

## Fun Bugs!

Name \_\_\_\_\_ per \_\_\_\_ date \_\_\_\_

**Background:** Genes contain the information that determines traits in living things. Each version of a gene is called an allele. Genes come in pairs on homologous chromosomes. Homologous chromosomes are separated during meiosis and sort independently of each other. This mixture of genes makes new individuals with a variety of traits. You will be simulating the process of meiosis to make new baby Fun Bugs!

**Materials:** penny, 8 Fun Bug Chromosomes (2 different colors), toothpicks, small colored marshmallows, large marshmallows, chocolate chips, dots, pretzel sticks, macaroni pasta, rotini pasta, linguini pasta, cinnamon hearts or orange slices for wings.

### Procedures:

1. Select a chromosome 1 (pink). Flip a penny for each trait listed in the chromosome 1 chart to find out if the gene is dominant or recessive.
  - Heads = dominant trait
  - Tails = recessive trait

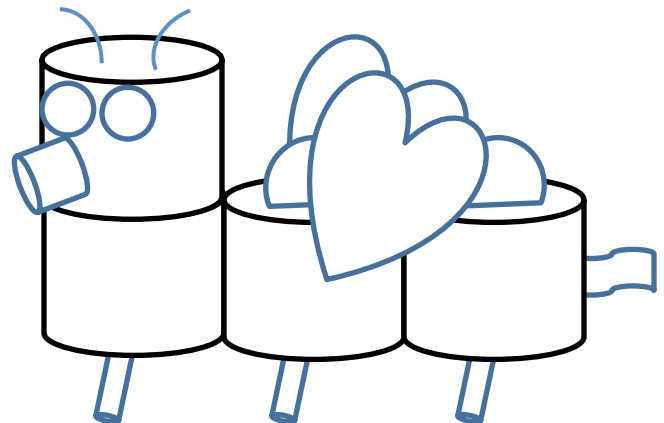
Write each gene onto the chromosome. (Use cursive to write the lower case of a recessive trait, it will make it easier to distinguish dominant from recessive.)

2. Repeat the process for a second chromosome 1. You need to have **2 pink chromosomes**.
3. Choose a chromosome 2 (green). Repeat the procedure to determine the traits using the chromosome 2 chart. You need to have **2 green chromosomes**.

Chromosome 1 (pink)	
Trait	Possible Genes
Nose color	P or p
# of antenna	N or n
# of body segments	M or m
Hump color	H or h
# of eyes	B or b

Chromosome 2 (green)	
Trait	Possible Genes
Tail	T or t
# of legs	L or l
Leg length	G or g
# of humps	C or c
# of wings	W or w

4. Using the chromosomes to fill in the **Fun Bug Parent Traits** chart.
5. Gather the supplies needed and build your parent Fun Bug.
6. Partner up with someone at your table. Your parent Fun Bugs are now going to have babies!
7. In order to have babies, each fun bug parent must make gametes, and in order to make gametes the chromosomes must be replicated. Cut out the rest of the chromosomes. Duplicate the original chromosomes by writing the same traits on the new ones. **Now you should have 4 pink chromosomes and 4 green chromosomes.**
8. Next, shuffle the chromosomes and let your partner choose one pink and one green chromosome at random. These two chromosomes represent a gamete from one Parent Fun Bug. Then randomly select one of each chromosome from your partner. This represents the gamete from the other Parent Fun Bug. The combination of these gametes results in a new



Baby Fun Bug! Write the genotypes and phenotypes of **Baby Fun Bug #1** on the **Baby Fun Bug Chart**.

9. Take back your chromosomes from your partner, reshuffle them, and have your partner choose one pink and one green at random again. Choose one of each chromosome from you partner again. The combination of these chromosomes now represents **Baby Fun Bug #2!** Write the genotype and phenotype on the **Baby Fun Bug Chart**.
10. Gather the supplies needed, and you and your partner can make the two baby Fun Bugs.
11. Answer the Analysis Questions.

<b>Nose Color</b> (Dots)	<b># of Antenna</b> (pasta)	<b># of Body Segments</b> (large marshmallows)	<b>Hump Color</b> (mini marshmallows)	<b># of Eyes</b> (chocolate chips)
PP = pink Pp = orange pp = green	NN = 2 Nn = 1 nn = 0	MM or Mm = 3 mm = 2	HH or Hh = orange/pink hh = green/yellow	BB & Bb = 2 bb = 3

<b>Tail</b> (rotini or linguini pasta)	<b># of Legs</b> (pretzel sticks)	<b>Leg Length</b> (whole or half pretzel)	<b># of Humps</b> (mini marshmallows)	<b># of Wings</b> (hearts or orange slices)
TT or Tt = curly tt = straight	LL or Ll = 4 ll = 6	GG or Gg = short gg = long	CC or Cc = 4 cc = 3	WW or Ww = 2 ww = 4

**Fun Bug Parent Traits**

<b>Trait</b>	<b>Genotype</b>	<b>Phenotype</b>	<b>Materials Needed</b>
Nose Color			
# of Antenna			
# of Body Segments			
Hump Color			
# of Eyes			
Tail			
# of Legs			
Leg Length			
# of Humps			
# of Wings			

**Baby Fun Bug Traits**

Trait	Fun Bug Baby #1		Fun Bug Baby #2		Materials Needed
	Genotype	Phenotype	Genotype	Phenotype	
Nose Color					
# of Antenna					
# of Body Segments					
Hump Color					
# of Eyes					
Tail					
# of Legs					
Leg Length					
# of Humps					
# of Wings					

**Analysis Questions:**

1. How did you simulate the Law of Segregation in this activity?
2. How did you simulate the Law of Independent Assortment in this activity?
3. Which traits are examples of incomplete dominance?
4. What traits did your two baby fun bugs share? What traits were different? How is this like siblings in a family?
5. Explain how the baby fun bugs showed genetic variation.

**Conclusion:** Write 2 things you learned in complete sentences.