

# Dimensional Analysis Lab-Key

## Part 1-

### Materials:

- Filter paper
- Scale
- Bag #1
- Bag #2

### Procedure:

1. Determine the mass of the substance in bag number one.  
Make sure to put its contents on a filter paper before measuring its mass (should you take into account the mass of the filter paper?).
2. Use this mass, which is the amount needed for one strong cup of coffee, to complete the table below.

Make: Bag #1- 27 g of coffee grounds, bag #2- 70 g of coffee grounds.

	Mass (g)
1 cup	27 g
2 cups	54 g
3 cups	81 g
10 cups	270 g

3. Based on the table you just completed, how many cups of coffee could you make using bag #2?  
Explain using numerical evidence.  
Put 70 g in bag #2- can make 2 cups with some excess

## Part 2-

Bags numbered 3-6 represent the amount of caffeine in 12 ounces of the following beverages-

- 3- Monster Drink
- 4- Coca Cola
- 5- Black Cup of Coffee
- 6- Red Bull Energy Drink
- 7- Mountain Dew

### Materials:

- Filter paper
- Scale
- Bag #3
- Bag #4
- Bag #5
- Bag #6
- Bag #7

Your task is to use your knowledge and expertise to complete the following table...

## Amount of Caffeine (mg)

	Monster	Coca Cola	Black Coffee	Red Bull	Mountain Dew
12 oz.	120 mg	34 mg	70 mg	114 mg	54.8 mg
24 oz	240 mg	68 mg	140 mg	228 mg	109.6 mg
36 oz.	360 mg	102 mg	210 mg	342 mg	164.4 mg
48 oz.	480 mg	136 mg	280 mg	456 mg	219.2 mg

- Rank the beverages from highest to lowest based on their amounts of caffeine.  
Monster, Red Bull, Black Coffee, Mountain Dew, Coca Cola
- How many mg of caffeine is safe for a teenager to consume daily (You will need to do some research!)  
100 mg
- What are the side effects of drinking too much caffeine each day? List at least 5. (You will need to do some research!)  
agitation, anxiety, shakiness, dizziness, sleep disorders, upset stomach, rapid heart rate, headaches, dehydration
- A Monster drink is normally 16 oz. How many milligrams of caffeine would a person consume in a week if they were to drink one 16 oz. Monster drink each day Monday-Friday?  
800 mg

Make: use baking soda to make the bags for each beverage.  
Example- Monster bag- 120 mg baking soda.

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	Mass (g)
1 cup	
2 cups	
3 cups	
10 cups	

3. Based on the table you just completed, how many cups of coffee could you make using bag #2?  
Explain using numerical evidence.

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## Part 2-

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## Amount of Caffeine (mg)

	Monster	Coca Cola	Black Coffee	Red Bull	Mountain Dew
12 oz.					
24 oz					
36 oz.					
48 oz.					

1. Rank the beverages from highest to lowest based on their amounts of caffeine.
2. How many mg of caffeine is safe for a teenager to consume daily (You will need to do some research!)
3. What are the side effects of drinking too much caffeine each day? List at least 5. (You will need to do some research!)
4. A Monster drink is normally 16 oz. How many milligrams of caffeine would a person consume in a week if they were to drink one Monster drink each day Monday-Friday?