

Lesson Title: *Reebop Baby Lab***I. Identification****Course title:** *Biology/Life Science***Teaching unit:** *"Meiosis: The Steps to Creating Life"***CDE Standards Addressed:** *Biology/Life Sciences*

- a. *Students know meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.*
- b. *Students know only certain cells in a multicellular organism undergo meiosis.*
- c. *Students know how random chromosome segregation explains the probability that a particular allele will be in a gamete.*
- d. *Students know new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).*
- e. *Students know why approximately half of an individual's DNA sequence comes from each parent.*
- f. *Students know the role of chromosomes in determining an individual's sex.*
- g. *Students know how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents.*

Lesson number in this unit: #3**Length (time):** *one class period***II. Specific Instructional Objective(s):** *Upon completion of this lesson student should be able to:*

- *Analyze how Meiosis maintains a constant number of chromosomes within a species.*
- *Infer how Meiosis leads to variation within a species.*
- *Relate Mendel's laws of heredity to the events of Meiosis.*
- *Describe the process of fertilization in living organisms.*
- *Discuss the transmission of genes through meiotic division to form sperm and ova*
- *Define the terms phenotype, genotype, haploid, diploid, homozygous, heterozygous, segregation, and homologous and use them correctly in discussing meiosis and the genetic makeup of organisms.*

III. Equipment, materials, supplies, books, resources needed for this lesson (attach handouts):

- *Reebop Baby Lab Student Handout*
- *Envelopes with Reebop Baby Chromosomes*
(one set of pink and one set of blue per pair of students)
- *Beaker or Plastic Cup*
- *Toothpicks*
- *Pipe Cleaners*
- *Large Marshmallows*
- *Small Colored Marshmallows*
- *Push Pins*
- *Thumbtacks*

IV. Academic Vocabulary:

- *Genotype*
- *Homozygous*
- *Dominant*
- *Allele*
- *Phenotype*
- *Heterozygous*
- *Recessive*

V. Teaching procedures:

- a. **Anticipatory set:** *Good morning everyone! Today we are going to be making babies! That's right, babies! But these are not the type of baby you may be thinking of. We are going to be making Reebop Babies.*
- b. **Stated objective(s):** *Today we are going to be learning about Meiosis and the phases it plays in sexual reproduction.*
- c. **Purpose:** *Understanding Meiosis and the many phases it plays in sexual reproduction allows for us to determine how and why different genetic traits occur in offspring. The purpose of this lab is to simulate fertilization for sexual reproduction. Variation is high during this process so zygotes (fertilized eggs) will have many possible genotypes.*
- d. **Input (presentation):**

Subject Matter (outlined)

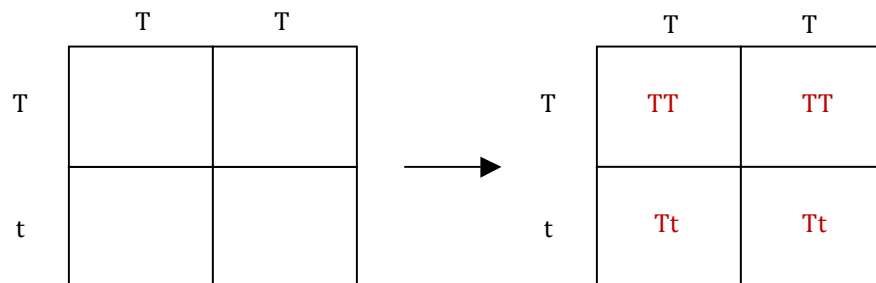
Teaching Methods

<p>Definitions:</p> <ul style="list-style-type: none"> • Genotype: <i>the allele combination of an organism.</i> • Phenotype: <i>the way in which an organism looks and behaves.</i> • Homozygous: <i>when two alleles for a trait are the same.</i> • Heterozygous: <i>when two alleles for a trait are different.</i> • Dominant: <i>observed traits of an organism that masks the recessive forms of traits.</i> • Recessive: <i>traits of an organism that can be masked by the dominant forms of traits.</i> • Allele: <i>the alternative forms of genes (example: tall and short, round and wrinkled.)</i> 	<p><i>Review previous vocabulary/definitions from previous unit (Mendelian Genetics & Punnett Squares) with students. Revisit any areas that students are having trouble understanding.</i></p>
<p>Purpose <i>You will be simulating fertilization for sexual reproduction. Variation is high during this process so your zygote (fertilized egg) will have many possible genotypes.</i></p> <p>Hypothesis</p> <p>Procedure</p> <ol style="list-style-type: none"> 1. <i>You will work in pairs. One person is mom; one person is dad. You should have 2 envelopes, one labeled male and one labeled female.</i> 2. <i>You and your partner should take out the paper strips (chromosomes) and turn them over so the letters aren't showing. Pair them according to length. You will have 8 pairs. (Remember a girl has XX and a boy has XY!)</i> 3. <i>When all of the chromosomes are paired, each person should pick one chromosome of each length and put it into a beaker. This beaker is your "Baby". Put the left over "chromosomes" back in the male and female envelope (this is Meiosis!)</i> 4. <i>Now find out what your baby looks like. Turn over the chromosomes and decode the genes using the "Key to Reebop traits" (you will need to complete the genotypes before you use it). Write your answers on the data table.</i> 5. <i>Place all paper strips from your baby (chromosomes) back in the correct envelope. Go to the supply table at the front of the room to get your supplies.</i> 6. <i>Construct your baby. Draw a picture of your baby in the box on the back of this paper.</i> 	<p><i>Pass out the "Reebop Baby Lap Student Handout" and the "Reebop Baby Chromosomes". Have students read over the lab and conduct Meiosis before receiving any other materials. Once students have finished with Meiosis, have them show you their data table and key. If they are filled in, students make get supplies to build their babies.</i></p>

7. Draw a picture of another baby at your table in the other box. Write 3 sentences (under the picture) describing how it is similar and/or different from your baby.
8. Label a ½ sheet of paper with your names and you baby's name. Place the baby on the paper and put it in the "nursery".

e. Check for understanding (write it out fully):

1. What is a Genotype? *A Genotype is the combination of genes in an organism. (The genes that make up an organism).*
2. What is a Phenotype? *A Phenotype is the outward appearance of an organism, regardless of its genes. (How an organism actually looks).*
3. What is the difference between Dominant and Recessive genes? *Dominant traits are the observed traits of an organism that mask the recessive forms of traits. Recessive traits are traits of an organism that can be masked by the dominant forms of traits.*
4. What are the odds that two Reebop Babies will look the same? Why? *The odds of two Reebop Babies looking the same are slim to none. There are too many variables (students can pick some colors of materials) for any two babies to look exactly alike.*
5. Punnett Square Practice:



- g. Guided practice (application ... bullets or paragraph):** *Students will work on the "Reebop Baby Lab" for the remainder of the period.*
- h. Quest activities (optional, if time permits):** *Students can make flash cards to help them study for the upcoming Meiosis Quiz.*
- i. Closure (Select one or more. Review, summarize, evaluation, synthesis, prep for tomorrow.):** *Good job today. After looking around the room it is easy to see that Meiosis has led to the random pairing of chromosomes resulting in your very unique looking Reebop Babies. Continue answering the Conclusion Questions on the last page of your Reebop Baby Lab. These will be a beneficial study tool for the upcoming Meiosis Quiz. Tomorrow we will be using an internet activity to review the phases of Meiosis prior to taking the quiz.*
- j. Independent practice (homework):** *Finish answering the "Reebop Baby Lab" conclusion questions. Continue working on your Meiosis Flip Book Project if you have not yet completed it. The Meiosis Flip Book Project is due the day of the Meiosis Quiz.*
- k. ELL / Special Needs:** *Allowing students to work in teams (paring up bilingual students with ELL), using visuals & handouts, repeating directions, demonstrating directions while saying them aloud, and including guided practice of the topic.*