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Title: Why Do Things Slide on Ice?

Synopsis

The purpose of the activity is to show visitors that objects slide on a thin layer of water that is formed by melting the ice, instead of the surface of the ice itself. To show this, the demonstrator will slide objects, including a clear glass, across an ice block. The visitors will then slide ice cubes on different substances to convince themselves that water causes the cube to slide.

Audience

The intended visitor is one who is in grades 5-8 who would have a limited knowledge of the scientific process. This age group would most likely have no prior understanding that water melt is the cause of sliding on ice.

Learning Goals

- Water melted from ice causes things to slide, not that ice is “slippery”
- The basic scientific process of conducting experiments and analyzing data

Materials

- Paper towels
 - 3-5 rolls (~\$1.50 each)
- Cooler to hold ice
 - Styrofoam chest (~\$7)
- Ice cubes, ice form (ice trays preferred for uniform size and shape)
 - Make at home or retrieved from ice machine
- Block of ice (~7-10 lbs.)
 - Grocery store (~\$3)
- Clear glass cup
 - Brought from home
- Container with flat bottom that can hold very little water in the bottom and short enough walls so visitors can reach into it



- Small plastic storage container works well (~\$5)
- Container to hold the block of ice
- 3-4 different materials for visitors to test ice cube sliding on (at least one cloth and one metal)
 - Household items like a skillet and table cloth

Preparation and Set-up

Besides gathering the required materials, limited set-up is required. The first consideration is to have the block of ice in a container so the melted ice is contained. The next item is placing the container of water where it will not spill, but is accessible. Then make sure the different materials that the visitors will use to explore how ice slides on them are placed on the table. To attract visitors, the big block of ice will be the first draw-in, along with the different materials on the table, including a metal pan of some sort.

Guiding Questions

- “What do you think will happen?”
- “How are the observations we see happening related to what we see every day?”
- “How can we use this in real life?”

Activity Description

First ask the visitors how things slide on ice. Most will say that the ice is slippery. Then follow up by asking what makes things slippery. Inform the visitor that what causes something to slide on ice is melted ice. Then show them by demonstrating that the clear glass does not slide on the table, but that on the block of ice, it does. Then bring attention to the appearance of water between the cup and the block of ice, which can also be shown in the tub with just water. Ask visitors how different materials affect this. Once the visitor has answered, give them an ice cube and ask them to test what they just described on the different materials. Once they have finished testing their hypothesis, ask them which material caused the ice cube to slide the best and which one would not let the ice cube slide.



To deal with people dropping in and out, the plan is to keep them enticed throughout the demonstration, but there are plenty of places that they could back out during the activity. While keeping the visitors on task, asking questions as to what they are doing and how it relates to the experiment works well, but a suggestion as to what they should be doing also seems to work.

Teaching Strategies

If the visitor goes through the entire planned demonstration, then each area of the learning cycle would have been explored. By asking the visitor to perform their own experiment and asking them about their results makes the activity inquiry-based and moves them through the learning cycle. The visitor will feel engaged by being asked some simple background questions, while being asked what they observe is happening helps to keep the visitor engaged, leading them to actually learning something instead of thinking that it was just really neat.

Vocabulary

- Ice melt: The water that is created from the object melting the ice
- Specific Heat: The ease of absorbing energy from different places
 - Try to avoid using this phrase unless the visitor actually asks about what really causes the ice to melt

Science Content Background and Additional Resources

This activity was inspired by the 2014 Winter Olympics and by watching a video that NBC Sports had put out talking about the different types of skates that the athletes wear. The only actual scientific background that is required is a working knowledge of specific heat.