

Parents \_\_\_\_\_  
\_\_\_\_\_

## Variations on a Human Face



**Materials:** 2 pennies, chart on human traits

1. First determine which partner will toss for the male and which will toss for the female. Each of you will get a penny.
2. Have the partner who is representing the male flip the coin, if the coin lands heads up, the offspring is female, if tails, the offspring is male. **What is the sex of your offspring?** \_\_\_\_\_
3. For all coin tosses from now on. **Heads will represent the dominant allele and tails will represent the recessive allele.** For each trait on the chart you will flip a coin to determine what GENOTYPE your offspring will have. Put a check in the box that represents your offspring.

*Example: For Shape of Face - Your partner tossed heads, and you tossed tails. That means your offspring's genotype is  $Rr$ , and the child will have a round face. You would check that box. If you had instead both tossed tails, the child would have a square-shaped face ( $rr$ ). If you'd both tossed heads, the child would have a round shaped ( $RR$ ) face.*

**Coins should be flipped only once for each trait.**

### Polygenic Traits

– some traits are controlled by more than two genes and are called polygenic. Hair, eye color and skin color are examples of polygenic traits.

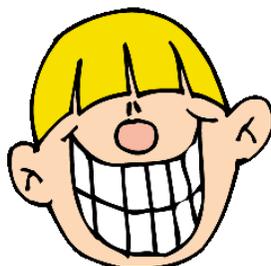
**Hair Color** -- Dark hair is dominant over light. To determine the color of the offspring's hair, assume there are two gene pairs involved (there are actually probably more than that, but for the purpose of this activity, let's not go crazy). Flip your coin first to determine the genotype of the first pair of alleles (AA, Aa, or aa). Now, flip the coins again to determine the genotype of the second pair of alleles (BB, Bb, or bb). Match the genotype you have to the hair color on the chart. **Circle your offspring's hair color.**

If the genotype is....

AABB  
 AABb  
 AAbb  
 AaBB  
 Aabb  
 AaBb  
 aaBB  
 aaBb  
 aabb

The hair color is...

black  
 black  
 red  
 brown  
 regular blonde  
 brown  
 dark blonde  
 regular blonde  
 pale yellow blonde



**Eye Color** – Dark eyes are dominant over light. To determine the color of the offspring’s eyes, assume there are two gene pairs involved, one which codes for depositing pigment in the front of the iris, and one which codes for depositing pigment in the back of the iris. Determine the genotype of the first pair (AA, Aa, or aa) Then flip again to determine the genotype of the second pair (BB, Bb, or bb). Use the chart below to find out what eye color your offspring has and circle it.

If the genotype is....

AABB  
AABb  
AAbb  
AaBB  
AaBb  
Aabb  
aaBB  
aaBb  
aabb

The eye color is....

dark brown  
dark brown  
brown  
brown with green flecks  
brown  
gray-blue  
green  
dark blue  
light blue (hazel)



**Skin Color** – skin color is controlled by a lot of different genes that basically add together to determine how dark the skin is and variations in tone. To simulate how skin color might be determined. Flip a single coin 10 times. Each time the coin turns up heads, give your offspring a point. Add your points together. 10 pts would be a very dark child and 1 pt would be a very pale child. How many points does your child have? \_\_\_\_\_

5. Now that you have determined all the traits of your child. You will **draw a picture**. Use colors and try to make the sketch as accurate as possible given the traits your child inherited. Make sure you name your child too!

### *Analysis and Conclusions*

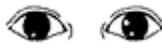
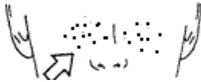
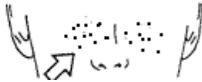
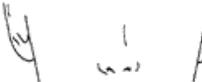
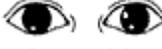
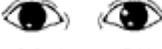
1. Was your child exactly like any other child in the room? What do you think the odds were that two children in the room would turn out **exactly** alike?

2. How might it be possible for you to show a trait that neither of your parents have?

3. Which traits are codominant or incompletely dominant? (these traits don’t have a clear dominant or recessive, the heterozygous condition shows a “blending” or a “middle” condition)

4. Why did you have to flip the coin twice to determine hair and eye color?

5. Show the cross of a wavy haired person with a wavy haired person. Use a Punnet square.

Human Variations				Trait	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
Trait	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)	Length of Eyelashes	 Long (LL)	 Long (Ll)	 Short (ll)
Shape of Face	 Round (RR)	 Round (Rr)	 Square (rr)	Shape of Eyebrows	 Bushy (BB)	 Bushy (Bb)	 Thin (bb)
Cleft in Chin	 Absent (CC)	 Absent (Cc)	 Present (cc)	Position of Eyebrows	 Not connected (NN)	 Not connected (Nn)	 Connected (nn)
Hair	 Curly (HH)	 Wavy (Hh)	 Straight (hh)	Size of Nose	 Large (NN)	 Medium (Nn)	 Small (nn)
Widow's Peak	 Present (WW)	 Present (Ww)	 Absent (ww)	Shape of Lips	 Thick (TT)	 Medium (Tt)	 Thin (tt)
Spacing of Eyes	 Close (EE)	 Normal (Ee)	 Far (ee)	Size of Mouth	 Large (LL)	 Medium (Ll)	 Small (ll)
Shape of Eyes	 Almond (AA)	 Almond (Aa)	 Round (aa)	Size of Ears	 Large (LL)	 Medium (Ll)	 Small (ll)
Position of Eyes	 Straight (SS)	 Straight (Ss)	 Slant (ss)	Freckles	 Present (FF)	 Present (Ff)	 Absent (ff)
Size of eyes	 Large (LL)	 Medium (Ll)	 Small (ll)	Dimples	 Present (DD)	 Present (Dd)	 Absent (dd)

