How To Make An Electrostatic Precipitator

Materials, Equipment, and Preparation

- plastic tube (fluorescent light tube)
- wire coat hanger
- plastic grocery bag
- electric blow dryer
- punch holes, black pepper or rice krispies

The electrostatic precipitator works on the principle of a static electric charge attracting particles where they are removed.

A 2-foot plastic tube in which fluorescent lights are stored can be used to simulate an electrostatic precipitator. The plastic tube can be charged by running a coat hanger with a plastic grocery bag attached to it. (See diagram B)

(The plastic bag as it moves through the tube strips the negatively charged electrons from the inside of the tube making the overall net charge positive. Anything that has a negative charge will be attracted to the tube because opposites attract.)

Hold the tube over some punch holes, black pepper, or rice krispies. Hold an electric hair dryer so the air stream blows across the top of the tube. The air mass creates a low pressure area at the top and the greater air pressure at the bottom pushes the punch holes up the tube. (This is called Bernoulli's Principal)

*****The Results*****

If the tube is charged, the punch holes will stick to the sides.
This activity can be used to study static electricity.
If the tube is not charged, the holes will shoot out in a spray.
This activity can be used to study Bernoulli's principle.

Extension:

Balloon Activity

Materials:

- pepper or ashes
- balloons

Procedure:

Give each student an inflated balloon and some black pepper. Rub the balloon on your hair or with a piece of cloth. Hold the balloon over the pepper on your desk. What happens to the pepper?

Ask the students what produces air pollution. Discuss that industry is just one producer of air pollution. Ask what kinds of pollutants are produced by industry. Discuss that particles (called particulate matter) can be captured before they enter the atmosphere by an electrostatic precipitator. Demonstrate with the plastic tube and black pepper how particles are attracted to the sides of the tube to an attraction much like the pepper was attracted to the balloon.