

**It's A Toss Up**  
(Student Handout)

**Purpose:** To explore how traits are passed from parent to offspring

**Background:**

Heredity is the passing of traits or characteristics from parent to offspring. The units of heredity are the genes that are found on chromosomes in the cells. In this activity, you will observe the results of how different gene combinations produce certain traits. Before starting, discuss these ideas with the group and write the answers in your own words:

1. What do the terms **dominant** and **recessive** mean?
2. Explain the difference between the **genotype** and the **phenotype** of an individual.
3. How are dominant and recessive genes written or abbreviated in a **genotype**?
4. How can you tell by looking at the genotype of the individual if he/she is **homozygous** or **heterozygous** for that trait?

**Materials/Equipment:**

2 coins

Facial Features Chart

Pencil

**Safety Considerations:** Always follow lab safety procedures.

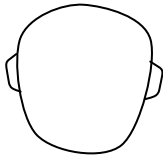
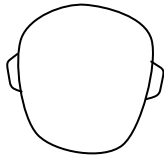






















**Procedure:**




























1. Work in teams of three. Assign one group member to toss for the female parent, one for the male, and one to be the offspring. The offspring will record the traits that result from the tosses and sketch the facial features that he or she has inherited from the parents on the observation sheet.
2. Have the team member who is representing the male parent flip a coin to determine the sex of the offspring. If the coin lands heads, the offspring is female. If it land tails, the offspring is male. Record the sex of offspring 1 in the sketch box provided.
3. From now on, heads will represent a dominant gene, and tails will represent a recessive gene. Both coins should be flipped at the same time but only once for each trait. Record the genotype and phenotype that result from the coin toss for the first trait.
4. Continue to flip both coins for each facial trait. Use the completed list of phenotypes to sketch the resulting offspring.
5. Next, each team member should be assigned a different role and repeat Steps 1-4 so that a different member will sketch the next offspring. Finally, switch roles a final time using Steps 1-4 to determine traits for the third offspring.

**Data Table:**

Sex of the offspring=\_\_\_\_\_

**Facial Feature Chart**

Traits	Homozygous Dominant (both heads)	Heterozygous Hybrid (one head, one tail)	Homozygous Recessive (both tails)
FACE SHAPE	 round (RR)	 round (Rr)	 square (rr)
CHIN CLEFT	 absent (CC)	 absent (Cc)	 present (cc)
WIDOW'S PEAK	 present (WW)	 present (Ww)	 absent (ww)
HAIR TYPE	 curly (HH)	 wavy (Hh)	 straight (hh)
EYE SIZE	 large (LL)	 medium (Ll)	 small (ll)
EYE SHAPE	 almond (AA)	 almond (Aa)	 round (aa)
EYE POSITION	 straight (SS)	 straight (Ss)	 slant upward (ss)
EYE SPACE	 close together (EE)	 normal distance (Ee)	 far apart (ee)

Traits	Homozygous Dominant (both heads)	Heterozygous Hybrid (one head, one tail)	Homozygous Recessive (both tails)
EYEBROW POSITION	 not connected (NN)	 not connected (Nn)	 connected (nn)
EYEBROW SHAPE	 bushy (BB)	 bushy (Bb)	 fine (bb)
EYELASH LENGTH	 long (LL)	 long (Ll)	 short (ll)
MOUTH SIZE	 large (LL)	 medium (Ll)	 small (ll)
LIP SHAPE	 thick (TT)	 normal (Tt)	 thin (tt)
DIMPLES	 present (DD)	 present (Dd)	 absent (dd)
NOSE SIZE	 large (LL)	 medium (Ll)	 small (ll)
EAR SIZE	 large (LL)	 normal (Ll)	 small (ll)
FRECKLES	 present (FF)	 present (Ff)	 absent (ff)

**Data Table:**

Sex of the offspring=\_\_\_\_\_

Chart (GT= genotype)

**SKETCH OF OFFSPRING**

TRAIT	GT	PHENOTYPE
Face shape		
Chin cleft		
Widow's peak		
Hair		
Eye size		
Eye shape		
Eye position		
Eye space		
Eyebrow position		
Eyebrow shape		
Eyelash length		
Mouth size		
Lip shape		
Dimples		
Nose size		
Ear size		
Freckles		

**Questions:**

1. Why is it appropriate for the male parent to flip for the sex of the offspring?
2. What percent chance is there for producing a male offspring? A female? Explain.
3. What do the coins represent?
4. What determines the observable physical characteristics of the offspring?
5. Are all three offspring in your group alike? Would you expect other groups to have offspring very similar to yours? Explain.
6. What are the possible genotypes for the parents of a child who has wavy hair?
7. Which traits in this activity do not show simple dominance but a blending of traits?
8. How would it be possible for the offspring to show a trait that neither of the parents shows physically?