

Quadrant D Gold Seal Lesson Submission Template

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DESCRIPTIVE TITLE: Congratulations! You're a grandparent.

SUBJECT(S) — Biology, Genetics

GRADE LEVEL(S) – 9-12

FOCUS — course/topic/unit

Biology I or II/Genetics/Meiosis and inheritance

STUDENT LEARNING — concepts, knowledge, skills, behaviors

- simple dominance and recessive inheritance of traits
- understanding of how chromosomes separate during meiosis to produce gametes
- understanding of how gametes combine to create full complement of chromosomes in offspring
- clear communication – writing and presentation

PERFORMANCE TASK — what students will do and produce to support Student Learning

Overview

Students will examine their own physical characteristics (phenotype) and determine their genetic make up for each characteristic (genotype) in order to predict what their offspring will look like.

Description

Introduction:

Today you will not only become a parent, but also a grandparent! You and your "spouse" will create a baby that has been created using your phenotypical characteristics. In doing so, you will simulate the process of meiosis to make your gametes, as well as fertilization. Once you have created your baby, you will join with another couple. Your baby and the other couple's baby will then produce your grandchild.

Procedure:

- 1) You will complete the characteristic table by circling YOUR phenotype and resulting genotype for the eleven characteristics listed.
- 2) On the colored chromosome page, fill in the allele (box) that corresponds to your genotype for each characteristic.

Example: brown eyes

1) B	1) B
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- 3) Once you have your alleles in their loci, you need to cut them out.
- 4) Place all of your alleles in the cup.
- 5) You will now simulate meiosis. Start drawing out alleles. You need to randomly pick only ONE of each characteristic. Thus, look at the number in the box. You will need only one 1), one 2), etc. If you draw a loci which you already have, return it to the cup and continue to draw until you have one of each of the eleven characteristics - a complete chromosome.
- 6) Empty the cup and put the unused alleles aside.
- 7) Your partner is now to complete the same drawing process (steps 4 through 6)
- 8) Place your "chromosome" next to the one your partner has created.
- 9) On your data sheet, complete the genotype and phenotype information for the baby you just created.
- 10) Your baby has grown up very quickly and has gotten married. You and your spouse are to form a group of four with another pair. Both pairs are to repeat the process of meiosis (step 5) with the chromosome of their baby.
- 11) On your data sheet, complete the genotype and phenotype information for the grandchild you just created.
- 12) On the white paper provided draw a picture of either your child or grandchild that is phenotypically correct.
- 13) Write a birth announcement for either your child or grandchild.

Grading:

- 1) You will be expected to turn in your characteristic data sheet containing your phenotype and genotypes, as well as those of the child and grandchild that you produced. (4 Points)
- 2) A picture of either your child or grandchild (label as child or grandchild) that is phenotypically correct. (6 Points)
- 3) A birth announcement for either your child or grandchild. Be sure to use complete sentences. (6 Points)
- 4) Be creative!!! (4 Points)

Name:

Date:

Data Sheet

Characteristic	Your		Child's		Grandchild's	
	Phenotype	Genotype	Genotype	Phenotype	Genotype	Phenotype
Eye Color	Brown Hazel Blue	BB Bb Bb				
Widow's Peak	Peak No peak	WW or Ww ww				
Ear Lobes	Attached Not attached	EE or Ee ee				
Freckles	Freckles No freckles	FF or Ff ff				
Blood Type	Type A Type B Type AB Type O	$I^A I^A$ or $I^A i$ $I^B I^B$ or $I^B i$ $I^A I^B$ ii				
Tongue Rolling	Can roll Cannot roll	RR or Rr rr				
Tongue Folding	Can fold Cannot fold	tt Tt or TT				
PTC tasting	Can taste Cannot taste	PP or Pp pp				
Skin Pigmentation	Dark Medium Light	SS Ss ss				
Hair color	Brown Red Blonde	HH Hh hh				
Sex	Female Male	XX XY				

1)	1)
2)	2)
3)	3)
4)	4)
5)	5)
6)	6)
7)	7)
8)	8)
9)	9)
10)	10)
11)	11)

1)	1)
2)	2)
3)	3)
4)	4)
5)	5)
6)	6)
7)	7)
8)	8)
9)	9)
10)	10)
11)	11)

STANDARDS — state, national, or Curriculum Survey of Essential Skills in all relevant subjects

UNIFYING CONCEPTS AND PROCESSES

- Systems, order, and organization.
- Evidence, models, and explanation.
- Change, constancy, and measurement.
- Form and function.

SCIENCE AS INQUIRY STANDARDS

- Understanding of scientific concepts.
- An appreciation of "how we know" what we know in science.
- Understanding of the nature of science.
- Skills necessary to become independent inquirers about the natural world.
- The dispositions to use the skills, abilities, and attitudes associated with science.

LIFE SCIENCE STANDARDS

- The cell
- Molecular basis of inheritance
- Matter, energy and organization in living systems

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES STANDARDS

An important purpose of science education is to give students a means to understand and act on personal and social issues. The science in personal and social perspectives standards help students develop decision-making skills.

Source of Standards:

National Academy of Sciences. "National Science Education Standards." 1995. Jun 8 2007
<<http://www.nap.edu/html/nses/>>.

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SCORING GUIDE — attach rubric, quiz, test, etc.

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- 3) A birth announcement for either your child or grandchild. Be sure to use complete sentences. (6 Points)
- 4) Be creative!!! (4 Points)

EXEMPLARS (optional) —copies/descriptions of exemplary student work that helps explain the lesson

It's a GIRL!!!!!!!

Marilyn and Larry Black are proud to announce the birth of their daughter Diana Marie. This beautiful baby girl with freckles, fair complexion and brown hair entered the world on October 5th, 2004 at 2:17PM. Although she has her mother's blue eyes, Diana will definitely be a daddy's girl as she has inherited her father's tongue rolling ability in addition to his blood type and widow's peak. Excited grandparents Tom and Debbie Jones of Indianapolis can't wait to pierce her dainty little attached ear lobes. Although Grandpa Jack keeps trying, it doesn't seem that little Diana will be able to fold her tongue or taste PTC.