

School:	South Ridge High School	Subject:	Biology	Teacher:	Ms. Jorge	Lesson Plan Date:	2/24/17
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PRE-PLANNING	OBJECTIVE What will your students be able to learn?	BENCHMARK:
	How to understand monohybrid crosses, construct and fill out punnett squares, understand dominant/recessive alleles	SC.912.L.16.1 Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance
	ASSESSMENT "Begin with the End in Mind" How will you know whether your students have made progress toward the objective? How and when will you assess mastery?	
	Can the students recall the terms given on the Starburst Genetics Sheet, and successfully fill out the exercise-navigating the nuances inherent of dominant and recessive alleles, and how they are related to homozygous/heterozygous genotypes, along with the resulting phenotypes.	
	ESSENTIAL QUESTION A higher order question that is directly derived from the benchmark, introduced at the beginning of the lesson, discussed throughout the lesson, and answered by students at the end of the lesson to show understanding of the concepts taught.	
	What is a monohybrid cross, and how can we best understand genotypes and phenotypes with this model of focusing on one gene, attributed by a set of alleles?	
	HIGHER ORDER QUESTIONS (3-5) What questions will be answered to provoke higher order thinking and include Moderate to High FCAT Complexity Levels? What would the ideal student response be for each question?	
	<ul style="list-style-type: none"> - What is homozygous/heterozygous, describing in relation to dominant/recessive? - Homozygous- two of the same alleles, heterozygous- two different alleles - Dominant- phenotype reflects the dominant trait (whether homozygous for dominant or heterozygous, where dominant allele masks recessive) Recessive- phenotype represents the recessive trait (must be homozygous recessive) - How to construct a punnett square and use it to find out offspring ratios for phenotype and genotype (Include reference to fact that either parent genotype can be placed on either top or left side—same outcome. Emphasize that dominant allele is always capital and before the recessive which is lower case) -To elicit critical thinking- Question at the end of Exercise in which the students explore the nature of pink starburst, as expressing two phenotypes, and having both alleles for each red and yellow in the genotype. (Incomplete Dominance) 	
LESSON CYCLE	BELLRINGER Follow the Focus Calendar to provide reinforcement of previously taught skills.	TIME Approximate
	Copy and answer questions about homozygous/heterozygous, dominant/recessive requested by Ms. Jorge	10 min
	INTRODUCTION Brief part of the lesson when students learn the objective/essential question and how mastering the objective leads to achieving the bigger goal of the course. <ul style="list-style-type: none"> • Provide a hook to motivate students and link to prior knowledge in order to introduce a new concept. • Explain the relevance of lesson and the importance of learning the concept. • Introduce important vocabulary using the word wall as an interactive learning tool. 	
	Watch video Ms. Jorge provided on monohybrid crosses	
	MODELING "I DO" Component of the lesson when teacher explicitly models to students exactly what they are expected to do during guided practice and eventually during independent work. <ul style="list-style-type: none"> • Conduct a think aloud while modeling the steps to completing an activity or solving a problem. • Model the use of a graphic organizer. • Use questioning techniques such as re-directing, wait-time and prompting. 	

<p>Discuss terms at the top of the Starburst exercise sheet</p>	
<p>GUIDED PRACTICE "WE DO" Guide students to independent practice by providing an opportunity to work in small groups and practice what was taught during the modeled portion of the lesson.</p> <ul style="list-style-type: none"> • Incorporate the use of a collaborative strategy in small groups. • Encourage student accountable talk during group discussion. • Perform checks for understanding. 	
<p>Complete the second half of the first Starburst Exercise Page together Have students understand scenario in which we are the "Starburst Factory", and establish relationship between the genotypes and phenotypes listed. Go through each individual allele, and then different combinations, familiarizing students with the terms homozygous/heterozygous and dominant/recessive.</p>	
<p>COLLABORATIVE PRACTICE "THEY DO" Guide students to independent practice by providing an opportunity to work in small groups and practice what was taught during the shared portion of the lesson.</p> <ul style="list-style-type: none"> • Incorporate the use of a collaborative strategy in small groups. • Circulate throughout the room and provide guidance to each group as needed. 	
<p>Distribute starbursts and have students go through the activity (See Starburst Exercise) while circulating to answer questions and help</p>	
<p>INDEPENDENT PRACTICE "YOU DO" Differentiate your instruction to reach the diversity of learners in your classroom.</p> <ul style="list-style-type: none"> • Assign students independent work that is directly aligned with the "I Do" and "We Do" portions of the lesson. • Conduct Center Rotations • Circulate around the room to provide individual support. • Pull small groups or individuals for more intensive support. 	
<p>Have students fill our Monohybrid cross assignment given by Ms. Jorge (see below), and walk around to help</p>	
<p>CLOSURE Wrap up the lesson and help students organize the information learned into a meaningful context.</p> <ul style="list-style-type: none"> • Have students reflect on or answer the Essential Question. <p>Help students connect today's learning to their bigger goal in the course.</p>	<p>5 min</p>
<p>Discuss main terms and themes from activity, answer questions, and ask what students answered for the question at the bottom of the starburst activity--- What can they say about Pink, in relation to it's phenotype (mixture of red and yellow) and genotype (Ry- two different allele types) in order to elicit discussion and independent revelation of incomplete dominance to transition into lesson they will have next. How would they explore two traits (di-hybrid cross)</p>	
<p>HOME-LEARNING How will students practice what they learned? How will opportunities be provided for students to maintain mastery of previously mastered skills/concepts?</p>	
<p>Complete power notes</p>	
<p></p>	
<p></p>	

3) Starting with only red starbursts, how many red and orange starbursts will;
 A. $Rr \times Rr$ yield? B. $RR \times Rr$? C. $RR \times RR$? (Upon crossing, however many RR are made, go ahead and eat them! We will pretend our "Starburst factory" can't sell those because they explode by the time they are on shelves)

$Rr \times Rr$: ____ red / 4 starbursts
 starbursts

$RR \times Rr$: ____ red / 4 starbursts

$RR \times RR$: ____ red / 4

____ "explosive" red / 4 starbursts
 starbursts

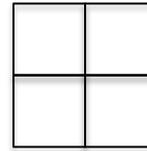
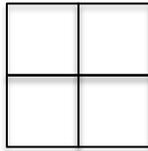
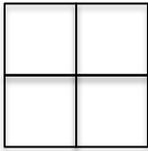
____ "explosive" red / 4 starbursts

____ "explosive" red / 4

____ orange/ 4 starbursts

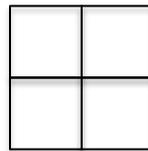
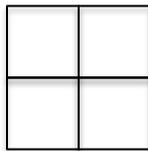
____ orange/ 4 starbursts

____ orange/ 4 starbursts



4) Without using a punnett square, what would the 4 offspring of $rr \times rr$ be? What is this genotype called? (Use the terms homozygous/heterozygous and dominant/recessive)

5) The starburst factory now needs to produce pink starbursts! Using yellow, red and orange starbursts, how would we do this? Show **two different crosses** that would yield pink starburst. Review the phenotype/genotype table above, and remember that ry yields a toxic phenotype (as opposed to Ry being pink).



6) What is the name of the pink genotype (Ry)?

*Be sure the terms homozygous/heterozygous, and dominant/recessive

Bonus: What is odd about Ry ? What would you say about its phenotype in relation to its "parents" (Hint: think about the phenotypes and how the inherited alleles relate to them)

Bikini Bottom Genetics 2

Name _____

Use your knowledge of genetics to complete this worksheet.

1. Use the information for SpongeBob's traits to write the phenotype (physical appearance) for each item.

Characteristic	Dominant Gene	Recessive Gene
Body Shape	Squarepants (S)	Roundpants (s)
Body Color	Yellow (Y)	Blue (y)
Eye Shape	Round (R)	Oval (r)
Nose Style	Long (L)	Stubby (l)

- (a) LL- _____
- (b) yy- _____
- (c) Ss- _____
- (d) RR - _____
- (e) Rr- _____
- (f) ll- _____
- (g) ss- _____
- (h) Yy - _____

2. Use the information in the chart in #1 to write the genotype (or genotypes) for each trait below.

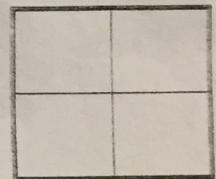
- (a) Yellow body - _____
- (b) Roundpants - _____
- (c) Oval eyes - _____
- (d) Long nose - _____
- (e) Stubby nose - _____
- (f) Round eyes - _____
- (g) Squarepants - _____
- (h) Blue body - _____

3. Determine the genotypes for each using the information in the chart in #1.

- (a) Heterozygous round eyes - _____
- (b) Purebred squarepants - _____
- (c) Homozygous long nose - _____
- (d) Hybrid yellow body - _____

4. One of SpongeBob's cousins, SpongeBillyBob, recently met a cute squarepants gal, SpongeGerdy, at a local dance and fell in love. Use your knowledge of genetics to answer the questions below.

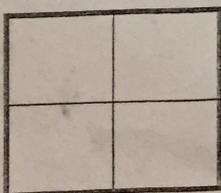
(a) If SpongeGerdy's father is a heterozygous squarepants and her mother is a roundpants, what is her genotype? Complete the Punnett square to show the possible genotypes that would result to help you determine Gerdy's genotype.



What is Gerdy's genotype? _____

(b) SpongeBillyBob is heterozygous for his squarepants shape. What is his genotype? _____

(c) Complete the Punnett square to show the possibilities that would result if Billy Bob & Gerdy had children.



(d) List the possible genotypes and phenotypes for the kids.

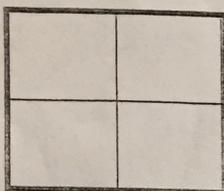
(e) What is the probability of kids with squarepants? _____ %

(f) What is the probability of kids with roundpants? _____ %

5. SpongeBob's aunt and uncle, SpongeWilma and SpongeWilbur, have the biggest round eyes in the family. Wilma is believed to be heterozygous for her round eye shape, while Wilbur's family brags that they are a pure line. Complete the Punnett square to show the possibilities that would result if SpongeWilma and SpongeWilbur had children.

(a) Give the genotype for each person. Wilma - _____ Wilbur - _____

(b) Complete the Punnett square to show the possibilities that would result if they had children.



(c) List the possible genotypes and phenotypes for the kids.

(d) What is the probability that the kids would have round eyes? ____ %

(e) What is the probability that the kids would be oval eyes? ____ %

6. SpongeBob's mother is so proud of her son and his new wife, SpongeSusie, as they are expecting a little sponge. She knows that they have a 50% chance of having a little roundpants, but is also hoping the new arrival will be blue (a recessive trait) like SpongeSusie and many members of her family. If SpongeBob is heterozygous for his yellow body color, what are the chances that the baby sponge will be blue? Create a Punnett square to help you answer this question.

7. SpongeBob's aunt is famous around town for her itty, bitty stubby nose! She recently met a cute squarepants fellow who also has a stubby nose, which is a recessive trait. Would it be possible for them to have a child with a regular long nose? Why or why not? Create a Punnett square to help you answer this question.

8. If SpongeBob's aunt described in #7 wanted children with long noses, what type of fellow would she need to marry in order to give her the best chances? Create a Punnett square to help you answer this question.