



Lesson Plan – Crossing Over Activity (Meiosis)

Name: Molla Huq Mentor: _____Grade Level: 9-12 Biology Date: _____Content Standard: Biology—Genetics Element(s): 2

- **Describe desired outcomes.** Identify what students will know and be able to do. Specify key knowledge, skills and/or understandings that will result from this lesson.

This activity will provide students the opportunity to see firsthand how DNA mixes to create various combinations. The following standard is directly addressed in this lesson:

2. Mutation and sexual reproduction lead to genetic variation in a population.

- **Identify evidence of learning.** Clarify how students will demonstrate their understanding, knowledge and/or skills. Determine the product or assessment that will be evidence of student learning.

Student written responses to questions will show their understanding of meiosis.

- **List materials needed.** Determine what materials and resources you will need during the lesson.

2 strips of paper of equal length and width for each student

Markers, crayons, or colored pencils

Tape

- **Open the lesson.** Connect students' prior knowledge, life experiences and interests with the learning goals of the lesson. Motivate, pique interest and engage the learner.

Explain to students that the activity will be an opportunity for them to show off their creative side, be social with their classmates, and learn about meiosis all at the same time.

Review the definition of meiosis with students (from previous night's reading).

Perhaps briefly discuss why "crossing over" would make a difference—why we study it.



- **Provide instruction and modeling.** Outline what you are going to teach and how. Sequence the instruction, and plan how you will differentiate the content and/or instructional methods to meet the learning needs of the students.

After the introductory explanation, explain what students will be doing and creating.

Go over the procedures for the activity with the whole class. Have the procedures available in print for students to follow along:

1. Take two strips of paper of equal length and width.
2. On the first strip, mark off 6 bands (drawing five lines will create six bands). The bands do not need to be the same size.
3. On the second strip of paper, mark six bands (drawing five lines will create six bands). The bands do not need to be the same size.
4. Number each band on the left and right sides of the band (1 – 6). The number sequence must be the same for both bands.
5. Color each band. Use different colors on each band. The color sequence should be different on each strip.
6. Split each strip in half (this is DNA replication).
7. Cut the strips in two places for crossing over.
8. Recombine the bands, keeping the number sequence the same.
9. Tape the newly sequenced bands together to create four different chromatids.
10. Check and see if anyone else in the class has the same color combination you have.

Leave time for student questions before they begin the activity.

- **Facilitate guided practice.** Plan student practice and interaction with the subject matter. Differentiate the process, content and/or product(s). Specify procedures, structures and time frames.

If students don't seem interested in designing their own, you could prepare completed strips in advance.

Provide students with the list of questions they will need to answer. They may want to keep track of some information as they go, based on these questions:

How many others had identical color combinations to yours?

What is the likelihood that someone else will have the same color combinations? Why?

What is the possibility of getting identical color combinations with thirty thousand gene locations instead of six?

What does this activity tell you about "crossing over"?

- **Close the lesson.** Summarize, debrief the lesson and/or foreshadow next steps.

Leave time for students to share their results with the rest of the class.



- **Plan independent practice or review.** Create a follow-up that students could do as homework or that could be used as review the next day.

Assign reading homework that discusses meiosis.
Begin class the next day with “crossing over” and why it matters.