

How Many  
Balloons to  
Go Up?

# PROBLEM 1

How many balloons would I need to lift me, or my Polly Pocket stand-in, up?

- Independent variable- Number of balloons
- Dependent variable- Whether Polly Pockets is lifted up or not
- Constants- Size, type and filler of the balloons, weight of Polly Pocket, room temperature



# HYPOTHESIS 1

- 5 balloons or fewer will float Polly

# PROCEDURE 1

## Step 1 – How much do I weigh?

Using my mom's bathroom scale the investigator weighs 66.5 pounds. Our dad converted this to metric using the following:

1 pound = 453.59237 grams

66.5 lbs \* 453.59237 grams/lbs = 30,164 grams

The investigator weighs 30,164 grams.

## Step 2 – How much does Polly Pockets weigh?

My mom's bathroom scale would not work because Polly was too light so we made a smaller scale. Using a wooden pole, paper clips and two small buckets, we made a simple scale that looks like this.

We placed Polly in one bucket and we placed six dimes and one dollar bill in the other



bucket until the buckets were even. Our dad converted this to metric using the following:

Weight of a dime = 2.268 grams

[http://en.wikipedia.org/wiki/Dime\\_\(United\\_States\\_coin\)](http://en.wikipedia.org/wiki/Dime_(United_States_coin))

Weight of a dollar bill = 1 gram

[http://wiki.answers.com/Q/What\\_is\\_the\\_weight\\_of\\_a\\_dollar\\_bill#ixzz1AT33PZEY](http://wiki.answers.com/Q/What_is_the_weight_of_a_dollar_bill#ixzz1AT33PZEY)

6 dimes X 2.268 grams =13.608 grams  
Plus 1 dollar bill = 1 gram

Polly Pockets weighs = 14.6 grams

### **Step 3– How much more do I weigh than Polly?**

Since the investigator weighs 30,164 grams and Polly Pockets weighs = 14.6 grams, I weigh the same as 2066 Polly Pockets (Our dad did the division.).

### **Step 4 - How many balloons does it take to lift Polly?**

We bought five heart shaped balloons filled with Helium from the Dollar Store.

Trimmed balloon strings to same length.

We tied loops at the bottom of the strings. We attached balloons one at a time to Polly, until she began to float with 5 balloons.

## BACKGROUND INFORMATION 1

We became interested in this idea when watching the movie "UP."



We also were interested after watching an episode of Myth Busters with a three-year-old girl with thousands of balloons <http://dsc.discovery.com/videos/mythbusters-balloon-girl.html>

# TRIALS AND SAMPLER 1

- **Trial 1** - Attached 1 balloon to Polly, she did not float.
- **Trial 2** - Attached 2 balloons to Polly, she did not float.
- **Trial 3** - Attached 3 balloons to Polly, she did not float.
- **Trial 4** - Attached 4 balloons to Polly, it almost lifted Polly.
- **Trial 5** - Attached 5 balloons to Polly, she did float.



- **Trial 6** - Attached 5 balloons to Polly plus 1 gram, she did float.
- **Trial 7** - Attached 5 balloons to Polly plus 2 grams, she did float.
- **Trial 8** - Attached 5 balloons to Polly plus 3 grams, she did not float.

## DATA/OBSERVATIONS/GRAPH 1

Not applicable.

## CONCLUSION 1

If it takes 5 balloons to lift 1 Polly and I weigh 2066 Polly Pockets, then using a calculator it will take 10,330 balloons to lift me.

## PROBLEM 2

How many balloons will it take to float some of our other toys?

- Independent variable- Number of balloons per other toy.
- Dependent variable- Whether toy is lifted up or not
- Constants- Size, type and filler of the balloons, weight of toy, room temperature



## HYPOTHESIS 2

- As in problem 1, 5 balloons or fewer will float the toy.

## PROCEDURE 2

Same as in Problem 1 except we did not weigh the other toys.

## BACKGROUND INFORMATION

Same as in Problem 1

## TRIALS AND SAMPLER 1

See table below

# DATA/OBSERVATIONS/GRAPH

Toy/Doll	Number of balloons				
	1	2	3	4	5
White Rabbit (Marshmallow)	No	Almost	Yes	Yes	Yes
Pink rabbit (Happy)	No	No	Yes	Yes	Yes
Gold dog (mama dog)	No	No	Almost	Yes	Yes
Black and white dog (shep)	No	No	No	Yes	Yes
Plum pudding	No	No	No	No	Almost
Mini Barbie	No	No	No	No	No
Ornament	No	Yes	Yes	Yes	Yes

## CONCLUSION 2

These 5 toys took fewer balloons to float them, therefore they weigh less than Polly Pockets:

- White Rabbit (Marshmallow)
- Pink rabbit (Happy)
- Gold dog (Mama Dog)
- Black and white dog (Shep)
- Ornament

These 2 toys did not float with 5 balloons, therefore they weigh more than Polly Pockets:

- Plum pudding
- Mini Barbie



## PROBLEM 3

For an item that almost floated inside (White Rabbit/ Marshmallow), will they float outside in colder temperatures?

- Independent variable- Temperature around balloons
- Dependent variable- Whether Marshmallow is lifted up or not
- Constants- Size, type and filler of the balloons, weight of Marshmallow

## HYPOTHESIS 3

- 2 balloons may float Marshmallow in colder temperature



## PROCEDURE 3

We took Marshmallow outside and she floated with 2 balloons in colder temperature.

### Temperatures in Fahrenheit

- inside temperature = 68 degrees F
- outside temperature = 43 degrees F
- temperature difference = 25 degrees F

### Converting to Celsius

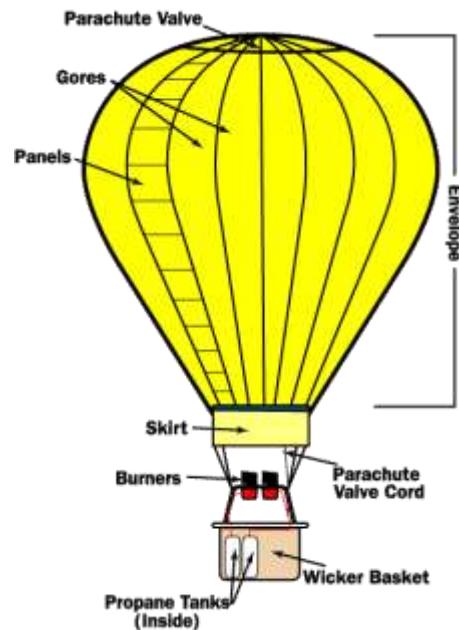
- inside temperature = 20 degrees C
- outside temperature = 6 degrees C
- temperature difference = 13 degrees C

# BACKGROUND INFORMATION 3

We became interested in this idea when our dad reminded us of the hot air balloon in the movie Wizard of Oz. Hot air inside made that balloon go up.

## How Hot Air Balloons Work

<http://science.howstuffworks.com/transport/flight/modern/hot-air-balloon1.htm>



# TRIALS AND SAMPLES 3

- **Trial 1** – only 1 trial needed

# DATA/OBSERVATIONS/GRAPH 3

Not applicable.

# CONCLUSION 3

It took 3 balloons to make Marshmallow float inside the house but only took 2 balloons to make it go up outside in the cold. So if the temperature outside the balloon is colder than inside the balloon then it will float better.