

Math Conversions

Many people are familiar with the U.S. Customary units of measure that are used, either because they are using them currently or have used them in the past. However, the metric system, while commonly used in many parts of the world, is not always as familiar to people in the United States.

The metric system began as a result of the French National Assembly asking the French Academy of Sciences to try to standardize the system of weights and measures that had become so confused in France. In 1791, work on the new system was begun, and by 1795, all metric units had been set and identified. By 1799, the new units were declared the legal standards for every measurement used in France. It wasn't until 1875 that an international conference met in Paris to set up an International Bureau of Weights and Measures. Meetings are held to reconsider the way the units have been determined, and the system has been refined over the years. However, the metric system, based on units of 10, has been officially adopted by most of the countries in the world.

There are a few things to keep in mind. When working with the weight equivalencies, one important thing to remember is that the U.S. Customary measurements measure weight, which depends upon the pull of gravity. The metric system measures mass, which is the same regardless of what the pull of gravity is. In other words, the mass would be the same on Earth and on the moon, but the weight would be different. For our purposes, we are using the gravity of Earth to do our conversions.

Temperature conversion can become confusing because of the negative numbers. Another way of converting temperatures is:

$$(\text{Fahrenheit temperature} - 32) \times 5/9 = \text{Celsius temperature}$$

$$(\text{Celsius temperature} \times 9/5) + 32 = \text{Fahrenheit temperature}$$

$$(\text{Fahrenheit temperature} + 459.67) \times 5/9 = \text{Kelvin temperature}$$

$$(\text{Kelvin temperature} \times 9/5) - 459.67 = \text{Fahrenheit temperature}$$

$$\text{Celsius temperature} + 273.15 = \text{Kelvin temperature}$$

$$\text{Kelvin temperature} - 273.15 = \text{Celsius temperature}$$

On the following pages, you will see tables for length, weight, volume (liquid), volume (dry), area, temperature, and speed that compare metric measurements to common U.S. Customary measurements. For ease in use, we have rounded the measurements to two decimal places where possible. When working the problems, the rounding of these measures will cause answers to vary.

Length Charts

	Millimeter	Centimeter	Meter	Kilometer
1 Inch	25.40	2.54	0.03	0.00003
1 Foot	304.80	30.48	0.30	0.0003
1 Yard	914.40	91.44	0.91	0.0009
1 Mile	1,609,344	160,934.40	1,609.34	1.61

	Inch	Foot	Yard	Mile
1 Millimeter	0.04	0.003	0.001	---
1 Centimeter	0.39	0.03	0.01	0.000006
1 Meter	39.37	3.28	1.09	0.0006
1 Kilometer	39,370.08	3,280.84	1,093.61	0.62

Weight Charts

	Milligrams	Grams	Kilograms	Metric Ton
1 Ounce	28,349.52	28.35	0.03	0.00003
1 Pound	453,592.37	453.59	0.45	0.0005
1 Short Ton (2000 lbs.—US)	907,184,740	907,184.74	907.18	.91
1 Long Ton (2240 lbs.—UK)	1,016,046,908.8	1,016,046.91	1,016.05	1.02

	Ounce	Pound	Short Ton	Long Ton
1 Milligram	0.00004	0.000002	---	---
1 Gram	0.04	0.002	0.000001	---
1 Kilogram	35.27	2.20	0.001	0.001
1 Metric Ton	35,273.96	2,204.62	1.10	0.98

Volume (Liquid) Charts

	Milliliter	Centiliter	Liter	Hectoliter
1 Fluid Ounce	29.57	2.96	.03	.0003
1 Pint	473.18	47.32	.47	.005
1 Quart	946.35	94.64	.95	.01
1 Gallon	3,785.41	378.54	3.79	.04

	Fluid Ounce	Pint	Quart	Gallon
1 Milliliter	.03	.002	.001	.0003
1 Centiliter	.34	.02	.01	.003
1 Liter	33.81	2.11	1.06	.26
1 Hectoliter	3,381.40	211.34	105.67	26.42

Volume (Dry) Charts

	Milliliter	Centiliter	Liter	Kiloliter
1 Pint	550.61	55.061	.55	.00055
1 Quart	1,101.2	110.12	1.10	.0011
1 Gallon	4,404.88	440.49	4.40	.0044
1 Bushel	35,240	3,524	35.24	.04

	Pint	Quart	Gallon	Bushel
1 Milliliter	.0018	.00091	.000227	.0000284
1 Centiliter	.018	.0091	.00227	.00284
1 Liter	1.82	0.9081	.227	.0284
1 Kiloliter	1,816.17	908.08	227.02	28.38

Area Charts

	Square	Square	Square Meters	Hectares
1 Square Inch	645.16 mm ²	6.45 cm ²	0.0006 m ²	---
1 Square Foot	92,903.04 mm ²	929.03 cm ²	0.09 m ²	0.000009 ha
1 Square Yard	836,127.4 mm ²	8,361.27 cm ²	0.84 m ²	0.00008 ha
1 Square Mile	---	---	2,589,988 m ²	259.00 ha

	Square Inches	Square Feet	Square Yard	Square Miles
1 Square Millimeter	0.002 in ²	0.00001 ft ²	0.000001 yd ²	---
1 Square Centimeter	0.16 in ²	0.001 ft ²	0.0001 yd ²	---
1 Square Meter	1,550 in ²	10.76 ft ²	1.20 yd ²	---
1 Hectare	15,500,031 in ²	107,639.1 ft ²	11,959.90 yd ²	0.004 mi ²

Temperature Charts

	Celsius	Kelvin	Fahrenheit
1° Fahrenheit	-17.22°	255.93	N/A
1° Celsius	N/A	274.15	33.80°
1° Kelvin	-272.15°	N/A	-457.87°

Speed Chart

	Kilometer per hour	Mile per hour
1 Mile per hour	1.61	N/A
1 Kilometer per hour	N/A	.62

Activity One (Length):

Find the answers to the following problems if 1 inch (in) = 25.4 millimeters (mm) or 2.54 centimeters (cm). There are 10 millimeters in a centimeter. To convert from millimeters to centimeters, divide the number of millimeters by 10. To convert from centimeters to millimeters, multiply the number of centimeters by 10.

Inches to Millimeters and Centimeters	Inches to Centimeters and Millimeters
3 in. = _____ mm or _____ cm	5 in. = _____ cm or _____ mm
9 in. = _____ mm or _____ cm	7 in. = _____ cm or _____ mm
18 in. = _____ mm or _____ cm	20 in. = _____ cm or _____ mm
25 in. = _____ mm or _____ cm	23 in. = _____ cm or _____ mm
34 in. = _____ mm or _____ cm	36 in. = _____ cm or _____ mm

Activity Two (Length):

Use the equivalencies at the top of each column to complete the problems.

Centimeters to Inches	Meters to Feet	Kilometers to Miles
1 cm = .39 in.	1 m = 3.28 ft.	1 km = .62 mi.
16 cm = _____ in.	16 m = _____ ft.	73 km = _____ mi.
249 cm = _____ in.	23 m = _____ ft.	19 km = _____ mi.
67 cm = _____ in.	35 m = _____ ft.	28 km = _____ mi.
83 cm = _____ in.	52 m = _____ ft.	97 km = _____ mi.
71 cm = _____ in.	30 m = _____ ft.	59 km = _____ mi.

Activity Three (Weight):

Find the answers to the following problems if 1 ounce (oz.) = 28.35 grams (g) or .03 kilograms (kg). There are 1000 grams in a kilogram. To convert from grams to kilograms, divide the number of grams by 1,000. To convert from kilograms to grams, multiply the number of kilograms by 1,000.

Ounces to Grams and Kilograms	Ounces to Kilograms and Grams
6 oz. = _____ g or _____ kg	12 oz. = _____ kg or _____ g
20 oz. = _____ g or _____ kg	48 oz. = _____ kg or _____ g
14 oz. = _____ g or _____ kg	42 oz. = _____ kg or _____ g
56 oz. = _____ g or _____ kg	36 oz. = _____ kg or _____ g
39 oz. = _____ g or _____ kg	25 oz. = _____ kg or _____ g

Activity Four (Weight):

Use the equivalencies at the top of each column to complete the problems.

Grams to Ounces	Kilograms to Pounds	Metric Tons to Long Tons
1 g = .04 oz.	1 kg = 2.20 lbs.	1 metric ton = .98 long ton
18 g = _____ oz.	34 kg = _____ lbs.	65 metric tons = _____ long tons
95 g = _____ oz.	76 kg = _____ lbs.	32 metric tons = _____ long tons
276 g = _____ oz.	48 kg = _____ lbs.	45 metric tons = _____ long tons
409 g = _____ oz.	29 kg = _____ lbs.	21 metric tons = _____ long tons
761 g = _____ oz.	17 kg = _____ lbs.	16 metric tons = _____ long tons

Activity Five (Volume—Liquid):

Find the answers to the following problems if 1 fluid ounce (fl. oz.) = 29.57 milliliters (ml) or 2.96 centiliters (cl). There are 10 milliliters in a centiliter. To convert from milliliters to centiliters, divide the number of milliliters by 10. To convert from centiliters to milliliters, multiply the number of centiliters by 10.

Ounces to Milliliters and Centiliters	Ounces to Centiliters and Milliliters
18 fl. oz. = _____ ml or _____ cl	24 fl. oz. = _____ cl or _____ ml
22 fl. oz. = _____ ml or _____ cl	5 fl. oz. = _____ cl or _____ ml
35 fl. oz. = _____ ml or _____ cl	8 fl. oz. = _____ cl or _____ ml
11 fl. oz. = _____ ml or _____ cl	49 fl. oz. = _____ cl or _____ ml
31 fl. oz. = _____ ml or _____ cl	43 fl. oz. = _____ cl or _____ ml

Activity Six (Volume—Liquid):

Use the equivalencies at the top of each column to complete the problems.

Centiliters to Pints	Hectoliters to Gallons	Gallons to Hectoliters
1 cl = .021 pt.	1 hl = 26.42 gal.	1 gal. = .04 hl
637 cl = _____ pt.	25 hl = _____ gal.	53 gal. = _____ hl
572 cl = _____ pt.	37 hl = _____ gal.	71 gal. = _____ hl
468 cl = _____ pt.	42 hl = _____ gal.	94 gal. = _____ hl
389 cl = _____ pt.	55 hl = _____ gal.	119 gal. = _____ hl
256 cl = _____ pt.	69 hl = _____ gal.	134 gal. = _____ hl

Activity Seven (Volume—Dry):

Find the answers to the following problems if 1 dry pint (pt.) = 550.61 milliliters (ml) or 55.061 centiliters (cl). There are 10 milliliters in a centiliter. To convert from milliliters to centiliters, divide the number of milliliters by 10. To convert from centiliters to milliliters, multiply the number of centiliters by 10. (We are using three decimal places for centiliters in this activity to achieve a more accurate answer. Please also use up to three decimal places in your answers.)

Dry Pints to Milliliters and Centiliters	Dry Pints to Centiliters and Milliliters
6 pt. = _____ ml or _____ cl	12 pt. = _____ cl or _____ ml
10 pt. = _____ ml or _____ cl	17 pt. = _____ cl or _____ ml
16 pt. = _____ ml or _____ cl	4 pt. = _____ cl or _____ ml
30 pt. = _____ ml or _____ cl	35 pt. = _____ cl or _____ ml
24 pt. = _____ ml or _____ cl	40 pt. = _____ cl or _____ ml

Activity Eight (Volume—Dry):

Use the equivalencies at the top of each column to complete the problems.

Centiliters to Dry Pints	Kiloliters to Dry Gallons	Kiloliters to Bushels
1 cl = .018 pt.	1 kl = 227.02 gal.	1 kl = 28.38 bu.
875 cl = _____ pt.	39 kl = _____ gal.	25 kl = _____ bu.
419 cl = _____ pt.	57 kl = _____ gal.	17 kl = _____ bu.
269 cl = _____ pt.	24 kl = _____ gal.	36 kl = _____ bu.
382 cl = _____ pt.	62 kl = _____ gal.	62 kl = _____ bu.
741 cl = _____ pt	74 kl = _____ gal.	122 kl = _____ bu.

Activity Nine (Area):

Find the answers to the following problems if 1 square inch (in.²) = 645.16 square millimeters (mm²) or 6.45 square centimeters (cm²). There are 100 square millimeters in a square centimeter. To convert from square millimeters to square centimeters, divide the number of millimeters by 100. To convert from square centimeters to square millimeters, multiply the number of square centimeters by 100.

Square Inches to Square Millimeters and Square Centimeters	Square Inches to Square Centimeters and Square Millimeters
9 in. ² = _____ mm ² or _____ cm ²	16 in. ² = _____ cm ² or _____ mm ²
15 in. ² = _____ mm ² or _____ cm ²	33 in. ² = _____ cm ² or _____ mm ²
21 in. ² = _____ mm ² or _____ cm ²	56 in. ² = _____ cm ² or _____ mm ²
29 in. ² = _____ mm ² or _____ cm ²	42 in. ² = _____ cm ² or _____ mm ²
35 in. ² = _____ mm ² or _____ cm ²	

Activity Ten (Area):

Use the equivalencies at the top of each column to complete the problems.

Square Centimeters to Square Inches	Hectares to Square Miles	Square Miles to Hectares
1 cm ² = .16 in. ²	1 ha = .004 mi. ²	1 mi. ² = 259 ha
159 cm ² = _____ in. ²	95 ha = _____ mi. ²	70 mi. ² = _____ ha
208 cm ² = _____ in. ²	154 ha = _____ mi. ²	24 mi. ² = _____ ha
375 cm ² = _____ in. ²	222 ha = _____ mi. ²	19 mi. ² = _____ ha
427 cm ² = _____ in. ²	87 ha = _____ mi. ²	3 mi. ² = _____ ha
543 cm ² = _____ in. ²	43 ha = _____ mi. ²	52 mi. ² = _____ ha

Activity Eleven (Temperature):

Use the equations from page 1 to convert the following.

Fahrenheit to Celsius and Kelvin	Celsius to Fahrenheit and Kelvin
15° F = _____ C or _____ K	27° C = _____ F or _____ K
46° F = _____ C or _____ K	39° C = _____ F or _____ K
75° F = _____ C or _____ K	7° C = _____ F or _____ K
24° F = _____ C or _____ K	0° C = _____ F or _____ K
63° F = _____ C or _____ K	

Activity Twelve (Temperature):

Use the equations from page 1 to convert the following.

Kelvin to Fahrenheit	Kelvin to Celsius
107 K = _____ F	110 K = _____ C
65 K = _____ F	76 K = _____ C
25 K = _____ F	66 K = _____ C
32 K = _____ F	31 K = _____ C
51 K = _____ F	81 K = _____ C

Let's Review

Use the charts in the front of the book to answer the questions.

1. If you are building a room onto your house that is 18 feet by 16 feet, what would those measurements be in meters?
2. For the race, you are making lines on the ground that are 15 feet apart to make it easier to see who is in the lead at different points. How many meters apart are the lines?
3. You are looking for a box to send a gift to a friend. The box must measure at least 8 inches, by 6 inches, by 4 inches. What would these measurements be in centimeters?
4. When figuring the distance to travel on your vacation, you find you will have to travel 175 miles. How many kilometers do you have to travel?
5. You have to total the distance traveled for your job for reimbursement. You traveled 30 miles on Monday, 21 miles on Tuesday, 16 miles on Wednesday, and 9 miles on Thursday. How many total kilometers did you travel?

6. If you are buying 3 lbs. of cheese at the deli, how many kilograms of cheese do you need? How many grams?
7. You just pulled a muscle in your arm, and the doctor tells you not to lift anything heavier than 5 lbs. How many kilograms can you lift?
8. You are working with a recipe that calls for 8 ounces of sugar. How many grams of sugar are needed?
9. You are talking to a friend who delivers topsoil. You decide you need to get 6 short tons of topsoil. How many metric tons of topsoil do you need?
10. You are driving a truck and come to an intersection. The road to the left allows no vehicles over 16 tons. The road to the right allows no vehicles over 20 tons. Both roads will get you where you are going, but you take the road on the right because of the weight of your truck. How many more metric tons are allowed on the road to the right? (Use US tons or short tons.)

11. Your mom just brought 5 quarts of orange juice home from the grocery store. How many liters of orange juice did she bring? How many centiliters of orange juice?

12. John's fish tank needed 24 quarts of water to fill it. How many liters of water does he need?

13. You stop to get gas in your car and need 10 gallons. How many hectoliters of gas did you need?

14. You served 16 pitchers of punch at your barbeque last weekend. If each pitcher held 3 pints of punch, how many centiliters of punch did you serve?

15. You are making ice tea for the softball team. You need to make 52 pints of ice tea. How many centiliters of ice tea do you have to make?

16. Blueberries are a fruit with lots of vitamins and minerals. If you bought 3 quarts of blueberries at the store to use for your family to snack on over the next week, how many liters of blueberries does that equal? How many centiliters of blueberries?

17. If you wanted to make gooseberry jam to can, how many liters of gooseberries would you have if you bought 17 quarts?

18. Strawberries are on sale at the local fruit stand. You decide to buy 6 pints. How many milliliters did you buy? How many centiliters?

19. You bought 3 bushels of pears, 4 bushels of peaches, and 2 bushels of apples for canning. How many total kiloliters of fruit did you buy?

20. Your garden produced an enormous amount of tomatoes this year. You decided to take them to the farmer's market and sell them by the bushel. If you sold 23 bushels of tomatoes, how many kiloliters of tomatoes did you sell?

21. You are in charge of renting a large dining hall for a banquet. You have a choice between a dining hall that measures 20 feet in length by 30 feet in width or one that measures 10 meters in length by 7 meters in width. Which dining hall is larger?

22. How many square centimeters of carpeting would you need to make a floor mat that measures 2.5 feet in length by 1.5 feet in width?

23. You need a piece of cardboard that is 27 square inches. What is the measurement you need in square centimeters?

24. You live in an old house that has one room which measures 27 feet in length by 18 feet in width. You go to buy carpeting and find that it is sold by the square meter. Knowing there are 3 feet in a yard, how many square yards does the room contain? How many square meters?

25. You have an odd-shaped piece of property that contains one rectangle measuring 6 yards in length by 12 yards in width, then narrows to another rectangle that measures 4 yards in length by 10 yards in width. How many square yards total does it contain? How many square meters?

26. You are driving from the United States to Canada. At a particular point, the speed limit signs change from 55 miles per hour to 104.65 kilometers per hour. How many miles per hour can you now drive?

27. You return from Canada by a different route and are driving at 112.70 kilometers per hour. The speed limit sign you see as you cross the border and drive toward a small town in the United States says 45 miles per hour. How many miles per hour do you need to slow down?

28. Someone who is used to watching their speed in kilometers per hour is driving in the United States and is stopped for speeding. They are going 136.85 kilometers per hour in a 60 mile per hour zone. How many miles per hour were they driving over the speed limit?

29. You are driving in another country where the speed limit is 72 kilometers per hour. If you want to be especially cautious and keep your speed 5 miles per hour under the speed limit, how many kilometers per hour do you need to drive?

30. How many kilometers per hour would you be driving if you were going 65 miles per hour?

Answer Key:

Activity One:

Inches to Millimeters and Centimeters	Inches to Centimeters and Millimeters
3 in. = 76.2 mm or 7.62 cm	5 in. = 12.7 cm or 127 mm
9 in. = 228.6 mm or 22.86 cm	7 in. = 17.78 cm or 177.8 mm
18 in. = 457.2 mm or 45.72 cm	20 in. = 50.8 cm or 508 mm
25 in. = 635 mm or 63.5 cm	23 in. = 58.42 cm or 584.2 mm
34 in. = 863.6 mm or 86.36 cm	36 in. = 91.44 cm or 914.4 mm

Activity Two:

Centimeters to Inches	Meters to Feet	Kilometers to Miles
1 cm = .39 in.	1 m = 3.28 ft.	1 km = .62 mi.
16 cm = 6.24 in.	16 m = 52.48 ft.	73 km = 45.26 mi.
249 cm = 97.11 in.	23 m = 75.44 ft.	19 km = 11.78 mi.
67 cm = 26.13 in.	35 m = 114.8 ft.	28 km = 17.36 mi.
83 cm = 32.37 in.	52 m = 170.56 ft.	97 km = 60.14 mi.
71 cm = 27.69 in.	30 m = 98.4 ft.	59 km = 36.58 mi.

Activity Three:

Ounces to Grams and Kilograms	Ounces to Kilograms and Grams
6 oz. = 170.1 g or 0.17 kg	12 oz. = 0.36 kg or 360 g
20 oz. = 567 g or 0.57 kg	48 oz. = 1.44 kg or 1,440 g
14 oz. = 396.9 g or .40 kg	42 oz. = 1.26 kg or 1,260 g
56 oz. = 1,587.6 g or 1.59 kg	36 oz. = 1.08 kg or 1,080 g
39 oz. = 1,105.65 g or 1.11 kg	25 oz. = .75 kg or 750 g

Activity Four:

Grams to Ounces	Kilograms to Pounds	Metric Tons to Long Tons
1 g = .04 oz.	1 kg = 2.20 lbs.	1 metric ton = .98 long ton
18 g = .72 oz.	34 kg = 74.8 lbs.	65 metric tons = 63.7 long tons
95 g = 3.8 oz.	76 kg = 167.2 lbs.	32 metric tons = 31.36 long tons
276 g = 11.04 oz.	48 kg = 105.6 lbs.	45 metric tons = 44.1 long tons
409 g = 16.36 oz.	29 kg = 63.8 lbs.	21 metric tons = 20.58 long tons
761 g = 30.44 oz.	17 kg = 37.4 lbs.	16 metric tons = 15.68 long tons

Activity Five:

Ounces to Milliliters and Centiliters	Ounces to Centiliters and Milliliters
18 fl. oz. = 532.26 ml or 53.23 cl	24 fl. oz. = 71.04 cl or 710.4 ml
22 fl. oz. = 650.54 ml or 65.05 cl	5 fl. oz. = 14.8 cl or 148 ml
35 fl. oz. = 1,034.95 ml or 103.5 cl	8 fl. oz. = 23.68 cl or 236.8 ml
11 fl. oz. = 325.27 ml or 32.53 cl	49 fl. oz. = 145.04 cl or 1,450.4 ml
31 fl. oz. = 916.67 ml or 91.67 cl	43 fl. oz. = 127.28 cl or 1,272.8 ml

Activity Six:

Centiliters to Pints	Hectoliters to Gallons	Gallons to Hectoliters
1 cl = .021 pt.	1 hl = 26.42 gal.	1 gal. = .04 hl
637 cl = 13.38 pt.	25 hl = 660.5 gal.	53 gal. = 2.12 hl
572 cl = 12.01 pt.	37 hl = 977.54 gal.	71 gal. = 2.84 hl
468 cl = 9.83 pt.	42 hl = 1,109.64 gal.	94 gal. = 3.76 hl
389 cl = 8.17 pt.	55 hl = 1,453.1 gal.	119 gal. = 4.76 hl
256 cl = 5.38 pt.	69 hl = 1,822.98 gal.	134 gal. = 5.36 hl

Activity Seven:

Dry Pints to Milliliters and Centiliters	Dry Pints to Centiliters and Milliliters
6 pt. = 3,303.66 ml or 330.366 cl	12 pt. = 660.732 cl or 6,607.32 ml
10 pt. = 5,506.1 ml or 550.61 cl	17 pt. = 936.037 cl or 9,360.37 ml
16 pt. = 8,809.76 ml or 880.976 cl	4 pt. = 220.244 cl or 2,202.44 ml
30 pt. = 16,518.3 ml or 1,651.83 cl	35 pt. = 1,927.135 cl or 19,271.35 ml
24 pt. = 13,214.64 ml or 1,321.464 cl	40 pt. = 2,202.44 cl or 22,024.4 ml

Activity Eight:

Centiliters to Dry Pints	Kiloliters to Dry Gallons	Kiloliters to Bushels
1 cl = .018 pt.	1 kl = 227.02 gal.	1 kl = 28.38 bu.
875 cl = 15.75 pt.	39 kl = 8,853.78 gal.	25 kl = 709.5 bu.
419 cl = 7.54 pt.	57 kl = 12,940.14 gal.	17 kl = 482.46 bu.
269 cl = 4.84 pt.	24 kl = 5,448.48 gal.	36 kl = 1,021.68 bu.
382 cl = 6.88 pt.	62 kl = 14,075.24 gal.	62 kl = 1,759.56 bu.
741 cl = 13.34 pt.	74 kl = 16,799.48 gal.	122 kl = 3,462.36 bu.

Activity Nine:

Square Inches to Square Millimeters and Square Centimeters	Square Inches to Square Centimeters and Square Millimeters
9 in. ² = 5,806.44 mm ² or 58.06cm ²	16 in. ² = 103.2 cm ² or 10,320 mm ²
15 in. ² = 9,677.4 mm ² or 96.77 cm ²	33 in. ² = 212.85 cm ² or 21,285 mm ²
21 in. ² = 13,548.36 mm ² or 135.48 cm ²	56 in. ² = 361.2 cm ² or 36,120 mm ²
29 in. ² = 18,709.64mm ² or 187.1 cm ²	42 in. ² = 270.9 cm ² or 27,090 mm ²
35 in. ² = 22,580.6 mm ² or 225.81cm ²	39 in. ² = 251.55 cm ² or 25,155 mm ²

Activity Ten:

Square Centimeters to Square Inches	Hectares to Square Miles	Square Miles to Hectares
$1 \text{ cm}^2 = .16 \text{ in.}^2$	$1 \text{ ha} = .004 \text{ mi.}^2$	$1 \text{ mi.}^2 = 259 \text{ ha}$
$159 \text{ cm}^2 = 24.44 \text{ in.}^2$	$95 \text{ ha} = 0.38 \text{ mi.}^2$	$70 \text{ mi.}^2 = 18,130 \text{ ha}$
$208 \text{ cm}^2 = 33.28 \text{ in.}^2$	$154 \text{ ha} = 0.62 \text{ mi.}^2$	$24 \text{ mi.}^2 = 6,216 \text{ ha}$
$375 \text{ cm}^2 = 60 \text{ in.}^2$	$222 \text{ ha} = 0.89 \text{ mi.}^2$	$19 \text{ mi.}^2 = 4,921 \text{ ha}$
$427 \text{ cm}^2 = 68.32 \text{ in.}^2$	$87 \text{ ha} = 0.35 \text{ mi.}^2$	$3 \text{ mi.}^2 = 777 \text{ ha}$
$543 \text{ cm}^2 = 86.88 \text{ in.}^2$	$43 \text{ ha} = 0.17 \text{ mi.}^2$	$52 \text{ mi.}^2 = 13,468 \text{ ha}$

Activity Eleven:

Fahrenheit to Celsius and Kelvin	Celsius to Fahrenheit and Kelvin
$15^\circ \text{ F} = -9.44^\circ \text{ C}$ or 263.71 K	$27^\circ \text{ C} = 80.6^\circ \text{ F}$ or 300.15 K
$46^\circ \text{ F} = 7.78^\circ \text{ C}$ or 280.93 K	$39^\circ \text{ C} = 102.2^\circ \text{ F}$ or 312.15 K
$75^\circ \text{ F} = 23.89^\circ \text{ C}$ or 297.04 K	$7^\circ \text{ C} = 44.6^\circ \text{ F}$ or 280.15 K
$24^\circ \text{ F} = -4.44^\circ \text{ C}$ or 268.71 K	$0^\circ \text{ C} = 32^\circ \text{ F}$ or 273.15 K
$63^\circ \text{ F} = 17.22^\circ \text{ C}$ or 290.37 K	$17^\circ \text{ C} = 62.6^\circ \text{ F}$ or 290.15 K

Activity Twelve:

Kelvin to Fahrenheit	Kelvin to Celsius
$107 \text{ K} = -267.07^\circ \text{ F}$	$110 \text{ K} = -163.15^\circ \text{ C}$
$65 \text{ K} = -342.67^\circ \text{ F}$	$76 \text{ K} = -197.15^\circ \text{ C}$
$25 \text{ K} = -414.67^\circ \text{ F}$	$66 \text{ K} = -207.15^\circ \text{ C}$
$32 \text{ K} = -402.07^\circ \text{ F}$	$31 \text{ K} = -242.15^\circ \text{ C}$
$51 \text{ K} = -367.87^\circ \text{ F}$	$81 \text{ K} = -192.15^\circ \text{ C}$

Let's Review

1. 5.4 m by 4.8 m
2. 4.5 m
3. 20.32 cm by 15.24 cm by 10.16 cm
4. 281.75 km
5. 122.36 km
6. 1.35 kg or 1,360.77 g
7. 2.25 kg
8. 226.8 g
9. 5.46 metric tons
10. 3.64 metric tons
11. 4.75 l or 473.2 cl
12. 22.8 l
13. .4 hl
14. 2,271.36 cl
15. 2,460.64 cl
16. 3.3 l or 330.36 cl
17. 18.7 l
18. 3,303.66 ml or 330.36 cl
19. .36 kl
20. .92 kl
21. The first dining hall is 54 m^2 . The second dining hall is 70 m^2 . The second dining hall (measuring 10 meters by 7 meters) is the larger of the two.
22. $3,483.86 \text{ cm}^2$
23. 174.15 cm^2
24. 54 yd.^2 or 45.36 m^2
25. 112 yd.^2 or 94.08 m^2
26. 65 mph
27. 25 mph
28. 25 mph (136.85 kph = 85 mph 85mph—60 mph = 25 mph over the speed limit)
29. 64 kph
30. 104.65 or 105 kph

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