Rube Goldberg™, The World of Hilarious Invention Exhibit! is created by the Children's Museum of Pittsburgh in partnership with the Heirs of Rube Goldberg.
VISITING TIPS

In this section, tips and tricks are provided to ensure that caregivers, educators, and learners of all ages experience the exhibit in the best way possible.

For Caregivers & Families

• Connect it to Home

All of the machines depict actions that you might do at home: cleaning, cooking, ironing, or making music. Connect with your child by looking for familiar household objects. Use the machines as a launchpad for making chores more playful. For example, challenge your child to invent a cleaning apparatus at home.

• Ask Open-Ended Questions

Rube Goldberg machines are designed around a narrative. Ask questions with your child to fill in some of the details, such as:

“What is this machine trying to accomplish?”
“What makes this machine funny?”
“What object would you add to this machine?”

• Team Up

Approach the machines as a collaborative component. Try to work with your child instead of directing from afar, but give them space to try and fail. Model how you would solve a challenge, encouraging patience and persistence.

General Tips

• Allow ample time in the space. Prepare for more time than expected due to trial and error and experimentation.
• Point out the context cues like arrows and number and letter sequences.
• Resetting the contraptions can happen forwards or backward. See what works best!
• Let children know that machines can be tricky. Frame the exhibit as an opportunity for problem-solving.
VISITING TIPS

• **Act as a Model Learner**

Prepare students and visitors for the experience of not knowing how something works. The machines are intricate enough that adults can also experience learning through trial and error. When you first see a machine, the task or goal may not be obvious. Approach this feeling of not knowing with the same open-mindedness and persistence you wish the students to have. Keep in mind that talking aloud through your thinking can be a powerful example for learners. “What doesthis slide do? Oh yeah - it slides!”

• **Slow Down**

The more you put into this exhibit, the more you will get out of it. Tinker with individual elements and allow enough time to focus on each machine in the exhibit. Patience and a slow pace will be rewarded with rich learning opportunities embedded within each machine and contraption.

• **Collaboration is Key**

Visitors will benefit most from working together to make the machines work. Encourage your students to break up into small groups to figure out the exhibits. Allow them to self-select and work with friends with whom they work well together. Once they master their machine, have them demonstrate to the rest of the group. That element of communication and presentation helps cement the learning that has happened!

• **Follow the Clues**

Prime your students to approach the machines like a detective. Look for clues as to how the machine works - the visual signs are often the best clue. Ask leading questions like:

  “Where do you think we put the ball?”
  “Can we tell how many balls this machine needs?”
  “What position does the sign show?”
  “How does ________ affect ________?”

• **Embrace Failure and Celebrate Success**

Your students may experience failure as they set up a machine and something goes awry. Embrace these as teachable moments to foster patience and persistence in students. Try to find the humor in the situation, and remember that the machines are designed for laughs. Finally, don’t forget to savor the celebratory moment when your students meet success.
STRATEGIES FOR ENGAGING YOUNG CHILDREN

Engaging young children in the exhibit can be tricky. Consider the tips below to scaffold learning for young children.

• **I Spy.** Find household items and talk about how they are used in different ways in the machines. Try to spot animals and find numbers and letters.

• Encourage **sensory exploration** of the space. It’s okay to pick up balls, interrupt the sequence, or move magnets around. Encourage and accept the curiosity and exploration that naturally happens in this exhibit!

• The **free play table** is a great place for young learners to begin exploring cause and effect relationships. Experiment with dominoes and move around different objects to see how sequence and placement affect outcomes.

• Try focusing on one part of the exhibit. See what **small details** children are naturally drawn to and talk to them about their observations. What are they curious about?

• Have young children **make up their own story** for the machine. What new sounds could they invent to add to the machine?

• **Identify feelings:** Does you or your child feel frustrated? Confused? Victorious? Express and share these feelings. Validate their emotions: let them know it is okay, even natural, to be frustrated or confused. Model curiosity and persistence and work through emotions together as you problem-solve. Approach each machine like a puzzle to be solved, using phrases like, “I wonder if...” or “What if we tried...” And, of course, do not forget to celebrate when you accomplish a goal!

• **Explore basic physics** together: What happens when a ball is released on a ramp? Why does it roll? What happens when your child activates a lever or turns a wheel? How do these simple actions influence the other parts of the machine?
### Component Description

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<th><strong>Component</strong></th>
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| **Self-Operating Napkin Photo Op** | Step into one of Rube’s wearables, “Self-Operating Napkin Machine.”, for a one-of-a-kind photo opp experience that lets the visitor be professor Butts in the iconic invention illustration.  

**Embrace Humor:**
Don’t be afraid to have a little fun and laugh at yourself. Embrace being a part of a Rube classic. |
| **Art Studio** | In the art studio, you can look at some of Rube Goldberg’s iconic drawings and comics and also create some of your own. Turn the knobs on the View Finder to look at examples of some of Rube’s original comics showing his wacky inventions. Once you’re feeling inspired, try out some of Rube’s drawing techniques at the drafting table and create your own comic or machine.  

**Embrace Humor:**
Look for the trademark strange objects featured by Rube in his comics. Do you recognize any elements in his comics that also appear in the exhibit?  

**Sensory Exploration & Experimentation:**
It’s your turn to be the storyteller. Try out different shading and hatching techniques like Rube used in his drawings. How do different drawing methods create an illusion of texture? |
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| **VIEWFINDER**  | Can you believe Rube Goldberg drew nearly 50,000 cartoons in his lifetime? Use the Rube Goldberg Viewfinder to slide through a timeline of Rube’s work. Turn one of the notched wheels and a cartoon will slide into view with a satisfying plop. The Viewfinder features dozens of cartoons, comic strips and articles. Curious about how Rube would design an alarm clock, home vacation machine, or an alternative to gasoline-fueled car? Find it here by exploring Rube’s wheelhouse - literally!  
**Embrace Humor:** With the Viewfinder, you can immerse yourself in Rube’s visual language, almost as if you were flipping through the artist’s portfolio. Discovers many of his most hilarious machines, such as “No More Oversleeping.” |
| **DRAFTING TABLES** | The Drafting Tables offers you the chance to inhabit the role of cartoonist. Have a seat at an angled drafting table and practice your cartooning skills. Try your hand at cross-hatching, the technique Rube and many cartoonists use to give shading and texture to their drawings. Once you practice your strokes, use what you have learned from Rube’s visual language to draw your own machine.  
**Sensory Exploration:** The Drafting Table helps you get into the cartoonists’ mindset. Explore how it feels to make thin versus thick lines. Squint your eyes at a drawing with cross-hatching - do you see the patterns of light and dark? |
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<td>DIE CUT A BOX</td>
<td>Die cutting is a process in which a machine cuts the exact same shape over and over. In this exhibit, it acts like a cookie cutter for an unfolded box shape. This component highlights the hard work put behind these machines! Visitors have to use their muscles to crank the machine so that it can squish the paper against the die. Then, the challenge is to turn a flat piece of paper into a box! Sensory Exploration &amp; Experimentation: Although boxes share the same shape, they can be made in different ways. Experiment with folding the die cut paper in different ways. How could you make a box using two pieces of paper? What about three? You can also experiment in reverse. Start with a rectangular prism, like a cereal box. What 2D shapes can you find on the prism? How many squares? How many rectangles? Then, dissect the prism so that it is in as few pieces as possible (ideally one flat piece), and examine the folds and shapes that created the 3D object. Energy and Scientific Elements: The tray that holds the die moves back and forth under the roller with the help of a crank. You may have used a crank before if you have sharpened a pencil or used a fishing rod. What other cranks do you see in the exhibit and what are their jobs?</td>
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<p>| REVOLVOMETER    | The Revolvometer turns the Art Museum on its head. This interactive contraption is based on Rube's cartoons, &quot;How to Look at Modern Art&quot; and &quot;Revolvometer.&quot; Making art is not only about creating a picture, but also choosing how it is viewed. Take examples of modern art masterworks and view them from different angles on the revolving picture frame. Or, experiment by revolving your own piece of art. Sensory Exploration: Turn the wheel and experiment with your visual senses by viewing art from different angles. Do different shapes or objects appear as you rotate the artwork? You make the call about what is most pleasing to your eye. Embrace Humor: Look at Rube's cartoon, &quot;How to Look at Modern Art.&quot; What if we used silly contraptions to look at art? Can you imagine going to an art museum and viewing things upside down? Imagine how funny it would be. |</p>
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<td><strong>MAGNETIC RAMPS</strong></td>
<td>Create paths with magnetic ramps and tunnels. What building strategies are helpful to get the balls from one side to the other? Try different configurations and placements of the parts and pieces: how can you help the balls move from one side to the next? What makes them go faster and slower? <strong>Teamwork and Collaboration:</strong> Form teams and work together to create racetracks for the tortoise or the hare. How does collaboration affect your success? <strong>Embrace Humor:</strong> This is a perfect place to create your own funny story! Each ramp has objects from a Rube classic that you can use to narrate your contraption! <strong>Energy and Scientific Elements:</strong> Explore potential and kinetic energy with ramp experiments. As you change the steepness of ramps, the acceleration of the ball changes. Why? The ball loses gravitational potential energy, which translates into an increase of kinetic energy.</td>
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<td><strong>CLEANING MACHINE</strong></td>
<td>This machine adopts a very playful approach to household chores (for example, dirt is literally swept under a rug). How does it inspire you to make cleaning more fun? <strong>Embrace Humor:</strong> Study all of the household objects used in this machine. Which ones seem a little out of place? <strong>Cause and Effect Relationships:</strong> You are the catalyst for this machine. Pull back the boxing glove to punch a ball and set the machine in motion. Study the sequence of actions to get a sense of how each individual part is important for the success of the whole machine.</td>
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| COOKING MACHINE   | This machine makes the task of cooking even more challenging and complex than it already is. It provides visitors with a wonderful opportunity to test the scientific method: make and test hypotheses about what will happen, and embrace iteration and problem-solving.  
**Embrace Failure & Celebrate Success:**  
Take the time to focus on some of the smaller tasks to better understand how the machine operates. Learn from mistakes and multiple attempts and approach the task with the same humor and playfulness Rube used.  
**Energy and Scientific Elements:** A variety of fundamental scientific concepts are embedded here waiting to be discovered. Study how the hedgehog uses momentum to gain speed, look for the potential energy of the hammer, and discover how pulleys of different sizes can change the direction of the force. |

| MUSIC MACHINE     | The Music Machine contains no fewer than 3 musical instruments. Have a sonorous experience as you pull a string and unfold a chain reaction involving a roving bookshelf, magical wind chimes, step levers, slide whistle, magnetic-break ramp, and a dramatic cymbal crash. Watch as some things move fast and others crawl at a snail’s pace.  
**Teamwork and Collaboration:**  
There are a lot of moving parts to making music. Don’t be discouraged if someone is working on a different section of this machine. Instead, work together to the sweet sound of music.  
**Energy and Scientific Elements:**  
The instruments in this exhibit aren’t in your normal orchestra. The whistle sound that is made from the machine is controlled by a piston that compresses air. Take a closer look and see how the sound is being made.  
**Science Behind the Machine:**  
Thanks to a combination of friction and magnets, acting as a small brake, there is a spot in the Music Machine that has a fixed speed. Can you find it?  
**Sensory Exploration:**  
This machine is literally music to your ears. Which sounds do you enjoy most? Can you change any sounds by manipulating the contraption? |
### Challenge Table

Jump in and explore open-ended chain reactions at the Free Play Table. Create your own challenge with recognizable components such as wheels, dominoes, tires and things that move! Use the terrain of the table to get from A to B. If you’re looking for a goal, try to ring one of the bells. And remember, it’s okay if your machine doesn’t work!

**Sensory Exploration and Experimentation:**
This is the perfect spot to engage with all of the elements of the exhibit that learners may not be able to see or touch. Experiment with ramps, wheels, and obstacles.

**Embrace Failure and Celebrate Success:**
There will be plenty of times where things don’t go as planned at this table. Things will tumble, fall, or stay standing. It’s important to embrace failure and celebrate successes. Some will be caused by you, and some will be caused by others - but keep a good attitude.

**Teamwork and Collaboration:**
This table allows many opportunities to work by yourself, or as a team. Try collaborating with your neighbor to build a chain reaction.

### Music Mural

Witness unique interactions between the real world and a digital screen at the Music Mural.

**Sensory Exploration & Experimentation:**
Pull the ropes to start the music. Starting at the top of each panel, track the progress of each task. Listen for the sounds at each step: can you detect the change in pitch?

**Cause and Effect Relationships:**
Observe the importance of each small step for the success of the larger task. Pay attention to the different levels. When the bee pollinates the flower, how does it activate the next step in the process?
WHO IS RUBE GOLDBERG?

Rube Goldberg (1883-1970) was a Pulitzer Prize-winning cartoonist best known for his zany invention cartoons. He was born in San Francisco on the July 4, 1883 – and graduated from U. Cal Berkeley with a degree in engineering in 1904. His first job at the San Francisco Chronicle led to early success, but it wasn’t until he moved to NYC and began working for Hearst publications that he became a household name. Rube Goldberg is the only person ever to be listed in the Merriam Webster Dictionary as an adjective. It’s estimated that he did a staggering 50,000 cartoons in his lifetime. For videos about Rube: https://www.rubegoldberg.com/about/.

A Rube Goldberg Machine is “a comically involved, complicated invention, laboriously contrived to perform a simple operation” (Webster’s New World Dictionary). Humor and a narrative are what separate a Rube Goldberg machine from a chain-reaction machine. Each of Rube’s cartoons told a story and his entire goal was to get you to laugh.

Rube Goldberg, Inc. is dedicated to keeping laughter and invention alive through the legacy of its namesake. Annual competitions, image licensing, merchandising, and museum and entertainment opportunities continue to grow and enhance the brand. At the helm is Rube’s granddaughter, Jennifer George. Her her recent book, The Art of Rube Goldberg highlights Rube’s iconic career, celebrates his legacy, and reminds people everywhere of the laughter fostered in Rube’s works.

Rube didn’t care if the machine worked, only if it made you laugh.