School: _____ **Teacher:** _____ **Name:** _____ **Date:** _____

Activity 4—INHERITANCE AND GENETICS Follow-up Activities

In the 4th science workshop we learned about ***GENES, CHROMOSOMES, AND GENETICS****. We also studied* ***PROBABILITY****, and how it affects the traits that offspring inherit from parents.*

I. Conduct a Genetic Cross

A) In class we crossed a **black-eyed** mouse (**Bb**) with another **black-eyed** mouse (**Bb**) and produced the following offspring:

1/4 BB black eyes

2/4 Bb black eyes

1/4 bb red eyes

Dad's genes
black eyes (Bb)

Mom's genes black eyes (Bb)	B	b
B	BB	Bb
b	Bb	bb

Bb x Bb Offspring:

3/4 have **black eyes** (**BB** or **Bb**)

1/4 have **red eyes** (**bb**)

1) In this particular genetic cross, the gene for **black eyes** is said to be

_____ over the gene for **red eyes**.

2) The gene for **red eyes** is: **DOMINANT / RECESSIVE** *[circle the correct answer]*.

B) Now let's do another genetic cross with our mice. This time, we'll cross a **black-eyed** (**Bb**) mouse with a **red-eyed** (**bb**) mouse: **Bb** x **bb**.

1) Complete the Punnet square for this cross:

2) Out of 4 total offspring, how many do you expect to have **black eyes**? _____

3) Out of 4 total offspring, how many Do you expect to have **red eyes**? _____

Dad's genes
black eyes (Bb)

Mom's genes red eyes (bb)	B	b
b		
b		

II. Probability

A) In class we tossed a coin to study probability. Remember that when we toss a coin, the probability that we will get a "heads" is ½ or **50%**, and the probability that we will get a "tails" is also ½ or **50%**.

1) Let's investigate the probability of tossing **6-sided dice** instead. Each side of the die has a number on it, from **1** to **6**. If the die is "fair" and well balanced, what is the probability that when you toss the die a single time, you will get a **1**? _____

[Hint: getting a "1" is one option out of a total of six possible options]

2) What is the probability that you will get a "**4**" if you toss the die one time? _____

B) Now let's toss the die a total of **50** times. Each time, record in the chart (separate page) the number that shows on top when the die comes to rest by coloring in a circle in the appropriate column. After you have tossed the die 50 times and recorded your results by coloring in 50 circles, you will have created a **frequency distribution** of your results. **(USE CHART ON SEPARATE PAGE)**

1) Which number did you get **most often** [*circle answer*]? **1 2 3 4 5 6**

2) Which number did you get **least often** [*circle answer*]? **1 2 3 4 5 6**

3) Based on the rules of probability, if your die was fair, did you expect to get about equal numbers of 1's, 2's, 3's, 4's, 5's, and 6's? **YES NO**

4) Compute the **average**, or **mean**, result from your 50 tosses by completing the chart below:

a) **count up the number of times** you got a 1: _____ [multiply by **1**] = _____

b) count up the number of times you got a 2: _____ [multiply by **2**] = _____

c) count up the number of times you got a 3: _____ [multiply by **3**] = _____

d) count up the number of times you got a 4: _____ [multiply by **4**] = _____

e) count up the number of times you got a 5: _____ [multiply by **5**] = _____

f) count up the number of times you got a 6: _____ [multiply by **6**] = _____

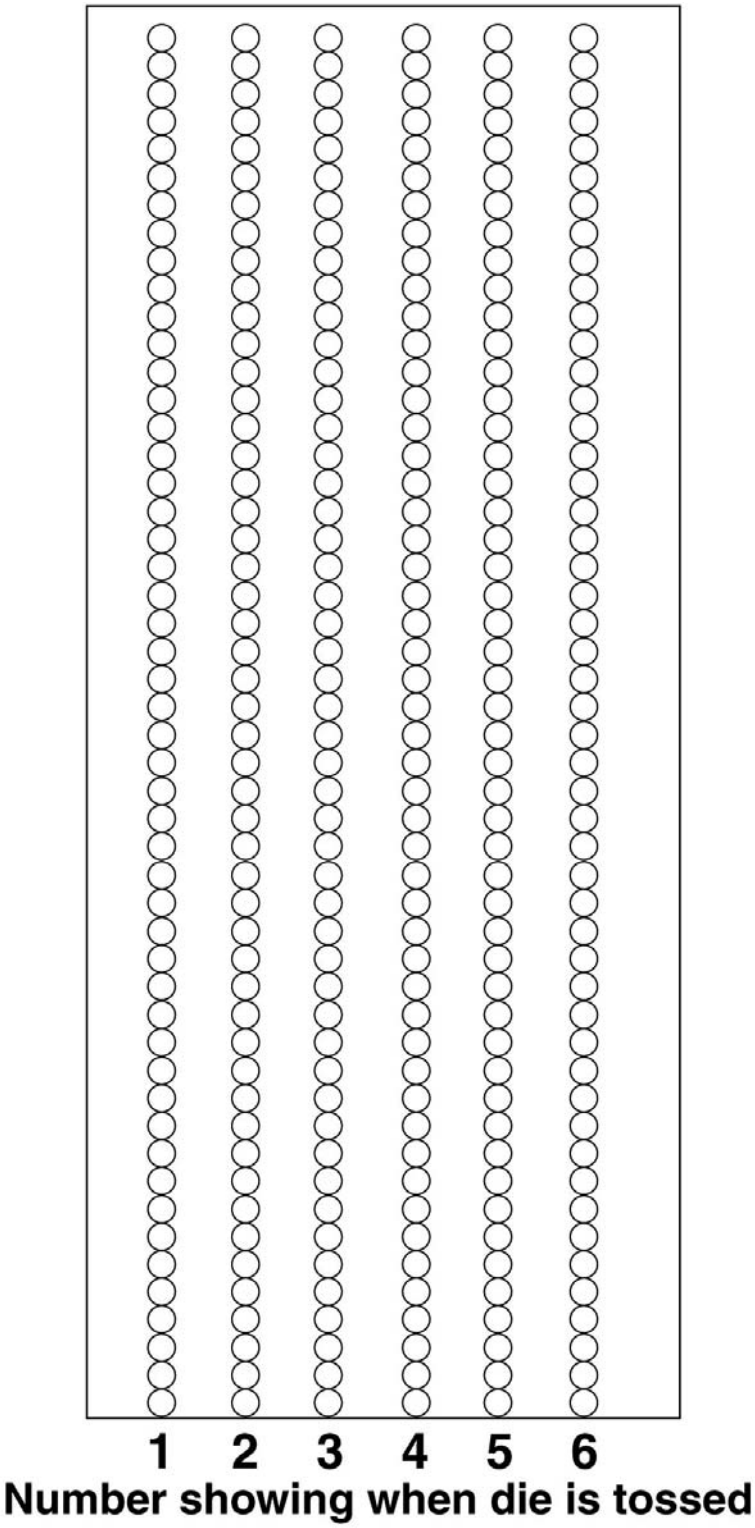
g) **Now add the 6 totals:** [ ]

h) **Divide by 50** (the total # of tosses)**:** _____ / **50**

i) The answer is the **mean**, or **average** result obtained in your **50** tosses: _____

5) Determine the **mode** for your 50 tosses. The **mode** is the result obtained **most often** in your 50 tosses. Look at your frequency distribution. The number with the **most** filled-in circles is the **mode**.

Record the **mode** for your **50 tosses** here: _____


1 2 3 4 5 6
Number showing when die is tossed