

## GENETICS: INTERNET ASSIGNMENT 1 – INHERITANCE PATTERNS

### Activity: Mouse Genetics

Objective: Identify patterns of inheritance (dominant vs recessive), collect and keep track of data, and calculating probabilities.

Background: The factors that control trait – genes – are inherited in distinct and identifiable patterns. Find the pattern of dominant and recessive alleles in the fur color gene of mice by observing several generations of simulated matings.

### Pre-Procedure:

- Go to <http://www.explorelearning.com/index.cfm?>
- Follow the directions in the ExploreLearning handout I provided – it includes the Class Code you will need to view the “gizmo”.
- Go to my home page, scroll down through the “gizmos” a bit until you get to the Life Science Samples;
- Go to Mouse Genetics - Click “Launch Gizmo”
- Feel free to take a moment or two to play around with the intro materials – especially the Stats link.
- When you are ready to begin, click on the “Simple MouseHouse” button...
- The mice in the left column are “Pure Bred” – meaning they are homozygous for the fur color they display:
  - The Black Mouse is homozygous for Black = 2 black alleles;
  - The White Mouse is homozygous for White = 2 white alleles.
- You don’t know which fur color is dominant (that’s why we need to breed them!)

### Procedure:

1. Click on and drag TWO BLACK MICE from the top left and place them in the top two empty circles of the simple mousehouse;
  - Breed these mice by clicking the “breed” button;
  - Before doing anything else: Keep track of your offspring by using the “counter” button on the lower right – use the counter to record the number of black and/or white offspring – Record Final Tally;
  - After counting the results, click the “Clear” button
  - Repeat this step 5 times – counting the results each time (so you should have 25 offspring)... but wait!
  - Save 2 of the Black offspring from the last generation you breed – drag those two black mice to “The Cage” – and place them there – These are your P generation mice;

- Take the two parents from the top circles of the mousehouse and put them back into the "potential parents" holders.
2. Repeat STEP 1 above using the TWO WHITE MICE – remember to use the counter, keep 2 white offspring in "the cage" (P Generation), and to put the parents back when you are done with 5 breeding rounds – Record Final Tally.
  3. Take one P Generation Black and one P Generation White mouse – Breed them 8 separate times (BE SURE TO USE THE COUNTER!!!) – Record Final Tally;
    - Take any TWO BLACK OFFSPRING from this cross – these will make you F1 Generation – drag them to "the cage";
    - Return the P Generation mice to the cage – be sure to keep them organized – you don't want to get a P Generation mouse confused with an F1 Generation mouse.
    - Clear the rest of the kids – Can you determine which allele is dominant now?
  4. Take one black mouse from the P Generation and one black mouse from the F1 Generation (from step 3):
    - Mate them 8 separate times;
    - Keep track of results with the counter – Record Final Tally;
    - Clear the kids and return the Parents to the cage.
  5. Take one white mouse from the P Generation and one black mouse from the F1 Generation:
    - Breed them 8 separate times;
    - Use the counter – Record Final Tally;
    - Clear the kids, return the parents to the cage.
  6. Take 2 Black mice from the F1 Generation:
    - Breed them 8 separate times;
    - Keep track with the counter – Record Final Tally;
    - The offspring of this mating represents the F2 generation.

Follow-Up:

Complete the questions/Punnett squares on the accompanying worksheet.

THIS IS DUE BY THE END OF THE PERIOD!!! Let me know if that's a problem for you...