

Name: \_\_\_\_\_



## Variations on a Human Face

Materials: 2 pennies, chart on human traits

### Single Allele Traits

1. Determine which partner will toss for the male and which will toss for the female.
2. Have the parent who is representing the male flip the coin, if the coin lands heads up, the offspring is female, if tails, then the offspring is male. What sex is 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 the GENOTYPE of your offspring. Put a check in the box that represents your offspring's appearance, or PHENOTYPE.

*Example: For the shape of the face, your partner tossed heads and you tossed tails. This means the offspring's genotype is Rr and the child will have a round face, so check that box. If you had both tossed tails, you would check the square-shaped face (rr) and if you had both tossed heads, you would have a round shaped face (RR)*

### Polygenic Traits - Hair, Eye, Skin

Some traits are controlled by more than two genes, such as hair color, eye color and skin color. For these traits you will need to perform a different procedure to determine your offspring's phenotype.



#### 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....	The hair color is....
AABB	black
AABb	black
AAbb	red
AaBB	brown
Aabb	regular blonde
AaBb	brown
aaBB	dark blonde
aaBb	regular blonde
aabb	pale yellow blond



#### Eye Color

To determine the color of the offspring's eyes, assume there are two gene pairs involved, one which codes for pigment in the front of the iris, and one which codes for 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....	The hair color is....
AABB	dark brown
AABb	dark brown

AAbb	brown
AaBB	brown with green flecks
Aabb	brown
AaBb	gray
aaBB	green
aaBb	dark blue
aabb	light blue



### Skin Color















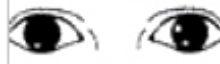









Skin color is controlled by a lot of different genes that basically add together to determine how dark the skin is and variations in tone. To simulate how skin color might be determined. Flip a single coin 10 times. Each time the coin turns up heads, give your offspring a point. Add your points together.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







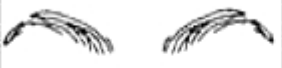
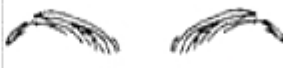













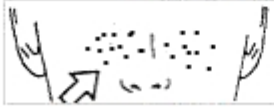





\*\*Now that you have determined all the traits of your child. You will **draw a picture**. Use colors and try to make the sketch as accurate as possible given the traits your child inherited. Make sure you name your child too! \*\*

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### 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)
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 (WW)	 Present (Ww)	 Absent (ww)
Spacing of Eyes	 Close (EE)	 Normal (Ee)	 Far (ee)
Shape of Eyes	 Almond (AA)	 Almond (AA)	 Round (aa)
Position of Eyes	 Straight (SS)	 Straight (Ss)	 Slant (ss)
Size of eyes	 Large (LL)	 Medium (Ll)	 Small (ll)

Trait	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)	 Thin (bb)
Position of Eyebrows	 Not connected (NN)	 Not connected (Nn)	 Connected (nn)
Size of Nose	 Large (NN)	 Medium (Nn)	 Small (nn)
Shape of Lips	 Thick (TT)	 Medium (Tt)	 Thin (tt)
Size of Mouth	 Large (LL)	 Medium (Ll)	 Small (ll)
Size of Ears	 Large (LL)	 Medium (Ll)	 Small (ll)
Freckles	 Present (FF)	 Present (Ff)	 Absent (ff)
Dimples	 Present (DD)	 Present (Dd)	 Absent (dd)