zSpace - Delivering A New Way of Learning

Can you remember the first time you experienced 3D? I can.

It was during my first trip to Disney World and it was at the *Honey, I Shrunk the Audience!* show. For those of you unfamiliar with it, it’s technically a 4D film spinoff of the *Honey, I Shrunk the Kids* movie that airs several times a day at Disney’s Epcot studios. Anyway, since I was so little, I don’t necessarily remember what I thought when I was handed my pair of futuristic looking 3D glasses, nor do I remember what I thought when I sat down in that large cold theater. But what I do remember is the initial, amazing feeling I felt when I experienced the 3D for the first time. To me, the 3D felt like magic, and I wanted to experience it again and again.

Although times have changed since I was a kid and technology has made so many advancements, 3D still has that effect on kids and adults alike. Every year, movie studios release more and more 3D films, and technology companies make even more advancements with 3D television and tablet capabilities. And it’s all because people like to be immersed in what they’re experiencing.

Now imagine bringing that experience to your classroom. With zSpace, you can.
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What is zSpace?

zSpace is an immersive, interactive 3D virtual reality hardware and software platform for students and educators. It gives depth to the digital learning experience by improving the way things are studied, explored, designed, and visualized.

Even better, it provides students with safe hands-on experiences with objects considered too big, too messy, or too expensive for the average classroom.

With its high definition screen, and easy to control stylus, the zSpace offers an intuitive and natural feeling experience, while providing your students with the excitement of 3D technology.

To see more visit www.youtube.com/watch?v=D1HQFftYvj8
Bringing Virtual Reality to the Classroom

This year, schools such as Long Island’s Plainview-Old Bethpage Central School District outfitted their schools, ranging from elementary to high school, with zSpace centers. Said Joyce Barry, the Chairperson of Science, Research, and Technology, “Our goal here in Plainview was to put these machines in front of as many students as possible within this one year.” And it paid off. They found that the students were excited to learn with the zSpace and engaged with the lesson material.

Teachers also found that with the zSpace, more could be accomplished in their 40 minute classes than ever before. According to AP Physics teacher Jordan Pekor, “Setting up these labs would be impossible in those kinds of time frames, but you can walk into a zSpace lab and have the thing saved for the students all ready to go.”

The students of Plainview-Old Bethpage CSD have been able to turn designs they’ve created on the zSpace into physical objects in their technology courses, and create 3D models of things considered too expensive or dangerous for the actual classroom.

To see the students of Plainview-Old Bethpage CSD in action, and to see more of how zSpace is changing the way they learn visit [http://goo.gl/ti3fBJ](http://goo.gl/ti3fBJ)
Setting Up Your zSpace

Creating a zSpace STEM Station
Whether you’re new to zSpace or already have a few in your classroom, we suggest the following when creating your zSpace STEM station.

According to zSpace, they recommend setting up your zSpaces on the same network. This will allow the teacher unit to seamlessly gather information from the student units.

With this setup, the teacher station will act as the “central repository,” where all student information, including logins, answers, and student activities, will be sent.

For a step-by-step guide on how to set up a zSpace STEM Lab Network, please refer to the zSpace administrative guide at cdn.zspace.com/downloads/documentation/setup-guides/STEM_Lab_Admin_Guide.pdf
Getting Started with zSpace

Once you have established how you would like your zSpace to function (whether alone or within a STEM station network) getting to work with zSpace is easy!

To begin
Sit or stand directly front and center of the zSpace station. This is important because of the four cameras located on the zSpace that track the positions of your zSpace **eyewear**, and your zSpace **stylus**.

To create a multi-user experience
The images on zSpace can be viewed by multiple viewers, however only one user can control the objects on the zSpace at a given time.

The user sitting center with the stylus and the sensored glasses will have control of the zSpace. The second student will be able to view what is happening with the non-sensored eyewear (distinguished by its lack of 5 visible sensor points). With the non-sensored eyewear, the student will be able to see everything the student in the sensored eyewear is viewing, however the second student will not have control of the zSpace, nor will they see the objects in 3D. The non-sensored glasses simply remove the layered effect of a 3D image.

For a tutorial video on how to set up your zSpace visit [http://goo.gl/Qcqyy0](http://goo.gl/Qcqyy0)
zSpace in Action

zSpace provides access to various apps that are centered around a comprehensive STEM learning environment. Students are encouraged to explore scientific principles using the software available on their zSpace system. Let’s take a closer look at three zSpace applications and their use for multi-level instructional practice.

- CyberScience 3D
- Newton’s Park
- Franklin’s Lab

The zSpace monitor provides a 3D viewing experience to engage students and enhance learning opportunities.
CyberScience 3D

zSpace partners with CyberScience to create engaging learning experiences using various scientific models for interaction. Students can access models to study anatomy, botany, Earth science, chemistry, and other scientific principles. With the use of the zSpace stylus, students can manipulate these objects on the zSpace platform to get a 360 degree view, peel the model apart, and view labels, providing an exceptional, in-depth learning experience. Students and teachers can also create presentations in the CyberScience application by enhancing the models with directions, notes, labels, and additional information. The zSpace system is a perfect way to make these models available to students, when they cannot normally be accessed in the classroom.

To see the different tools available with Cyber Science, and see how they interact with a models within this application visit [www.youtube.com/watch?v=Rqw7EVgfp_0&list=PL4ewDzVtUHqVEUdNuvyxnc30KUk_cYYF0N&index=14](http://www.youtube.com/watch?v=Rqw7EVgfp_0&list=PL4ewDzVtUHqVEUdNuvyxnc30KUk_cYYF0N&index=14)
CyberScience 3D Activity - Plant Life Cycle
Grade Level: 3rd - 5th
Lesson Time: 45 minutes

Lesson Overview
Just like animals, plants also go through life cycles with various stages. While each plant’s life cycle is unique, they all have common stages including birth, growth, reproduction, and death. In this lesson, students will learn about the life cycle of a flowering plant. Using Cyber Science 3D, students will observe a seed and a mature flower.

Objectives
- Observe the first and last stages of a flowering plant’s life cycle (the seed and mature flower)
- Conduct an experiment to observe and record measurements for the stages in between
- Make conclusions about what life cycle stages plants and animals have in common

CyberScience 3D Activity - Nervous System
Grade Level: 6th - 8th
Lesson Time: 120 minutes

Lesson Overview
In this lesson, students will learn about the nervous system, specifically how the brain and spinal cord work together to receive information from the five senses. After conducting research about the central and peripheral nervous system using multiple resources, students will work in small groups to create posters about the human nervous system and make class presentations.

Objectives
- Learn how humans receive information about their surroundings through their five senses: sight, touch, taste, hearing, and smell
- Learn how different sections of the brain process and respond to sensory information in different ways
- Conduct in-depth research about the central and peripheral nervous system using multiple resources
CyberScience 3D Activity - Brain, Spinal Cord, and the Five Senses
Grade Level: 3rd - 5th
Lesson Time: 120 minutes

Lesson Overview
In this lesson, students will learn about the nervous system, specifically how the brain and spinal cord work together to receive information from the five senses. After conducting research about the nervous system using Cyber Science 3D, textbooks, and the Internet, the students will create a model of the brain and spinal cord and make class presentations.

Objectives
• Learn how humans receive information about their surroundings through their five senses: sight, touch, taste, hearing, and smell
• Conduct in-depth research about the brain and spinal cord using multiple resources
• Learn how the brain processes and responds to this information in different ways

For a complete lesson plan of these activities and more visit edu.zspace.com/activities/
Newton’s Park

Newton’s Park is an application created by zSpace to aid with physics instruction. Experiments focused around force and motion can be built, demonstrated, and data can be collected based on interactions viewed through the zSpace. Teacher or student directed simulations can be built to help students gain a conceptual understanding of Newton’s Laws of Motion throughout a variety of software settings.

Within the applications that zSpace has created, teachers have the opportunity to build activities and push them out to student stations through the system’s network. Students can make observations, answer questions, and digitally report their answers directly to the teacher. Think about the ability to start digital lab reports with your students! Below, see a demonstration activity available from zSpace.
Newton’s Park Activity - Kinetic Energy in Action
Grade Level: 8th
Lesson Time: 45 minutes

Lesson Overview
Students will be predicting the speed of a bowling ball before and after multiple collisions with deflectors. They will be making connections between the ball’s speed and its kinetic energy.

Objectives
• Predict the motion and speed of a bowling ball before and after each collision with a deflector
• Determine the velocity of the bowling ball before and after each collision
• Use the values of the velocity of the bowling ball at various intervals to state the concept of energy being transferred into and out of objects
Newton’s Park Activity - Parabolic Trajectories

Grade Level: 4th - 6th
Lesson Time: 45 minutes

Lesson Overview
Students will explore that projectiles launched from a tower will return to Earth’s surface in a parabolic path due to gravity. They will increase/decrease the mass of a ball and compare the distance and path that the balls travel in each trial.

Objectives
- Observe that Earth’s gravity exerts a downward force on objects by comparing the effect of gravity on projectiles
- Predict the motion of objects with different masses in the same environment, based on their observations from the previous experiment
Newton’s Park Activity - How Speed Relates to Energy

Grade Level: 3rd - 5th
Lesson Time: 45 minutes

Lesson Overview
Students will run a pre-set investigation comparing the speed and energy of two balls being launched from force fields with different amounts of force. They will compare the different results when the balls collide with cardboard boxes.

Objectives
• Observe the difference in the speed and energy of an object when it is launched with varying amounts of force
• Make assumptions on the amount of energy in each object, based on their observations in the investigation

For a complete lesson plan of these activities and more visit edu.zspace.com/activities/
Franklin’s Lab
Do you want to teach your students about the power of electricity (get it? haha!)? Franklin’s Lab makes this easy without having to set up hazardous materials in your classroom. In the Franklin’s Lab application, students can set up circuits, visualize reactions, and interact with various materials like batteries, wires, conductors, and resistors. Because this is an application created by zSpace, educators also have access to pre-created lessons within the software, and can also create their own activities with built-in assessments.

Franklin’s Lab Activity - Investigation—Conductivity
Grade Level: 3rd - 5th
Lesson Time: 45 minutes

Lesson Overview Activity
Students will attempt to close a circuit using some conductive and some non-conductive materials such as a gummy candy, rubber tubing, carbon fiber, and a pencil. They will evaluate the conductivity of the various materials by determining which materials allow electrical current to flow through the circuit smoothly.

Objectives
• Attempt to close a circuit using some conductive and some nonconductive materials
• Observe how energy can be transferred through conductive materials in a circuit
• Evaluate the conductivity of the various materials used to close the circuit
Franklin’s Lab Activity - Series vs. Parallel Circuits

Grade Level: 3rd - 5th
Lesson Time: 30 minutes

Lesson Overview
Students will compare the appearance of the series and parallel circuits that are displayed. They will explore how the electrical current is affected when a light bulb “blows out” in both circuits.

Objectives
• Observe how energy can be transferred through electrical currents
• Compare how energy moves in different types of circuits
Franklin’s Lab Activity - Investigation – Open and Closed

Grade Level: 3rd - 5th
Lesson Time: 45 minutes

Lesson Overview
Students will be investigating the concepts of circuits by comparing an open circuit with a closed circuit. They will be observing electrical current flowing through the closed circuit, and they will be exploring the ways in which to close the open circuit.

Objectives
• Observe how energy can be transferred through a closed circuit
• Observe the lack of electrical current flowing in an open circuit
• Identify methods of closing open circuits, using materials from the Franklin’s Lab inventory

For a complete lesson plan of these activities and more visit edu.zspace.com/activities/
About Teq

Teq offers a full spectrum of professional development services designed to empower educators, improve technology integration, and increase student achievement. Since 1972, we’ve remained one of the largest providers of interactive classroom technology in the nation.

Our model fosters passion and creativity in the classroom, offering a unique blend of experienced service and support. We take a holistic approach to strengthening school goals, while differentiating the practice for individual educators.

To learn more about solutions for your district, visit teq.com or call 877.455.9369.

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