5.3 FRUIT FLY INHERITANCE
PART A GENOTYPES & PHENOTYPES

Complete the following activity to prepare your three fruit flies and determine their genotypes and phenotypes!

1. Set up your introduction page:
   a. Collect an envelope and a glue stick.
   b. Fold the flap of the envelope back so the envelope now looks like a pocket. Glue this down on your introduction sheet in the dotted rectangle. This is where you will put your fruit fly specimen when we are not using them.
   c. Set this page aside while you complete the rest of Part A.

2. Create your fruit flies!
   o No you don't get to make crazy colorful fruit flies. Instead you will use a dice to randomly select dominant and recessive alleles.
   o For Fruit Fly #1:
      A. Start with the gene for wing shape: curly or straight
         • Collect a dice to share between you and your partner. Also collect one half sheet of paper with a fruit fly with curly wings and one half sheet with a fruit fly with straight wings. (Both you and your partner will each need one.)
         • One of you rolls the dice first. This first roll will determine the **MALE ALLELE FOR WING SHAPE**.
            1. IF THE DICE ROLLS AN <u>ODD</u> NUMBER, THE ALLELE WILL BE DOMINANT FOR CURLY WING SHAPE (<u>C</u>)
               • Note: the letter is underlined to make sure it is obviously capital!)
            2. IF THE DICE ROLLS AN <u>EVEN</u> NUMBER. THE ALLELE WILL BE RECESSIVE FOR STRAIGHT WING SHAPE (c)
            3. Write <u>C</u> or c in the table on your Part A sheet for this roll for the male allele.
         • This second roll will determine the FEMALE **ALLELE FOR WING SHAPE**.
            1. IF THE DICE ROLLS AN <u>ODD</u> NUMBER, THE ALLELE WILL BE DOMINANT FOR CURLY WING SHAPE (<u>C</u>)
               • Note: the letter is underlined to make sure it is obviously capitol)
            2. IF THE DICE ROLLS AN <u>EVEN</u> NUMBER. THE ALLELE WILL BE RECESSIVE FOR STRAIGHT WING SHAPE (c)
            3. Write <u>C</u> or c in the table on your Part A sheet for this roll for the female allele.
         • Based on your roll in the step above, choose the half sheet of paper you will be using for Fruit Fly #1. If you rolled <u>CC</u> or <u>C</u>c, you will have a fruit fly with curly wings. If you rolled cc, then you will have a fruit fly with straight wings. Put your name and period number on the half sheet and number the fruit fly #1.
         • Let your partner determine his/her fruit fly wing shape and follow these same steps.
         • Now for the fun part! Coloring!
            1. Write the <u>C</u> or c on the male chromosome next to your fruit fly.
            2. If the male allele is dominant. shade the gene (box) on the male chromosome **dark green** (shade lightly!). If the male allele is recessive. shade the gene (box) on the male chromosome **LIGHT green** (shade lightly!).
            3. Write the <u>C</u> or c on the female chromosome next to your fruit fly.

4. If the female allele is dominant, shade the gene (box) on the female chromosome **dark green** (shade lightly!). If the female allele is recessive, shade the gene (box) on the female chromosome **LIGHT green** (shade lightly!).
- Now allow your partner to do the above too.

B. Now determine the genotype for body color: brown or black
- Roll the dice again to determine the body color: either black or brown. This first roll will determine the **MALE ALLELE FOR WING SHAPE.**
  1. **IF THE DICE ROLLS AN <u>ODD</u> NUMBER, THE ALLELE WILL BE DOMINANT FOR BROWN BODY COLOR (B)**
     - Note: the letter is underlined to make sure it is obviously capital!)
  2. **IF THE DICE ROLLS AN <u>EVEN</u> NUMBER. THE ALLELE WILL BE RECESSIVE FOR BLACK BODY COLOR (b)**
  3. Write B or b in the table on your Part A sheet for this roll for the male allele.
- This second roll will determine the FEMALE **ALLELE FOR BODY COLOR.**
  1. **IF THE DICE ROLLS AN <u>ODD</u> NUMBER, THE ALLELE WILL BE DOMINANT FOR BROWN BODY COLOR (B)**
     - Note: the letter is underlined to make sure it is obviously capitol)
  2. **IF THE DICE ROLLS AN <u>EVEN</u> NUMBER. THE ALLELE WILL BE RECESSIVE FOR BLACK BODY COLOR (b)**
  3. Write B or b in the table on your Part A sheet for this roll for the female allele.
- Based on your rolls in the step above, if you rolled BB or Bb, color your Fruit Fly #1 the dominant phenotype: BROWN. If your rolled bb, color your Fruit Fly #1 the recessive phenotype: BLACK (don't color too dark).
- Write the B or b on the male chromosome next to your fruit fly.
  1. If the male allele is dominant, shade the gene (box) on the male chromosome **dark brown** (shade lightly!). If the male allele is recessive, shade the gene (box) on the male chromosome **LIGHT brown** (shade lightly!).
- Write the B or b on the female chromosome next to your fruit fly.
  1. If the female allele is dominant, shade the gene (box) on the female chromosome **dark brown** (shade lightly!). If the female allele is recessive, shade the gene (box) on the female chromosome **LIGHT brown** (shade lightly!).

C. Repeat the above steps for Fruit Fly #1 for wing spots, which has the alleles <u>P</u> or p where <u>P</u> stands for the dominant plain allele and p stands for the recessive spot allele.
- If your fruit fly ends up with pp, it will have wing spots. Use a black colored pencil to draw 3-5 spots on each wing. If your fruit fly is Pp or PP, it will have plain wings.
- On the male and female chromosomes, color them either **dark blue** for the dominant allele, <u>P</u>, or **light blue** for the recessive allele, p.

D. Repeat the steps for Fruit Fly #1 for eye color, which has the alleles R or r where R stands for the dominant red allele and r stands for the recessive white allele.
- If your fruit fly ends up with rr, it will have white eyes. Leave the eye white. If your fruit fly is Rr or RR, it will have red eyes. Color the eye red.
- On the male and female chromosomes, color them either **red** for the dominant allele, R, or **pink** for the recessive allele, r.

o That was fun! Now repeat this entire process for Fruit Fly #2 and Fruit Fly #3
o Once you have your three cute fruit flies complete, put them in the pocket on your intro page and put it in your binder. Complete the tables on your Part A sheet and answer the analysis questions that follow.

o **When everything is complete, put all pages in your binder and clean everything up!**