Where There's a Worm, There's a Way:
Exploring Molecular Genetics with *C. elegans* and RNAi

Name: _____ Period: _____

Day One, Part 1:

- Examine the plate of wild-type worms under the dissecting microscope. Try observing the worms under several magnifications. See if you can identify both hermaphrodites and males, and try picking up worms using the worm pick. Record your observations below.

	Observations
Size:	
Appearance:	
Color:	
Behavior:	
Movement:	
Drawing:	

Day One, Part 2:

- Your teacher is growing two other strains of worms that you will observe tomorrow. The *bli-1* gene was affected in the first set of worms, which controls development of the cuticle, or hard outside "shell" of the worm. The *dpy-11* gene was affected in the second set of worms, which affects body shape morphology and the worm's ability to grow to normal shape and size. Do you think these worms will exhibit a different phenotype than the normal wild-type worms because of a disruption in gene expression? On the back of this sheet, form a hypothesis that describes what you predict the phenotype of *bli-1* and *dpy-11* mutant worms will be.

Hypothesis:

_____

_____

_____

_____

_____

Day 2, Part One:

- Examine a plate of the *bli-1* and *dpy-11* worms under the dissecting microscope. Try observing the worms under several magnifications. How do they compare to yesterday's wild-type worms? Try observing the worms under several magnifications. Record your observations below and answer the analysis questions that follow.

	bli-1	*dpy-1*
Size:		
Appearance:		
Color:		
Behavior:		
Movement:		
Drawing:		

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Analysis Questions:

1. Did your hypotheses match your observations for the RNAi-depleted worms? Describe.

2. Geneticists label specific genes with letter combinations when they are identified and named. Often, these genes are named after the phenotype or function of the particular gene. It turns out that *bli* is short for blister and *dpy* is short for dumpy. Explain why these names were chosen to represent these particular phenotypes.

3. Compare the appearance of the blister worms with the wild-type worms. Given what you know about the process of protein synthesis and the function of the *bli-1* gene, what is causing the blister worms to look different than the wild-type worms?

4. Compare the appearance of the dumpy worms with the wild-type worms. Given what you know about the process of protein synthesis and the function of the *dpy-11* gene, what is causing the dumpy worms to look different than the wild-type worms?

5. Does RNAi affect replication, transcription or translation? Explain.

6. Why do scientists use *C. elegans* to study genetics? Give three reasons.

7. Another important gene in *C. elegans* encodes the TALIN protein in the cellular cytoskeleton.
    a. What effect might a loss-of-function mutation in the synthesis of a cytoskeleton protein have on a developing worm?

    b. There is a closely-related homolog of this TALIN protein in humans. What effect might the same mutation have on a developing human?