

# 7<sup>th</sup> grade Science

Use the information about melting icebergs and your knowledge of science to answer the questions.

## Melting Icebergs

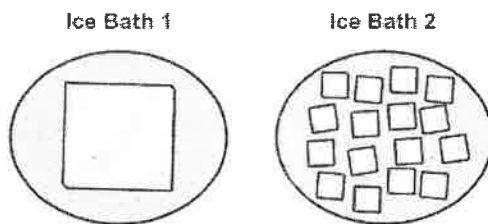
### Melting Icebergs

Icebergs often form when large pieces of ice from land-based ice sheets and glaciers break off into the surrounding ocean water. These icebergs can have many shapes and sizes, ranging from only sixteen feet across to as wide as a small country. The number of icebergs in an ocean at any one time also varies. Scientists studying icebergs have observed that smaller icebergs melt at different rates than larger icebergs.

A group of students designed a classroom investigation to study the melting process for ice pieces of different sizes. They will use their results to build a model explaining why icebergs with different sizes melt at different rates.

For the experiment, the students started with an ice block that had the same total mass of ice as several ice cubes. The students placed the ice block and ice cubes in separate containers with water. The water in both containers started at the same temperature. They then measured the amount of time needed for the large block of ice and several smaller ice cubes to melt. The experiment setup for the ice baths is shown in Figure 1. The data in the table show the starting conditions of the experiment just as the ice was added to the water.

Figure 1. Overhead View of Ice Bath Setup



	Ice Bath 1	Ice Bath 2
<b>Total Mass of Ice (g)</b>	3,245	3,245
<b>Water Temperature (°C)</b>	23	23
<b>Total Surface Area of Ice (cm<sup>2</sup>)</b>	1,623	3,716

**Q1:** Drag the particles into the boxes to show how temperature affects the motion of particles in the ice bath experiment model.

Particles may be used more than once.

**DRAG DROP VALUES**



**Q2:** The students observed that the smaller ice cubes in Ice Bath 2 melted faster than the larger ice block in Ice Bath 1.

Based on the ice bath setup in Figure 1, which statement **best** explains why several smaller ice cubes melt faster than a larger block of ice?

- A** Smaller ice cubes have more surface area in contact with the liquid water, so more thermal energy is transferred from the water to the ice.
- B** Smaller ice cubes have more surface area in contact with the liquid water, so more thermal energy is transferred from the ice to the water.
- C** A larger ice block has more surface area in contact with the liquid water, so less thermal energy is transferred from the ice to the water.
- D** A larger ice block has more surface area in contact with the liquid water, so less thermal energy is transferred from the water to the ice.

**Q3:** Select the correct answer from **each** drop-down menu to complete the paragraph about experimental variables in the ice bath experiment.

During the ice bath experiment, the  was the independent variable and the  was the dependent variable. The  was held constant for both experiments.

a. \_\_\_\_\_

**Q4:** The students want to collect data on how the average kinetic energy of the liquid water molecules in the ice baths changes during the experiment.

Which statement **best** describes a change to the ice bath experiment that will help the students collect this data?

- A** Measure the water height in each ice bath throughout the experiment and compare the initial and final water heights.
- B** Measure the water volume in each ice bath throughout the experiment and compare the initial and final water volumes.
- C** Measure the size of each piece of ice in each ice bath throughout the experiment and compare the initial and final sizes of each piece of ice.
- D** Measure the water temperature in each ice bath throughout the experiment and compare the initial and final water temperatures.

Use the information about spider plants and your knowledge of science to answer the questions.

## Spider Plants

### Spider Plants

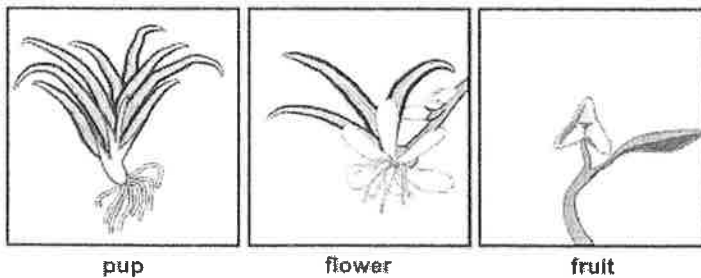
The species of the plant *Chlorophytum comosum* is most commonly known as the spider plant. This plant can be easily grown and is very often grown by home gardeners. Spider plants are native to South Africa, but have adapted to several different climates and soil types. The variety with white-edged green leaves shown in Figure 1 is the spider plant most often chosen as a houseplant.

Figure 1. Spider Plant



Spider plants have small clusters of leaves called "pups" that are the result of asexual reproduction. Pups will take root if they reach soil, and they can be snipped off and planted in a flowerpot. Spider plants can also reproduce sexually. The small, white flowers can be pollinated by insects. After the flowers fall off, small fruit containing seeds appear. The parts of a spider plant are shown in Figure 2.

Figure 2. Spider Plant Parts



A botanist working for a large plant nursery knows that only three varieties of spider plants are commercially available. She would like to develop a new variety with larger flowers that have a color other than white. She would also like to produce a plant with a different pattern of leaf colors.

**Q5:** Drag the descriptions into the correct boxes to complete the model describing the types of spider plant reproduction.

Not all descriptions will be used.

**DRAG DROP VALUES**

Offspring receive genes from two parents and are identical to the parents.

Offspring receive genes from one parents and can have different traits than the parent.

Offspring receive genes from two parents and can have different traits than the parents.

Offspring receive genes from one parent and are identical to that parent.

<b>Asexual Reproduction</b>	<b>Sexual Reproduction</b>

**Q6:** Like some traits in other plants, spider plant traits can change over time through the process of natural selection.

Which trait change would **most likely** affect both the pollination and the probability that future generations of spider plants will survive?

- A** a change in the number of pups per plant
  - B** a change in the color of the leaves
  - C** a change in the shape of the flowers
  - D** a change in the size of the seeds
- 

**Q7: Part A**

Different types of trait selection can take different amounts of time for trait changes to occur.

Which change would cause the traits of a spider plant to change the **fastest**?

- A** spider plants adapting to different climates in South Africa
- B** a gardener planting a spider plant in a new garden
- C** spider plants adapting to light intensity in different locations
- D** a botanist developing a new type of spider plant

**Part B**

Which statement **best** explains how the answer from Part A results in a faster change in the traits of a spider plant?

- A** Artificial selection always results in the desired trait changes in the first generation.
  - B** Artificial selection helps control which traits survive, resulting in trait changes over fewer generations.
  - C** Natural selection always results in the desired trait changes in the first few generations.
  - D** Natural selection favors the survival of specific traits, resulting in trait changes over several generations.
-

**Q8:** The botanist from the nursery is planning to develop a large number of new spider plants with larger flowers.

Identify the type of reproduction the botanist should use to develop the new spider plants and explain why this type of reproduction is preferable.

### Graded Rubric

Criteria	Rating		
Criteria Name 1	Rating 1	Rating 2	Rating 3
	Student's response correctly identifies the type of reproduction the botanist should use and explains why this type of reproduction is preferable.	Student's response correctly identifies the type of reproduction the botanist should use OR explains why this type of reproduction is preferable.	Student's response does <b>not</b> correctly identify the type of reproduction or explain why this type of reproduction is preferable. <b>OR</b> Student's response is blank, irrelevant, or too brief to evaluate.