

### Homemade Dew and Frost

#### Objectives

By the end of this lesson the student will:

- understand that air contains water and that under cold conditions, some of the water may become visible.

#### Background

The ice cools the can and the air in contact with it. As the air cools, water from the air condenses as dew. Adding salt to ice cools the temperature to below freezing point (0°C). Now, rather than dew forming, crystals of ice, known as frost, form.

Tiny droplets of dew often form at night on cold surfaces such as grass and leaves. In deserts, dew may be the only form of moisture available to plants and animals.

On clear, still nights the temperature at ground level can fall to below 0°C. When this happens, water vapour can turn into solid crystals of frost. Frost can be very damaging to crops such as wheat.

Frost doesn't usually occur on cloudy nights. Clouds trap heat, acting like a blanket. Frost occurs more often in valleys than higher areas because cold air is dense and flows down valley slopes.

When warm, moist air rapidly cools, tiny droplets of water may form and stay suspended in the air. This is fog. Fog is sometimes called low cloud. Warm sea breezes often produce fog when they move over colder land surfaces. Fog is often thickest in valleys and low-lying areas.

#### Fact File

Jack Frost is a fictional elf-like character, part of a Scandinavian legend. According to Norse mythology, the son of the god of the winds was Jokul (meaning icicle) or Frosti (frost). It is Jack Frost who is supposedly responsible for the patterns formed by frost.

#### Resources and actions

Teachers will need to ensure that there are no jagged edges on the can.

Print off the student's worksheet and photocopy one for each student:  
[http://www.bom.gov.au/lam/Students\\_Teachers/Worksheet13.shtml](http://www.bom.gov.au/lam/Students_Teachers/Worksheet13.shtml).

Ask the students to carry out the activity from the worksheet then go over their results at the end of the class.

#### Initial questions and solutions

1. What do you notice about your breath on cold mornings?  
On cold mornings when you breathe outside, your breath comes out as a fog like substance.
2. On some mornings grass and leaves may be very damp even though it hasn't rained during the night. Where does this water come from?  
It comes from the air. As the air cools, water in the air condenses as dew.

3. What do you see on the outside of a bottle, jar or can when you take it out of the fridge?

Small droplets of moisture are present on the outside of a bottle, can or jar when taken out of the fridge.

### Questions and solutions

1. Why does water condense to form droplets of dew on the can?

The ice cools the can and the air in contact with it. As the air cools, water from the air condenses as dew.

2. What does salt do to the temperature of ice in the can?

Adding salt to ice cools the temperature to below freezing point (0°C). Now, rather than dew forming, crystals of ice, known as frost, form.

3. What did you observe on the outside of the very cold can?

Frost.

4. Why do you think that frost forms on the outside of the can when salt is added to the ice?

Frost forms because the salt cools the temperature to below freezing point (0°C) which causes the dew to turn into frost.

### Extension activities

Examine frost under a microscope. Describe what you observe.

Students should be able to see the crystal structure of the frost.

Frost can cause great damage to crops. Find out how frost harms plants and where it generally occurs. How do farmers try to combat frost?

Frost damages plants by freezing the water that is present in the plants cells. When this occurs the cell will expand and then burst causing damage to the plant. In Australia frost occurs mainly from late autumn to early spring in the wake of cold fronts associated with low pressure systems over the Southern Ocean. Frost generally occurs in valleys because of the drainage of cold dense air during the night. Farmers try to combat frost by using special burners to heat their crops, large fans are used to mix the air and fine water sprays are also used to keep the temperature above the damaging level.

### Time

60 minutes

### Assessment

Q1, 2, 3 & 4