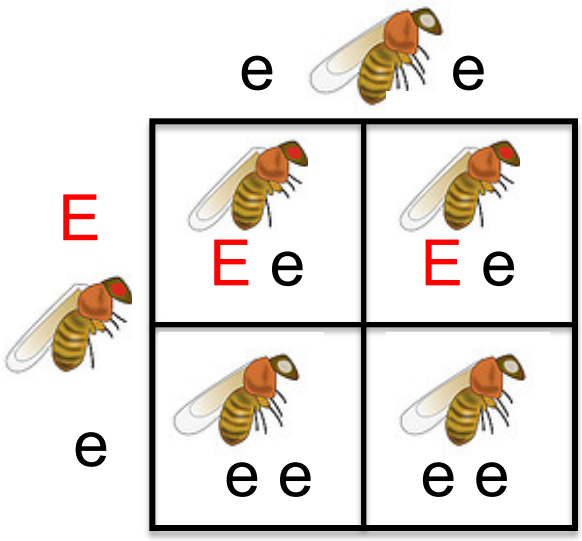
Using a Punnett Square

Activity

When two organisms have offspring, there is a way to predict the possible genetic combinations that can occur. This is a special chart called a Punnett square. It is named after an English geneticist name Reginald Punnett. It is a model that allows us to discover all the potential combinations of genotypes that can occur in offspring. Genotypes are the genetic combinations of an organism. Phenotypes are the physical characteristics of the organism.



Procedure

1. Look at the Punnett square in the picture above. The letters represent the genes and the drawings of the flies show you the phenotypes.
   a. What are the phenotypes shown in the Punnett square?

   b. What are the genotypes shown in the Punnett square?

2. When using a Punnett square, we use capital letters to show the dominant trait and lowercase letters to show the recessive trait. A dominant trait, if present, is the the trait that shows up in the organism. The recessive trait is the one that shows up only if the dominant trait is not present.
   a. Which letter in the Punnett square above represents the dominant trait?

   b. Which letter represents the recessive trait?

3. When there are two recessive traits in the box (ee), the recessive trait shows up. When there are two dominant traits (EE), the dominant trait shows up, and when both are present (Ee), the dominant trait shows up.
   a. What trait will show up in the ee box?

   b. What trait will show up in the Ee box?

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Activity, continued

After completing a Punnett square, we are able to calculate the probability of a trait showing up. There will always be 4 chances in Punnett squares such as these. So, we count the number of traits that might show up and divide it by 4, then multiply by 100 to get the percentage.

4. How many offspring with the dominant trait might show up?

5. What is the percentage of offspring that might have that trait?

6. How many offspring with the recessive trait might show up?

7. What is the percentage of offspring that might have that trait?

Using a Punnett Square

Activity, continued

Use the abbreviation R for round peas and r for wrinkled peas in the Punnett squares for each question.

8. Work out the following crosses and answer the questions.
   a. RR X rr What percentage of offspring will be round?

   b. RR X rr What percentage of offspring will be wrinkled?

   c. RR X Rr What percentage of offspring will be round?

   d. RR X Rr What percentage of offspring will be wrinkled?

   e. Rr X Rr What percentage of offspring will be round?

   f. Rr X Rr What percentage of offspring will be wrinkled?

   g. rr X rr What percentage of offspring will be round?

   h. rr X rr What percentage of offspring will be wrinkled?

   i. RR X RR What percentage of offspring will be round?

   j. RR X RR What percentage of offspring will be wrinkled?
