

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ HOUR: \_\_\_\_\_

## Understanding Meiosis Virtual Lab

### Problem

Why don't siblings look exactly alike?

### Procedure & Data

1. Turn on your computer.
2. Log in to your student account. See your teacher if you need this information.
3. Click to open the Google Chrome web browser and go to the page <http://concord.org/stem-resources/subject/biology>
4. Select the blue **GENETICS** tab and click on the **Understanding Meiosis** program.
5. Click the orange **DOWNLOAD & LAUNCH** button and select **KEEP** at the bottom of your screen. Click to open the ITSI\_Activity . . . jnlp file. Do **not** update java, select the **later** option. Make sure you select the **Run** program option.
6. Read the **Introduction** and answer the following questions (both on the program and this sheet):

- a. What is meiosis?

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- b. If two parents are contributing genetic material to their offspring, why don't the genes and chromosomes double in each generation?

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- c. If each parent has two set of genes and chromosomes, why do their offspring only receive only set from each parent?

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7. Read the **Procedure** and answer the following questions:

- a. What is an allele? \_\_\_\_\_

- b. Different alleles are represented by a single uppercase (F) or lowercase (f) letter. List the alleles for the following dragon traits.

Horns: \_\_\_\_\_ or \_\_\_\_\_

Color 1: \_\_\_\_\_ or \_\_\_\_\_

Wings: \_\_\_\_\_ or \_\_\_\_\_

Color 2: \_\_\_\_\_ or \_\_\_\_\_

# of legs: \_\_\_\_\_ or \_\_\_\_\_

Type of tail: \_\_\_\_\_ or \_\_\_\_\_

Fire-breathing: \_\_\_\_\_ or \_\_\_\_\_

8. Read **Collect Data I** and follow the instructions. Answer the questions on the next page.

- a. Describe the mother dragon by filling in the chart below. Click the magnifying glass to see the information about her alleles. Do the same for the father.

Mother	
Name	Hilda
Color	Purple
Horns alleles	h, h, h, h (no horns)
Wings alleles	W, W, w, w, (no wings)
# of legs alleles	L, L, l, l (2 legs)
Fire-breathing alleles	F, F, f, f
Color 1 alleles	a, a, a, a
Color 2 alleles	B, B, B, B
Type of tail alleles	t, t, t, t

Father	
Name	
Color	
Horns alleles	
Wings alleles	
# of legs alleles	
Fire-breathing alleles	
Color 1 alleles	
Color 2 alleles	
Type of tail alleles	

- b. After selecting a gamete from each parent, click play to observe the two gametes combining. What is this process called?

\_\_\_\_\_

- c. Are the gametes diploid (2n) or haploid (n)? \_\_\_\_\_

- d. Is the zygote (first fertilized cell) diploid or haploid? \_\_\_\_\_

- e. Describe the offspring by completing the chart below. Answer the **bold** questions.

Offspring	
Name	
Color	
Horns alleles	
Wings alleles	
# of legs alleles	
Fire-breathing alleles	
Color 1 alleles	
Color 2 alleles	
Type of tail alleles	

**How does the offspring differ from the parents?**

**How was the offspring similar to the parents?**

9. Read **Collect Data II** and follow the instructions. Answer the questions below and on the next page.

- a. What allele (or letter) represents the trait "horns"? \_\_\_\_\_

- b. What allele represents the trait "no horns"? \_\_\_\_\_

- c. List whether the following combinations of alleles would have horns or no horns:

HH: \_\_\_\_\_

hh: \_\_\_\_\_

Hh: \_\_\_\_\_

d. Describe the mother and father dragons by filling in the charts below.

Mother	
Name	
Color	
Horns alleles	
Wings alleles	
# of legs alleles	
Fire-breathing alleles	
Color 1 alleles	
Color 2 alleles	
Type of tail alleles	

Father	
Name	
Color	
Horns alleles	
Wings alleles	
# of legs alleles	
Fire-breathing alleles	
Color 1 alleles	
Color 2 alleles	
Type of tail alleles	

e. Create **one** offspring with **no horns** and describe it by filling in the chart below. Create **one** offspring with **horns** and describe it by filling out the chart below.

Offspring: No Horns	
Name	
Color	
Horns alleles	
Wings alleles	
# of legs alleles	
Fire-breathing alleles	
Color 1 alleles	
Color 2 alleles	
Type of tail alleles	

Offspring: Horns	
Name	
Color	
Horns alleles	
Wings alleles	
# of legs alleles	
Fire-breathing alleles	
Color 1 alleles	
Color 2 alleles	
Type of tail alleles	

f. How many tries did it take to make an offspring with no horns? \_\_\_\_\_

10. Using the parents Tanada and Landar, try to create one offspring with wings and one offspring without wings. Answer the questions below.

a. Is it possible for these parents to have offspring with wings? \_\_\_\_\_

b. What combination(s) of alleles (WW, Ww, or ww) results in dragons with wings? \_\_\_\_\_

c. Is it possible for these parents to have offspring without wings? \_\_\_\_\_

d. What combination(s) of alleles (WW, Ww, or ww) results in dragons without wings? \_\_\_\_\_

11. Read **Collect Data II** and follow the instructions. Answer the questions below and on the next page.

a. Can Tanada and Landar have offspring with 4 legs? \_\_\_\_\_

b. What combination of alleles (LL, Ll, or ll) results in dragons with no legs? \_\_\_\_\_

- c. What combination of alleles (LL, Ll, or ll) results in dragons with 2 legs? \_\_\_\_\_
- d. What combination of alleles (LL, Ll, or ll) results in dragons with 4 legs? \_\_\_\_\_

### Analysis

12. How does meiosis increase the genetic diversity (or variation) of potential offspring?
13. Look back at the charts you filled out describing the individual parents. Did any of the traits (horns, wings, number of legs, type of tail, color 1, color 2, or fire-breathing) have different numbers of alleles (for example: HHhh versus HH)? If so, which ones? **Hypothesize:** What might this difference be related to?
14. How does the genetic code (the chromosomes and genes) of the offspring differ from its parents?
15. What processes make children different from their parents?

### Conclusion

16. Why don't siblings look exactly alike?