Procedure: 1. Go to Mr. Powell's website, mrpowellscience.com
2. Click on "Science Resources" then click through to the "Genetics" page
3. Scroll down and click on the "Fruit Fly Genetics" virtual lab
4. Read through the website and answer the questions on this sheet

Homepage:

1. Fruit flies don't actually eat fruit. What do they eat?_____

2. What is the special Latin name for fruit flies? _____

Fly Background:

3. Cancer occurs when cells grow out of control. This growth is caused by _____
Not working properly.
4. How similar are fruit flies to humans?_____

_____

5. What are the **5** reasons fruit flies are considered a *model organism?*

a._____ **b.**_____

c. _____ **d.**_____

e._____

Fly Work - Phenotypes

6. In fruit flies **WILDTYPE** flies are considered _____ or without _____

7. What do wildtype fruit flies look like?_____
8. What are the six **MUTANT** types of fruit flies?

a._____ **b.**_____ **c.** _____

d._____ **e.**_____ **f.** _____

Virtual Lab - Simple Cross: Now you will be conducting a virtual lab. Use the following procedure.
Step 1: Choose your cross- select "wing shape"
Step 2: Hypothesis:
What kind of flies will you be crossing? _____ and _____

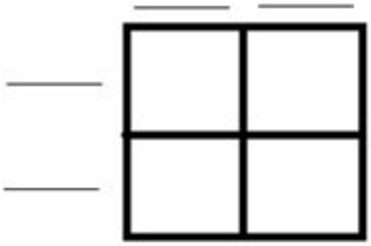
What results should you expect? (follow the questions on the screen, select your responses and record them on the screen as well as your lab sheet. The questions start on the back of this page. **Be sure to read all information provided to you on the website**)

1. Recessive traits are represented by which type of letters?
a. Capital. b. Lowercase. c. Vowels.d. Consonants.

2. According to the work of other scientists, the curly trait is dominant. Therefore, what should we predict the genotype of a heterozygous curly fly to be?
a. Yy. b. YY. c. yy.

3. If the wildtype fly we use in our cross is homozygous, what is its genotype?
a. Yy. b.YY. c. yy.

4. Show the cross of the wildtype female to the curly male using a Punnett square (shown below). What percentage of the offspring in the F1 (first generation) will be curly?



a. 50%. b. 75%. c. 100%. d. 0%.

5. According to your Punnett square, what percentage will be wildtype?
a. 50%. b. 75%. c. 100%. d. 0%.

6. All the offspring that are curly will have what genotype?
a. Yy .b. YY. c. Yy.

7. On your Punnett square, you wrote letters above each space. What does each single letter represent?
a. A complete genotype.
b. A gamete that contains one allele of the gene from theparent.
c. A gamete that contains a gene from the parent.
d. A body cell that contains a gene from the parent.

8. A heterozygous fly (Yy) would have the same phenotype as a homozygous dominant fly (YY). Why is this so?
a. Since the Y allele causes the fly to have at least half its proteins for curly wing development, this is enough for the fly to have curly wings.
b. This is false; since a heterozygous fly has only half the proteins for curly wing development it will still have normal wings (and therefore have a different phenotype from the YY fly).
c. The big Y is capital and therefore stronger than the little y, so the heterozygous fly will have curly wings just like the homozygous dominant fly.

Experiment: List the steps for your procedure
Step 1:_____

Step 2:_____

Step 3: S__r__ your flies Step 4: __ a__ e your flies Step 5: Wait _____ days

Results fill in your data table according to the results of the cross

Hatch Day	 Wildtype Females	 Wildtype Males	 Curly Females	 Curly Males
Day 1				
Day 2				
TOTAL				

Was there anything unexpected about your results? Explain why or why not_____

_____

_____

_____

Data Analysis

9. Overall, did your results support your hypothesis?

a. Yes, because we hypothesized that the curly trait was dominant and the offspring ratio showed that the curly trait was expressed in a dominant pattern.

b. Yes, because we hypothesized that the curly trait was recessive and the results show it was covered up by the dominant wildtype phenotype.

c. No, because we hypothesized that the curly trait was dominant and the offspring ratio did not show that it was expressed in a dominant pattern.

d. No, because our offspring ratio was not exactly 1:1.

10. Based on the results from this cross, is it likely that the curly trait is sex-linked dominant rather than merely dominant?
a. No, because the ratio of males to females was equal.
b. Yes, because all of the females would have been curly and all of the males would have been wildtype.
c. It cannot be determined from this cross alone.

11. Suppose the curly trait is not sex-linked. If we crossed two of our heterozygous curly flies, what would be the resulting offspring ratio?
a. 3 wildtype to 1 curly.
b. 1 wildtype to 1 curly.
c. All curly.
d. 3 curly to 1 wildtype.

12. Scientists have now determined that being homozygous curly (YY) is lethal (these flies die). Knowing this, what would be the offspring ratio from the same cross in question 10?
a. 3 curly to 1 wildtype
b. 2 curly to 1 wildtype
c. All wildtype
d. 1 wildtype to 1 curly

13. What should you do after this experiment has been completed?
a. Record your results in your lab journal.
b. Repeat the experiment.
c. Share your results with other scientists (publish).
d. All of the above.

Conclusion: Write a conclusion for this lab explaining what you learned, what you found interesting, what questions you still have and why you think studying fruit flies is important.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

If you complete this lab with time left you may try the other simple cross or try the harder cross