

# X Chromosome 3D

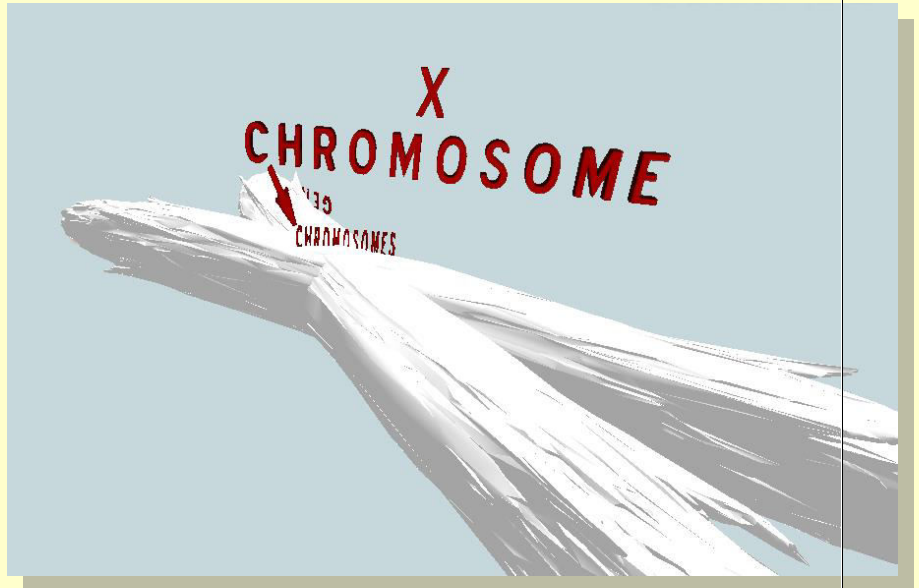
Teaching the X Chromosome, Genetics, and Biology through 3D simulation

## Lesson

Teaching the X Chromosome, Genetics, and Biology through 3D simulation

## Objectives

- 1) Students will gain a basic understanding of the X Chromosome through 3D simulation and visualization,
- 2) Students will gain a deeper understanding of the components of the X Chromosome and how they function together.



## Activity

Students travel through the X Chromosome in real-time 3D, helping them to visualize and understand its structure and function.

## Materials

### X Chromosome 3D Homepage

(click or cut and paste URL into browser)

<http://www.sunrisevr.com/xchromosome3d>

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## 3D Simulation and Investigation

*3D simulations are designed to make subject matter more engaging to today's technology-savvy kids, and help them bridge the gap between the "concrete" world and the abstract world of concepts. When students experience complex subject matter in real-time 3D it becomes clearer. Students learn best when they are actively immersed in subject matter from a variety of different viewpoints; 3D simulation is designed to help students visualize difficult ideas and objects through investigation at any scale (atomic, cellular, planetary, conceptual, etc), and doing things that would normally be impossible.*

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## Required Technology

- PC/Tablet

## Optional Technology

- Projector
- Multiple Computers
- Internet Connection

## Grouping

- Large Group Instruction
- Small Group Instruction

## Staging

Check computer/Tablet for Internet access if needed

## Procedure

1. Access program
  2. Pick a lead student navigator to control movement through the 3D environment
  3. Pick a lead student reader to read information about the Human Cell as it appears on-screen
  4. Begin the lesson by asking students what they already know about the Human Cell; write responses on the board
  5. Review basic facts about the Human Cell including:
    - The cell is the smallest living thing found in nature
    - The Human Cell is the basic component of our bodies
    - A single Human Cell is made up of many different structures, called organelles
  6. Start traveling through the program, facilitate discussion by asking students where the class should go.
  7. Use the 3D simulation as a visual aid; explain information as needed
  8. Have students pay special attention to:
    - The number of organelles
    - How organelles differ in shape and function
    - The function of the nucleus
  9. Have a final wrap-up with students with a question and answer period about the Human Cell. Ask them how it works, and what are the primary components and function of each component.
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## Optional Activity: 3D Scavenger Hunt + Discussion

Have students find a particular part of Human Cell, such as the Golgi Apparatus. If students are on multiple computers, have them “race” to the part of the cell the teacher wishes to highlight. Once students find/arrive at the location, the teacher may commence discussion. Repeat in other areas of the simulation as desired to build understanding.

## Homework/Review

Students may also access the program outside the classroom to supplement textbook questions

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## Functional Notes

1. The program is available on multiple platforms
2. If using the program online, please ensure the Unity3D Player is installed on the computer; through the Internet Explorer Browser; download the latest at <https://unity3d.com/webplayer>.
3. If you see something in **red** you can probably click on it
4. For ease of use you can go through most 3D objects, and even the ground
5. The school library can request and access programs (free) at [www.sunrisevr.com](http://www.sunrisevr.com) for off-line use via PC and Mac if there is no internet connection