

## THE MAGIC PLASTIC BAG

### Objectives

This demonstration illustrates how indestructible plastic bags are and what they can do to the environment.

### Duration

45 minutes

### Group Size

20-30 students

### Materials

- Plastic zip-lock bag
- 5 pencils
- Pencil sharpener
- Jug full of water
- Towel
- Bucket
- Balloon
- Food colouring (optional)

### Background

Almost all plastic bags are made of a type of plastic called polyethylene. Plastic zip-lock bags, freezer bags, fruit and vegetable bags, grocery bags and cling wraps are all made of this type of plastic.

**Over 6.5 million plastic shopping bags are handed over counters in Australia each year!**

This plastic is also used in agriculture for dam liners, silage bags and greenhouses. Polyethylene is not biodegradable and presents many environmental problems.

In this demonstration, audiences often expect the plastic bag to leak as they think it will behave the same way as a balloon full of water which is rubber and would split. Plastic is strong and it stretches considerably before it tears, which is why it is so popular.

### LESSON PLAN

#### Introduction (5 minutes)

Explain to students that this activity will help demonstrate some of the properties of plastic.

Explain that almost all plastics (including plastic bags) are made of a type of plastic called polyethylene. Ask students to list some uses of plastics made from polyethylene (eg. Shopping bags, freezer bags, fruit and vegetable bags, cling wrap, silage wrap, dam liners etc).

#### Setting the Scene (5 minutes)

Explain to students that in this demonstration you will be filling a plastic bag with water and poking a hole in it with a pencil.

Ask students what they think will happen when you poke a pencil into the plastic bag with water.

#### Activity (20 minutes)

1. Ask a student to sit out the front.
2. Place the towel around the students shoulders

3. Fill a plastic zip-lock bag with water from the jug.
4. Tell the students you are going to pierce the bag with a pencil
5. Build the suspense by sharpening the pencil
6. Hold the bag of water over the students head.
7. Push the sharpened pencil through the bag
8. Repeat several times leaving each pencil in place in the bag (if you remove a pencil the bag will leak).
9. Hold the bag over a bucket and remove one of the pencils.
10. Carefully re-insert the pencil into the holes and the leak will stop.
11. Ask students why they think the bag did not break and did not leak with the pencils in.
12. Explain that you will do the same test with a balloon and ask them what they think will happen.
13. Take a balloon, fill it with water, hold it over a bucket and pierce it with a pencil (it will burst).
14. Discuss why the balloon burst but the plastic bag did not. Using the following information for reference:

The pencils easily cut a very small hole into the plastic, but these holes do not continue to grow as they would in stretched rubber, nor do they tear. Due to the shape of the pencil, the holes stretch around the pencil forming a perfectly waterproof seal.

### Conclusion (10 minutes)

Have a discussion with students about the nature of plastic bags which does not allow them to break down.

Ask students to think about what problems plastic bags may cause in the environment due to their un-biodegradable nature.

Ask students for ideas on how to prevent some of these problems occurring (eg. Use material bags or boxes instead).

### Extension Activity

If time permits, split the students into pairs or small groups, hand out plastic bags and pencils and let them have a go over a bucket/ sink/ jug or outside.

### More information

Contact Sandy Dellwo, Land Services Officer – Education on 03 5880 1415.

### Acknowledgements

This activity has been adapted from an activity provided by the Riverina Environmental Education Centre. For more information visit:

[www.reec.nsw.edu.au](http://www.reec.nsw.edu.au)

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