Biodegradables Lesson

Safety Notes: Take MSDS (Material Safety Data Sheet) for acetone with you. Perform the (packaging) peanut race in a large, well ventilated room (ex: Gymnasium) or outside. Leave acetone bottled as long as possible and rebottle it as quickly as possible. Use only the amount necessary to ensure a successful experiment (about 3/4 inch along the bottom). Protect against spilling of the substance or exposure to any heat source.

Background:

To begin this week, we are going to talk about competition. As we have touched on before, all animals compete. Oftentimes this competition is between creatures of the same species that all rely on the same food source. For our activity today, we are all going to be chipmunks and the male and female chipmunks are going to compete for the same food source. Chipmunks often eat fruits and nuts, so for our activity we will be using peanuts. Unfortunately we couldn't afford lots of real nuts, so we will be using packaging peanuts.

Activity:

At one end of the room are two open bags full of packaging peanuts and at the other are two dark buckets. Unknown to the students is that one bucket contains a small amount of acetone.

Boys and girls are separated into two lines, and their objective is to get peanuts from the bag into the bucket as quickly as possible. Each person in the line takes his or her turn and steps to the side to watch.

Stop the activity when the bucket without acetone is nearly full. Cap both buckets and return students to their seats before sharing the results. Laugh at the losing team.

Introduction:

As important as understanding competition is, there is little that we can do to help competing animals survive outside of stopping destruction of habitat and planting new food sources.

Every week we come to teach a lesson that involves the environment. Many times we talk about problems in the environment. For example, last week we discussed problems surrounding oil spills. Today we're going to look again into some of the problems with throwing materials into landfills and what we can do to help eliminate these problems. Because our packaging peanuts were made of Styrofoam, we will look at the impact that Styrofoam has on the environment.

Did you know that each year Americans throw away 25,000,000,000 Styrofoam/Polystyrene cups? Even 500 years from now, millions of Styrofoam coffee cups will still be sitting in a landfill.

To address the classic issue of paper vs. styrofoam, it is important to realize that all materials in the landfill actually decompose incredibly slowly if at all. Because precautions are made to protect the environment from landfills (buffers are created so harmful metals and other toxic materials cannot easily find their way into the environment), the decomposers that help break down materials cannot easily access them.

Styrofoam's greatest detriment to the environment is a result of pollution. When humans toss Styrofoam out of their car windows, for example, many animals are impacted. Most often, animals can choke when trying to eat Styrofoam products.

The best way to help protect the environment other than recycling or reuse of Styrofoam containers is to compact it. Styrofoam is roughly 90 percent air, so the use of a chemical like acetone is a good way to compact the material for disposal.

Demonstration (If time permits):

Since we have some time left, we have a demonstration you may like. Don't try this at home.

This is something you might hear about or read about in a newspaper. Do any of your relatives farm? Sadly, sometimes explosions can occur in the grain bins, or silos, of farms. If particles of any kind (in our experiment we will use ordinary coffee creamer) are dispersed in the air, like when grain is being poured into the bins, and someone lights a cigarette nearby, there may be an explosion.

Safety: Keep all but one presenter away from the explosion. The presenter should be lower than table level. Note: The explosion is instantaneous; no burning matter will reach below table-level.

Set-up/Procedure: place can on table, pour about 25mL creamer into funnel, place lid very loosely on top, light and place candle. Shut off lights. Crouch below table and blow into mouthpiece.

Reaction: Small particles of coffee creamer are dispersed in the air of the can. Flame initializes explosion.

Unfortunately, there is not a good way to prevent such explosions. Most modern silos have built-in ventilation systems to help keep small particles out of the air, but accidents occur far too often. The best way to prevent accidents like this is to take extra care in eliminating nearby heat sources.