

Design Document

Energy Lab



Vis Viva

ENERGY LAB HIGH LEVEL SUMMARY

An Interactive Lab to Empower Student Science Learning

TeamVis Viva is working with the Elizabeth Forward school district, Beth Center, and Chevron to create an interactive Energy Lab for middle school students. The goal of the Energy Lab is to empower kids to take ownership over their education and share their knowledge with others. We also want to use the benefits of technology to get kids excited about energy and to show them that this is an industry in which they can have a voice. Vis Viva is the second of four teams who will work on the project and will add the second installment to this space.

GOALS OF THE ENERGY LAB:

1. Get kids excited about energy
2. Empower students to take ownership
over their education
3. Collaboration in the classroom

VIS VIVA HIGH LEVEL SUMMARY

Use Science to Map the Earth and Locate Fossil Fuel

This term our team will be focusing on using the science behind the layers of the earth to locate fossil fuels. Through an interactive installation, our project will help students explore and answer questions like: What are fossil fuels? And how do we find them?

GOALS OF TEAM VIS VIVA

1. Help students understand
where fossil fuels are located
and how to find them
2. Spark student interest in this
field

VIS VIVA GAME DESIGN OVERVIEW

SUMMARY

Vis Viva is a game that allows the students to take on the role of geologists and learn about the scientific processes behind where their energy comes from. The game is broken into three sequential steps that students will travel through in teams of 4. As students start the game they will get an introduction to their objective (lighting up the sign by collecting fossil fuel energy) from a “real” geologist character in a brief video. This first video will also include instructions for the first stage (seismic mapping).

Students will then reveal as many layers of the earth as they can by using seismic mapping. Two students will work together at this stage, one shouting into the microphone and the other turning the dial and sending the waves. A list of words to say will be provided to make talking into the microphone more comfortable for students. This first section will be timed at 2 minutes. The layers they reveal will be returned as color coded shapes layers. The student will get a score for the number of layers they reveal, and move on to the next stage.

In the second stage students will take core samples to get specific layer information. Students should use the shapes of the layers to narrow down the locations they think might contain resources. They will have a reference sheet on the platform that shows where resources typically gather under the earth. Students will take up to 10 samples and they will be stored in a data log for analysis in the final planning stage.

The last stage of the game is where students use the information they gathered in steps one and two to plan out a drilling path. They are only able to drill once so it is important to decide where they are likely to find more resources. Students will draw out their path using a joystick then hit a button when they are ready to drill. An animation will play through their path and collect any fossil fuel they found. After the animation, their energy will be displayed and used to light up the Pittsburgh Skyline.

VIS VIVA GAME DESIGN: STAGE ONE

Seismic Mapping

SUMMARY:

Students will then reveal as many layers of the earth as they can by using seismic mapping. Two students will work together at this stage, one shouting into the microphone and the other turning the dial and sending the waves. A list of words to say will be provided to make talking into the microphone more comfortable for students. This first section will be timed at 2 minutes. The layers they reveal will be returned as color coded shapes layers. The student will get a score for the number of layers they reveal, and move on to the next stage.

LEARNING GOALS

1. Sound can be used to map the earth
2. Amplitude determines the depth of the wave

GADGETS AND GIZMOS

1. Microphone
2. Rotating dial
3. Button to send wave

* waiting to get info from Teachers to finalize this

GAME DESIGN NOTES

1. The rotation of the spinner should be able to reach all layers
2. There will be a microphone to change amplitude, a dial to change direction, and a button to send wave
3. There are 5* different types of layers: Sandstone, Shale, Limestone, Salt Beds, and oil traps
4. Each layer type is assigned a color and this color always indicates that type of layer. The color gives no indication about the presence of fossil fuels
5. Half way through a pop up message will tell students to swap who is controlling.
6. UI will display the number of layers revealed out of the total, and then at the end of the time will be converted to a score based on the percentage revealed.

VIS VIVA GAME DESIGN: STAGE TWO

Core Sampling

SUMMARY:

In this stage, students will take core samples of the earth layers. The intro video will provide some information about how the shapes affect where resources are located. There will also be a printed version at the kiosk. They should decide as a team where and how many times to sample. They will be able to take up to 10 samples, but each sample will subtract a set amount of their initial score because of the costly nature of the sampling process.

LEARNING GOALS

1. Analysis of the shapes of the layers
2. Decide where to test for fossil fuels and gather more layer data

GADGETS AND GIZMOS

1. Spinner
2. Left & Right buttons
3. Sample Button
4. Next Level Button

GAME DESIGN NOTES

1. Samples can be taken from any layer, even those not revealed in seismic mapping
2. Samples taken will be saved in a data log that can be accessed in the third step
3. Key information on sample sheet includes:
Type of layer, Permeability, Density, and Probability
4. The spinner should be able to go backwards in case they dig past the layer they want to sample from.

VIS VIVA GAME DESIGN: STAGE THREE

Path Planning

SUMMARY:

Here students will plan out a drilling route. They only get to drill once so they must use the information gathered in the first two steps to both where the resources are, and how to not break the drill by going through too many hard layers. A joystick will be used to control the drawing path and there will be buttons for draw and erase as well as open an close data log, and start drill animation. They can go through any layers they want but there will be an indicator of damage done to the drill as they progress and if it hits zero their drill breaks. The amount of energy collected will be displayed on the screen and will be used to power the lights on the city skyline in the background.

LEARNING GOALS

1. Learn the characteristics of different rock types

GADGETS AND GIZMOS

1. Joystick to draw path
2. two buttons for draw and erase
3. One button for data log
4. two buttons for scrolling through samples

GAME DESIGN NOTES

1. There will be feedback when a resource layer is hit with the amount of points added to their score
2. Their drilling path can be modified until they hit the start button, then the path gets locked in.
3. The lights will be LED and be part of the Pittsburgh skyline.
4. Lights will be segmented so that different parts light up according to the amount of energy collected.

VIS VIVA: OTHER GAME DESIGN DECISIONS

SCORING

TYPES OF LAYERS, CHARACTERISTICS AND COLOR RELATIONSHIP

A score is given in each of the 3 sections.

Pt1: the number of revealed layers equates to a percentage of map uncovered which translates to a score. EX: 10/20 layers= 50% = 500pts

Pt2: score starts at 10,000 and 1000 is lost for each sample taken. The remaining score is added to the total.

PT3: Each resource layer collected will add an amount of points to the total score. 10,000 for large traps, 5,000 for medium traps, and 2,000 for small traps.(these numbers can be adjusted as needed)

The maximum points will be determined by how many resources are in each map.