# Assignment Summary

For this assignment, you will examine, through research, how meiosis connects to traits and genetic diversity. Then, you will complete a graphic organizer of the key ideas from your research. Lastly, you will construct a testable question about genetic diversity.

Background Information

Meiosis allows for much of the genetic diversity found in sexually reproducing organisms. Genetic diversity helps populations survive in times of changing environment. For example, if a new pathogen is introduced to a population, genetic diversity within a population could be the difference between some organisms surviving. Without genetic diversity, it is less likely that individuals within the population can resist the pathogen and pass on those pathogen resistant genes

There are some populations that have low genetic diversity, even though these populations are sexually reproducing and their cells undergo meiosis. In this project, you will investigate these populations and explain the effects that low genetic diversity have on meiosis.

Materials

* Writing and drawing supplies (colored pencils, paper, etc.)
* Access to the Internet and other reference materials

# Assignment Instructions

For this project, you are expected to submit:

1. A completed version of this guide, featuring a graphic organizer of the key ideas of your research, and constructed testable question about genetic diversity.

**Step 1: Prepare for the project.**

1. Read through the guide before you begin so you know the expectations for this project.
2. If there is anything that is not clear to you, be sure to ask your teacher.

**Step 2: Research organisms and relate back to genetic diversity.**

1. Research genetic diversity of the following organisms. Fill in the graphic organizer as you read the articles about each.
   1. Island Foxes: *https://www.nytimes.com/2016/04/26/science/channel-island-foxes-least-genetic-diversity.html*
   2. Koalas: <https://www.sciencedaily.com/releases/2012/10/121023204636.htm>
   3. Wolves: <https://www.newscientist.com/article/dn6730-wolves-genetic-diversity-worryingly-low/>
   4. Cavendish banana. <https://www.conservationmagazine.org/2008/09/the-sterile-banana/>
2. Complete the graphic organizer based on your research. Choose at least two organisms to use in your data table.

**Step 3: Construct a model and a testable question.**

1. Construct a model that shows meiosis. Your model should include:
   1. The stages of meiosis I and meiosis II.
   2. Crossing over and independent assortment. Use different colors to represent the paternal and maternal chromosomes.
   3. Label a few genes on the chromosomes and indicate that they are homozygous versions of the genes.
   4. Repeat but with an example with variation (heterozygous version of genes).

**Step 4: Answer the analysis questions.**

a) Answer the questions in the Written **Analysis** section of this document, including constructing a testable question.

**Step 5: Evaluate your project using this checklist.**

If you can put a check in each box below, you are ready to submit your project.

* Did you conduct research, making notes in the graphic organizer below?
* Did you construct a Meiosis Model?
* Did you complete the Written Analysis section, including your testable question?

**Step 6: Revise and submit your project.**

1. If you were unable to check off all of the requirements on the checklist, go back and make sure that your project is complete. Be sure to save your project before submitting it.
2. Turn in your graphic organizer, Meiosis Model, and written analysis to your teacher. Make sure that your name is on it.
3. Congratulations! You have completed your project.

Graphic Organizer

|  |  |  |  |
| --- | --- | --- | --- |
| Organism | Effects of low genetic diversity | Causes of low genetic diversity | Link to Meiosis |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Construct a Meiosis Model

|  |  |
| --- | --- |
| Low Genetic Diversity | High Genetic Diversity |
|  |  |

Written Analysis

Answer the questions below.

1. Explain why even though these species are undergoing meiosis, there is low genetic diversity.
2. Choose an organism and construct a testable question about the organism’s population. The question should focus on meiosis’s role in genetic diversity.