Important Concepts . . .

Preview Review

Mathematics   Grade 5   TEACHER KEY

W3 - Lesson 1: Volume, Capacity, Mass, and Time

Important Concepts of Grade 5 Mathematics

Materials Required

Protractor
Ruler
Calculator

A textbook is not needed.

This is a stand-alone course.
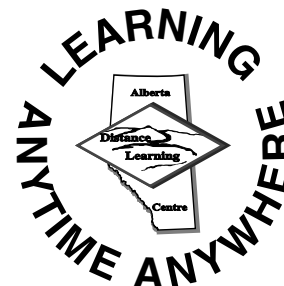
Alberta Distance Learning Centre has an Internet site that you may find useful. The address is as follows: **http://www.adlc.ca**

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Preview/Review Concepts
for
Grade Five Mathematics

TEACHER KEY
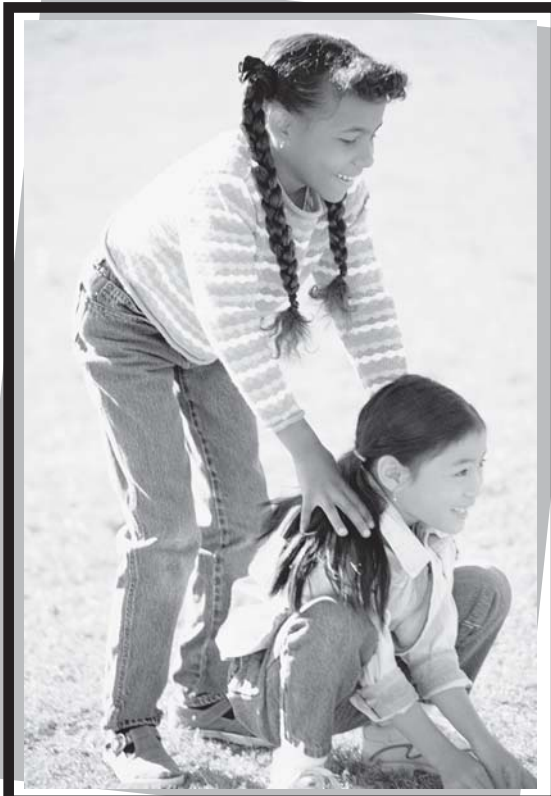
W3 - Lesson 1:
Volume, Capacity,
Mass, and Time

OBJECTIVES

By the end of this lesson, you should

- understand measurement of volume, capacity, and mass

- be familiar with metric (SI) units

- understand measurement of time in 12-hour and 24-hour clocks

Glossary of Terms

Capacity: Capacity is the measurement of how much a container holds. Capacity is measured in litres.

Example: mL (millilitre)

Mass: Mass is a measurement of matter or the measurement of how much an object weighs.

24-Hour Clock: A method of reading time based on the 24 hours in a day. The 24-hour clock has no a.m. or p.m.; rather, 24 hours are used.

Example: 20:00 is 8:00 p.m.
11:30 is 11:30 a.m.

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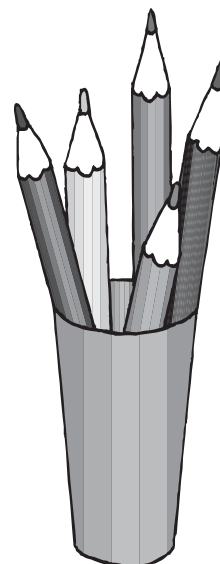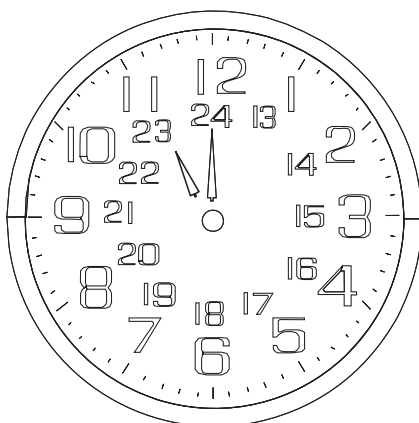
Volume: Volume is the measurement of how much space an object takes up. Volume is measured in units^3.

Example: cm^3

Three dimensions are used to calculate volume.

Example: The volume of this prism is 24 cm^3.

$$4 \times 2 \times 3 = 24 \text{ cm}^3$$

3 cm

2 cm

4 cm
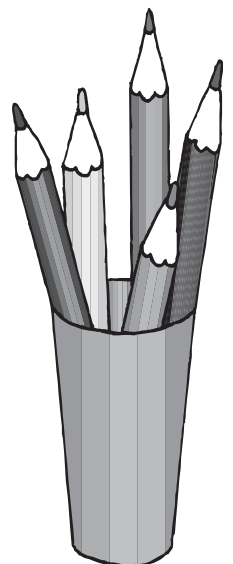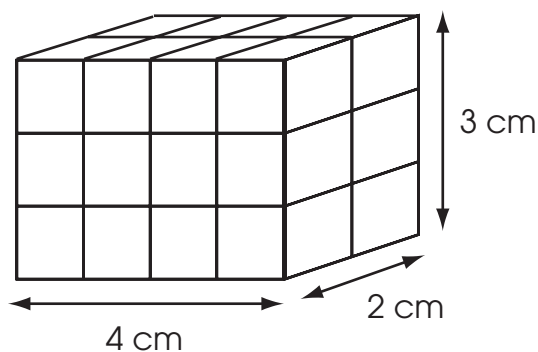
W3 - Lesson 1: Volume, Capacity, Mass, and Time

Concepts

- Estimating Mass: A Trip to the Grocery Store
- Understanding Cooking Measurements
- 24-Hour Clock
- Metric (SI) Units for Time and Date
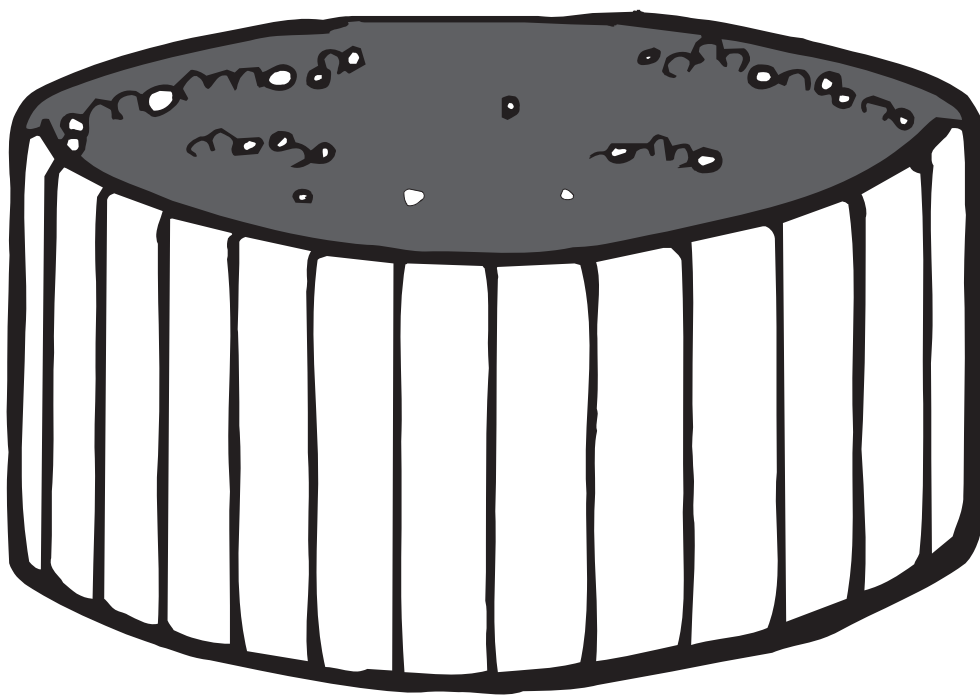
Estimating Mass: A Trip to the Grocery Store

Mass is often thought of as a measurement of matter and the measurement of how much an object weighs.

Grocery stores are great places to estimate mass. Answer the following questions. Please show all your work. Keep in mind that you will be required to use your addition, subtraction, multiplication, and division skills.

1. Honey Nut Cheerios come in 750 g packages. You are trying to save on packaging for the environment, so you buy 4.5 kg from the bulk section. How many boxes worth of Honey Nut Cheerios did you buy?

> *Step 1:   4.5 kg = 4 500 g*
>
> $$\begin{array}{r} 6 \\ 750g\overline{)4500\ g} \end{array}$$
>
> *Step 2:*
>
> *Step 3: I bought the equivalent of six 750 g packages.*

2. Turkey costs $1.29 for each 100 g and beef costs $1.49 for each 100 g at the grocer's deli.

    a. Estimate the total cost of 200 g of beef and 300 g of turkey.

Beef $3.00/200 g	*Answers may vary*
Turkey $3.90/300 g	

    b. Find the exact cost 200 g of beef and 300 g of turkey.

> *Beef $2.98/200 g*
>
> *Turkey $3.87/300 g*

c. Estimate the cost of 0.5 kg of turkey.

If 100 g = $1.29, then 500 g or 0.5 kg is approx. $6.50

Answers may vary

d. Find the exact cost of 0.5 kg of turkey.

$$\frac{\$1.29}{100 \text{ g}} = \frac{n}{500 \text{ g}} \quad \text{ or } 5 \times \$1.29 = \$6.45$$

$$n = \frac{\$1.29 \times 500 \text{ g}}{100 \text{ g}} = \$6.45 \qquad \text{5 kg of turkey will cost \$6.45.}$$

e. There are 8 slices of beef in 150 g. How many slices are in 225 g?

$$\frac{8}{150 \text{ g}} = \frac{n}{225 \text{ g}}$$

$$n = \frac{8 \times 225 \text{ g}}{150 \text{ g}}$$

$$n = 12 \text{ slices} \qquad \text{There are 12 slices of beef in 225 g}$$

3. The produce manager received a shipment for grapes. He received 3.75 kg of grapes that he divided into 250 g packages. How many packages was the produce manager able to make?

n = 3.75 kg ÷ 250 g
n = 3750 g ÷ 250 g
n = 15 packages

The produce manager was able to make 15 packages of grapes.

Understanding Cooking Measurements

Volume is the measurement of how much space an object takes. Volume is measured in cubic units.

Example: cm³

Capacity is the measurement of how much a container holds. Capacity is measured in litres.
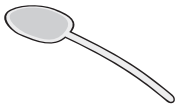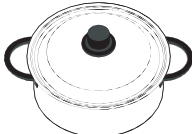
Example: mL
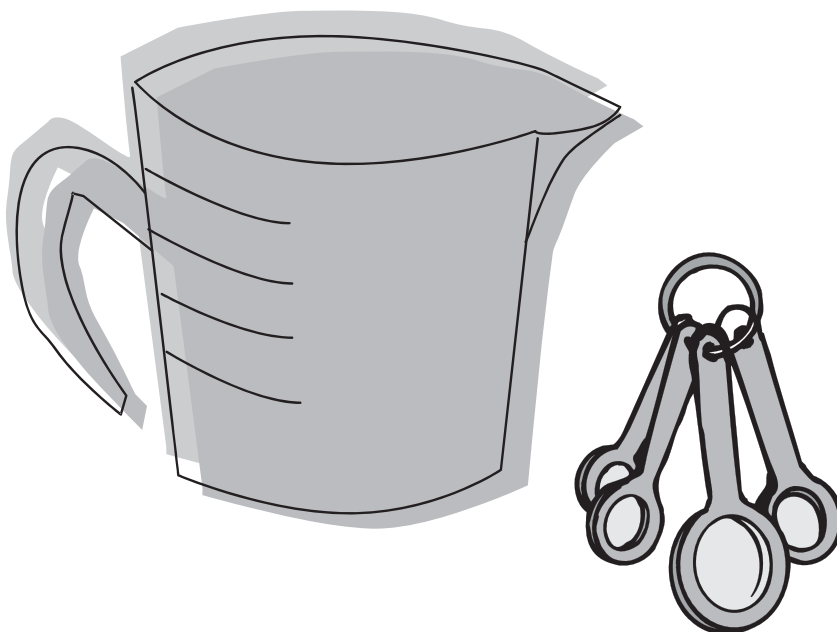
Volume and capacity can be confusing. The best way to think of them is the *container* compared to the *product*. Volume is the *milk* and capacity is the *milk container*.

Capacity and volume are closely related.

Capacity	Volume
1 mL	1 cm³

Metric Unit for Volume	Metric Unit for Capacity
mm, cm, dm, m, dam, hm, km	mL, cL, dL, L, daL, L, kL
millimetre	millilitre
centimetre	centilitre
decimetre	decilitre
metre	litre
decametre	decalitre
hecometre	hectolitre
kilometre	kilolitre

Using your knowledge that 1 mL of capacity is equal to 1 cm³ of volume, convert the following.

15 mL= **15** cm³	2 L= **2 000** cm³	250 mL= **250** cm³	4.5 cL **450** cm³
30 dL=**3 000** cm³	2 dL= **200** cm³	4 L= **4 000** cm³	50 cL= **500** cm³

24-Hour Clock

24-hour clock is a method of reading time based on the 24 hours in a day. The 24-hour clock has no a.m. or p.m.; rather, 24 hours are used.

Example: 20:00 is 8:00 p.m.

A day has 24 hours, so a clock that shows 24-hour instead of 12-hour is more specific.

Twenty-four hour time is used in airports, bus depots, hospitals, and the army. Why do you think these places chose 24-hour time over 12-hour time?

Midnight is the "start" of each day.

- In 12-hour time, we write midnight as 12:00 a.m.

- In 24-hour time, we start the day at 00:00. (Note, each 24-hour time has 4 places. Early morning time still uses a leading zero.)

Example: 9:00 a.m. is 09:00.

- When reading or saying 24-hour time, we say hours or hundred hours instead of a.m. or p.m. Therefore, 08:00 is *eight-hundred hours*, and 14:35 is *fourteen thirty-five hours*.

Complete the following table.

12h Time	24h Time
1:00 A.M.	*01:00*
3:00 A.M.	*03:00*
6:00 A.M.	06:00
9:00 A.M.	*09:00*
12:00 P.M.	12:00
3:00 P.M.	15:00
6:00 P.M.	*18:00*
10:00 P.M.	*22:00*

A 24-hour clock has numbers from 1 to 24. How would you make this clock into a 24-hour clock? Show your work.
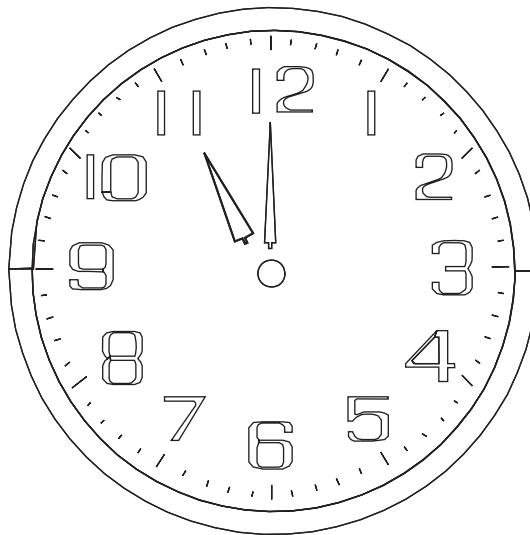
John said that when he uses 24h time in the afternoon, he just subtracts 12 to get 12-hour time. Is he correct? __*Yes*_____

Metric (SI) Units for Time and Date

Have you ever seen a date written as 2005 07 03? Does it mean March 7th, 2005, or July 3rd, 2005? To prevent confusion, the SI (metric) notation for dates and times was invented.

Dates are to be listed in the following order: year – month – day (with a hyphen separating them)

Times are to be listed as hour: minute: second with a colon separating them.

Complete the following chart.

SI Notation		Description of the Date and Time
2003-05-07	20:02	*8:02 p.m. on May 7, 2005*
2003-05-10	*19:23*	7:23 p.m. on May 10, 2003
1974-03-06	08:14	*8:14 a.m. on March 6, 1974*
1991-09-12	*22:12*	10:12 p.m. September 12, 1991
1994-12-28	*05:38*	5:38 a.m. December 28, 1994
1996-05-26	17:12	*5:12 p.m. on May 26, 1996*
2000-06-06	04:03	*4:03 a.m. on June 6, 2000*
1997-08-03	*07:00*	7:00 a.m. August 3, 1997
1995-03-07	18:36	*6:36 p.m. on March 7, 1995*
1993-07-12	*15:27*	3:27 p.m. July 12, 1993

3-Step Problem-Solving Process

1. Write the problem in a number question.

2. Solve the problem. **Show your work.**

3. Write a sentence with the answer.

STEP 1
STEP 2
STEP 3

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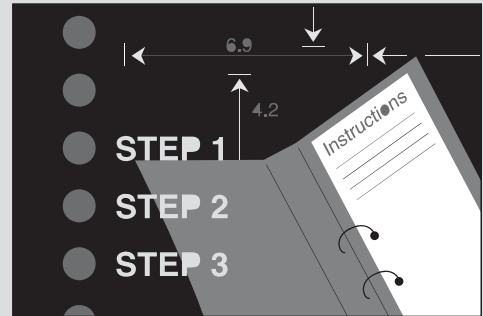
1. Two clocks were set at 13:00. One of the clocks ran fast, gaining 10 minutes every hour. The other clock ran slow, losing 5 minutes every hour. What will the actual time be when the fast clock reads 2 hours ahead of the slow clock?

   At 21:00 the fast clock will be 2 hours ahead of the slow clock. (Every hour the difference would be 15 minutes, so it would take 8 hours to have a difference of 2 hours)

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2. Harley looked at the calendar and saw that the date was 2005–07–23. He said that he will be ten years old in 3 months and 12 days.

   a. Use SI notation to write the date of Harley's tenth birthday.
      2005 - 11 - 04

   b. Use SI notation to write the date when Harley was born.
      1995 - 11 - 04   (take 10 away from the years)

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3. Mark bought a 1kg pail of Chocolate Chip Cookie Ice Cream. If Mark eats all the ice cream in 8 servings, eating the same amount every time, how many grams will Mark eat per serving?

   125 g servings will be eaten every time Mark had a serving!