

Getting More Out of Less: Designing short homework assignments that focus on application and analysis

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Category #1: Topics that lend themselves to problem sets

- This assignment is short, which is less intimidating for students, but these problems require understanding and **application** of the concepts we learned in class.
- Because the assignment is only two problems, we have time for a whole-class discussion at the beginning of the following class. This gives students with completed homework an opportunity for timely **feedback** in the form of discussion with peers and the instructor.

1. (5) The spiral direction of a snail's shell is a trait determined by a single gene. A snail shell can spiral either in a left hand or a right hand direction. A series of crosses were performed between snails with clockwise and counterclockwise-spiraled shells, the data is shown below.

	P1 Crosses:		F1 Offspring:
1	Left x Left	1	28 Left, 0 Right
2	Left x Right	2	34 Left, 0 Right
3	Right x Right	3	0 Left, 33 Right

Some of the offspring from the F1 generations were then chosen for mating in order to produce an F2 generation. The offspring to be mated were chosen from either cross 1, 2, or 3. Which crosses offspring is indicated in parenthesis.

	F1 x F1 Crosses:		F2 Offspring:
1	Left (1) x Right (3)	1	30 Left, 0 Right
2	Left (2) x Right (3)	2	16 Left, 17 Right
3	Left (2) x Left (2)	3	27 Left, 9 Right
4	Left (1) x Left (2)	4	35 Left, 0 Right

How is left and right directionality of shells being inherited? Use the data collected from the crosses in the tables above to help you discern the inheritance pattern. Justify your answer using information from the crosses shown above. Which crosses in particular helped you determine this and why?

Adapted from Essentials of Genetics, Klug et al, 9th edition.

2. (5) Consider the traits that we talked about in class with the Labrador retrievers. We followed the genes for coat color (black, chocolate) and vision (normal, PRA: progressive retinal atrophy). Look at the crosses between some Labradors with these traits below and **determine the genotypes of the parent dogs** in each of the four examples by analyzing the phenotypes of their offspring.

	Parents:		Offspring:
1	Black, Normal x Black, Normal	1	3/4 Black, Normal 1/4 Chocolate, Normal
2	Chocolate, Normal x Black, Normal	2	6/16 Chocolate, Normal 2/16 Chocolate PRA 6/16 Black, Normal 2/16 Black, PRA
3	Black, Normal x Black, Normal	3	9/16 Black, Normal 3/16 Black, PRA 3/16 Chocolate, Normal 1/16 Chocolate, PRA
4	Black, Normal x Chocolate, PRA	4	1/4 Black, Normal 1/4 Black, PRA 1/4 Chocolate, Normal 1/4 Chocolate, PRA

Adapted from Essentials of Genetics, Klug et al, 9th edition.

Category #2: When textbook and/or figures are insufficient

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163 Students

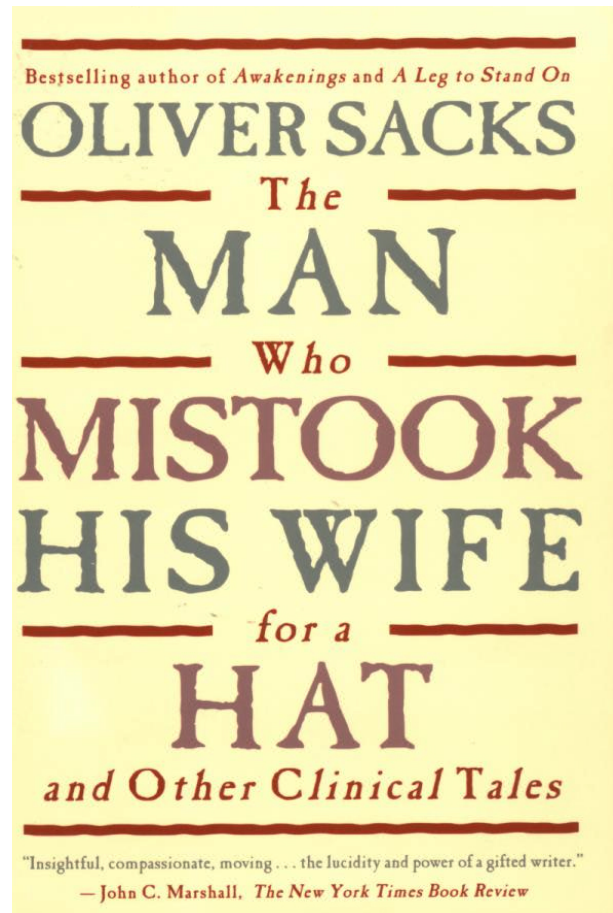
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Review Student Work

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Many of my TED-Ed lessons include both video comprehension and extension / application questions. Students answer these questions either while watching the video or after the video finishes, but the platform allows students to move back and forth through the video and the questions as they wish. Instructors can access student responses through the TED website.



This homework assignment uses an excerpt from the short story by Oliver Sacks, "The Man Who Mistook His Wife for a Hat." This excerpt describes interactions with a patient, Dr. P., who is experiencing some strange neurological and visual disturbances.

Students are then to apply their knowledge from an in-class discussion on various neuroimaging techniques to address the question "Which neuroimaging technique or techniques would you employ to learn more about what might be going on in Dr. P's brain. Why do you feel this is the best technique for collecting additional information about the patient? What additional information might the use of this technique tell you?"