

Exercise: Simulating Mitosis and Fertilization

Objectives

- Understand the role chromosomes play in the process of reproduction.
- Simulate the process of Mitosis, and observe the phenomenon of "Crossing-Over".
- Explain these mitotic phenomena genetically.
- Simulate fertilization.
- Explain how sexual reproduction produces genetic diversity.

During exercise, you will use chromosome simulation kits for:

1. simulate the process of mitosis in a cell with a diploid number of 2n = 4
2. simulate fertilization using the gametes produced by that simulated mitosis.

You will work with a partner and the teacher will decide if you will be making eggs or spermatozoa. Most of the groups will be making eggs and half will be making spermatozoa. All the rest of members of groups will handle with spermatozoa or oocytes/fertilization.

Chromosome preparation

• CHROMOSOME 1

Take one string of 22 red pig beads connected by magnetic connectors and two strings of 22 yellow-pig beads connected by magnetic connectors. One of the red strings represents the chromosome contribution of one parent, and one of the yellow strings represents the chromosome contribution of the other parent. These two strings represent homologous chromosomes. The second yellow chromosome is used to be used as substitute for pairs of these chromosomes after replication.

• CHROMOSOME 2

Take one string of 8 red pig beads connected by magnetic connectors and two strings of 8 yellow-pig beads connected by magnetic connectors. One of the red strings represents the chromosome contribution of one parent, and one of the yellow strings represents the chromosome contribution of the other parent. These two strings represent homologous chromosomes. The second yellow chromosome is used to be used as substitute for pairs of these chromosomes after replication.



5. Mitosis 1

a. egg phase

- Place one of each chromosome (one 22 red, and 12 yellow, and 8 red, and 8 yellow) together in the middle of your table table, assuming that the chromosome labels represent a cell. For simplicity, you will not keep track of the homologous chromosomes in this task. Observe that chromosomes in this stage should not be different structures and make visible structures:
 - 1. How many total chromosomes are found in this cell?
 - 2. How many total molecules of DNA are found in this cell?
 - 3. Is this cell haploid or diploid?
 - 4. Which stage of the cell cycle is represented at this point? (Use specific.)



Simulating Meiosis And Fertilization Lab Answers

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Simulating Meiosis And Fertilization Lab Answers:

Labster Virtual Lab Experiments: Basic Biology Sarah Stauffer, Aaron Gardner, Dewi Ayu Kencana Ungu, Ainara López-Córdoba, Matthias Heim, 2018-11-29 This textbook helps you to prepare for both your next exams and practical courses by combining theory with virtual lab simulations With the Labster Virtual Lab Experiments book series you have the unique opportunity to apply your newly acquired knowledge in an interactive learning game that simulates common laboratory experiments Try out different techniques and work with machines that you otherwise wouldn't have access to In this volume on Basic Biology you will learn how to work in a biological laboratory and the fundamental theoretical concepts of the following topics Lab Safety Mitosis Meiosis Cellular Respiration Protein Synthesis In each chapter you will be introduced to the basic knowledge as well as one virtual lab simulation with a true to life challenge Following a theory section you will be able to play the corresponding simulation Each simulation includes quiz questions to reinforce your understanding of the covered topics 3D animations will show you molecular processes not otherwise visible to the human eye If you have purchased a printed copy of this book you get free access to five simulations for the duration of six months If you're using the eBook version you can sign up and buy access to the simulations at www.labster.com springer If you like this book try out other topics in this series including Basic Genetics Basic Biochemistry and Genetics of Human Diseases Please note that the simulations included in the book are not virtual reality VR but 2D virtual experiments

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