raft RESOURCE AREA FOR TEACHING

STEAM SCIENCE TECHNOLOGY ENGINEERING ARTS MATHEMATICS

LEARNING ACTIVITY

Materials Needed

- Stiff packaging foam (polyethylene is best) or equivalent. **Do not** use crumbly or soft sponge foam.
- Plastic serrated knife or equivalent
- Variety of targets (boxes, cups/bowls, paper, etc.)

Grade Range

Pre-K

Topics/Skills

Observation
Pressure
Energy
Fine motor skills

Learning Standards

NGSS: Forces and Interactions; Definitions of Energy
DRDP: Cause & Effect (8); Physical Development – Health (4); Language and Literacy Development (3)

Duration

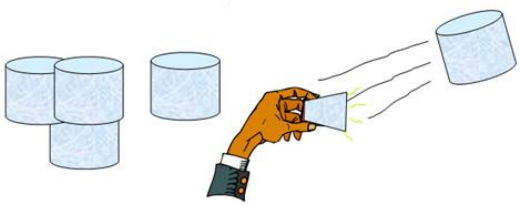
20-30 minutes

Prep Time

10-15 minutes

Finger Poppers

Give Them a Squeeze and Watch Them Fly!



Foam provides a fun, safe way for young learners to practice fine motor skills and experience basic physical science concepts such as pressure and energy.

Activity Challenge

Squeeze foam pieces between two fingers until they pop and fly into a target!

Preparation

1. Gather stiff pieces of packaging foam and a plastic serrated knife.
2. Using the plastic knife, cut the foam into smaller pieces appropriate for preschool-age students. If students are doing this, adult supervision is required.
3. Choose a box, cup, bowl or paper as a target. Place the target on the ground, floor, or other surface, easily accessible to children.

To Do

1. Show students how to position a small piece of foam between the thumb and index finger.
2. Demonstrate how to slowly pinch the foam along an edge. While doing this use the word *pressure*, to help show what is happening.
3. Show students how to slowly pinch the foam until an audible pop can be heard and the foam projects forward. Say the word *energy* as the foam moves through the air to help show what is happening.
4. Have students practice pinching the foam while saying pressure.
5. Students should practice until they can make the foam pop and fly forward with little assistance.
6. Students position themselves a certain distance in front of the designated target and try to pinch the foam into the target. As the foam moves through the air, they say energy.

Observations

- Students compare relative strengths of pinching on the foam and their effects on either the loudness of the popping or the relative distance the foam moves.
- Students use the words *pressure* and *energy* in the comparison.

Extensions

- Create fun math reinforcement games by setting out a variety of targets, each with an assigned value. Players launch 5 finger poppers in each round to add earned points to their scores.
- Go for distance! Challenge students to send their popper the farthest!
- Popper Golf! Set up several box-type targets with a starting point for players to "tee off". Add obstacles to make each "hole" resemble a miniature golf course.

The Science behind the Activity

Finger Poppers are foam pieces that are simply expanded plastic. As opposed to Styrofoam (expanded polystyrene), expanded polyethylene packaging material is flexible and contains large pockets of air. As the air trapped in the foam piece is pinched (compressed), the air **pressure** inside the pockets increases. This increased air pressure leads to increased **potential energy** (stored energy). When a pressurized popper slides out, and away from pinched fingers, it "pops" back into its original shape, transferring potential energy into **kinetic energy** (energy of motion) and causing the fingers to exert a force that propels the popper forward. The goal of this activity is *not* that preschoolers understand the difference between potential and kinetic energy, but instead it is that they experience the cause and effect relationship between the act of pinching the foam (putting potential energy into the system) and its resulting sound and motion (manifestations of kinetic energy). Pinching foam is an example of a **fine motor skill**, one that involves the coordination of small muscles in the fingers, hand, or eyes. **Gross motor skills** involve coordination between large muscles in the legs, arms, and torso.

This activity involves the use of scientific vocabulary (pressure and energy) while engaging in physical movements. The method of associating words with actions, or physical movements, is called total physical response, or TPR. The method was developed for language teaching by James Asher, a professor emeritus of psychology at San Jose State University. Its purpose is to link speech and action to boost language and vocabulary. Its users have also found that it lowers stress and inhibitions for young students, thereby, enhancing their social emotional development as well as their language development.