

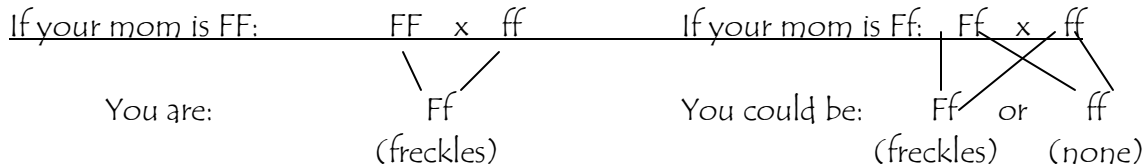


Alien Life Form (ALF)

Closely related siblings are most often different in both genotype (the actual genes) and phenotype (the appearance of the genes). This is because of the great variety of traits in a human population and reproduction continually creates new combinations of these traits.

Think about you and a sibling. You have many similar traits as well as many traits that are not at all alike. Your traits were determined from information from both your parents. Each parent contributed half of your genes. The way these genes combined determined what you would be like.

For example, if your mom has freckles on her cheeks, but your dad does not there is a very good chance that you will have freckles on your cheeks. Here is how it works. Freckles is a dominant trait that we will represent by the letter "F". Your mom has freckles so she must have at least one "F" in her genotype. She could be FF or Ff. Your dad does not have freckles so he has the recessive trait. His genotype is ff (pure). (Hopefully you noticed that both your mom and dad have two genes to make up the trait. Where did they get them from?) Your genotype could be any of the following:



Can you see why there is a greater chance that you would have freckles? Why?

Actual inheritance is really much more complicated than this and geneticists are always searching for new information. However, the following activity will give you a baseline of knowledge about inheritance and how it works.

On the next page you will find a table of traits for an alien population. You are going to create an alien using the traits in this chart!

Alien Characteristics

Trait	Dominant	Recessive
Tail (T)	straight	curly
Horns (H)	absent	present
Ears (E)	pointed	rounded
Teeth (R)	flat	pointed
Arm shape (D)	fat	skinny
Legs (L)	long	short
Tongue (M)	hairy	smooth
Eye shape (G)	round	almond
Nose (N)	pointed	rounded
Fur (F)	blue	red
Arms (A)	six	two
Leg Shape (B)	triangular	rectangular
Eye Color (Q)	yellow	green

Procedure:

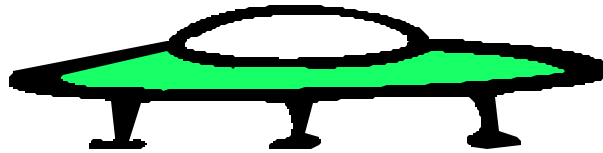


1. Flip two coins simultaneously to determine the gene pairs for each trait. Heads means dominant and tails means recessive.
2. In the table, record the genotype and phenotype for each characteristic.

My Alien Creature

Trait	Genotype	Phenotype
Tail		
Horns		
Ears		
Teeth		
Arm Shape		
Legs		
Tongue		
Eye Shape		
Nose		
Fur		
Arms		
Leg shape		
Eye Color		

Alien Life Form II



Before you create your alien, you must determine the sex of your creature. Remember, it takes two genes to make a trait. Females are XX and males are XY. Each parent provides half of what it has. A female has two X's, so she provides an X to her offspring. A male has an X and a Y, so the male is really the one that determines if the offspring will be a boy or a girl. If the male provides an X, the offspring will be a girl. If the male provides a Y, then the offspring will be a boy.

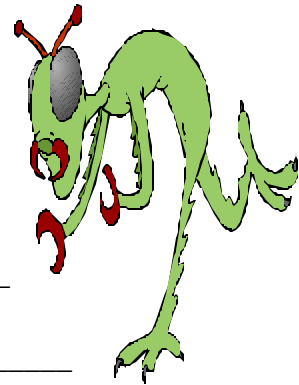
Procedure:

1. Get two pennies. On one of the pennies, place an X on each side. This represents your alien's mom. On the other penny, place an X on one side and a Y on the other side. This represents your alien's dad.
2. Toss the coins simultaneously, just once.
3. Record your findings and determine the gender of your alien.

1st penny

2nd penny

The sex of my alien is: _____



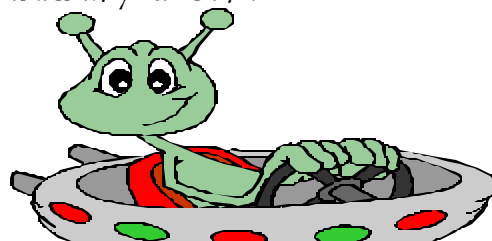
4. Name your alien. _____
5. Place your results on the data chart on the board.
6. Count the number of males and females and record the totals in the space below.

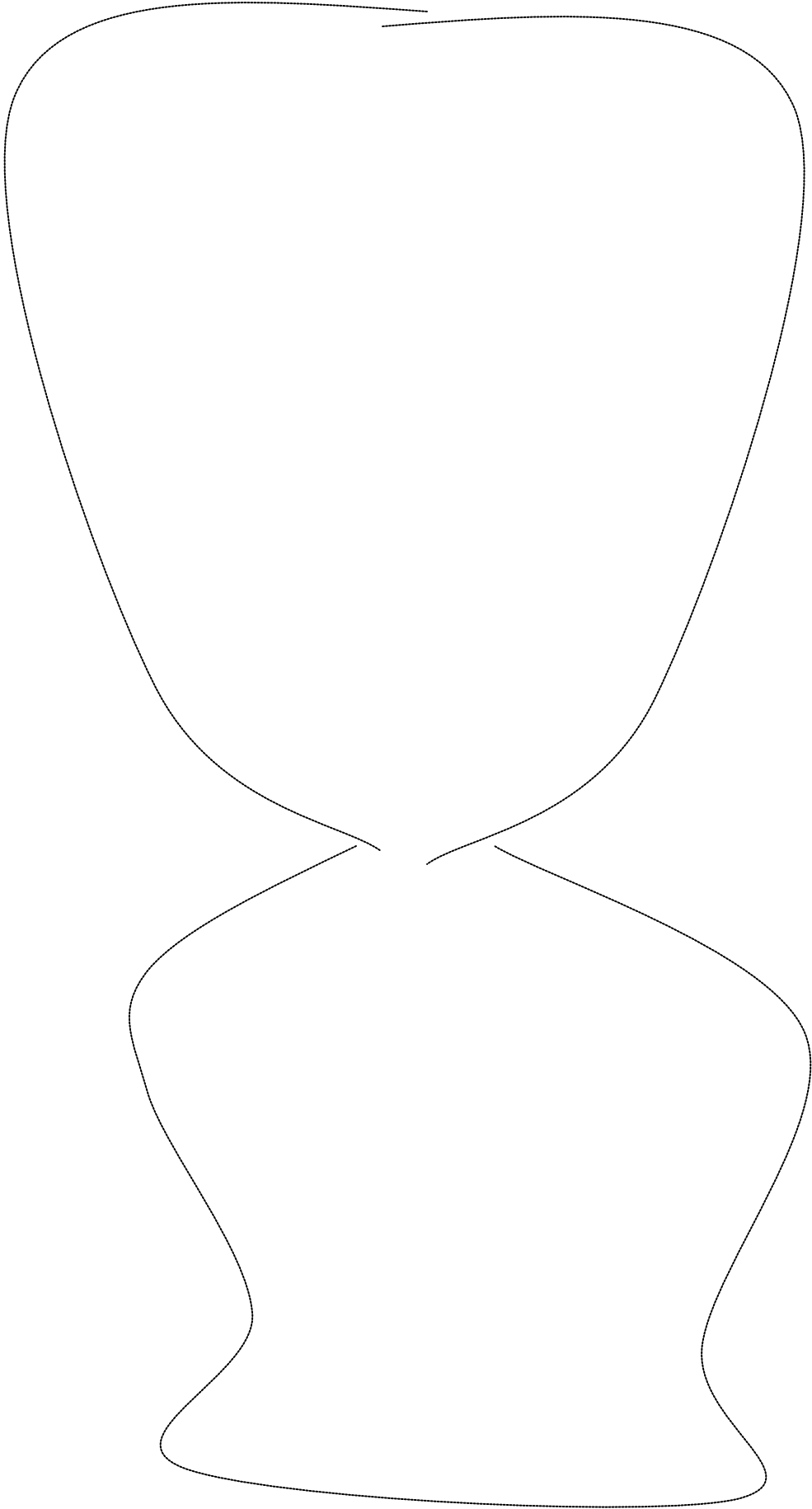
Males _____ Females _____

7. Record the name of your partner on the line below (your teacher will tell you who your partner is).

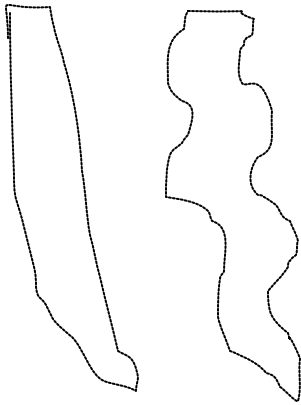
My partner is: _____

8. Use the cut-outs on the next pages to make your alien. You may get creative as long as you keep to the characteristics in your chart.

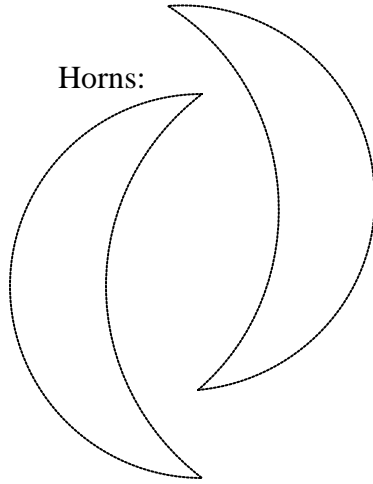




Tails: straight curly



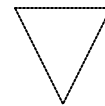
Horns:



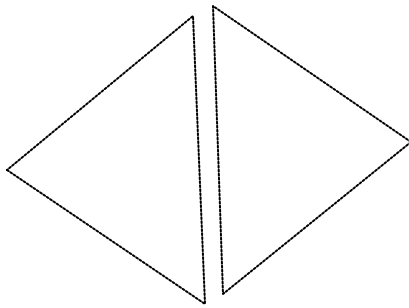
Teeth: Flat



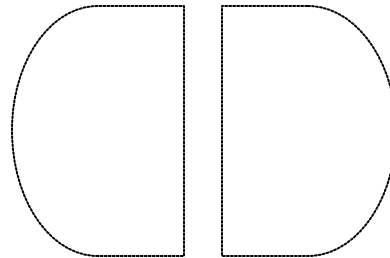
Pointed



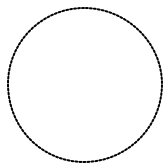
Ears: Pointed



Rounded



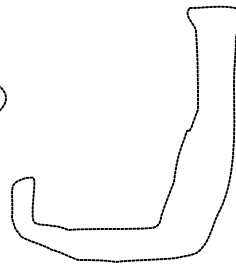
Eye shape: Round



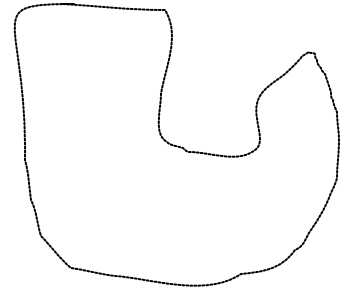
Almond



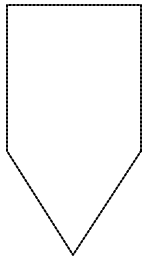
Arms: Skinny



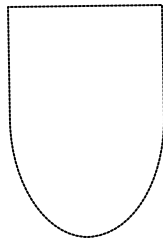
Fat



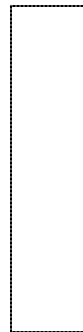
Nose: Pointed



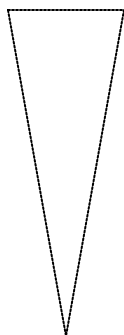
Rounded



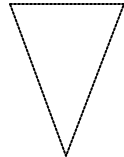
Legs: Long rectangular



Legs: Long triangular



Short triangular



Short rectangular



Alien Life Form II

Answer the following questions after creating your alien creature. Think in terms of human inheritance.

1. What is the difference between a genotype and a phenotype? Give an example from the activity.
2. What is the difference between dominant and recessive? Give an example from the activity.
3. Why isn't your creature exactly the same as anyone else's (genetically)?
4. How is it genetically possible that you might have a trait that neither parent has? For example, you may have blue eyes, but both your parents have brown.
5. Did your alien end up with mostly dominant or recessive traits? Explain.

Alien Life Form (III)

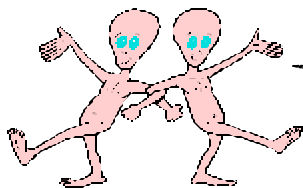
You and your spouse will have 2 "lovely" alien children. You are going to create these two children determining their genotypes and phenotypes based on the genes of the parents.

For example, let's say that the mom has a straight tail (TT) and the dad has a curly tail (tt). (Remember that straight was dominant). Mom gives half of her genes, in this case T, and dad give half of his genes, in this case t. The child will have the genotype Tt and will therefore have a straight tail. As a matter of fact, all of the children born to these two parents will have straight tails because this is the only possible combination of genes (unless there is a gene mutation, then anything could happen).

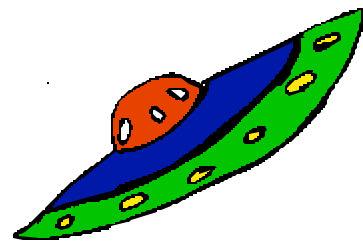
You are probably wondering what you are going to do if the parent is hybrid for a trait. What if the parent had a genotype of Tt? How is it determined which gene will be given to the offspring? It's totally random! Each gene has a 50/50 chance of being passed on. You will toss a penny to determine which one will be passed on.

Procedure:

1. Look at your and your spouse's data tables from the previous activity. Label them "Mom" and "Dad" appropriately.
2. Determine the sex of each child by tossing the pennies that you used before. Determine names for your two children. Record this information in the chart on the next page.
3. Complete the genotype and phenotype for one child at a time. Once you have finished one, then do the other. Look at the genes from Mom and Dad for the first trait, fur. Determine what gene(s) each parent can offer the offspring. If either parent is a hybrid, you will have to toss the penny to determine which gene the parent will provide. Remember, heads is dominant and tails is recessive.
4. Record your findings for the genotype in the data chart. Determine the phenotype and record that too.
5. Repeat the steps for each trait until you have the first offspring done.
6. Complete the data chart for the second offspring.
7. Create these two offspring using the cut-outs.

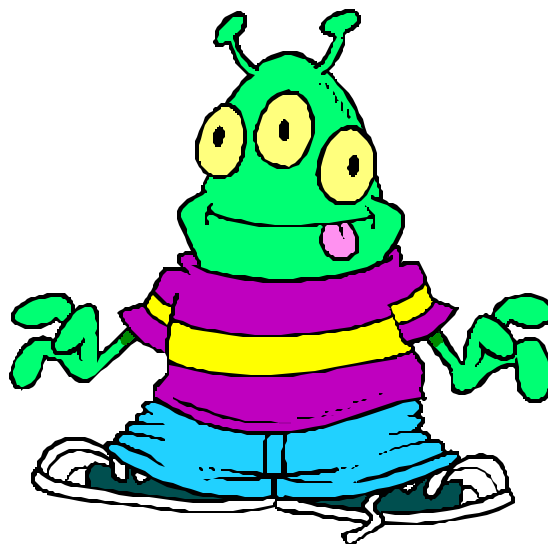


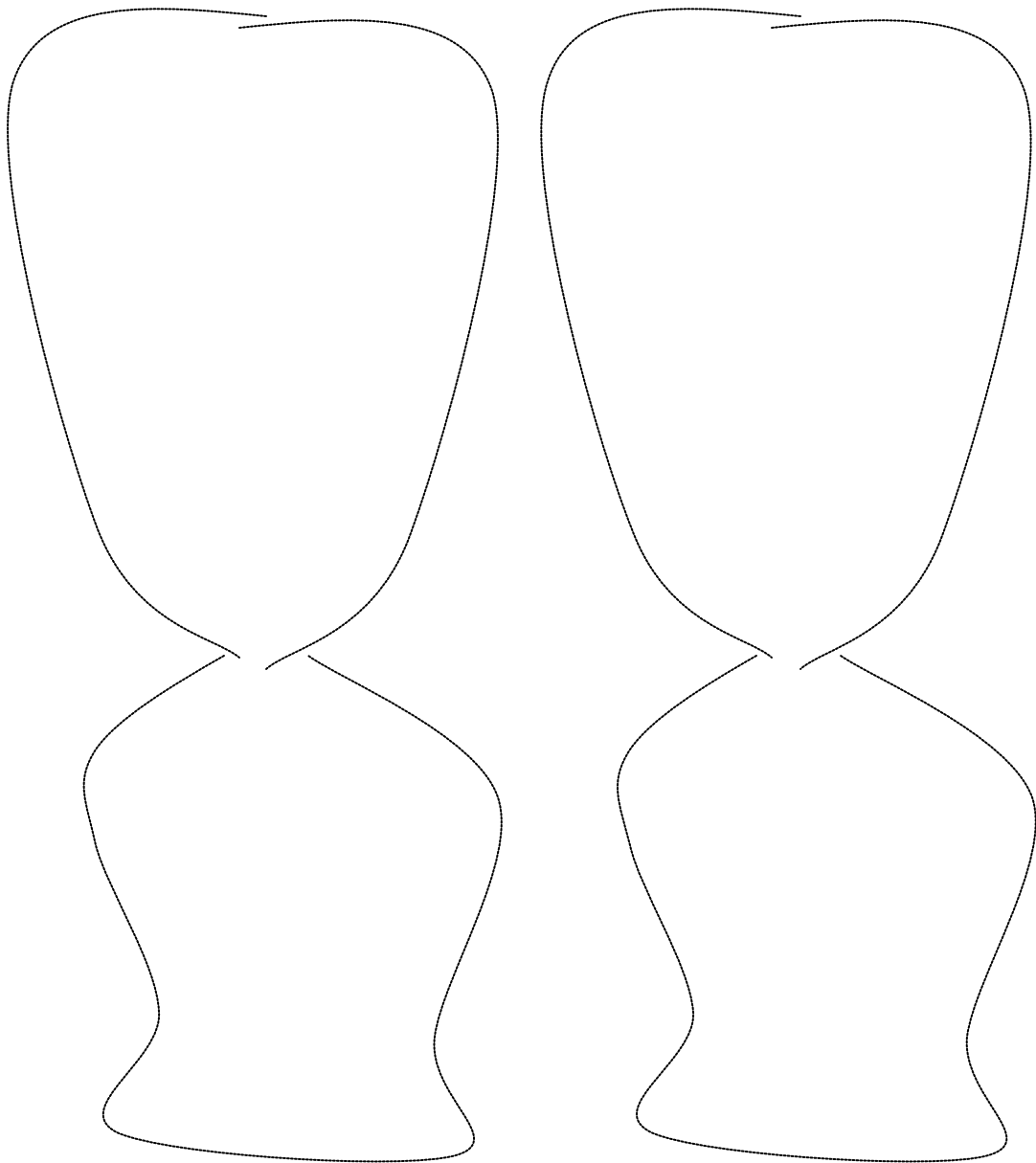
Wait for us, Mom!

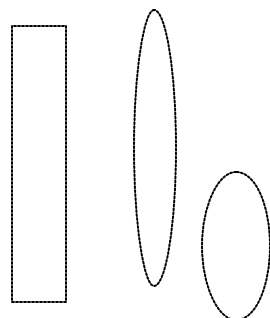
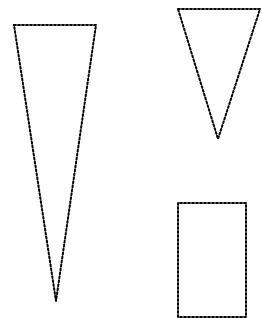
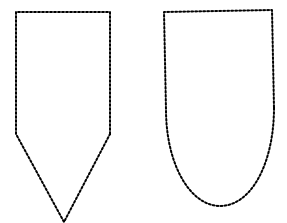
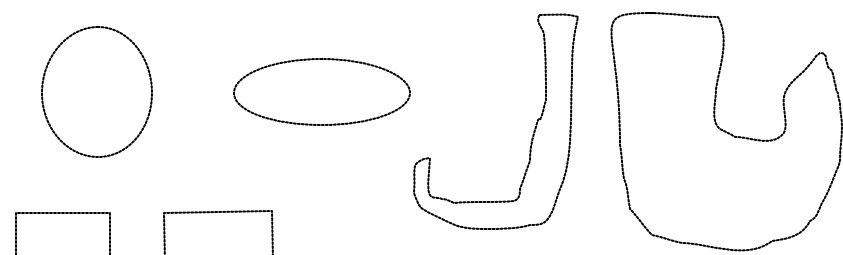
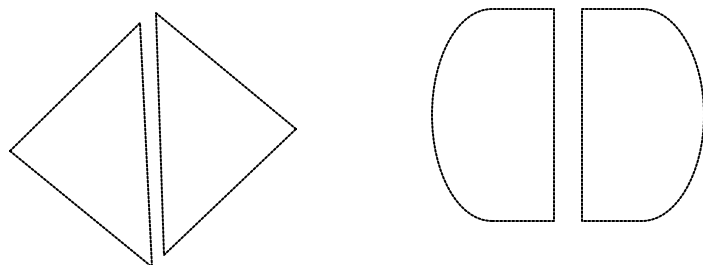
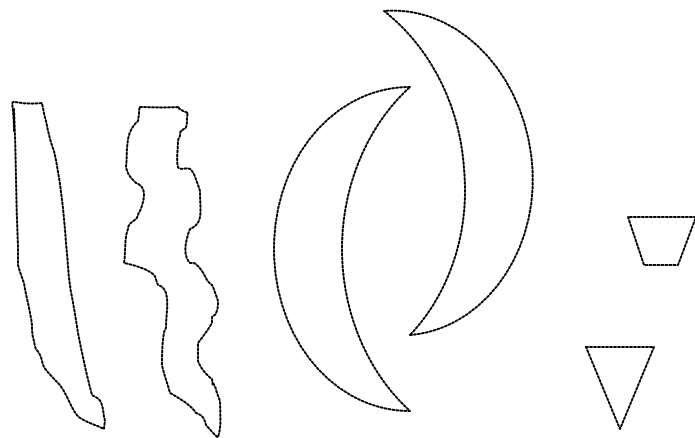


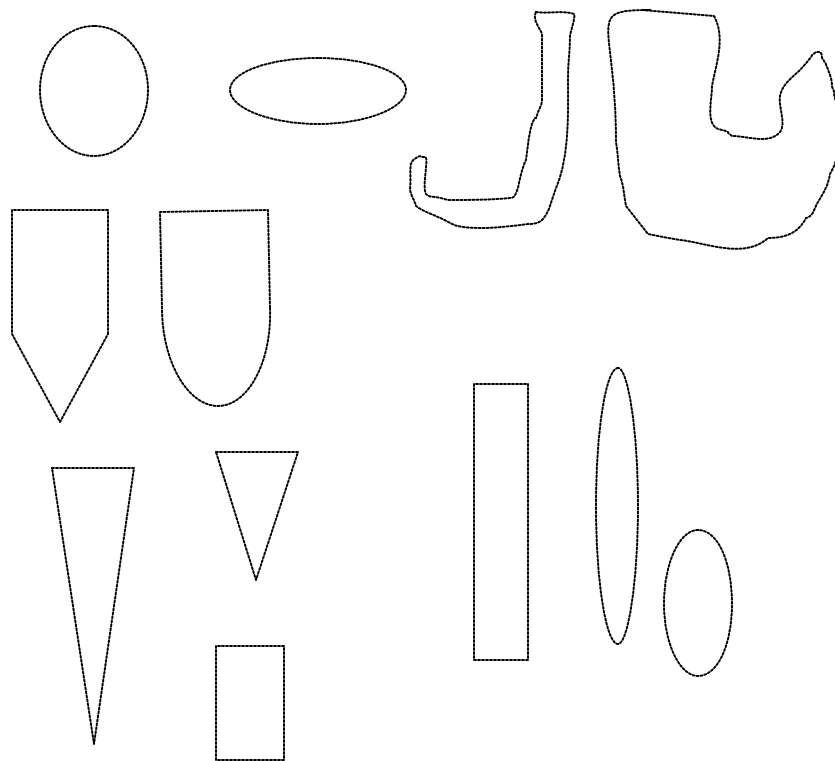
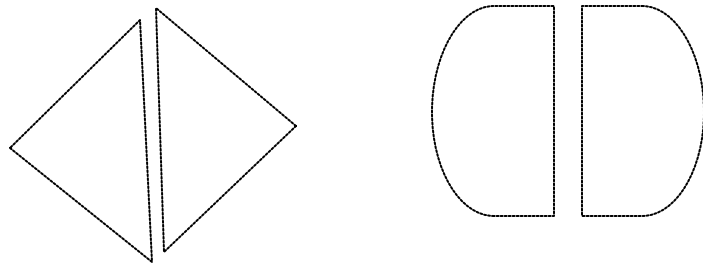
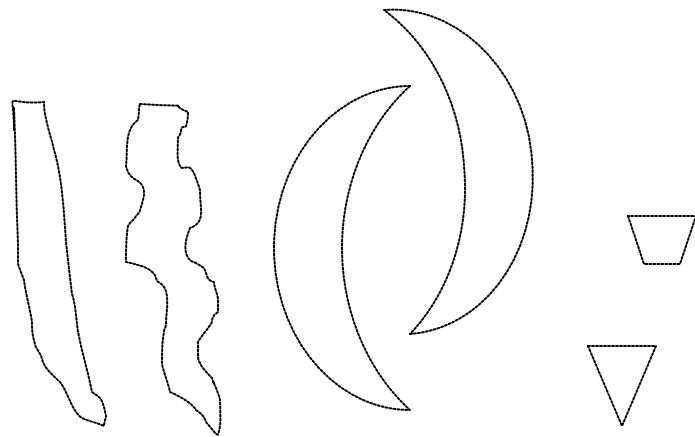
Our Alien Children

Trait	Offspring #1		Offspring #2	
	Genotype	Phenotype	Genotype	Phenotype
Tail—T				
Horns—H				
Ears—E				
Teeth—R				
Arm Shape—D				
Legs—L				
Tongue—M				
Eye Shape—G				
Nose—N				
Fur—F				
Arms—A				
Leg shape—B				
Eye Color—Q				









Alien Life Form (III)

1. Looking back at the class data for the number of males and females, does the information seem accurate to you? Is it what you would have expected? Why or why not?
2. What is/are the possible gene(s) that an almond eyed alien could pass on to its offspring. Why is this?
3. What is a hybrid?
4. What are the possible genotypes and phenotypes of the offspring of two hybrids for the horn trait? How did you determine this?

Alien Life Form (IV)

You now have created an alien family. There is a mom and a dad and two children. You have represented this family in several ways. You are able to share the genotype and phenotype for each family member and you are able to "see" the family by looking at your drawings. There are other ways that scientists show family traits. One method is called a pedigree. A pedigree follows just one trait through the family tree. In this next activity, you are going to select one trait and make a pedigree for your alien family for this trait.

About pedigrees:

○ = females

□ = males

An open shape represents the dominant pure trait.

A completely shaded in shape represents the recessive trait.



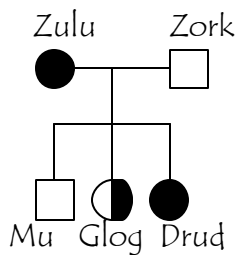
A partially shaded in shape represents a hybrid.



A line connecting two shapes represents a marriage.

Indicate the sex, genotype, and phenotype of each member of this family for the TEETH trait. Use the letter R.

Hint: For teeth, _____ is dominant
and _____ is recessive.



	Sex	genotype	phenotype
Zulu	_____	_____	_____
Zork	_____	_____	_____
Mu	_____	_____	_____
Glog	_____	_____	_____
Drud	_____	_____	_____

- Knowing what you know about inheritance, is this pedigree possible? Why or why not? (Hint: Think Punnett!)

Now it is your turn.

Procedure:

1. Select any trait from the alien characteristics chart.
2. Look at that trait in the mom, dad, and two kids that you created.
3. Complete the pedigree worksheet.

Trait you are following: _____

Letter: _____

Dominant: _____ Recessive: _____

Mom: Name _____ Genotype _____ Phenotype _____ Symbol _____
Dad: Name _____ Genotype _____ Phenotype _____ Symbol _____

Punnett: Parental genotypes: _____ x _____

Punnett Square:

Offspring #1
Sex: _____

Name: _____

Genotype: _____

Phenotype: _____

Symbol:

Offspring #2
Sex: _____

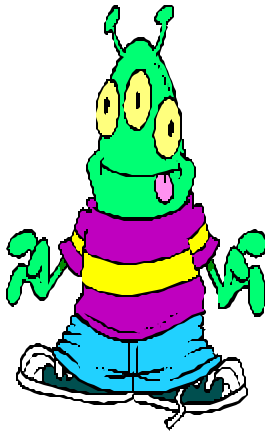
Name: _____

Genotype: _____

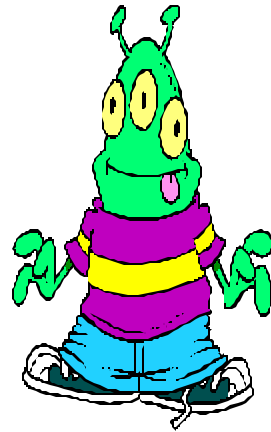
Phenotype: _____

Symbol:

Alien Project Grading Rubric Checklist



Your Names _____
 Class Section _____
 Family Name _____
 Parent Aliens Present _____
 Names Parent Aliens _____
 Gender Parent Aliens _____
 Baby Aliens Present _____
 Names Baby Aliens _____
 Genders Baby Aliens _____
 Two Pedigrees _____
 Two Pedigree Paragraphs _____



	4	3	2	1
Timeliness	Submitted on time, when asked for. No finishing touches were needed.	Handed in minutes after requested due to finishing touches or other delays.	Handed in late, but on the due date.	Handed in one day late.
The Product	There is evidence of planning. The information is typed or expertly lettered. The design is appealing to the eye and is unique and creative. Glue, tape, etc. is not evident.	There is evidence of planning. The information is typed or expertly lettered. The design is appealing to the eye. Glue, tape, etc. is not evident.	There is not evidence of a plan, but the information is typed or the lettering is neatly done. Glue, tape, etc. is not evident.	The lettering is sloppy or hard to read. Items appear carelessly applied. It appears that there was little time or effort put into the project.
The Information	The information is factual, logical, and complete.	The information is factual, but is presented in an illogical way or some relevant information is missing.	The information is factual, but does not contain enough facts for the reader to gain insight or the arrangement is illogical.	Some information is inaccurate or there doesn't seem to be a logical flow. Important pieces of information are missing.
Language	There are no spelling or grammar errors.	There are very few spelling or grammar errors – one or two.	There are several spelling or grammar errors, but they do not impact readability.	There are many spelling or grammar errors that impact readability.
Score				

Alien Project Group Evaluation

1. What would you do to improve your alien project if you were allowed to do it over again?
2. Describe each group member's time and effort on this project. Include time spent out of class.
3. Describe the quality of the work from each group member. What could be done to improve quality?
4. Based on your answers to questions 1, 2, and 3, do you think each group member should receive the same grade? Why or why not?

❖ Enrichment Activity Alien Life Form (V)

You and your partner need to create a poster showing your alien family. The poster must contain the following:

- Both parents
- Both children
- The names and gender of your family members
- Your two names and your class section
- Your pedigree for the trait you followed
- A paragraph explaining your pedigree
(the pedigree and the paragraph will be graded before they are attached to your poster)

The poster must be creative, neat, and well organized.

BONUS: 5 points will be awarded to the student that writes the best report explaining the entire project. This report will be hung in the hall with our posters. It must be typed and in a large font. You may apply the 5 points to any task we have done. Go for it!!!

