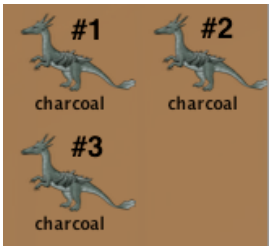
Challenge 2: High Tail It…

You must determine the tail allele combination of each mother drake. If your teacher has you submit your answer in the journal (DJG+ button in Geniverse), type "Case 8: Challenge 2" in the claim box and type your answers in the reasoning box.

Determine the tail allele combination of each mother drake.

The mothers are numbered in this picture so you can refer to them easily.



1. What type of tail does each mother have? _____

2. List the possible allele combinations that would result in this type of tail.

   _____

3. The father drake has a short tail. What is his allele combination? _____
   How do you know this is the father's allele combination?

4. **Predict & Explain.** Predict how you will know the tail allele combination of each mother by breeding her to the father and observing the offspring.

   a. If I breed a mother drake with the father and see offspring with _____ tails, I'll know the mother's tail allele combination is _____, because _____ _____.

   b. If I breed a mother drake with the father and see offspring with _____ tails, I'll know the mother's tail allele combination is _____, because _____ _____.

c. If I breed a mother drake with the father and see offspring with _____ tails, I'll know the mother's tail allele combination is _____, because _____ _____.

5. **Observe.**
   a. Breed each mother drake one at a time to the father drake and record the results in the table.
   b. Examine the data for each breed and determine the tail allele combination for each mother, and record them in this table.

Mother Drake	Offspring Tail Types	Mother's Allele Combination
#1		
#2		
#3		

After you find out whether or not your answers are correct, complete the next question.

6. **Did your predictions lead you to the correct answers?** Yes No
   a. If yes, congratulations!
   b. If no, then in the space below explain why your predictions were wrong and how you would answer differently now.

Challenge 2: High Tail It…

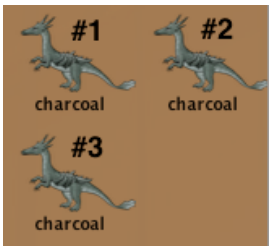
You must determine the tail genotype of each mother drake. If your teacher has you submit your answer in the journal (DJG+ button in Geniverse), type "Case 8: Challenge 2" in the claim box and type your answers in the reasoning box.

Apprentice Tip:

- Notice the male drake in the Fathers Pool. What is his genotype? How can he be useful in understanding the females' genotypes?

Determine the tail allele combination of each mother drake.

The mothers are numbered in this picture so you can refer to them easily.



1. **Predict & Explain.** Predict how you will know the genotype of each mother by breeding her to the father and observing the offspring.

2. **Observe.**
   a. Breed each mother drake one at a time to the father drake and record the results in the table.
   b. Examine the data for each breed and determine the tail allele combination for each mother, and record them in this table.

Mother Drake	Offspring Tail Types	Mother's Allele Combination
#1		
#2		
#3		

Case 8: Predict-Explain-Observe (B)

After you find out whether or not your answers are correct, complete the next question.

3. **Did your predictions lead you to the correct answers?** Yes No
   a. If yes, congratulations!
   b. If no, then in the space below explain why your predictions were wrong and how you would answer differently now.

Use this sheet to record your work and findings from Case #8.

Playground

As an Apprentice you will discover new genes, and some of these genes will have more than two alleles. To prepare for the challenges in this case, figure out what's dominant over what for the three tail types.

Long tail Short tail Kinked tail

Figure out the alleles needed for each type of tail.

1. Make every possible combination of alleles in the playground and record the way the tail looks for each one. Use the table below to record your work.

Allele Combination	Tail Type

2. Write the alleles in order from most dominant to most recessive.

_____ > _____ > _____

Challenge 1: Once, Twice, Three Times a Tail

Welcome back to meiosis, Apprentice! It's baby-making time again! Notice in this challenge that each target drakeling has a different tail.

Find the right parents, and the right gametes, to match each target.

1. In the table below, circle the tail type each target has. Then write the possible allele combinations that could result in that tail type.

Target	Tail Type	Possible Allele Combinations
#1		
#2		
#3		

2. Match the targets.
- Examine each parent's alleles to decide which pairs might produce each target.
- Test your ideas by breeding, and record your results in the data table.
- Use additional paper if you need to do more breeding experiments.

	Which parents were bred?	What were the tail alleles of each parent?	Which target matched?
Mother			
Father			
Mother			
Father			
Mother			
Father			

3. In your attempts to solve this challenge, what worked well and what didn't?

Answer this question silently to yourself, and then wait for further instructions from your teacher.

How is the tail trait similar to other traits we've seen so far? How is it different?

When directed to do so by your teacher, discuss your ideas above with a partner and/or small group. How does your thinking about this question compare to others' with whom you shared your ideas?