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All in the Family.

Have you ever been surprised to see two people who looked alike but were not related? On the other hand, you are probably surprised when family members do not share the same physical characteristics. You may have wondered what causes people to look the way they do, or why offspring commonly look like their parents. These are questions that geneticists are trying to answer.

With this project, you will explore how traits are passed from parent to offspring by creating a family of “paper pets.” First, you will create your own “paper pet” by choosing its characteristics. Then you will breed your pet with another and determine the characteristics of six offspring.

Read this before starting your work.

Overview of the Project

- Use the Making a Paper Pet Procedure to help you create your paper pet. Cut out your pet from either blue or yellow construction paper. Then choose the other traits for your pet: gender, eye shape, nose shape, and teeth shape.
- On the back of your pet, glue the tables and write the alleles it has for each trait. Use XX for females and XY for males. For the other traits, the **dominant** alleles are for **blue body color**, **round eyes**, **triangular nose**, and **pointed teeth**. The *recessive* alleles are those for *yellow body color*, *square eyes*, *oval nose*, and *square teeth*. **Show me your work.**
- Use the Making Paper Pet Offspring Procedure to breed offspring with your partner. Determine the alleles that each of six offspring will inherit from each parent by tossing a coin. Construct a paper pet for each of the offspring, showing their phenotypes. Write the genotypes on the back of each offspring.
- Make a display of your pet family in which you label the P generation and the F1 generation. Construct a Punnett square for each trait to show all the possible allele combinations in your pet family. Compare the predicted possibilities with the actual results.

Project Hints

- In your original pet (P1) do not make more than one homozygous genotype for traits controlled by a dominant allele.
- Construct each of six offspring. Remember that each offspring must inherit its traits from the parents according to the laws of genetics. You will toss a coin to determine which allele each offspring inherits.
- Set up your display so that it is easy to turn over the pets and read their genotypes.

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Making a Paper Pet Procedure









Follow these instructions to create your own paper pet with five different traits. You will make one (male) and your partner will make one (female).

Materials

blue or yellow construction paper
scissors
glue
markers
large paper pet templates
large paper pet genotype/phenotype tables

Procedure

1. Trace the large paper pet template onto either blue or yellow construction paper and cut it out.
2. On the front of your paper pet, draw the other four traits you have chosen for it. The table below lists the possible trait choices and shows how to draw them.
3. After you have drawn all your traits, fill in a large paper pet table. Write your pet's traits in the phenotype column. Give your pet a name, and write the name at the top of the table. Glue the table to the back of your pet.
4. Fill in your pet's genotypes. For dominant traits, only one may be homozygous. Use XX for a female and XY for a male. The **dominant** alleles for the other four traits are **B** (blue skin), **R** (round eyes), **T** (triangular nose), and **P** (pointed teeth).

Possible Traits		
Color	blue	yellow
Gender	female (curl) 	male (no curl) 
Eyes	square 	round 
Nose	triangular 	oval 
Teeth	square 	pointed 

Table

Pet's Name _____	
Phenotype	Genotype
Color _____	_____
Gender _____	_____
Eyes _____	_____
Nose _____	_____
Teeth _____	_____

Show me your work before proceeding further.

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Making Paper Pet Offspring Procedure

Follow these instructions to make the offspring of your paper pets.

Materials

scissors
blue and yellow construction paper
glue
markers
coin
offspring templates
offspring tables

Procedure

1. Get six offspring small tables. Toss the coin to determine which alleles the first offspring will inherit for color from each parent. For example, “heads” could represent *B*, the allele for blue skin, and “tails” could represent *b*, the allele for yellow skin. Remember, blue is controlled by a dominant allele. Trace the outline of the offspring onto the appropriate color construction paper and cut it out.
2. On the back of the colored offspring, glue the table for the phenotype and genotype of each trait. Write in the genotype and phenotype for color.
3. Toss the coin and record the results to determine the genotypes for the other four traits. Record the genotypes and phenotypes in the appropriate column. Remember, the traits controlled by **dominant alleles are round eyes, triangular nose, and pointed teeth**. *A male has an X and a Y. A female has two Xs.* Name each paper pet offspring, and write its name on the back.
4. On the front of the offspring, draw its traits according to the genotypes determined by the coin toss.
5. Repeat this procedure five more times so that all together you have six offspring.