

Write your
questions here!



4.2 – Conversions & Dimensional Analysis

Name: _____

Unit	2 examples of length for each unit
Millimeter	<i>Its about the size of a...</i> • . • .
Centimeter	<i>Its about the size of a...</i> • . • .
Meter	<i>Its about the size of a...</i> • . • .
Kilometer	<i>Its about the size of a...</i> • . • .

Unit Conversions

English Conversions you must know

- 1 foot = _____ inches
- 1 yard = _____ feet
- 1 mile = _____ feet
- 1 hour = _____ minutes
- 1 minute = _____ seconds

Metric Units you must know

- 1 cm = _____ mm
- 1 mm = _____ cm
- 1 km = _____ m

Converting between English to Metric

- 1 inch = _____ cm
- 1 mile = 1.60934 km

Dimensional Analysis

is the process used to
_____ a value from one
unit/set of units to another.

- What are the starting units?
- What are the units we wish to obtain?
- What are the conversion factors we can use to get from the starting units to the desired units?

Write your
questions here!

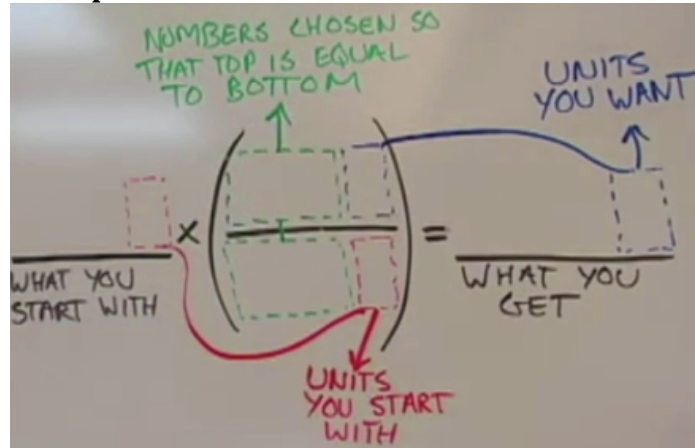


_____ are fractions where the numerator and denominator are given quantity expressed in different units.

Can also use the reciprocal.

$$1000 \text{ mL} = 1 \text{ L} \quad \frac{1 \text{ L}}{1000 \text{ mL}} = \frac{1000 \text{ mL}}{1 \text{ L}}$$

Example 1: Pretend I have 7.3m and I want it in cm!!



$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Example 2: **Speed:** Chris Johnson runs 40 yards in 4.24 seconds. If he continues at this speed, what would his rate be in miles per hour?

Example 3: One gallon milk is equal to how many milliliters of milk?

Example 4: If a space shuttle can travel at 17,000 miles per hour, how many meters per second does it travel?

Now,
summarize
your notes
here!



4.2 Problem Set

Write the correct abbreviation for each metric unit.

1) Kilogram _____

4) Milliliter _____

7) Kilometer _____

2) Meter _____

5) Millimeter _____

8) Centimeter _____

3) Gram _____

6) Liter _____

9) Milligram _____

MATCHING: Match the example length with the approximate metric unit of measure.

10. Meter _____

11. Centimeter _____

12. Kilometer _____

13. Millimeter _____

- A. Length of a guitar
- B. 12 city blocks
- C. A grain of sand
- D. Length of someone's nail
- E. Thickness of a dime
- F. Length of a staple
- G. 10 soccer fields in a row
- H. Diameter of a school bus

Equivalent Units: Fill in the blanks.

14. 1000 mm = _____ m

15. 1L = _____ mL

16. 10 mm = _____ cm

17. 1 yd = _____ ft

18. 1000 mm = _____ m

19. 1L = _____ mL

20. 1 mile = _____ ft

21. 1 ft = _____ in

22. 1 min = _____ sec

23. 60 min = _____ hr




METRIC UNIT CONVERSIONS: Perform dimensional analysis.

24. 1500 milliliters is how many liters?	25. 14 kilometers is how many meters?
26. 109 grams is how many kilograms?	27. 6.3 centimeters is how many millimeters?

METRIC UNIT CONVERSIONS: Perform dimensional analysis.

28. 5 liters is how many milliliters?	29. 50 centimeters is how many meters?
30. 8 millimeters is how many centimeters?	31. 120 milligrams is how many grams?

Compare using <, >, or =.

32. 56 cm  6 m	33. 7 g  698 mg	34. 1,500 mL  1.5 L
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UNIT CONVERSIONS: Perform multi-step dimensional analysis.

35. How many seconds are in 2.5 hours?	36. 3 yards is equal to how many inches?
37. Two days is equivalent to how many seconds?	38. 8 feet is equivalent to how many centimeters. (1 inch = 2.54 centimeters)
39. 0.237 meters is equal to how millimeters?	40. 84 inches is equal to how many yards?

41. STUDY ABROAD PROGRAM IN SPAIN: My friend Kristin went to Spain for 6 months to teach English. While there she joined a local soccer team. When Thanksgiving rolled around she wanted to do something special for her new friends, so he decided she would cook everyone a Thanksgiving Day Dinner. No one on the team was from America, so none had ever celebrated this holiday before or had even tried Turkey before. In Spain, they don't commonly sell turkeys and if you wanted to get one, you would have to get them specially ordered in advance from the local butcher.



Kristen had private English lessons that she taught after school and can't get to the butcher shop. Therefore, her friend Ronan (Who doesn't speak Spanish) goes for her instead. At the butcher shop, Ronan dials Kristen's number and hands the phone to the butcher. Kristen answers and the butcher asks how many turkeys Kristen needs to feed everyone.

Kristen thinks to herself in her head "I invited 20 people from her soccer team to dinner. Each person will eat 1 lb of turkey, but the butcher wants to know how much turkey in kilograms not pounds."

A) How many pounds of Turkey would she need to order?

Knowing that she needs _____ pounds of turkey, Kristen quickly looks at the following conversion on her phone (pictured to the right). From seeing this image she rounds 0.454 to 0.5 and doubles the conversion to not have to deal with decimals. From this she infers that 1lb = 2 kg, and does the following mental math:

$$\text{Kristin's Calculaton: } 20\text{lb} \cdot \frac{2\text{kg}}{1\text{lb}} = 40\text{kg}$$

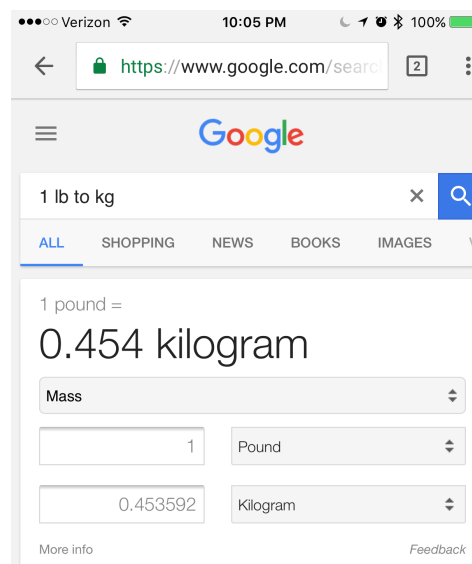
B) What was her mistake?

C) How many kilograms should she have ordered if she had done her calculation correctly?

D) How much did Kristen over order? Answer in both kilograms and pounds.

E) When Kristin walked from her apartment to the butcher shop to pick up her Turkeys, the butcher placed 10 un-plucked (i.e. fully feathered) turkeys on the counter. On average how many kilograms was each turkey?

F) Ask Mrs. Urquhart to tell you the conclusion of the story (or watch the conclusion video).



RATE CONVERSIONS: Perform dimensional analysis.

- 42.** The average teenager spends \$1742 per year on fashion related items.
How much is this per week?



- 43.** Mrs. Urquhart went to Puerto Rico for her Honeymoon and saw the following speed limit sign. (1 km = 1000m)

In Puerto Rico people measure speed in kilometer per hour, whereas in the US we use mile per hour. What would the speed limit be of the sign below in miles per hour?



- Convert 3 kilometers into feet by filling
44. in the blanks below and solving.

$$\frac{3 \text{ km}}{\text{km}} \cdot \frac{\text{mi}}{\text{km}} \cdot \frac{\text{ft}}{\text{mi}}$$

- 45.** Convert 2.3 miles into centimeters by filling
in the blanks below and solving.

$$\frac{2.3 \text{ miles}}{\text{miles}} \cdot \frac{\text{ft}}{\text{miles}} \cdot \frac{\text{in}}{\text{ft}} \cdot \frac{\text{cm}}{\text{in}}$$

- 46.** A quarter of a mile per hour is
equivalent to how many feet per second?

- 47.** A seagull can fly at a speed of 22 miles per
hour. About how many feet per
second can the seagull fly?



- 48.** What is 8,800 fps (feet per second) in mph (miles per hour)?

4.2 APPLICATIONS

1. INTERACTIVE ASSIGNMENT QUESTION:

A)

Low Guess	Official Guess	High Guess



B) What information will you need to know to solve the problem?

C) Solve and check your answer with your teacher.

D) Sequel 1 – Look up what kind of food contains 50 sugar packets?

E) Sequel 2 – Jake used to have 3 cans of Mountain Dew every single day, how many sugar packets would he consume by drinking Mountain Dew at this rate for an entire year?

To better visualize how much sugar this actual is, find out how many 5 pound bags of sugar would he consume by drinking Mountain Dew for an entire year?

2. INTERACTIVE ASSIGNMENT QUESTION:

A)

Low Guess	Official Guess	High Guess

B)

Low Guess	Official Guess	High Guess



C) What information will you need to know to solve the problem?

D) Solve and check your answer with your teacher.

E) If you want to eat a *lot* of bear, what's the cheapest way to get your fix? Use the prices below.

<p>3. 12080 gallons per month into liters per hour.</p>	<p>1 year = 12 months 1 year = 365 days 1 gal = 3.785 L</p>
<p>4. Suzie is 11 weeks pregnant. Her husband asked her, “How many months pregnant are you?” What is the correct answer to his question?</p>	<p>1 year = 12 months 1 year = 52 weeks</p>
<p>5. A woman is measuring the distance around the walls of her living room so that she can order a wallpaper border. The only available measuring device is a meter stick with which she determines the distance to be 14.63 meters. How many feet of wallpaper border must she order?</p>	<p>1 inch = 2.54 cm</p>
<p>6. A newborn infant weighs 112 oz but hospital regulations require the weight to be recorded in kilograms. What is the baby's weight in kilograms?</p>	<p>1 lb = 16 oz 1 kg = 2.2 lb</p>

7. An American man is weighed at a physician's office in France (not knowing the scale is a kg scale). He is surprised when his weight is 100 (kg). What is his weight in pounds?

8. The same man is surprised at his height of 1.84 (m). What is his height in feet?

9. A standard aspirin tablet contains 324 mg of aspirin. What is the ounce weight of aspirin in the tablet?

10. A bottle of lemon juice contains 32 fl oz what is the volume in ml?

11. How many ounces are there in 6 pounds?

12. 4 tons is how many ounces?

13. **What is the kg weight of a 125 lb person?**

14. **How many fl oz are there in a 2 liter soda bottle?**

15. **What is the length (in meters) of car which is 15.87 ft long?**

16. **What is the weight (in lb) of a 65 kg person?**

17. **How many liters are there in a 160 fl oz container?**

18. **What is the length (in feet) of a building which is 60 m long?**

19. **What is the weight (in grams) of 2 lb of hamburger?**

20. **A 20,000 ml bucket contains how many gallons?**

21. **What is the height (in meters) of a tree which is 52 feet tall?**

22. **What is the weight of 1250 grams of fertilizer in lbs?**

23. **How many pints are there in 24.5 liters of water?**

24. **What is the height (in inches) of a tree which is 2.3 meters tall?**

25. **What is the weight (in lbs) of 2.5 kg dog?**

26. **INTERACTIVE ASSIGNMENT QUESTION:**

Low Guess	Official Guess	High Guess



B) What information will you need to know to solve the problem?

C) Solve and check your answer with your teacher.

Cooking Conversions

27. Fill in the blanks

1 pint	=	___ cups
1 gallon	=	___ quarts
1 quart	=	___ cups
1 cup	=	___ tablespoons
1 tablespoon	=	___ teaspoons
1 cup	=	___ oz.
1/2 pint	=	___ oz.
1 pint	=	___ oz.
1 quart	=	___ oz.
1 gallon	=	___ oz.

28. 1 tablespoon is equivalent to _ teaspoons and 1 fluid ounce is equivalent to _ tablespoons.

- a. 3, 4
- b. 4, 1
- c. 3, 2
- d. 2, 3

29. Fill in the chart

Original Recipe	Triple Recipe	Volume Conversion
2 tsp of olive oil		
4 tbs of vinegar		
8 pinches of salt		

Original Recipe	Half Recipe	Volume Conversion
1 pint		
1 fluid ounce		
1 quart		

Original Recipe	Double Recipe	Volume Conversion
2 tbs		
4 tbs		
1 pint		

30. Find the unit price of each (per oz). Which is the better deal?



\$7.00/gallon

\$2.39 for 8

4.23 oz boxes