

The Evolution of the Y Chromosome

A lesson plan by Sheila Bonacci, Fontbonne Academy, Milton, MA

Objective: This lesson plan is an enrichment exercise for first year Biology students.

Materials: DVD player, the disk, **The Meaning of Sex: Genes and Gender;** television/computer screen, remote control, paper, pencil

Time Frame: Approximately 1 hour

Content area: biology, technology

Level: 11th and 12th grades

Overview and Rationale: It is important for students to understand that biology is Dynamic, and looking at the evolution of the Y chromosome is a good example of that. Also, the topic is not part of a regular high school Biology/Human Anatomy -Physiology curriculum.

Procedure: This lesson plan has three parts:

- A. Ordering the DVD that is going to be used- Fall of this academic year. This procedure will be done once. The students will submit their disks to the Biology department when they are finished using them.
 - B. Programming the DVD player for the specific lesson plan.
 - C. Viewing and answering appropriate questions on the topic.
 - D.
- A. **Ordering the disk:** Go to the website <http://www.hhmi.org/lectures/> and order the disk **The Meaning of Sex: Genes and Gender.** Have it sent to the school care of the Biology department.

B. Programming the DVD Player.

1. Make sure the DVD is plugged in
2. Press the power button; The DVD player will turn on.
3. Press open/close and the disk tray will open. Insert the disk, press open/close to close the disk tray and using the remote press memory during stop. The letters **T** (title number) and **CT** (chapter number or track number) will come up on the screen.
4. Select the following **T's** and **CT's** by pressing the left arrow or right arrow, thus highlighting the appropriate letter.
Enter T-2, CT-4, 5,7,10,11,12,13,14. Enter T-2 once and used the down arrow to enter the CT's.
Enter T-17, CT -7, 8, 9, 10,11,12,13,14,16. Again, you need only enter the T-17 once.

5. Press play while the display appears on the TV screen.

C. Watch the segments of the disk that have been pre-selected and answer all of the questions.

1. Using the remote pause after T-2, CT-7. When does sexual differentiation occur in the human fetus?
2. Pause after T-2; CT-10. When did the scientific community begin to understand how sex was determined? What factor(s) determine(s) the sex of the baby? Prior to this time what factors did people think contributed to the sex of the baby?
3. Pause after T-17; CT-8. Why was this segment of the DVD shown? Explain your answer.
4. Pause after T-17; CT-10. How is the why chromosome reproduced? What is the fundamental definition of male and female?
5. Pause after T-17; Ct-11. Discuss the X and Y-chromosomes as they were 300 million years ago.
6. What happened to the chromosome that eventually became the Y – Chromosome, starting with the first mutation? Explain the SRY gene, inversion, rotting, DAZ and the consequences of these events.

Assessment. As the students view the disk, questions will be addressed and answered. These papers will be graded.

Modifications: I would prefer that the students write a one /two page paper on the evolution of the Y chromosome. The assignment would probably have to be given over a longer period of time.

Standards: The following Massachusetts state standards are met with this assignment:

1. Structure and function of cells
 - a. Relate cell parts/organelles to their functions
2. Genetics
 - a. Mutations
3. Human Anatomy and Physiology
 - a. The individual system and how it functions.
4. Evolution and Biodiversity
 - a. Explains how evidence supports the theory of evolution.
5. Technology
 - a. Programming the DVD player (although they probably all know how to do this already)

