Investigating the Results of Inherited Traits

Background Information

Heredity is the passing on of traits, or characteristics, from parent to offspring. The units of heredity are called genes. Genes are found on the chromosomes in the cell. The combinations of genes for each trait occurs by chance.

When one gene in a gene pair is stronger than the other gene, the trait of the second gene is masked, or hidden. The stronger gene is the dominant gene. The gene that is masked is the recessive gene. Dominant genes are written as capital letters and recessive genes are written as lower case letters. If both genes in a gene pair are the same, the trait is said to be pure. If the genes are not similar, the trait is said to be hybrid. Sometimes genes can be neither dominant nor recessive. The result of such a situation is a blending of traits.

The genetic make-up of an individual is known as its genotype. The observable physical characteristics of an individual that are based on its genotype is known as its phenotype. In humans, the sex of an individual is determined by the male gene. Individuals that have two X chromosomes (XX) are females, while individuals with an X and Y chromosome (XY) are males.

In this investigation, you will observe how the results of different gene combinations produce certain traits.

Problem

How are traits inherited?

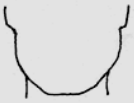
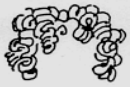
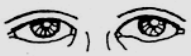
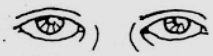
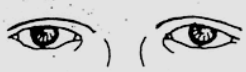
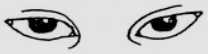
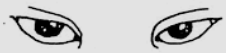
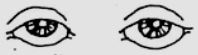
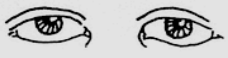
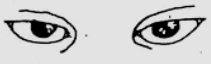
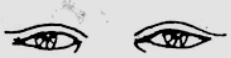
Materials *(per pair of students)*

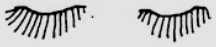
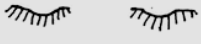
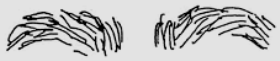
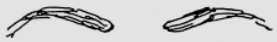
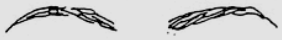
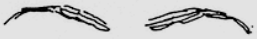
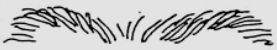
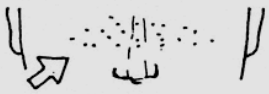
3 textbooks
2 coins
Pencil

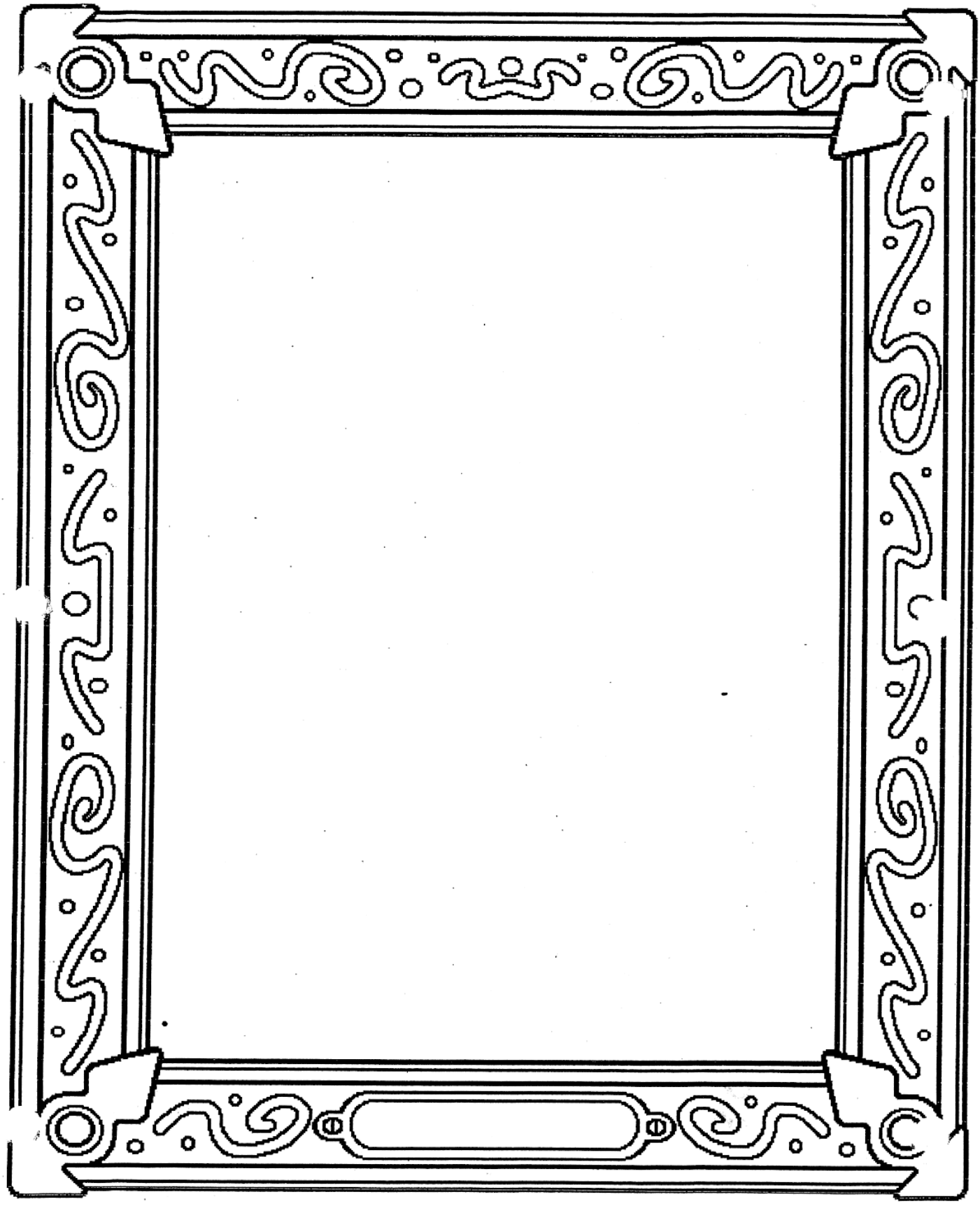
Procedure

1. Each coin flip counts. No re-flips. Find the coin and count it.
2. Determine which partner will toss for the female gene and which will toss for the male gene. Remember that there are two genes per trait.
3. Have the partner who is representing the male gene flip a coin into the well to determine the sex of the offspring. If the coin lands heads up, the offspring is a female. If the coin lands tails up, the offspring is a male. Record the sex of the offspring in Observations.
4. For all the coin tosses you will now make, heads will represent the dominant gene and tails will represent the recessive gene.
5. You and your partner should now flip your coins into the well at the same time. Note: The coins should be flipped only once for each trait.

6. Continue to flip the coins for each trait listed in the table. After each flip, record the trait of your offspring by placing a check in the appropriate box in the following table.
7. Using the recorded traits, draw the facial features for your offspring in the frame on the next page.

Traits	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
Shape of face	 round (RR)	 round (Rr)	 square (rr)
Cleft in chin	 absent (CC)	 absent (Cc)	 present (cc)
Hair	 curly (HH)	 wavy (Hh)	 straight (hh)
Widow's peak	 present (W W)	 present (Ww)	 absent (ww)
Spacing of eyes	 close together (EE)	 normal distance (Ee)	 far apart (ee)
Shape of eyes	 almond (AA)	 almond (Aa)	 round (aa)
Position of eyes	 straight (SS)	 straight (Ss)	 slant upwards (ss)
Size of eyes	 large (LL)	 medium (Ll)	 small (ll)

Traits	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
Length of eyelashes	 long (LL)	 long (Ll)	 short (ll)
Shape of eyebrows	 bushy (BB)	 bushy (Bb)	 fine (bb)
Position of eyebrows	 not connected (CC)	 not connected (Cc)	 connected (cc)
Size of nose	 large (LL)	 medium (Ll)	 small (ll)
Shape of lips	 thick (TT)	 normal (Tt)	 thin (tt)
Size of ears	 large (LL)	 normal (Ll)	 small (ll)
Size of mouth	 large (LL)	 medium (Ll)	 small (ll)
Freckles	 present (FF)	 present (Ff)	 absent (ff)
Dimples	 present (DD)	 present (Dd)	 absent (dd)



Name _____ Period ____ Flipping for _____ of _____ offspring
(parent) (gender)