Biology Activity

Face / Head Variation Lab

materials
- two coins
- drawing paper
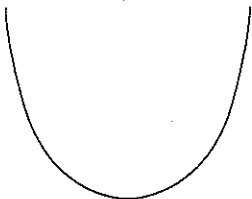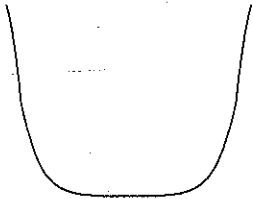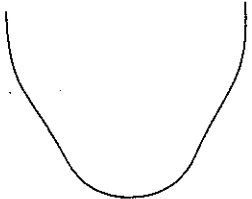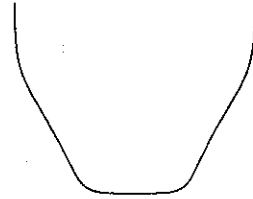- pencil
- colored pencils or crayons

Why are even closely related siblings different both in genotype and phenotype? They differ because the variety of traits in a human population is very large and reproduction creates new combinations of traits.

What traits would a baby have at age 15 if both the student and a partner were heterozygous for each trait listed on the lab? Inherited traits are determined by chance as illustrated that by this lab activity. (It must be kept in mind that actual inheritance is much more complicated than this simulation exercise implies.)

procedure
1. Choose a partner for this experiment. You and your partner will flip a coin to determine the facial characteristics of your "offspring."
   - One of you will represent the father and the other will represent the mother.
2. Determine the sex of the offspring. Only the father flips, as the father determines the child's sex.
   - heads will be a "Y chromosome" for boy (XY).
   - tails will be a "X chromosome" for girl (XX).
   - Record your results on the DATA SHEET.
3. Continue with each of the traits. Each partner flips a coin.
   - In each coin toss, *heads* represents a dominant gene and *tails* represents a recessive gene.
   - In some cases, a hybrid result will look like a mixture of the two traits. This is called *incomplete dominance.*
   - In some cases, several sets of genes may work together to produce a certain trait. This is called a *polygenic trait.*
4. On the DATA SHEET, list the genes contributed by each parent, and what they are together for the genotype of the baby, and what phenotype is represented by that genotype.
5. Now that you have determined all the traits of your child, draw a picture. Use colors and try to make the sketch as accurate as possible given the traits your child inherited.
6. Attach your drawing (baby picture) to your data sheet and hand in. Make sure your name(s) and the child's name are recorded on both the drawing and the DATA SHEET.
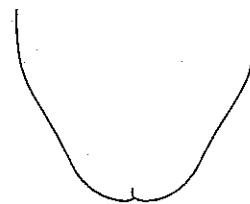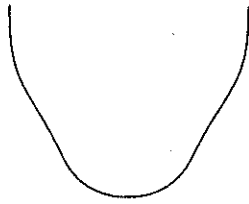
GUIDE for DETERMINING INDIVIDUAL TRAITS

FACE SHAPE	Round (RR, Rr)	Square (rr)
CHIN SHAPE	Round (RR, Rr)	Square (rr)

CLEFT CHIN	Absent (AA, Aa)	Present (aa)

SKIN COLOR   Dark color is dominant over light. At least four gene pairs are involved in determining skin color. Each partner flips the coin 4 times to determine the genotype.

    8 capitals (AABBCCDD)-very dark black
    7 capitals (for example, AaBBCCDD)- black
    6 capitals (for example, AaBbCCDD)-very dark brown
    5 capitals (for example, AaBbCcDD)-dark brown
    4 capitals (for example, AaBbCcDd)-medium brown
    3 capitals (for example, AaBbCcdd)-light brown
    2 capitals (for example, AabbccDd)-very light brown
    1 capital (for example, Aabbccdd)-light tan
    no capitals (for example, aabbccdd)-very pale white

HAIR COLOR   Dark color is dominant over light. At least four gene pairs are involved in determining hair color. Each partner flips the coin 4 times to determine the genotype.

    8 capitals (AABBCCDD)-black
    7 capitals (for example, AaBBCCDD)-dark red
    6 capitals (for example, AaBbCCDD)-red brown
    5 capitals (for example, AaBbCcDD)-dark brown
    4 capitals (for example, AaBbCcDd)-brown
    3 capitals (for example, AaBbCcdd)-light brown
    2 capitals (for example, AabbccDd)-dark blonde
    1 capital (for example, Aabbccdd)-medium blonde
    no capitals (for example, aabbccdd)-pale/light blonde

HAIR TYPE	Curly (HH)	Wavy (Hh)	Straight (hh)
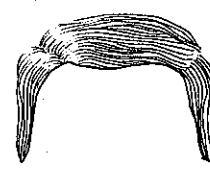
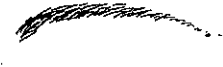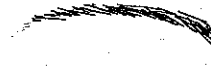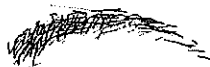| WIDOW'S PEAK	Present (DD, Dd)	Absent (Dd)

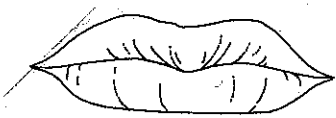| EYEBROW COLOR	Darker than hair (HH)	Same color as hair (Hh)	Lighter (hh)
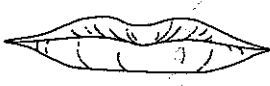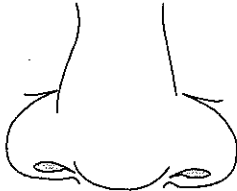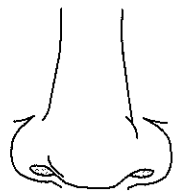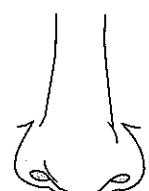
EYEBROWS I	Bushy (BB, Bb)	Fine (bb)

EYEBROWS II	Not connected (NN, Nn)		Connected (nn)

SPACING OF EYES	Close together (EE)	Average (Ee)	Far Apart (ee)

SIZE OF EYES	Large (LL)	Medium (Ll)	Small (ll)

SHAPE OF EYES	Almond/Wide (AA, Aa)		Round/Narrow (aa)

EYE COLOR   Dark color is dominant over light. As least four gene pairs are involved in determining eye color. Each partner flips the coin 4 times to determine the genotype.

- 8 capitals (AABBCCDD)-dark brown
- 7 capitals (for example, AaBBCCDD)-dark brown
- 6 capitals (for example, AaBbCCDD)-brown
- 5 capitals (for example, AaBbCcDD)-brown
- 4 capitals (for example, AaBbCcDd)-brown/green fleck
- 3 capitals (for example, AaBbCcdd)-dark gray-blue
- 2 capitals (for example, AabbccDd)-light gray-blue
- 1 capital (for example, Aabbccdd)-green-blue
- no capitals (for example, aabbccdd)-light brown/green/hazel

EYELASHES	Long (LL, Ll)		Short (ll)

MOUTH SIZE	Long (MM)	Average (Mm)	Small (mm)

LIPS	Thick (TT, Tt)	Thin (tt)

DIMPLES	Present (DD, Dd)	Absent (dd)

SIZE OF NOSE	Big (NN)	Medium (Nn)	Small (nn)

NOSTIL SHAPE	Rounded (RR, Rr)	Flared (rr)

EARLOBE ATTACHMENT	Free (FF, Fr)	Attached (ff)

FRECKLES	Present (FF, Ff)	Absent (ff)