



# Cryogenic Roses

## Grade Levels: 4-9

### Background

When living things die, they slowly break down or decay over time. This is a chemical reaction where chemical energy is transferred. Adding heat or removing heat can cause a chemical reaction to speed up, or slow down. Heating or cooling a material can also change how quickly its energy is released or absorbed.

### Question

Can ice be used to preserve once-living things?

### Vocabulary

▪ cryogenic: a material at a very low temperature

### Possible Hypothesis

Ice can/cannot preserve once-living things.

### Materials

- 5 Rose buds just beginning to open
- 4 Plastic bowls
- Water

### Procedure

1. Fill four plastic bowls with equal amounts of water.
2. Observe the five rose buds and record any differences in the fragrance, texture, appearance, or color.
3. Submerge one rose bud in each bowl of water and put the bowls in the freezer, keeping one rose bud at room temperature for a control. Observe the control daily and record your observations.
4. After one week, allow one rose bud to thaw and observe, comparing it to the control and to the observations made before freezing. Place the thawed rose bud with the control.
5. Repeat this procedure the next week with another frozen rose. Do this weekly until all roses have been thawed and observed.

### \*\* Analysis and Conclusion

Did ice preserve the roses well? Did the length of freezing have an effect? What happened to the roses once they were thawed? How did the freezing affect the decaying process?

### Real World Connection

What practical applications could this technique be used for?

