

Name_____

Class_____

Date_____

ZOMBIE SURVIVAL

Real life application of dimensional analysis

You are part of a team made up of 4 men and 3 women. You are in a zombie infested wooded area and they are closing in on your camp quickly. Luckily the former truck driver in your team has a salvaged CB radio and was able to communicate with Camp Nirvana just southwest of your current location. The bad thing is it will take about 7 days to get there driving through temperate terrain with rest stops.

1. Before you leave you need to make sure your team has enough water for everyone. Due to the zombie apocalypse everyone left quickly and only have empty soda cans and a large water container. You have to make sure to measure out enough water for the seven day journey. Use the space below to calculate how many cans of water you need to dump into the water storage container.
2. Food is another concern before the trip begins. Everyone has become accustomed to a 1,500 calorie diet due to the current state of zombies. There is hardly any food left at your camp but luckily two men scouted an apple orchard about a mile away. A 189 g apple has 95 calories. Will 35 pounds of apple be enough for one day?

3. In order to drive to the new camp the team can only drive during the day to avoid the zombie's wake period. There are currently 11 safe hours in which to drive. The water rig the team is driving will over heat at 40 miles an hour so they agreed to only drive 35 mph. How many miles will the team be driving?

4. A dictator junk gang has all the gas left in the region. They are requiring 2 kg of scrap metal in exchange for gasoline which they are selling by the liter. Your water rig is American made with a gallon gas tank and it can drive 30 miles per gallon. How many liters of gasoline do you need from the junk gang in order to successfully make it the new destination?

5. Your team decided to give the junk gang aluminum cans to pay for the gasoline. How many empty cans need to be given to the gang to pay for the gasoline for the trip.

6. Camp Nirvana sent a warning message over the CB radio. The Glass Skulls are patrolling the roadways and only allowing free passage with a payment of 100 kg glass. The latest report stated there would be a possible run in every 400 miles. Your team has some solid 30 lb glass blocks to use as bribe “money” How many blocks should you take on your trip to ensure you have enough glass?

Reflection

What problems did you encounter with your team mates while solving your problems?

Did anyone person take over the calculations? Who was it and why do you think that person took over?

Would your team survive a zombie apocalypse?

ZOMBIE SURVIVAL

FACT SHEET

500 mL = 1 soda can

12 oz = 1 soda can

14.9 g = 1 soda can

1 oz = 0.125 cup

1 oz = 28.349 grams

1 lb = 453.6 grams

1 kg = 2.2 lb

1 gal = 3.785 L

1 apple = 95 calories

Water Requirements (daily)	Desert	Rainforest	Temperate
Male	18 cups (4.5 L)	16 cups (3.69 L)	13 cups (3L)
Female	14 cups (3.42 L)	12 cups (2.93 L)	9 cups (2.2 L)

ZOMBIE SURVIVAL TEACHER KEY

Real life application of dimensional analysis

You are part of a team made up of 4 men and 3 women. You are in a zombie infested wooded area and they are closing in on your camp quickly. Luckily the former truck driver in your team has a salvaged CB radio and was able to communicate with Camp Nirvana just southwest of your current location. The bad thing is it will take about 7 days to get there driving through temperate terrain with rest stops.

(I had my students round to the nearest one. I left the raw answer and how I rounded for you to decide what would best fit your class.)

1. Before you leave you need to make sure your team has enough water for everyone. Due to the zombie apocalypse everyone left quickly and only have empty soda cans and a large water container. You have to make sure to measure out enough water for the seven day journey. Use the space below to calculate how many cans of water you need to dump into the water storage container.

Equivalency statements: 89 cups / 1 day , 1 oz / 0.125 cups , 1 can / 12 oz

Given quantity: 7 days

Question : How many cans of water does the team need for 7 days?

7 days	79 cups	1 oz	1 can	553 = 369 = 369 full cans of water
	1 day	0.125 cup	12 oz	1.5

2. Food is another concern before the trip begins. Everyone has become accustomed to a 1,500 calorie diet due to the current state of zombies. There is hardly any food left at your camp but luckily two men scouted an apple orchard about a mile away. A 189 g apple has 95 calories. Will 35 pounds of apple be enough for one day?

Equivalency statements: 1500 cal / 1 person , 189 g/ 95 cal , 1 lb/ 453.6 g

Given quantity: 7 people

Question : How many pounds of apples do 5 people need for 7 days?

7 persons	1500 cal	189 g	1 lb	1,984,500 = 46.05 = 46 lb apples
	1 person	95 cal	453.6 g	43,092 35 lb is not enough

3. In order to drive to the new camp the team can only drive during the day to avoid the zombie's wake period. There are currently 11 safe hours in which to drive. The water rig the team is driving will over heat at 40 miles an hour so they agreed to only drive 5 mph below 40 mph. How many miles will the team be driving?

Equivalency statements: 11 hr / 1 day , 35 m/ 1 hr

Given quantity: 7 days

Question : How many miles will be driven to get to the new camp?

7 days	11 hr	35 miles	2,695 = 2695 miles
	1 day	1 hr	1

4. A dictator junk gang has all the gas left in the region. They are requiring 2 kg of scrap metal in exchange for gasoline which they are selling by the liter. Your water rig is American made with a gallon gas tank and it can drive 30 miles per gallon. How many liters of gasoline do you need from the junk gang in order to successfully make it the new destination?

Equivalency statements: 1 gallon / 30 miles , 3.785 L / 1 gallon

Given quantity: 2695 miles

Question : How many liters of gasoline are needed to make the trip?

2695 miles	1 gal	3.785 L	10,200.575 = 340.019167 = 340 Liters of gasoline
	30 miles	1 gal	30

5. Your team decided to give the junk gang aluminum cans to pay for the gasoline. How many empty cans need to be given to the gang to pay for the gasoline for the trip.

Equivalency statements: 2 kg / 1 L , 1000 g/ 1 kg , 1 can / 14.09 oz

Given quantity: 340 Liters

Question : How many empty soda cans will you need to pay for 340 Liters of gasoline?

340 Liters	2 kg	1000 g	1 can	680,000 = 45,638 aluminum cans
	1 Liter	1 kg	14.9 g	14.9

6. Camp Nirvana sent a warning message over the CB radio. The Glass Skulls are patrolling the roadways and only allowing free passage with a payment of 100 kg glass. The latest report stated there would be a possible run in every 400 miles. Your team has some solid 30 lb glass blocks to use as bribe “money” How many blocks should you take on your trip to ensure you have enough glass?

First students need to calculate how many bribes they need $2695/4 = 6.7375 = 7$ bribes

Equivalency statements: 100 kg / 1 day , 2.2 lb / 1 kg , 1 bribe / 30 lb

Given quantity: 7 bribes

Question : How many cans of water does the team need for 7 days?

7 bribes	100 kg	2.2 lb	1 bribe	1540 = 51.333 = 51 glass blocks
	1 bribe	1 kg	30 lb	30

ALERT ALERT ALERT

To make things more interesting I have included an Alert problem the students can be handed while solving the first set of problems. The “Alert” problem is optional and the problem and answer are posted below.

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Heart’s mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?

Equivalency statements: 3.785 L / 1 gal , 5 m / 1 L

Given quantity: 19 gallons

Question : How many meters of copper wire are needed to barter the required coolant?

19 gallon	3.785 L	2.2 lb	5 meters	359.575 = 360 meters of copper
	1 gallon	1 kg	1 L	1

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Heart's mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Hearts mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Heart's mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Hearts mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Heart's mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?

ALERT ALERT ALERT!!!

While taking the water rig out for a test run it began overheating at 30 mph. It has a 19 gallon cooling system which needs to be flushed and replaced with coolant.

The only people left with coolant are the nuns who live at the top of Stone Hearts mountain. The nuns will only give the coolant out in 1 liter increments and want 5 meters copper wire per 1 liter of coolant.

How much copper wire must your team scavenge?