Student's Name _____ Date _____ Class _____

Student Sheet 1.1: KWL Chart

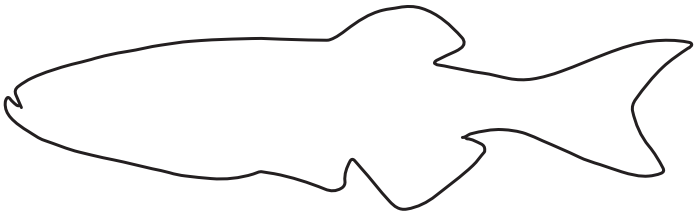
Topic: _____

K	W	L
What do you Know?	**What do you Want to know?**	**What did you Learn?**

Student's Name _____ Date _____ Class _____

Student Sheet 1.4 Zebrafish Variation

Zebrafish



Description

_____

_____

_____

How are the zebrafish similar to and different from the other zebrafish?

_____

_____

_____

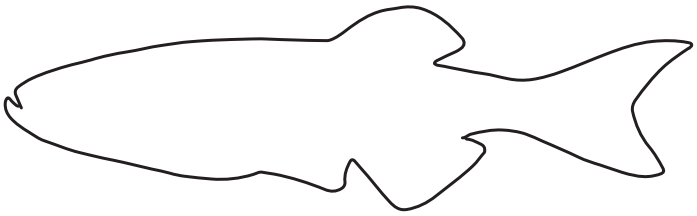
How are the zebrafish similar to or different from the Casper Fish™ and GloFish®?

_____

_____

_____

Casper Fish™



Description

_____

_____

_____

How are the Casper Fish similar to and different from the other Casper Fish?

_____

_____

_____

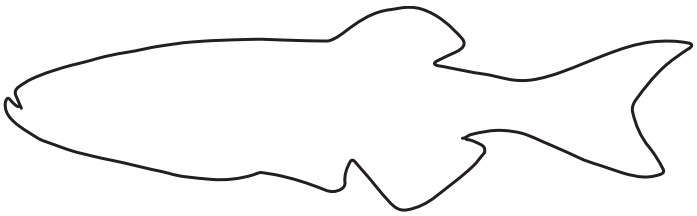
How are the Casper Fish similar to or different from the zebrafish and GloFish?

_____

_____

_____

GloFish®



Description

_____

_____

_____

How are the GloFish similar to and different from the other GloFish?

_____

_____

_____

How are the GloFish similar to or different from the zebrafish and Casper Fish?

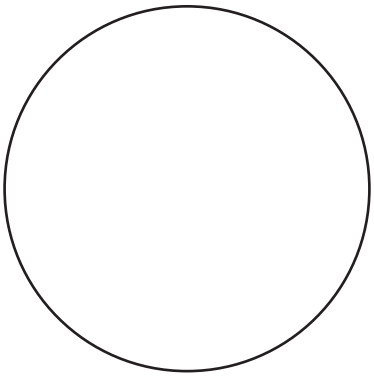
_____

_____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 2.3: Exploring Cell Types (page 1 of 2)



Proposed function: _____

_____

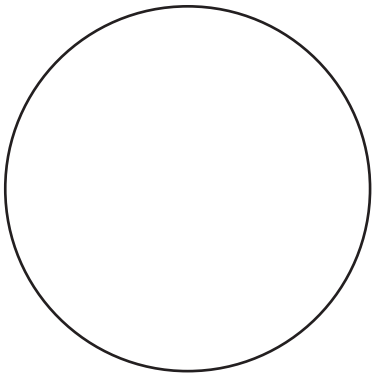
Name of slide: _____

Answer to questions: _____

_____

_____

_____



Proposed function: _____

_____

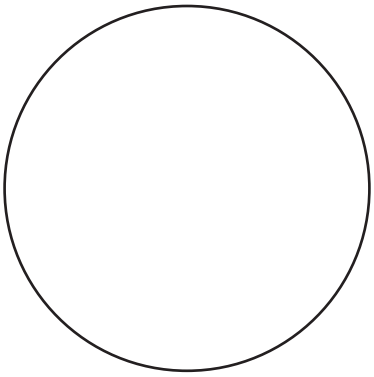
Name of slide: _____

Answer to questions: _____

_____

_____

_____



Proposed function: _____

_____

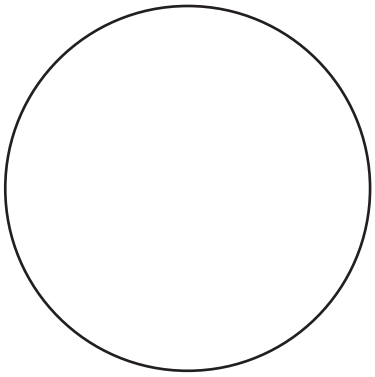
Name of slide: _____

Answer to questions: _____

_____

_____

_____



Proposed function: _____

_____

Name of slide: _____

Answer to questions: _____

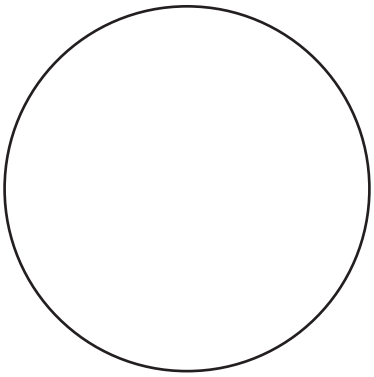
_____

_____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 2.3: Exploring Cell Types (page 2 of 2)



Proposed function: _____

_____

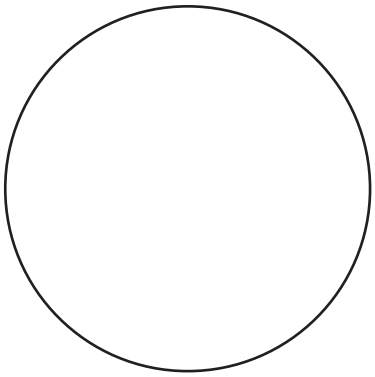
Name of slide: _____

Answer to questions: _____

_____

_____

_____



Proposed function: _____

_____

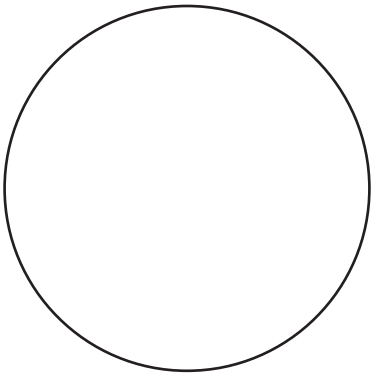
Name of slide: _____

Answer to questions: _____

_____

_____

_____



Proposed function: _____

_____

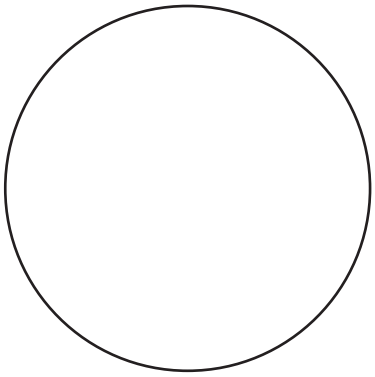
Name of slide: _____

Answer to questions: _____

_____

_____

_____



Proposed function: _____

_____

Name of slide: _____

Answer to questions: _____

_____

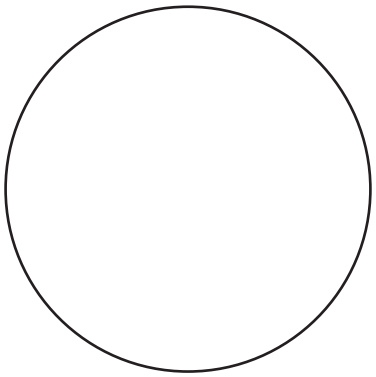
_____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 4.1: Onion Root Tip Investigation (page 1 of 2)

1. Observe all the cells squashed on your slide. Pay special attention to the dark, squiggly chromosomes inside each cell. Sketch what you see in your field of vision in the space below.



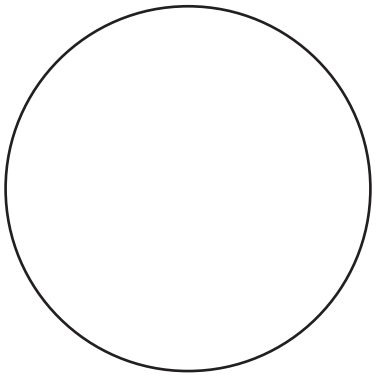
2. After making your initial observations, what do you notice about the chromosomes in these root cells?

_____

_____

_____

3. Trade microscopes with another group and observe their slide. Sketch what you observed in their field of vision in the space below.



4. Were the chromosomes in these cells similar to the ones you viewed on your own slide?

_____

_____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 4.1: Onion Root Tip Investigation (page 2 of 2)

5. Trade microscopes with two other groups. Compare your slide with theirs. Do you notice any similarities? Do you notice any differences? Describe your observations in the space below.

6. Based on your observations, what do the chromosomes appear to be doing in these cells?

7. What steps or process does a cell appear to go through to make more cells?

8. Why do you think we used the root tips of the onion bulblet instead of the onion epidermis to view cell division for this investigation?

Student's Name _____ Date _____ Class _____

Student Sheet 4.3: Examining Meiosis (page 1 of 2)

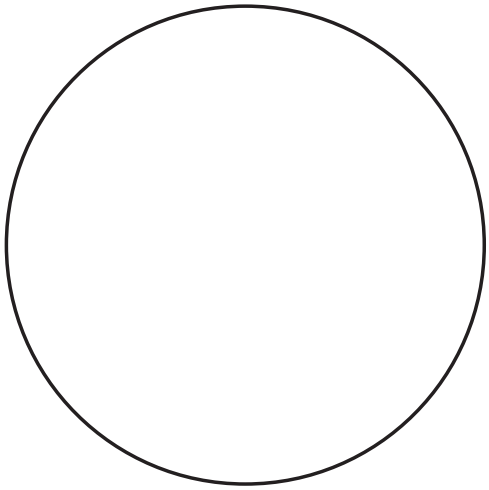
1. Meiosis is the division of sex cells, or sperm and eggs. Based on what you have already learned about cell division, what are some things that a cell must do before it can divide?

_____

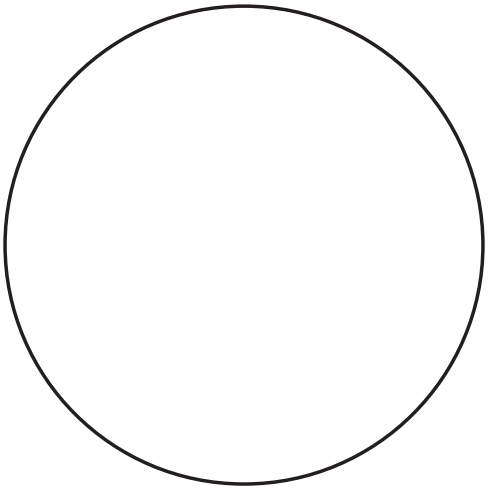
_____

Directions: With your partner, attend each microscope station and briefly discuss and then sketch what you see below. Be sure to sketch each slide under the correct box. Check your station number each time you rotate.

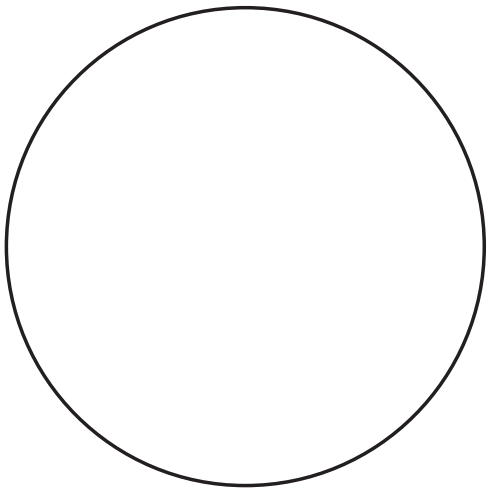
Microscope 1



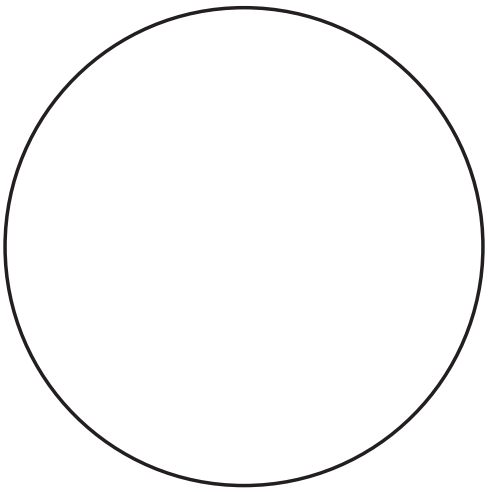
Microscope 2



Microscope 3



Microscope 4



Student's Name _____ Date _____ Class _____

Student Sheet 4.3: Examining Meiosis (page 2 of 2)

2. Compare these stages to the stages that occur during mitosis. What are some similarities you have noticed between mitosis and meiosis?

3. What is a major difference that you observed between mitosis and meiosis?

4. Using your prior knowledge, how would you arrange the microscope slides to display meiosis? Start from what you believe would be the beginning microscope slide and work your way toward what you believe would be the last slide. List the order in which you put the microscopes below.

Student's Name _____ Date _____ Class _____

Student Sheet 5.2a: Create a Creature (page 1 of 2)

Creature 1: Mother							
Trait	**Dominant Allele**	**Recessive Allele**	**Allele 1**	**Allele 2**	**Genotype**	**Homozygous Recessive, Heterozygous, Homozygous Dominant**	**Phenotype**
Fur Length	Long (L)	Short (l)					
Fur Color	Green (G)	Blue (g)					
Eye Color	Purple (P)	Blue (p)					
Horn Shape	Curved (C)	Straight (c)					
Wing Shape	Dragonfly (D)	Butterfly (d)					
Wing Color	Purple (R)	Red (r)					
Feet	Not webbed (W)	Webbed (w)					
Height	Tall (H)	Short (h)					
Teeth	Pointed (T)	Blunt (t)					

Student's Name _____ Date _____ Class _____

Student Sheet 5.2a: Create a Creature (page 2 of 2)

Creature 1: Father							
Trait	**Dominant Allele**	**Recessive Allele**	**Allele 1**	**Allele 2**	**Genotype**	**Homozygous Recessive, Heterozygous, Homozygous Dominant**	**Phenotype**
Fur Length	Long (L)	Short (l)					
Fur Color	Green (G)	Blue (g)					
Eye Color	Purple (P)	Blue (p)					
Horn Shape	Curved (C)	Straight (c)					
Wing Shape	Dragonfly (D)	Butterfly (d)					
Wing Color	Purple (R)	Red (r)					
Feet	Not webbed (W)	Webbed (w)					
Height	Tall (H)	Short (h)					
Teeth	Pointed (T)	Blunt (t)					

Student's Name _____ Date _____ Class _____

Student Sheet 5.2b: Create a Creature Mat

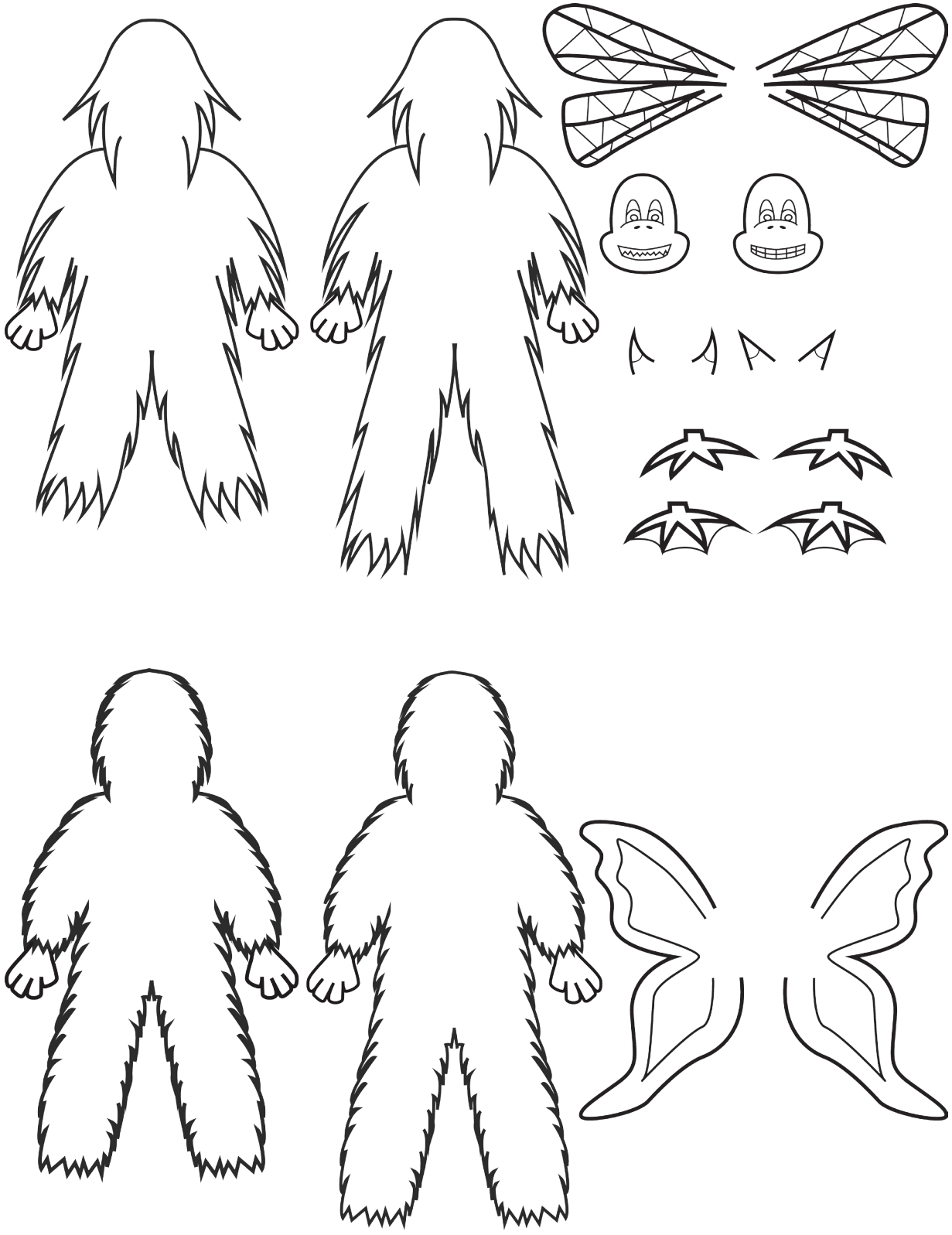
Parent 1

Parent 2

Baby

Student's Name _____ Date _____ Class _____

Student Sheet 5.2c: Creature Template



Student's Name _____ Date _____ Class _____

Student Sheet 5.3: Creature Babies

Table 1. Parental Information

	Mother		Father	
Trait	**Allele 1**	**Allele 2**	**Allele 1**	**Allele 2**
Fur Length				
Fur Color				
Eye Color				
Horn Shape				
Wing Shape				
Wing Color				
Feet				
Height				
Teeth				

Table 2. Offspring Information

Trait	Dominant Allele	Recessive Allele	Allele 1 (from mother)	Allele 2 (from father)	Genotype	Homozygous Recessive, Heterozygous, Homozygous Dominant	Phenotype
Fur Length	Long (L)	Short (l)					
Fur Color	Green (G)	Blue (g)					
Eye Color	Purple (P)	Blue (p)					
Horn Shape	Curved (C)	Straight (c)					
Wing Shape	Dragonfly (D)	Butterfly (d)					
Wing Color	Purple (R)	Red (r)					
Feet	Webbed (W)	Not Webbed (w)					
Height	Tall (H)	Short (h)					
Teeth	Pointed (T)	Blunt (t)					

Student's Name _____ Date _____ Class _____

Student Sheet 5.4: Creature Punnett Squares

Maternal Phenotype: _____ Maternal Genotype: _____

Maternal Allele 1: _____ Maternal Allele 2: _____

Paternal Phenotype: _____ Paternal Genotype: _____

Paternal Allele 1: _____ Paternal Allele 2: _____

		Mother	
		Allele 1 _____	Allele 1 _____
Father	Allele 1 _____		
	Allele 2 _____		

Maternal Phenotype: _____ Maternal Genotype: _____

Maternal Allele 1: _____ Maternal Allele 2: _____

Paternal Phenotype: _____ Paternal Genotype: _____

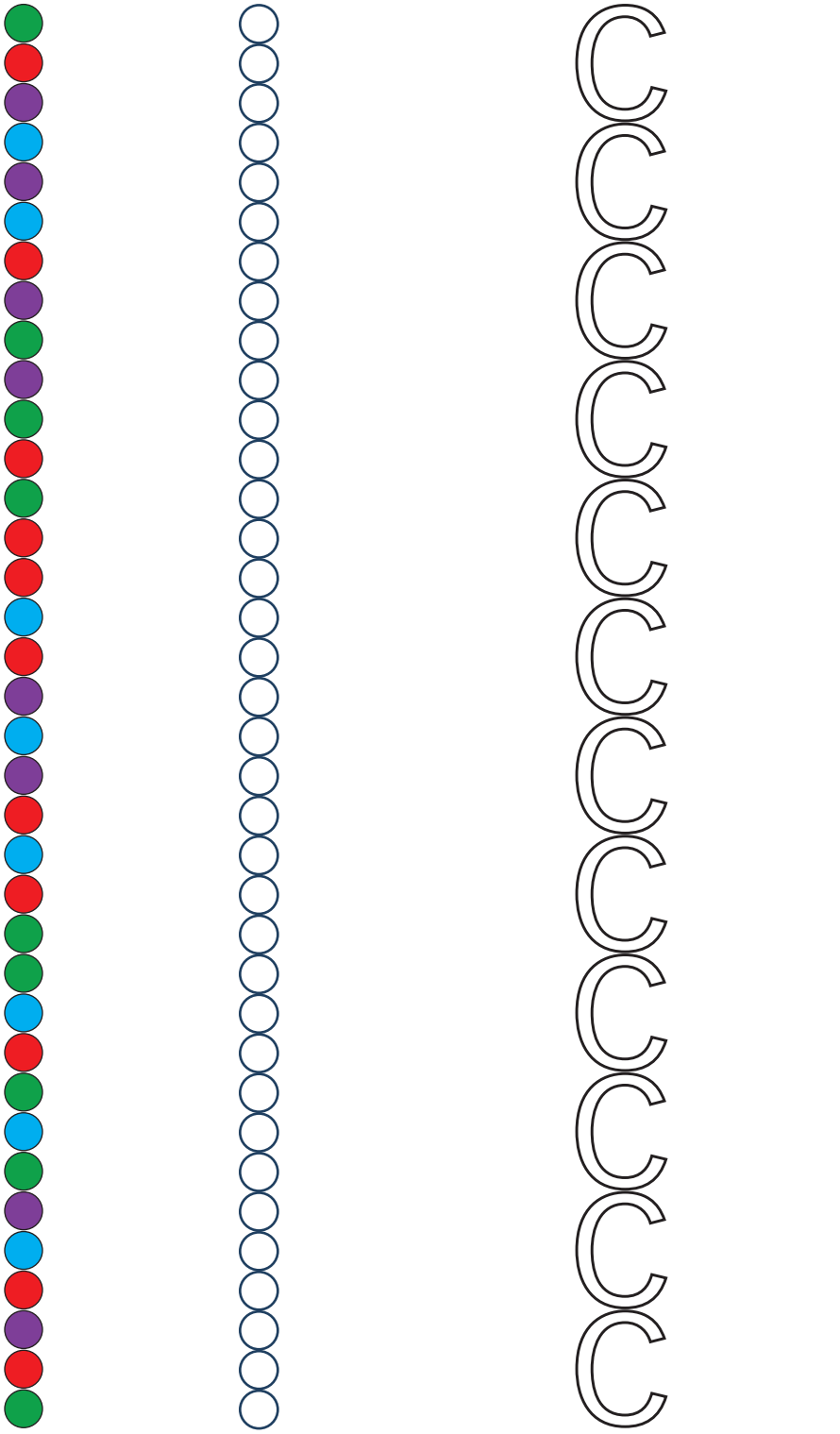
Paternal Allele 1: _____ Paternal Allele 2: _____

		Mother	
		Allele 1 _____	Allele 1 _____
Father	Allele 1 _____		
	Allele 2 _____		

Student's Name _____ Date _____ Class _____

Student Sheet 6.2: It's All in the Strand

DNA **RNA** **Proteins** (Amino Acid Sequence)



Student's Name _____ Date _____ Class _____

Student Sheet 6.3: Changes to the Strand

Table 1.			
	DNA	RNA	Protein (Amino Acid Sequence)
1			
2			
3			

Table 2.			
	DNA	RNA	Protein (Amino Acid Sequence)
1			
2			
3			

Student's Name _____ Date _____ Class _____

Student Sheet 8.3: Fast Plants® Punnett Squares (page 1 of 2)

Cross 1: Heterozygous Parent × Heterozygous Parent

Genotype Parent 1: _____

Genotype Parent 2: _____

		Parent 1	
		Allele 1 _____	Allele 1 _____
Parent 2	Allele 1 _____		
	Allele 2 _____		

Cross 2: Homozygous Recessive Parent × Homozygous Dominant Parent

Genotype Parent 1: _____

Genotype Parent 2: _____

		Parent 1	
		Allele 1 _____	Allele 1 _____
Parent 2	Allele 1 _____		
	Allele 2 _____		

Student's Name _____ Date _____ Class _____

Student Sheet 8.3: Fast Plants® Punnett Squares (page 2 of 2)

Cross 3: Homozygous Recessive Parent × Homozygous Recessive Parent

Genotype Parent 1: _____

Genotype Parent 2: _____

		Parent 1	
		Allele 1 _____	Allele 1 _____
Parent 2	Allele 1 _____		
	Allele 2 _____		

Cross 4: Homozygous Dominant Parent × Homozygous Dominant Parent

Genotype Parent 1: _____

Genotype Parent 2: _____

		Parent 1	
		Allele 1 _____	Allele 1 _____
Parent 2	Allele 1 _____		
	Allele 2 _____		

Student's Name _____ Date _____ Class _____

Student Sheet 8.4: Diversity in a Population

Table 1. Population 1			
Generation	**Number of Parents**	**Number of Offspring**	**Total Number of Individuals**
1			
2			
3			
4			
5			
6			

Table 2. Population 2				
Generation	**Number of Parents**	**Number of Reproductive Pairs**	**Number of Offspring**	**Total Number of Individuals**
1				
2				
3				
4				
5				
6				

Student's Name _____ Date _____ Class _____

Student Sheet 9.1: Natural Selection (page 1 of 3)

Habitat Map 1

Table 9.1.		Initial Number	Number Captured	Number Remaining	Number of Offspring	Number for the Next Generation
Generation 1	Blue	30				
	Green	30				
	Red	30				
	Yellow	30				
Generation 2	Blue					
	Green					
	Red					
	Yellow					
Generation 3	Blue					
	Green					
	Red					
	Yellow					
Generation 4	Blue					
	Green					
	Red					
	Yellow					
Generation 5	Blue					
	Green					
	Red					
	Yellow					

Student's Name _____ Date _____ Class _____

Student Sheet 9.1: Natural Selection (page 2 of 3)

Habitat Map 2

Table 9.2.		Initial Number	Number Captured	Number Remaining	Number of Offspring	Number for the Next Generation
Generation 1	Blue	30				
	Green	30				
	Red	30				
	Yellow	30				
Generation 2	Blue					
	Green					
	Red					
	Yellow					
Generation 3	Blue					
	Green					
	Red					
	Yellow					
Generation 4	Blue					
	Green					
	Red					
	Yellow					
Generation 5	Blue					
	Green					
	Red					
	Yellow					

Student's Name _____ Date _____ Class _____

Student Sheet 9.1: Natural Selection (page 3 of 3)

Habitat Map 3

Table 9.3.		Initial Number	Number Captured	Number Remaining	Number of Offspring	Number for the Next Generation
Generation 1	Blue	30				
	Green	30				
	Red	30				
	Yellow	30				
Generation 2	Blue					
	Green					
	Red					
	Yellow					
Generation 3	Blue					
	Green					
	Red					
	Yellow					
Generation 4	Blue					
	Green					
	Red					
	Yellow					
Generation 5	Blue					
	Green					
	Red					
	Yellow					

Student's Name _____ Date _____ Class _____

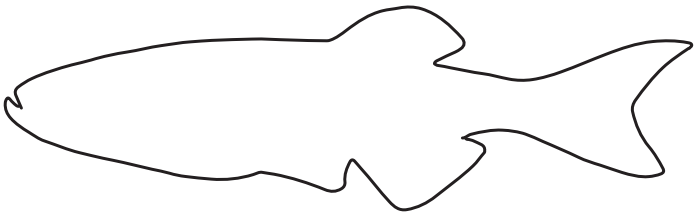
Student Sheet 9.2: Artificial Selection

Table 9.4.		Initial Number	Number Captured	Number Remaining	Number of Offspring	Number for the Next Generation
Generation 1	Blue	30				
	Green	30				
	Red	30				
	Yellow	30				
Generation 2	Blue					
	Green					
	Red					
	Yellow					
Generation 3	Blue					
	Green					
	Red					
	Yellow					
Generation 4	Blue					
	Green					
	Red					
	Yellow					
Generation 5	Blue					
	Green					
	Red					
	Yellow					

Student's Name _____ Date _____ Class _____

Student Sheet 10.1: Zebrafish Variations

Zebrafish



Description

_____

_____

_____

How are the zebrafish similar to and different from the other zebrafish?

_____

_____

_____

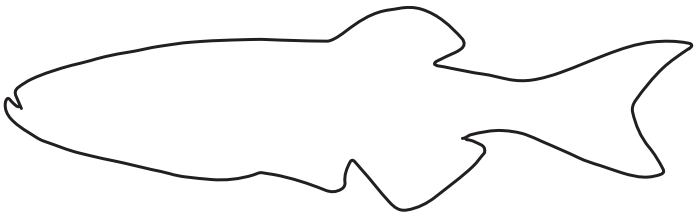
How are the zebrafish similar to or different from the Casper Fish and GloFish?

_____

_____

_____

Casper Fish™



Description

_____

_____

_____

How are the Casper Fish similar to and different from the other Casper Fish?

_____

_____

_____

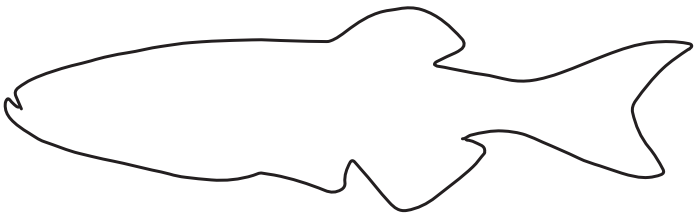
How are the Casper Fish similar to or different from the zebrafish and GloFish?

_____

_____

_____

GloFish®



Description

_____

_____

_____

How are the GloFish similar to and different from the other GloFish?

_____

_____

_____

How are the GloFish similar to or different from the zebrafish and Casper Fish?

_____

_____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 10.2: Genetic Manipulation Research (page 1 of 3)

Method: _____

_____

Description: _____

_____

_____

_____

Resource 1: _____

_____

Resource 2: _____

_____

Resource 3: _____

_____

Method: _____

_____

Description: _____

_____

_____

_____

Resource 1: _____

_____

Resource 2: _____

_____

Resource 3: _____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 10.2: Genetic Manipulation Research (page 2 of 3)

Method: _____

_____

Description: _____

_____

_____

_____

Resource 1: _____

_____

Resource 2: _____

_____

Resource 3: _____

_____

Method: _____

_____

Description: _____

_____

_____

_____

Resource 1: _____

_____

Resource 2: _____

_____

Resource 3: _____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 10.2: Genetic Manipulation Research (page 3 of 3)

Method: _____

_____

Description: _____

_____

_____

_____

Resource 1: _____

_____

Resource 2: _____

_____

Resource 3: _____

_____

Method: _____

_____

Description: _____

_____

_____

_____

Resource 1: _____

_____

Resource 2: _____

_____

Resource 3: _____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 11.WA: *Genes and Molecular Machines*
Written Assessment Answer Sheet (page 1 of 2)

Multiple Choice

1. _____ **3.** _____ **5.** _____

2. _____ **4.** _____ **6.** _____

Short Answer

7. _____

_____

_____

_____

8. _____

_____

_____

_____

9. _____

_____

_____

_____

10. _____

_____

_____

_____

11. _____

_____

_____

_____

Student's Name _____ Date _____ Class _____

Student Sheet 11.WA: *Genes and Molecular Machines*
Written Assessment Answer Sheet (page 2 of 2)

12. _____

_____

_____

_____

13. _____

_____

_____

_____

14. _____

_____

_____

_____

15. _____

_____

_____

_____