *Could you do this alone or did you need a partner?*

What happens when more than one person connects to the same device?

Sustainable Energy Dancefloor

Complete the Energy Battle game with at least one partner. *How many joules (units of energy) did you produce?*

How many did your partner produce?



Bubble Zone

Use the rings in the bubble table to make the largest bubble possible. *Is the bubble rigid or does it stretch and bend?*

Make a bubble window and hold it. *What colors can you see?*

Are bubbles a liquid, a solid, or a gas?

Parachute Launcher

Launch a paratrooper into the air and try to catch it. *Could you do it?*

How does a parachute slow the descent of an object or person?

Try an experiment! Load a parachute into the launcher in the following ways:

Parachute first

Weight first

Weight tucked inside a folded parachute.

Parachute folded weight hanging free

Which method produced the best result?

Flight Zone

Choose a paper airplane design and make it (hint: you may need to cut the paper to size). Test it at the launcher. *Did your plane fly through any hoops? If so which one(s)?*

How far did your plane travel?

Try and improve your design so that your plane flies farther. There are helpful tips on the sign if your plane is turning left or right or flying straight up or down. You can use tape or staples to add weight. When you're done test it again.

How many hoops did your plane fly through?

What as your distance?

Describe the changes you made:



Benham Disk

Choose a black and white disk and velcro it to the spinner. Press the button and watch the center as it spins. *What colors can you see as it spins?*

Try and change the speed. *Does the speed affect what you see? Yes or no?*

Our eyes have cones for which color combination:

red, blue, and yellow

red, orange, and yellow

red, blue, and green

Duck Under Kaleidoscope

Duck into the Kaleidoscope. *How many mirrors are there?*

What shape is the Kaleidoscope?

The mirrors are set at a _____ angle

Laser Harp

Press the buttons to select a tone (there are a few dozen to choose from). Stand at the side of the harp and "pluck" the lasers to hear the music. *How many laser lights are there?*

How do you know this?

How is laser light different than sunlight or lamps?



Sand Pendulum

Start with a clean, sand-free surface. Fill one of the pendulums with sand while holding your finger over the opening. Angle the pendulum in any direction and then release it. Observe the pattern that the sand makes. *Draw what you see:*

Repeat this experiment with the other pendulum and try to make the same pattern. *Could you do it?*

Why do you think that is?

Magnetic Motion Wall

Use at least seven pieces to create a rollercoaster for the ball. *Did it work on the first try or did you have to make any changes?*

When the ball is at the beginning of the track (not moving) what kind of energy does it have?

Gravity Well

Starting at the top of the well, release four balls so that they reach the bottom without running into each other. *Did you release them at the same time?*

Send a ball into the well rolling along the side. Release another ball aiming it directly toward the bottom. *What happens to the second ball?*

What do scientists call the rolling pattern of the first ball?

Super Bounce

Lift and drop just the top ball (don't throw it). Now lift and drop the top two balls. Now three. Now all four. *Which time did the smallest ball bounce the highest?*

The Super Bounce is a great example of **Newton's Third Law of Motion**: For every action, there is an equal and opposite reaction.

Based on your observation, why do you think this exhibit demonstrates Newton's Third Law? (Repeat the experiment if necessary)



Puzzles Tables

Find the puzzle called The Tower of Hanoi. Try and solve it and then repeat the puzzle. *Did you solve it faster on your first or second attempt?*

Find the puzzle called Circle Packing and try and solve it.

What is a practical application of circle packing?

Try at least one other puzzle. *Which one did you try?*

Catenary Arch

Follow the directions to build and raise the red tabletop arch. Follow the directions carefully. *Does the arch stand?*

If not, describe what went wrong.

What force keeps an arch together?

Giant Arch

With a partner follow the directions to build the Giant Arch (make sure the numbers on each brick face inward).

What is the number of the last piece you used?

What is that called?

Shake Table

On the building side of the Shake Table, build a skyscraper and test it with an earthquake. *Does your building shake?*

What shape reinforcements will give your building stiffness?

What spe reinforcements will give your building flexibility?

On the bridge side of the Shake Table, build a suspension bridge including a road going across both sides. Test it with an earthquake. *Describe what happens:*

Sky Bridge

Climb the Sky Bridge as far as you can. *How many panels did you climb on to get there?*

Does the Sky Bridge exhibit touch the ground?

How many panels does this Sky Bridge have?

If you made it to the top, what did you notice about the photos on each panel as you climb?

BONUS QUESTION: *How many pounds can each Sky Bridge panel hold?*
