3D VIRTAL REALITY VIEWER

TEACHER'S REFERENCE GUIDE

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INTRODUCTION

HamiltonBuhl 3D Virtual Reality Viewer is a fold-out cardboard headset with lenses, a magnet, a hook-and-loop fastener and a headband for hands-free use! When combined with your smartphone, running the proper app, it will transport you into an exciting, immersive and interactive 3D virtual reality world.

The image, sound and movements surround you and your viewpoint adjusts as you move your head or body in any direction.

The HamiltonBuhl 3D Virtual Reality Viewers are fun, easy and an economical way to take your students on a narrated virtual field trip; have them explore settings of novels or cityscapes; trek habitats of endangered species or see the inner workings of a human heart; "go inside" virtual rocket engines, or practice building satellites.

Imagine experiencing history rather than just reading about it. Imagine standing next to the Great Pyramids of Giza, walking amongst the ancient sequoia trees, climbing to the top of Machu Picchu, or touring an art gallery anywhere in the world all from the comfort of your classroom!

The possibilities are limitless, while the opportunities and impact of these affordable 3D Virtual Reality Viewers in the classroom are immense!

IMMERSIVE – ACTIVE – IMMEDIATE

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3D VIEWER CLASS ACTIVITIES

Human Anatomy – Digestive System

There are multiple 3D human anatomy apps available for download at various price points. Choose the one that works best for you and follow the lesson plan below:

Lesson Overview

On average, food travels a distance of 30 feet through your body. Take your students on the journey from entrance to exit and learn about the structures that are in charge of digesting and absorbing nutrients from the food they eat.

Objectives

- Dissect and identify the structures and functions of the digestive system
- Explain how the location and orientation of the body structures enable efficient digestion
- Identify the areas where chemical and/or mechanical digestion takes place

Lesson Introduction

Before class, measure out and discreetly mark 30 feet in the classroom or hallway to represent the length of the digestive tract. Begin the activity by asking the following starter question: “How long is your digestive tract?” After collecting a few answers, point out the distance of 30 feet. Ask the students what the function of the digestive system is and why they think the digestive system is so long. Encourage students to discuss this with one another and ask curious questions about the digestive system. If desired, provide a copy of a diagram of the digestive system for students to use while they take notes. Direct the students to dissect the human digestive system, paying close attention to the shapes and organization of the organs.

Activity

1. Let’s follow the pathway of food through the human digestive tract from entrance to exit. Begin in the mouth. What happens inside your mouth when you eat a bite of food? How are your front teeth used compared to the function of your molars in the back of your mouth during mechanical digestion? What is the function of the salivary glands and how do they help with chemical digestion? Dissect the parts of the mouth and write your answers to these questions on Notes. Then take a photo of the model and your answers.
2. Why do you think the inside of the stomach is bumpy and full of ridges of muscle? Use this information as data to support whether the stomach plays a larger role in mechanical or chemical digestion. Hint: What happens inside the stomach?

3. What factors impact how long chewed food remains in the stomach? Hint: Think about the different types of foods and organic molecules you eat. Hint: How would the structure of organic molecules impact the rate at which the food can be digested?
4. The small intestine is responsible for the majority of chemical digestion and is the main location for nutrient absorption. What characteristics of the small intestine are adapted to accomplishing chemical digestion of nutrients and absorption of nutrients into the bloodstream?
5. After your small intestine has absorbed the majority of the nutrients from the food you ingested, what is left inside the small intestine? What is the function of the large intestine? Hint: Remember that a vital resource to your body is water. In order to digest your food, your body has added saliva and enzymes suspended in water.
6. Our bodies rely on symbiotic relationships with bacteria that work to chemically digest the proteins, lipids, and carbohydrates that we eat. Our intestinal bacteria also produce compounds that we cannot manufacture, such as some vitamins. What type of symbiotic relationship do we have with our gut bacteria?
7. The large intestine is also known as the colon. At the bottom of the ascending colon, along the right side of the body, is the appendix. Scientists are still debating the function of the appendix. One theory states that the appendix provides a place for healthy gut bacteria to live so that they are available to repopulate the digestive tract after an illness. Other theories call the appendix a vestigial organ, an organ that has lost all or most of its function. What data would need to be gathered in order to support one theory or another?
8. There are some food components that are indigestible to humans, such as cellulose. If we cannot digest cellulose, which is the main component of the cell walls in plants, why does your doctor always say to eat at least five servings of fruits and vegetables every day?
9. Your food travels the last five feet (60 inches or 150 centimeters) through the ascending, transverse, and descending colon. As indigestible plant material passes through the colon, this roughage pulls other matter along, cleaning out the colon. Water also diffuses out through the colon and back into the body. This process is vital to your body so that you do not get dehydrated. How do you think the three portions of the colon got their names? Use evidence from your observations to support your answer.

After students have completed the activity, review what they learned. Assign small groups of students one of the structures of the digestive system and ask them to describe it on a piece of paper. Ask the students to include the structure, function, and a sketch of the organ. Then ask the students to stand along the 30-feet distance that represents the digestive tract with their organ sketches, arranged in order from beginning to end.

3D VIEWER CLASS ACTIVITIES

Our Solar System

There are multiple 3D Solar System apps available for download at nominal price points. Choose the one that works best for you and follow the lesson plan below:

Lesson Overview

Fully grasping the sheer vastness of the solar system is an abstract and challenging task for any student. Take your students on a trip through the solar system, where they can investigate the diameter, relative sizes, and parts of the Sun and each planet.

Objectives

- Identify each celestial body in the solar system and its respective parts
- Compare the diameters of each body in the solar system
- Compare the relative sizes of each body in the solar system
- Explore the internal facets of each body in the solar system

Lesson Introduction

To begin the activity, start a discussion among the students by asking the following questions: “Have you ever considered the true sizes of the planets in our solar system? Would Mars be larger in diameter than Earth? What about Neptune?” Allow students to share, then continue by asking more questions: “Do you think the inside of other planets in our solar system is the same as the inside of Earth? Would other planets also have a crust, a mantle, and a core?” Explain to the students that they will measure the diameter of various planets in the solar system, dissect the planets, and compare the sizes of those planets to that of Earth.

Activity

1. The Sun is the closest star. The diameter of the Sun is approximately 1,400,000 km. Dissect the model, make and write down your observations.
2. Mercury is only a bit bigger than the Moon. Measure the diameter. Dissect the model and make observations.
3. Let's compare Mercury and the Earth and write your observations.
4. Venus has no moons or rings. Measure the diameter. Dissect the model, make and write your observations.
5. Let's compare Venus and the Earth and write your observations.
6. Earth: Home Sweet Home. Measure the diameter. Dissect the model and make observations.
7. Let's compare Earth and the Moon.

8. Mars is known as the Red Planet because it contains a lot of iron that has rusted. Measure the diameter. Dissect the model and make observations.
9. Let's compare Mars and the Earth.
10. Jupiter has a Great Red Spot. This is a storm that is bigger than Earth. Measure the diameter. Dissect the model and make observations.
11. Let's compare Jupiter and the Earth.
12. Saturn does not have any solid surfaces. It is a gas giant. Measure the diameter. Dissect the model and make observations.
13. Let's compare Saturn and the Earth.
14. Uranus is the only planet that rotates on its side. Measure the diameter. Dissect the model and make observations.
15. Let's compare Uranus and the Earth.
16. Neptune has only been visited by a human-made spacecraft called Voyager 2. Voyager 2 is still traveling into deep space today, and it will continue until it collides with something. Measure the diameter. Dissect the model and make observations.
17. Let's compare Neptune and the Earth.

After students complete the activity, have them discuss any observations, revelations, or questions they have about the solar system.