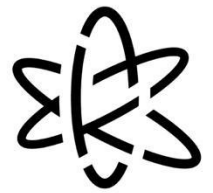




# **Eighth Grade Science**

# 8<sup>th</sup> Grade Science: Activity 3

How do sudden changes in the environment impact species survival?



Directions: This handout goes with a KCS Teacher Video. If you have access to the video, watch the video before doing this activity. You can find the videos here <https://www.knoxschools.org/Page/21816>

## Genetics Coin Toss Activities (2 Parts):

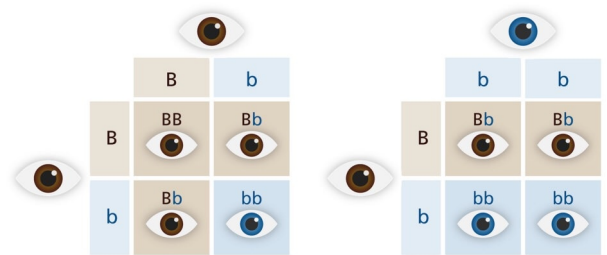
### Task 1 Goal:

- To observe how traits (characteristics) are distributed (passed on) to offspring .
- To calculate the probability of dominant and recessive traits during a coin toss activity.

**Background Information:** Genetics is the study of the passing of traits from parents to offspring. Each trait is associated with certain genes we get from our parents. Genes come in two forms, **dominant** and **recessive**. The **dominant** of the two genes masks or “covers up” the weaker recessive gene. These genes determine what the offspring looks like and even how it behaves.

**Materials:** Two coins (the heads side of the coin will represent the DOMINANT trait (**T**) and the tails side of the coin will represent the RECESSIVE trait (**t**).

**KEY:** T – Dominant Trait  
t – Recessive Trait



B - dominant brown eye allele  
b - recessive blue eye allele

BB ● brown eyes  
Bb ● brown eyes  
bb ● blue eyes

**Pre- Think:** Write a sentence or two about what you already know about genetics and probability.

**Procedure:**

1. Obtain two coins (they can be any coins). Each coin “heads” represents uppercase (T), and each coin “tails” represents lowercase (t). Each coin represents a parent, so each parent’s genotype is Tt (one heads/dominant and one tails/recessive).
2. Toss or flip both coins together for a total of 60 times. Each coin represents the genes for one parent; therefore the genetic code represented by the coin tosses is Tt X Tt.
3. Record the genotype for each coin toss (TT for both heads, Tt for one heads and one tails, tt for both tails).
4. The possible genotypes are as follows:
  - a. **TT** – purebred dominant
  - b. **tt** – purebred recessive
  - c. **Tt** – hybrid



**Possible Outcomes**

5. Record the data on your chart below. Complete the tally chart and determine the total number of genetic combinations and percentages that resulted from your tosses. To find the percentages take your tally number for each line and divide by 60 (total trials) then multiply it by 100 to find your answer in percentage form.

**Tally of Dominant and Recessive Traits**


# of TT = \_\_\_\_\_

% of TT (# of TT ÷ 60 = \_\_\_\_ × 100) = \_\_\_\_\_

# of tt = \_\_\_\_\_

% of tt (# of tt ÷ 60 = \_\_\_\_ × 100) = \_\_\_\_\_

# of Tt = \_\_\_\_\_

% of Tt (# of Tt ÷ 60 = \_\_\_\_ × 100) = \_\_\_\_\_

# of TT + Tt = \_\_\_\_\_

% of TT + Tt (# of TT + tt ÷ 60 = \_\_\_\_ × 100) = \_\_\_\_\_

(Total offspring with dominant genes)

(Total of offspring with dominant genes)

**What I Learned:** Describe what you learned from this activity.

**What I Wonder:** Pose one question that you still have about the topic of genetics and probability.

**Task 2 Goal:**

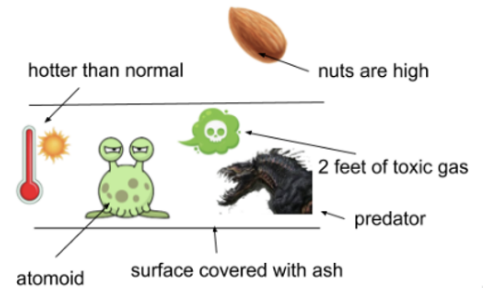
- To observe how traits are distributed to offspring .
- To hypothesize an organism’s chance of survival in a newly changed environment.

**Background Information:**



**HELP!** A great seismic shift has occurred deep in the crust of the planet Xeon and it has caused every volcano on the surface to erupt spewing molten rock, dangerous gasses, and producing a thick yellow ash. This dramatic change within the planet has created a new landscape on the surface affecting every living species. This includes the Mendelivian species of Atomoids (an alien looking organism) that live on this planet. The current living Atomoids (and their genes) that were not wiped out during the eruption are the only hope for their populations survival. Your task is to flip your coins to determine an offspring’s genotype and traits and then determine if it can survive in this new environment.



**The following are the new environment’s conditions:** Thick yellow ash present over the surface, toxic gas that occupies the first 2 feet above ground level, hotter than normal temperatures, aggressive predators (food is scarce so predators are quick and attack from all sides), and the source of the Atomoids are nuts that have to be reached high up.



**Materials:** 1 Coin, Colored Pencils or Crayons

**Procedure:**

1. Flip a coin to determine the combination of genes your Atomoid baby has for each trait. A head represents a dominant gene, and a tail represents a recessive gene. Write “H” or “t” (for head or tail) in the “Flip 1” and “Flip 2” columns on the attached chart.
2. The combination of your two flips determines your genotype or gene combination. Using the letters assigned to each trait (found in the table below) write your alien’s genotype on the attached chart.
3. Use the information found in the table below to determine your alien’s phenotype or appearance for each trait and record on the attached chart.
4. Use the information provided in the “Notes” section of the table to determine how the traits should look and draw a simple sketch of your alien at the end.

Trait	Dominant 	Recessive 	Notes
Skin Color	Blue (B)	Yellow (b)	The alien skin tone
Limb Length	Legs longer than arms (L)	Arms longer than legs (l)	Longer legs or arms?
Antennae Shape	Circle (C)	Square (c)	Refers to the shape at the end of the antennae
# of Antennae	Three (T)	One (t)	How many on alien’s head
Height	Tall (H)	Short (h)	Tall is bigger than 3 feet
Number of Eyes	Three (T)	One (t)	Same placement as humans
Eye Color	Red (R)	Blue (r)	Eyes are solid one color
Head Shape	Square (S)	Oval (s)	Head shape can be large or small
Body Shape	Wide Torso (W)	Skinny Torso (w)	Wide or skinny
Furriness	Furry Body (F)	No Fur (f)	Fur is all over except on head
Fur Color	Yellow (Y)	Purple (y)	Fur is uniform in color

## Data Chart

Trait	Flip 1	Flip 2	Gene Combination	Trait Appearance
Skin Color				
Limb Length				
Antennae Shape				
# of Antennae				
Height				
Number of Eyes				
Eye Color				
Head Shape				
Body Shape				
Furriness				
Fur Color				

## Conclusion

1. What do you feel your alien's chances of survival are based on the new planet conditions?
2. What traits does your alien possess that will help it to survive?
3. What traits does your alien possess that might hurt its chance of survival?
4. If you did this activity again, would you expect the same results (an identical alien)? Why or why not?

## Create an Alien Genetics Activity - Drawing (On a separate sheet of paper)

Instructions for your alien drawing:

1. Your alien drawing must include all traits from the chart.
2. Label each trait on your drawing, specifying the phenotype (ex. "Blue Skin Color").
3. Draw any additional traits you would like to add that aren't in the chart.
4. Give your alien a name!!!

