Altered Reality   **Student name:** _____

Objectives
1. Describe neural pathways and how they change as a basis for learning.
2. Collect and interpret data.
3. Design and carry out an experiment to solve a problem (optional).

Predictions
1. Where do you think the beanbags will land when the altered reality goggles are worn? **Why do you think so?**

2. After successfully hitting the target with the beanbags while wearing the altered reality goggles, where do you think the beanbags will land if you toss them immediately after taking off the goggles? **Why do you think so?**

Set-up Directions
1. Get a target, one data recording sheet per person, one pair of altered reality goggles, and 5-10 beanbags.
2. Place the target on the floor against a blank wall.
3. Position thrower 6 feet away from the target, facing the wall.

NOTE: To get the best effect, Parts 1-3 should happen consecutively with minimum interruptions.

Round #1
Part 1 -- No Goggles
1. The thrower underhand tosses beanbags at the target with his/her dominant hand.
2. The recorder quickly gathers and hands the thrower the beanbags.
3. For each toss, the recorder places an **X** in the appropriate column of the data table when the beanbag lands to the **left** of the target, **on** the target, or to the **right** of the target.
4. When 5 consecutive tosses land on the target, the thrower stops tossing.

Part 2 -- Wearing Goggles
1. The thrower puts on the goggles and underhand tosses beanbags at the target with his/her dominant hand.
2. The recorder quickly gathers and hands the thrower the beanbags.
3. For each toss, the recorder places an **X** in the appropriate column of the data table when the beanbag lands to the **left** of the target, **on** the target, or to the **right** of the target.
4. When 5 consecutive tosses land on the target, the thrower stops tossing.

Part 3 -- No Goggles
1. The recorder gently removes the goggles from the thrower IMMEDIATELY after s/he hits the target 5 consecutive times in Part 2.
2. The thrower immediately underhand tosses beanbags at the target with his/her dominant hand.
3. The recorder quickly gathers and hands the thrower the beanbags.
4. For each toss, the recorder places an **X** in the appropriate column of the data table when the beanbag lands to the **left** of the target, **on** the target, or to the **right** of the target.
5. When 5 consecutive tosses land on the target, the thrower stops tossing.

Round #2 -- Switch roles and repeat Parts 1, 2, and 3.

Altered Reality Recording Sheet

Student name: _____

Round # _____

Thrower _____

Recorder / Retriever _____

Data Table (if you need more rows, continue on a separate sheet of paper)

Toss #	Part #1 Toss Results			Part #2 Toss Results			Part #3 Toss Results		
	left	target	right	left	target	right	left	target	right
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
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22									
23									
24									
25									
26									
27									
28									
29									
30									

explain your brain

Student name: _____

Data Analysis

Beanbag Landed	Part 1		Part 2		Part 3	
	Total #	Percent (%)	Total #	Percent (%)	Total #	Percent (%)
Left of Target						
On Target						
Right of Target						
Total per Part						

Calculation

$$\text{Percent (\%)} = \frac{\text{Total \#}}{\text{Total \# of Tosses per Part}} \times 100$$

Example Imagine these are the results of Round 1.

Beanbag Landed	Part 1		Part 2		Part 3	
	Total #	Percent (%)	Total #	Percent (%)	Total #	Percent (%)
Left of Target	6	25	3		12	
On Target	12		15		8	
Right of Target	6		12		10	33.33
Total per Part	24		30		30	

To calculate the percentage of tosses that landed left of target in Part 1, your equation would look like:

$$\text{Percent (\%)} = \frac{6}{24} \times 100 \quad \text{which equals} \quad 25\%$$

To calculate the percentage of tosses that landed right of target in Part 3, your equation would look like:

$$\text{Percent (\%)} = \frac{10}{30} \times 100 \quad \text{which equals} \quad 33.33\%$$

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explain your brain

Altered Reality

Student name:_____

Data Analysis

Part	# of Tosses on Target	Total # of Tosses	Average # of Tosses on Target
1			
2			
3			

Calculation

$$\text{Average} = \frac{\text{\# of Tosses on Target}}{\text{Total \# of Tosses}} \times 100$$

Lab Analysis

1. Before you put the goggles on, where did most of the beanbags land? Why do you think that happened?

2. When you put the goggles on, where did most of the beanbags land? Why do you think that happened?

3. Immediately after you took the goggles off, where did most of the beanbags land? Why do you think that happened?

4. Which Part required the most tosses to land the beanbag on the target 5 times in a row? Why?

5. Which Part required the fewest tosses to land the beanbag on the target 5 times in a row? Why?

6. Did it take more tosses in Part 2 or Part 3 to land the beanbag on the target 5 times in a row? Why?

7. Based on your results, do you think it is easier for your brain to use established pathways or new neural pathways to do things? (Your answer to question 6 should help answer this one.)

Student name:_____

Design Your Own Experiment - write your experiment on
a separate sheet of paper.

Problem Statement - the question you are trying to answer

You may use one of these suggested questions or write your own question:

- How does tossing the beanbags with the dominant vs. non-dominant hand affect the amount of time it takes to adjust to wearing the altered reality goggles?
- How do people who play softball or baseball adjust to wearing the goggles compared to people who don't play softball or baseball?
- How does distance from the target affect a person's ability to adjust to wearing the goggles?
- How does the target height (waist level vs. on the floor) affect a person's ability to adjust to wearing the goggles?
- How does having one eye covered affect a person's ability to adjust to wearing the goggles?

Prediction - your best educated guess about what the answer will be

Hypothesis - why you think your prediction will be right (For example, you might say, "IF I do this...., THEN this will happen....")

Materials - a list of the supplies you will need to do your experiment

Results - a picture, graph, or table showing your data; explain what happened in your experiment

Conclusion - reflect on how the experiment went

- Summarize your results in a sentence or two.
- Identify what your data shows and what you can and cannot conclude.
- Address whether or not your results support your hypothesis and why.
- List possible sources of error.
- List ways that the experiment could have been done better, for example, if you'd had all the time, space, people, etc. that you would need.
- List any new questions that you thought of while you were doing the experiment or analyzing the results.