

 **Activity 7.1.2 Splitting Genes****Purpose**

Mitosis, the process of cellular division, produces two genetically identical diploid (2n) daughter cells from the diploid parent cell. A diploid cell has two sets of chromosomes. Animal cells undergo mitosis to generate specialized tissues and organs for growth. Meiosis is cell division in which gametes are produced. Gametes are haploid (1n) cells that pass genetic material onto offspring during fertilization. Gamete cells contain only one set of chromosomes. The male gamete is a sperm cell and the female gamete is an ovum or egg cell. During sexual reproduction, sperm unites with an ovum to produce a zygote containing a diploid number of chromosomes.

The whole process of gametogenesis, or the formation of gametes, includes both meiotic and mitotic division producing egg and sperm cells. What other differences exist between gamete cells and other animal cells? How do gamete cells contribute to new animals that are genetically diverse?

Ancient Egyptians used the hieroglyphics alphabet, consisting of small pictures, to record information. You will develop your own set of small pictures to accompany the story of meiosis.

**Materials****Per student:**

- *Modern Livestock and Poultry Production* course text
- Colored pencils
- Pencil
- *Agriscience Notebook*

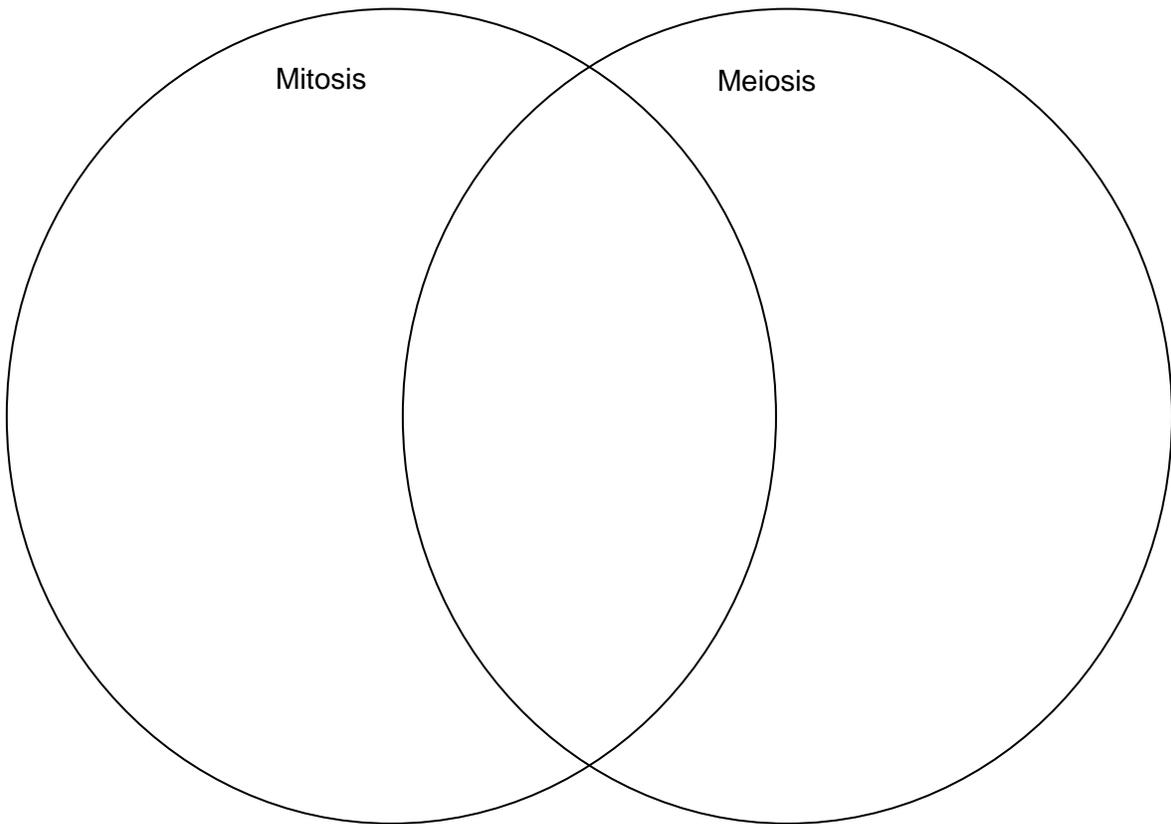
**Procedure**

You will examine meiosis by sketching the different stages of meiosis and determine the number of chromosomes in each step as well as the purpose of the step.

1. Review page 184 – 186 (Meiosis) of *Modern Livestock and Poultry Production*.
2. Sketch, label, and describe each step of the process of meiosis in Table 1. Use Figure 9-4 on page 185 in your course text for your reference. Include the following information in your sketch.
  - Number of chromosomes (haploid or diploid)
  - Number of cells or nuclei produced in each step
  - Purpose of step or product
  - Other pertinent cell parts that contribute to offspring success and survival
3. Describe the processes of spermatogenesis and oogenesis in Table 2. Use the information provided in Step 1 as well as Figure 9-5 on page 186 in your course text for your reference. Include the following information in your sketch.
  - A labeled sketch of each step
  - Number of chromosomes (haploid or diploid)
  - Write a description of each step and what is produced
4. Under Table 2, describe fertilization in your own words

## Conclusion

1. How are sperm and egg cells different from most other animal cells?
2. What do gamete cells contribute to offspring?
3. How many sets of chromosomes do gamete cells contain?
4. Use the Venn diagram to compare and contrast the processes of mitosis and meiosis.



Name: \_\_\_\_\_

# Activity 7.1.2 Student Worksheet

**Table 1. Steps of Meiosis**

Step	Labeled Sketch	Chromosome Number
Diploid Cell (Parent)		____n
<b>Meiotic Prophase I</b>		
Condensation		____n
Pairing		____n
Recombination		____n
Recondensation		____n

<b>Meiotic Reduction</b>		
<b>Step One</b>		___n
<b>Step Two</b>		___n
<b>Step Three</b>		___n

**Table 2. Steps in Spermatogenesis and Oogenesis**

<b>Step</b>	<b>Sketch</b>	<b>Description</b>	<b>Chromosome Number</b>
<b>Mitosis Testicle Cell</b>			___n
<b>Mitosis Ovary Cell</b>			___n
<b>Meiosis Primary Spermatocyte</b>			___n

Meiosis Primary oocyte			___n
Meiosis Secondary Spermatocyte			___n
Meiosis Spermatids			___n
Meiosis First Polar Body			___n
Mature Sperm			___n
Ovum			___n

In your own words, describe fertilization. Use the course text, *Modern Livestock and Poultry Production* for your reference. Make sure your description includes the following words; sperm cell, egg cell, haploid, diploid, gamete, and zygote.