Admiring art on the giant Etch-a-Sketch

Practicing a steady hand in the game of Operation

Turning the gears makes the ballerina dance

What Makes Elmo Dance

SCIENCE FACTORY EXHIBIT EXPLAINS HOW TOYS TICK

by Camilla Mortensen and Chelsea Fryhoff

Bells, clinks, cranks, squeaking and excited voices fill the small space of the rainbow-colored building. An afternoon at The Science Factory Children's Museum & Exploration Dome sounds more like an arcade than a museum.

Toys: The Inside Story, currently at the Science Factory, is a wonderland of hands-on exhibits of circuits, cams, gears, pulleys and linkages — everything from what makes the Elmo doll dance the hokey-pokey to what makes the buzzer bleat at unsteady hands in the game of Operation. If you were (or are) the kind of kid who really wanted to crack open your Etch-a-Sketch and see what was inside, *Toys* is calling your name.

The Science Factory isn't just any museum; it's an educational emporium for kids encouraging them to use their minds as well as their bodies to explore its many mysteries. *Toys* is one such interactive exhibit featuring 12 different stations that reveal the underpinnings of toys and how their mechanisms work, says Executive Director Carolyn Rebbert. Also on display are many "classic toys" that appeal to parents as much as they do to kids, she adds.

If Operation still startles the crap out of you when that horrid buzzer goes off, and the bulbous nose of that weird looking patient, Cavity Sam, lights up while you're removing his "spare ribs," learning about what makes the game work may ease your jumpy nerves. The *Toys* version of the game shows "what happens when you close a circuit," Rebbert says. On the "Circuit Wall," kids can move a ring along an angled rod in order to keep a circuit open, showing on a larger scale why you need that steady hand to play doctor. (*EW* was unable to verify before press time the rumor that real-life doctors use the game to train for surgery.)

The Jack-in-the Box is an even more classic example. We all know what happens after the line "all around the mulberry bush the monkey chased the weasel" — Pop! But what makes Jack jump? It's a cam combination (cam is a rotating or sliding piece in a mechanical linkage, or more simply, the thingy that camshafts link to). But kids and parents can explore this for themselves on the "Cam Wall" and at "What's Inside Jack-in-the Box?"

Elmo might be a more recent phenomenon, but the exhibit shows that his hokey-pokey dance also uses cams. And though the infamous Tickle Me Elmo isn't included in the *Toys* exhibit, inquiring minds might want to know that the same thing making your cell phone vibrate makes Elmo quiver — a battery powered gear mounted off-center with a small weight. When the gear spins, the wonky weight vibrates your phone, or your Elmo. This is what happens when cool museum exhibits show you what makes Elmo dance — it makes you want to know what makes him vibrate, too.

While there's only one Elmo at the Science Factory, there are plenty of gears. The "Gear Train" and "Gear Table" are where kids can see and feel how gears work with "one mechanical piece linked to another to make it a small to large ratio," and the way this affects how powerfully things turn, Rebbert says. For example, kids can inspect how gears spin a ballerina or a carousel.

Toys also demonstrates "why it's so difficult to use an Etch-a-Sketch," Rebbert says. (Spoiler alert for those of you who, like us, thought it was simply magic or elves living inside the little red doohickey that made it work — we're about to question that theory.)

The Etch-a Sketch is all about pulleys. The two knobs at the bottom of the toy's frame control a vertical and a horizontal bar. That's right — you're trying to use straight bars to make circles when you attempt to draw a snowman on an Etch-a-Sketch. That's why making curved lines is so hard. The knobs you turn are connected to steel wires. When you turn one or both knobs, the wires move a bar. A stylus is mounted at the spot where the bars cross, and as it scrapes across the screen it removes the aluminum beads that coat it. Once you and your munchkin companions have learned how the toy works, you can test out your drawing skills on the Science Factory's "Giant Pattern Tracer" (i.e., the biggest Etch-a-Sketch you've ever played with).

When they're done exploring *Toys*, Rebbert says, "kids can return to their old favorites" like the "The Recyclotron." This is a tall glass box filled with recycled toys, cans, bottles, metal tubes, plastic buckets and lights, all fronted by three trash cans and resembling something like the inside of a complex gumball machine. The trick is to stop the balls from ending up in the "landfill" by choosing a path that leads them to be reduced, reused or recycled. On a recent afternoon, one budding young recycler watched with bated breath and fists clenched by his ears as his friend worked to get a metal ball the size of a jawbreaker through the various tubes in order to make a red, yellow or green bulb light up.

"I wish I had all that recycle so I could build a robot," the little one told his mom as they walked away.

If you're "child-free" (or just want to leave the kids at home) don't let that stop you from the joys of The Recyclotron or the giant Etch-a-Sketch — from 5 to 8 pm on March 18 the exhibit is "adults only," Rebbert says. *EW*

***Toys: The Inside Story* will be at the Science Factory until May 8, and is open 10 am to 4 pm Wednesday through Sunday (free for Science Factory members, $7 for nonmembers or $4 if you want to see the exhibit but not the Exploration Dome).**

If kids want to come out in their pajamas, the museum has recently begun a Friday Science After Five series. Friday, February 18, is the Seven Wonders of the Science Factory Scavenger Hunt (members $2; nonmembers $5).

For more on the Science Factory and its events go to www.sciencefactory.org