Lesson Plans: Biology 06.01 Chromosomes and Meiosis

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Title : **Biology 06.01 Chromosomes and Meiosis**

GRADE LEVEL : 09,10,11,12

SUBJECT : SCIENCE - High

SBBC COURSE CONNECTIONS : BIOLOGY I (2000310),BIOLOGY I HONORS (2000320)

Creator : Development Team High School Science

DESCRIPTION / ABSTRACT OF LESSON :

Select from the materials and activities presented here to build a lesson on chromosomes and meiosis that will assist students in understanding the differences between body cells and gametes and between autosomes and sex chromosomes. The time will depend on the activities, strategies, and reinforcement activities selected.

OBJECTIVE(S) :

- Differentiate between body cells and gametes.
- Compare and contrast autosomes and sex chromosomes.

TEACHER MATERIALS/TECHNOLOGY CONNECIONS :

Teacher Materials:

Teacher Edition, Chapter 6, Section 1

Overview of 5-E Lesson Design

Ancillary Worksheets

- Study Guide
- Power Notes
- Reinforcement

Assessment Book

- Section Quiz

Technology

- Power Presentation 6.1

Online Extension

- Online Quiz

STUDENT MATERIALS / TECHNOLOGY CONNECTIONS :

Student Materials:

Student Edition, Chapter 6, Section 1

Duration : 55 Minutes

ESSENTIAL QUESTION / KEY VOCABULARY :

Essential Question: How are gametes and sex chromosomes different from body cells and autosomes?

Key Vocabulary: somatic cell, gamete, homologous chromosome, autosome, sex chromosome, sexual reproduction, fertilization, diploid, haploid, meiosis

LESSON LEAD IN/OPENING :

ELICIT

OPTIONS:

Activate Prior Knowledge (10 minutes)
Students should recognize that there is no simple answer to the question: What makes you who you are? The development of a human being involves not just the genetic component, but also internal and external environmental factors. Ask:

- What is so distinctive about sex cells, as compared to all other cells found in the body? *(Sperm and egg cells contain only a single set of chromosomes, not chromosome pairs.)*
- What role do sex cells play in the well-being of a human? *(Unlike somatic cells, human sex cells do not contribute to the general maintenance of the human body. Rather they control sexual determination and development.)*
- If you were looking at a couple who is expecting a child, what traits could you predict for the child just by observing the parents? *(Students may say color of hair, eyes, and skin; height and body type; facial features.)*
- What traits, physical or otherwise, seem to be a combination of the parents, compared with those traits that seem to come from one parent but not the other? *(Students may say skin color, personality traits, blood type)*

ENGAGE

OPTIONS:

K-W-L (15 minutes)
Have students write the title of the lesson at the top of a sheet of paper. Then have them create three columns under the title with the following heads, Know, Want to Know, and Learned. The Learned column will remain blank for this activity. Have students spend three minutes writing what they think they already know about chromosomes and meiosis. Set another three minutes for students to list what they want to know about chromosomes and meiosis. Then spend five minutes discussing the items on students' lists. Generate a series of questions that you can answer during the class's investigation of the lesson topic. Make note of any other questions that can be answered later in the chapter.

EXPLORE

OPTIONS:

Labs and Activities
Venn Diagram (15 minutes)
Have students work in pairs create two Venn diagrams in their notes. The first should compare somatic cells and gametes. The second should compare autosomes and sex chromosomes. After completing their diagrams, each pair should work with another pair to check for errors and inclusion of all key details. Pairs should correct any mistakes. Finally, pairs should contribute what they learned to a single Venn diagram for each comparison to be displayed in the classroom.

STEPS TO DELIVER LESSON :

EXPLAIN

OPTIONS:

Student Edition
Teacher Edition

Vocabulary *Greek and Latin Word Origins* (15 minutes)
The word *gamete* comes from the Greek word *gamos*, meaning "marriage." The following words share the same root. The prefixes indicate number: *polygamy*, *polygamous*, *monogamy*, *monogamous*, *bigamy*, *bigamous.*

Academic Vocabulary The complete set of chromosomes for an organism is sometimes referred to as a *chromosome complement.* The word *complement* has different uses, but it typically refers to a complete set or pairing. For example, in grammar, the word used after a verb to complete the predicate is its complement. In logic, the complement is a universal set, the set of all elements.

Greek and Latin Word Origins The word *meiosis* comes from the Greek word *meion*,word *meion* meaning

"less," This is the same root as the word *minor.*

Teach with Technology (20 minutes)
If your classroom is equipped with a personal response system, use it to test students on haploid, diploid, and polyploidy cells; mitosisand meiosis; and autosomes and sex chromosomes. Test on the number of chromosome sets in each type of cell, where in the body each cell type or process occurs, and what the importance of each cell or chromosome type is.

DIFFERENTIATED INSTRUCTION :

ELABORATE

OPTIONS:

ELL *Compare/Contrast Chart* (15 minutes)
Have students make a sequence diagram for meiosis I and meiosis II with a single pair of homologous chromosomes, like those in Figure 6.3. Tell them that meiosis is considered a reduction division because the chromosome number is reduced. Have them make a sequence diagram of mitosis, using Figure 5.7 (parts 1-4) on page 141 as a guide. Tell students to compare the two diagrams and describe the differences to you.

Pre-AP *Anticipation Guide* (15 minutes)
Prepare a number of true/false questions on the different phases of division in meiosis I and II. Having learned the basic phases of division in mitosis, see how well students anticipate how those apply to mitosis. Students should go back after reading the section and correct their answers as needed.

ESE Resources

Teaching Resources for Florida ESE

ESE Accommodations Poster

ESOL Strategy A13 Use of Illustrations/Diagrams*
ESOL Strategy B2 Explain Key Concepts
ESOL Strategy B4 Semantic Feature Analysis*
ESOL Strategy C5 K-W-L*
ESOL Strategy C13 Venn Diagrams*
ESOL Strategy E7 Peer Pair*
ESOL Strategy F1 Activating and/or Building Prior Knowledge
ESOL Strategy F8 Reading with a Specific Purpose*

LESSON CLOSURE :

EXTEND

OPTIONS:

Interactive Reader *Chromosomes* and *Meiosis* (15 minutes)

Power Notes *Chromosomes* and *Meiosis* (20 minutes)

Reinforcement *Chromosomes* and *Meiosis* (20 minutes)

ASSESSMENT :

EVALUATE

OPTIONS:

Section Review
Section Review answers

Study Guide: Section Review
Section Quiz
Online Quiz

FORIDA SUNSHINE STATE STANDARDS and ISTE/NETS STANDARDS:

Florida Sunshine State FL Science Standard (2008)
Nature of Science Body of Knowledge
Florida Sunshine State Standards
Standard 1: The Practice of Science

Benchmark SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.

Life Science Body of Knowledge

Florida Sunshine State Standards

Standard 16: Heredity and Reproduction

Benchmark SC.912.L.16.16 Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.

Benchmark SC.912.L.16.17 Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.

Broward ESOL Strategies (2007):

Broward DISTRICT Broward K-12 ESOL Instructional Strategies (2007)

A. Instructional Modifications based on Level of English Proficiency

A13 Use of Illustrations/Diagrams*

B. Vocabulary

B2 Explain Key Concepts

B4 Semantic Feature Analysis*

C. Visuals & Graphic Organizers

C5 K-W-L (Know/Wants to Know/Learned)*

C13 Venn Diagrams*

E. Interactive Strategies & Cooperative Learning Settings

E7 Peer Pair*

F. Other Strategies

F1 Activating and/or Building Prior Knowledge

F8 Reading with a Specific Purpose*

Jurying Profile : BEEP JURY

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