UNIT REVIEW

Using Key Terms

1 Create a short story or magazine article about fluids that uses the following terms:

viscosity
density
buoyancy
gravity
Particle Theory of Matter
hydrometer
compressibility
hydraulic systems
pneumatic systems

Reviewing the Big Ideas

2 Describe one factor that can affect the viscosity of a liquid.

3 Some people think that viscosity and density are related. Give one example that suggests that they are related, and one example that suggests that they are not.

4 Compare and contrast the following pairs of terms:
a) mass and weight
b) mass and density

5 Why is water considered to be a special fluid?

6 Consider the development of snowshoes by First Nations peoples.
a) What need within First Nations culture did the development of snowshoes address?
b) How did First Nations peoples develop the design of snowshoes?
c) How might we explain the operation of snowshoes using scientific ideas?

7 Why is it easier to float on salt water than on fresh water?

8 Compare air and water. What is the difference in the ability of these two substances to be compressed?

9 Describe a situation that uses a hydraulic system and another situation that uses a pneumatic system.

10 Give two examples of industries for which an understanding of fluid dynamics is required.

Connecting the Big Ideas

11 Use the Particle Theory to explain your observations of fluids, including viscosity, density, effects of temperature, pressure, and compressibility.

12 Why do you think the densities of ice, water, and steam are different?

13 Can there be buoyancy without gravity? Explain.

14 Archimedes had many ideas regarding displacement, volume, and buoyancy. Restate his discoveries in your own words.

15 You have samples of the same liquid. One is at 50°C and one is at 30°C. What will happen if you pour the same amount of each liquid onto a ramp? Which flow rate will be faster? Explain your answer. If you were to add the same amount of the liquid at 70°C to the ramp, what would happen?

Using the Big Ideas

16 Use ideas about displacement to explain why a river ferry made out of steel can float.

17 If you had to make a device to lift a large mass, would you use a hydraulic fluid or a pneumatic fluid? Explain your answer.

18 Compare and contrast pneumatic and hydraulic systems. Use a table similar to the one below.

	Pneumatic Devices	Hydraulic Devices
characteristics that are different		
characteristics that are the same		

19 A report in British Columbia described a situation in which a fishing boat loaded with fish sank when it entered the Fraser River. Why do you think this happened?

20 The Canadarm and Canadarm2 on the space shuttles and International Space Station use gears to move large objects. Why are hydraulic and pneumatic systems not used?

21 For each of the substances listed below, describe whether the viscosity is likely to be low, average, or high. Give an explanation for each of your choices.
a) oil
b) salad dressing
c) cough syrup
d) carbonated drink
e) ketchup

22 List three criteria that traditional boat builders had to meet when designing a boat. Explain how traditional craft meet each of these criteria.

23 Referring to the Big Ideas in this unit, describe how you would make and calibrate a hydrometer.

24 You are given three liquids. Explain what types of tests you could do to determine the properties of each liquid.

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25 A student dropped copper pennies one at a time into a known volume of water and measured the volume displaced. Her results are in the table below.

Mass (g)	Volume Displaced (mL)
17	2
35	4
52	6
70	8
88	10

a) What is the mass-to-volume ratio for the pennies?
b) What is the density of a copper penny?
c) Graph this data with mass on the vertical axis and volume on the horizontal axis. Compare the incline of this line to the lines you graphed in the Investigator: *Calculating Mass/Volume Ratio* on page 200. What does this tell you about the density of copper compared to the other substances you investigated?

26 Create a Venn diagram to compare and contrast two types of kayaks or canoes by analyzing:
a) the purpose of each type of craft
b) the design of each type of craft

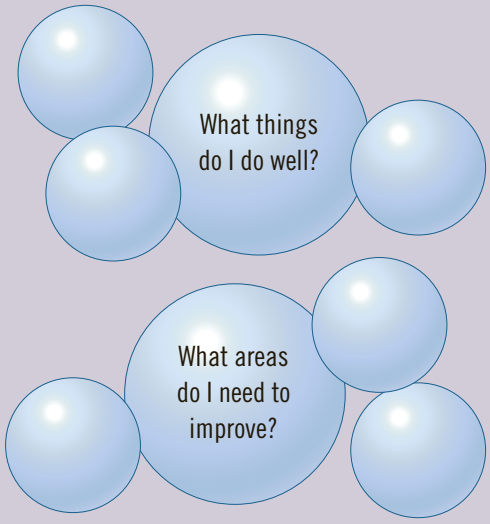
27 Imagine that you have been asked to design a vehicle that could travel through water. What features could you add to your design to take advantage of one or more properties of fluids?

28 A new drink that some people enjoy contains tapioca beads suspended in tea. Describe how you could design an experiment to determine the density of the tapioca beads.

29 Imagine a world where water behaved like every other liquid and became more dense as it froze. Write a story about living in Saskatchewan on a cold January day.

Self Assessment

30 Copy the following diagram into your notebook and answer the questions by filling in the appropriate empty bubbles.



31 a) During this unit, what was the hardest problem you had to solve?
b) Describe what you did to figure out or solve your problem.

32 During this unit, what was the most interesting thing you learned?