

Building & Teaching with Immersive VR

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Developing an Immersive Virtual Reality Environment to Explore the Lehigh River Watershed and the Lehigh Gap

Department of Education and Human Services

Earth and Environmental Sciences

Library and Technology Services

Lehigh University

Hershey, PA
February 2019

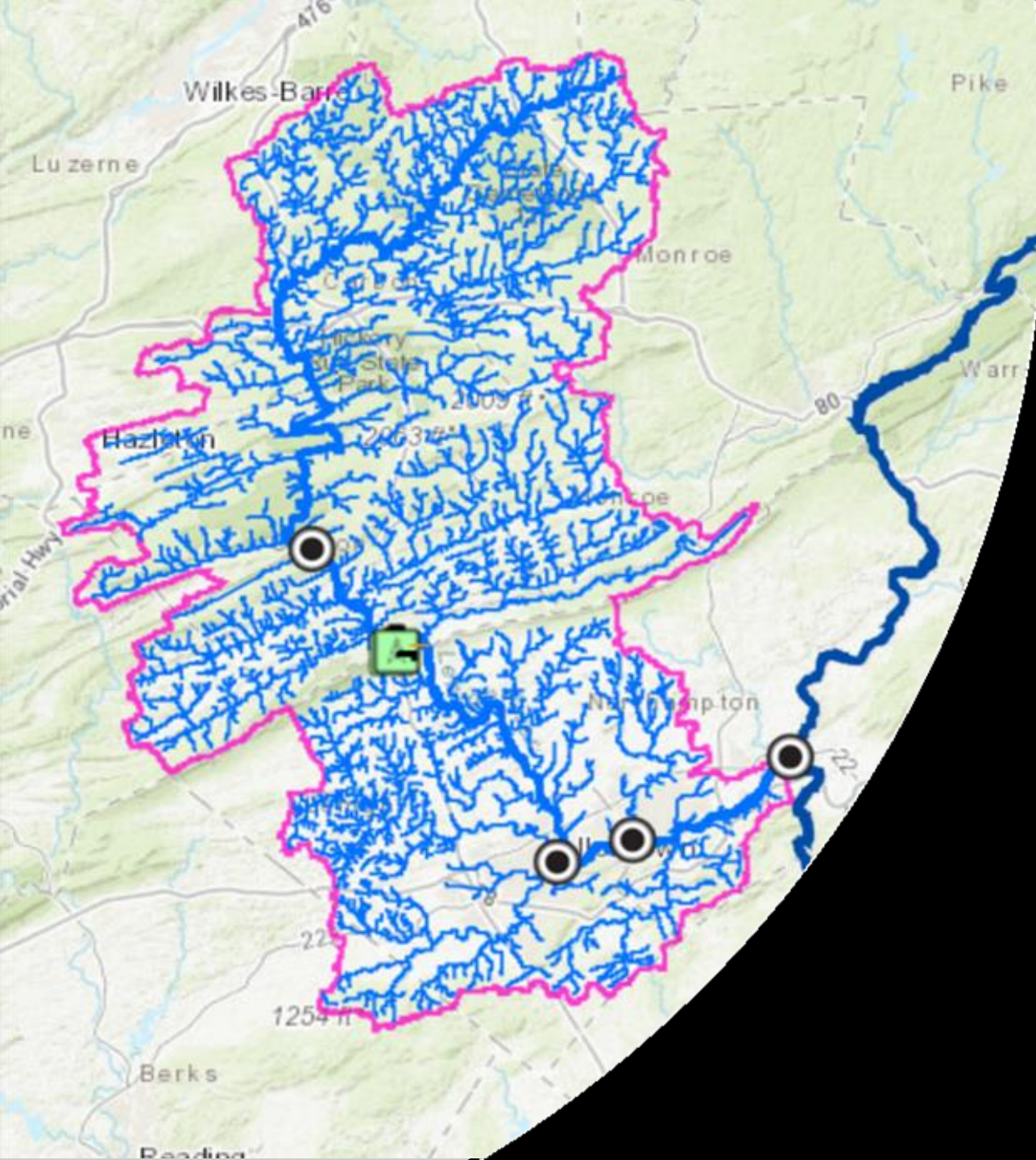
What?



A realistic immersive
VR environment of the
Lehigh River Watershed

Target Location:

Lehigh River Watershed



About our watershed:

Urban core in south (ABE)

4 abandoned mine drainage streams

Forested and rural in the North

What?

An immersive
Virtual Field Trip
in the Lehigh Gap

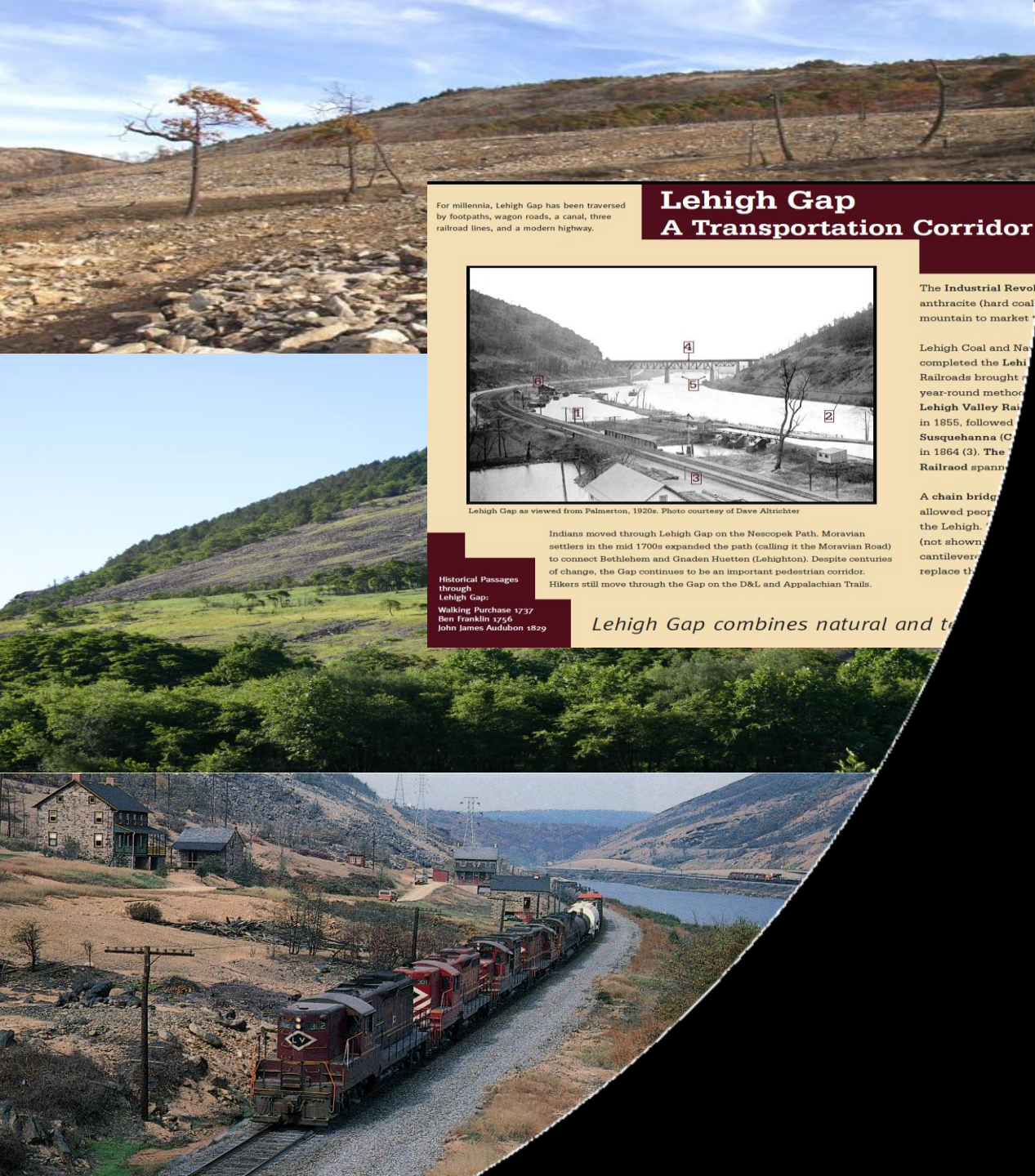


Immersive Virtual Field Trip (iVFT)

Lehigh Gap

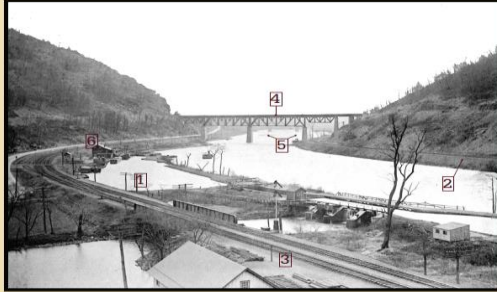
About:

- Geography of the Lehigh Gap
- Historical Transportation Hub
- Zinc Smelting >> Moonscape >> Revegetation
- Appalachian Trail



For millennia, Lehigh Gap has been traversed by footpaths, wagon roads, a canal, three railroad lines, and a modern highway.

Lehigh Gap A Transportation Corridor



Lehigh Gap as viewed from Palmerton, 1920s. Photo courtesy of Dave Altrichter

Indians moved through Lehigh Gap on the Nescopek Path. Moravian settlers in the mid 1700s expanded the path (calling it the Moravian Road) to connect Bethlehem and Gnadens Huetten (Lehigh). Despite centuries of change, the Gap continues to be an important pedestrian corridor. Hikers still move through the Gap on the D&L and Appalachian Trails.

Historical Passages through Lehigh Gap:

Walking Purchase 1737
Ben Franklin 1756
John James Audubon 1829

Lehigh Gap combines natural and transportation

The Industrial Revolution brought anthracite (hard coal) from the mountain to market.

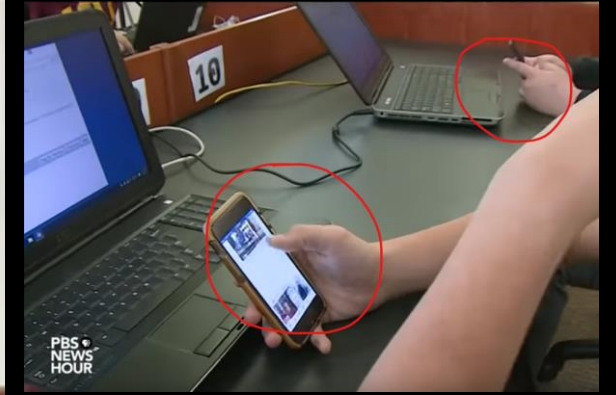
Lehigh Coal and Navigation Company completed the Lehigh Railroad in 1825. The Railroad brought a year-round method of transporting anthracite. The Lehigh Valley Railroad was completed in 1855, followed by the Susquehanna River Railroad in 1864 (3). The Lehigh Railroad spans the gap.

A chain bridge was built in 1825, allowing people to cross the Lehigh. The bridge was replaced by a cantilever bridge in 1890. The cantilever bridge replaced the chain bridge.



“Why?”

Can you relate?





Immersion → engagement, motivation, content learning

Diversity/Multiculturalism included → make experiences relatable to a broader audience.

Accessibility features.

Authentic and engaging (make-up) alternative for field trips or cost / risk prohibitive outdoor explorations.

That's why!



[These students in São Paulo are using technology to purify river water](#)

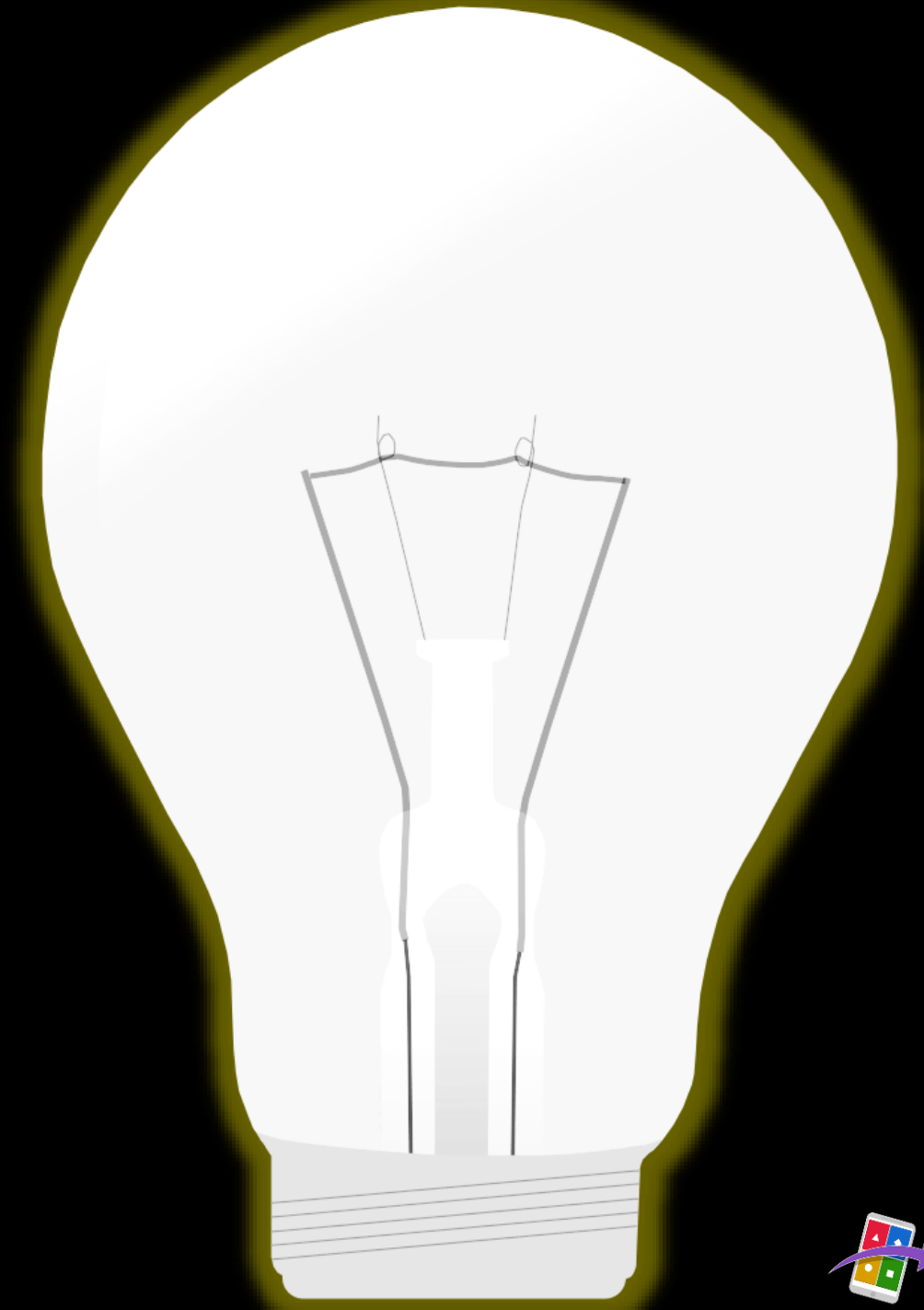
We
needed
this!

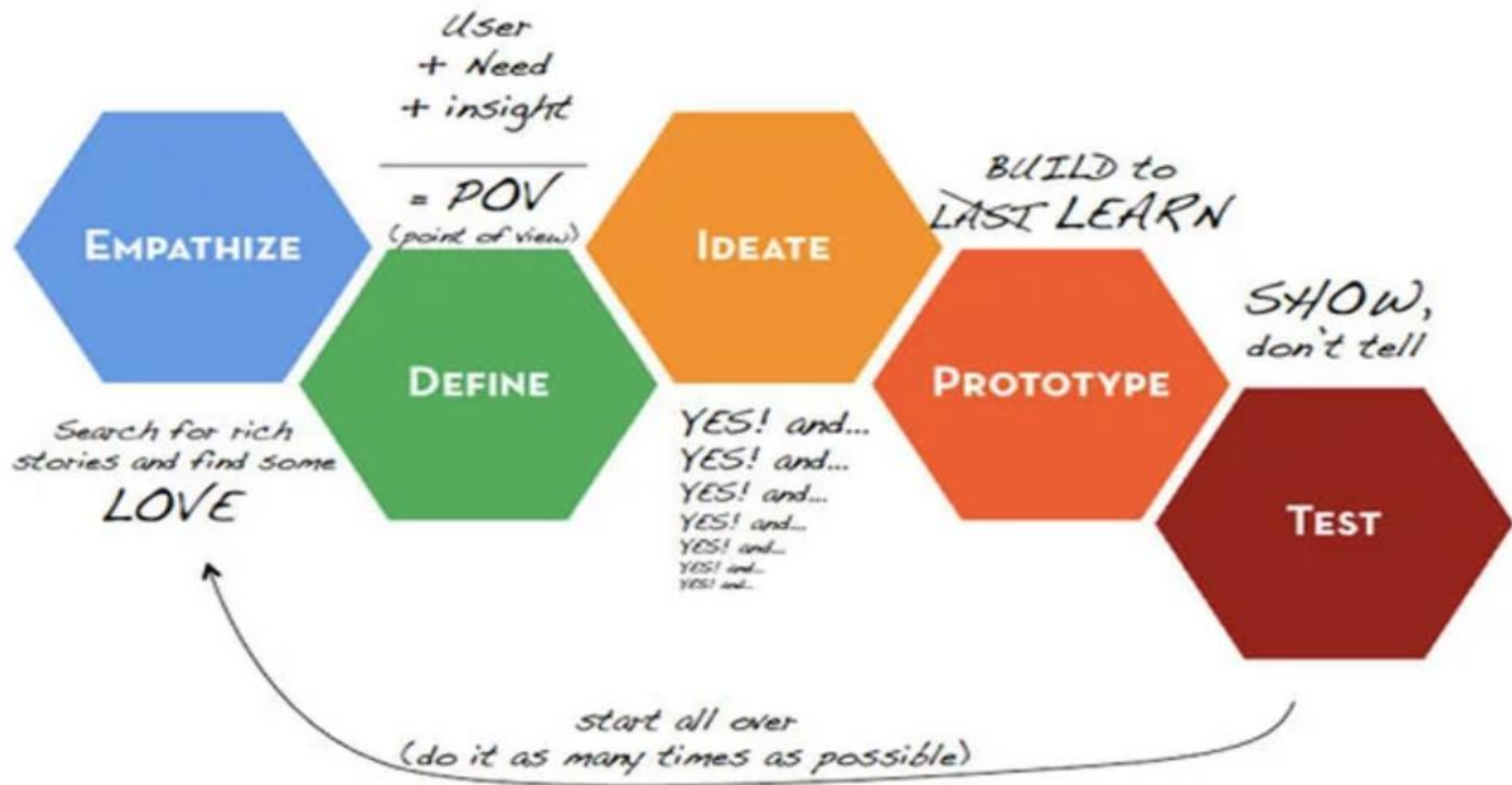
Authenticity Realism Engagement

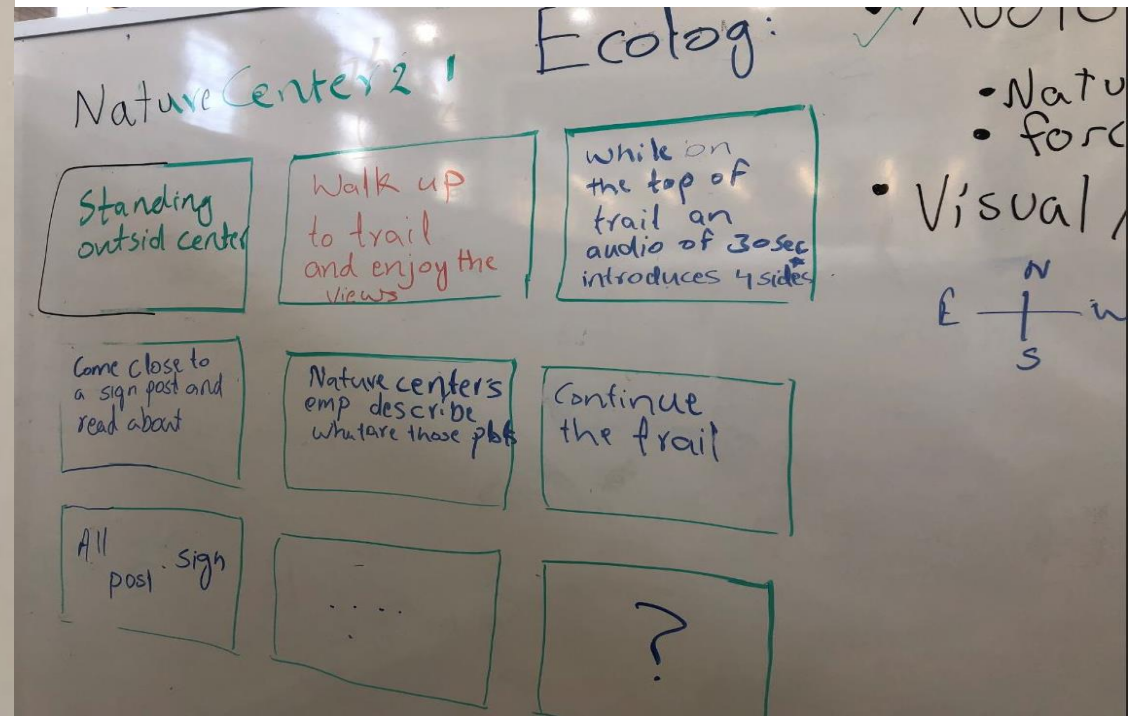
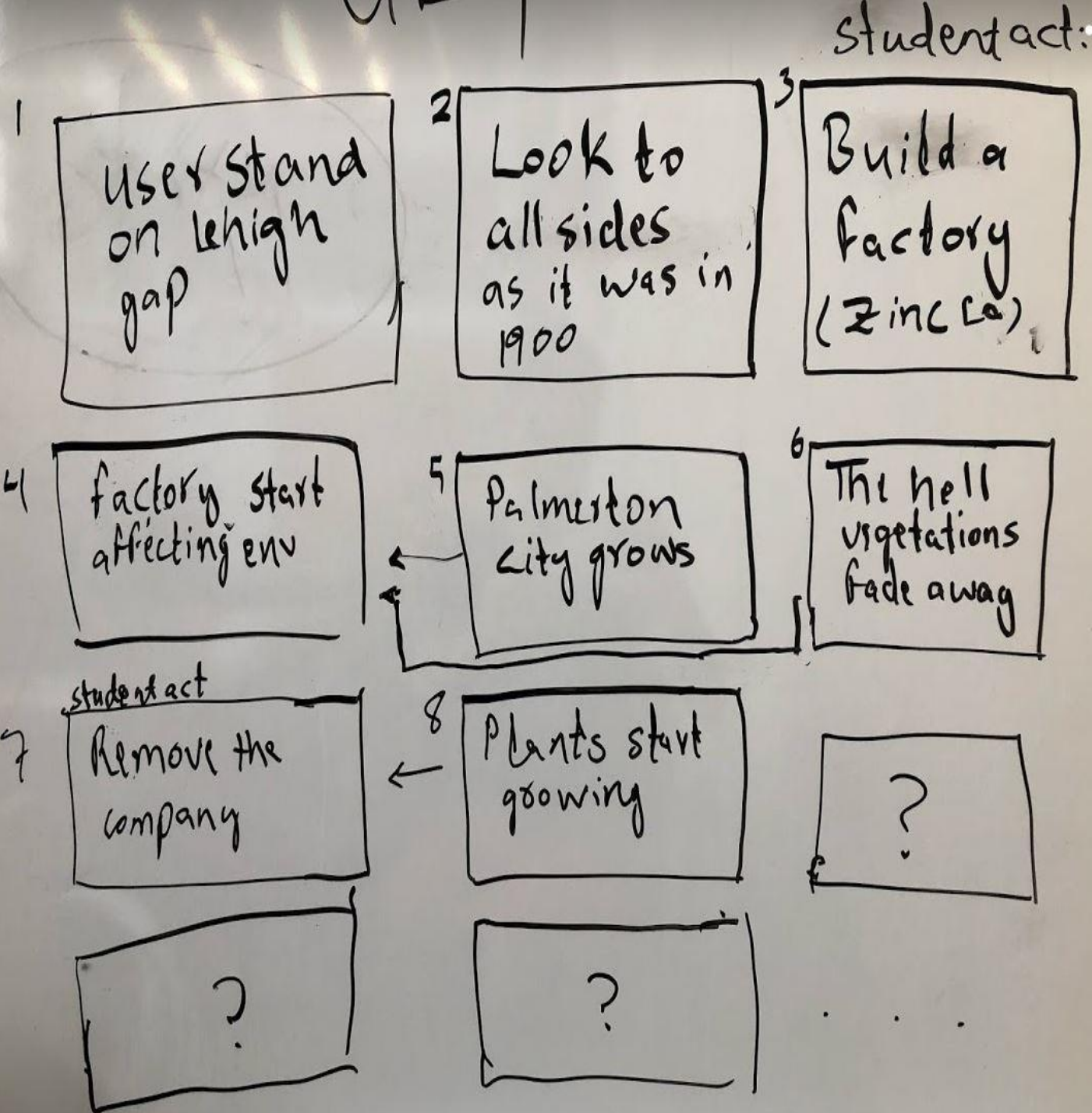
But
how?!



The Design Process







Documentation



1 Documentation | Edit History

Version: 1.0

Modifier: Bashir Sadat

Date: 1/16/19

Description of Change: Finalizing

Version: 0.3

Modifier: Dr. Tom Hammond, Henry Levy, Brian Yeung and Bashir Sadat

Date: 8/3/18

Description of Change: Adding pictures and figures revising and adding contents

Version: 0.2

Modifier: Dr. Tom Hammond, Henry Levy, Brian Yeung and Bashir Sadat

Date: 7/25/18

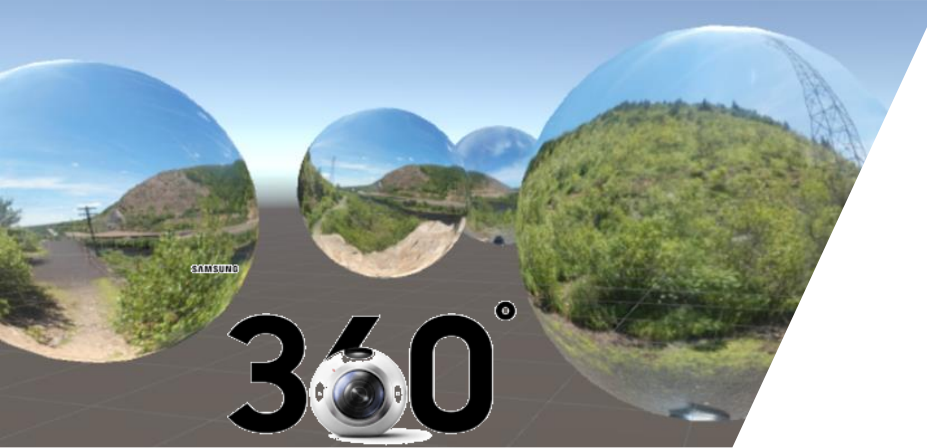
Description of Change: Organization of content and adding more details

Version: 0.1

Modifier: Bashir Sadat

Date: 7/11/18

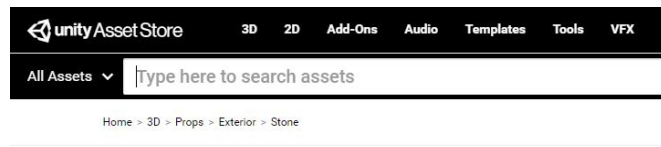
Description of Change: Initial Draft



THE FUTURE OF POSSIBLE



DroneDeploy



Paint3D



BlendSwap



SketchFab



TurboSquid



Version 2



START

CREDITS

QUIT



Green Mountain
2007

Green Mountain
2007

Green Mountain
2007

CONTROLS

Esc: Pause Menu || **WASD / Arrows:** Move || **Hold SHIFT:** Speed up || **Left Click:** Interact

SELECT YOUR EXPERIENCE



**EXPLORE
THE LEHIGH RIVER
WATERSHED**

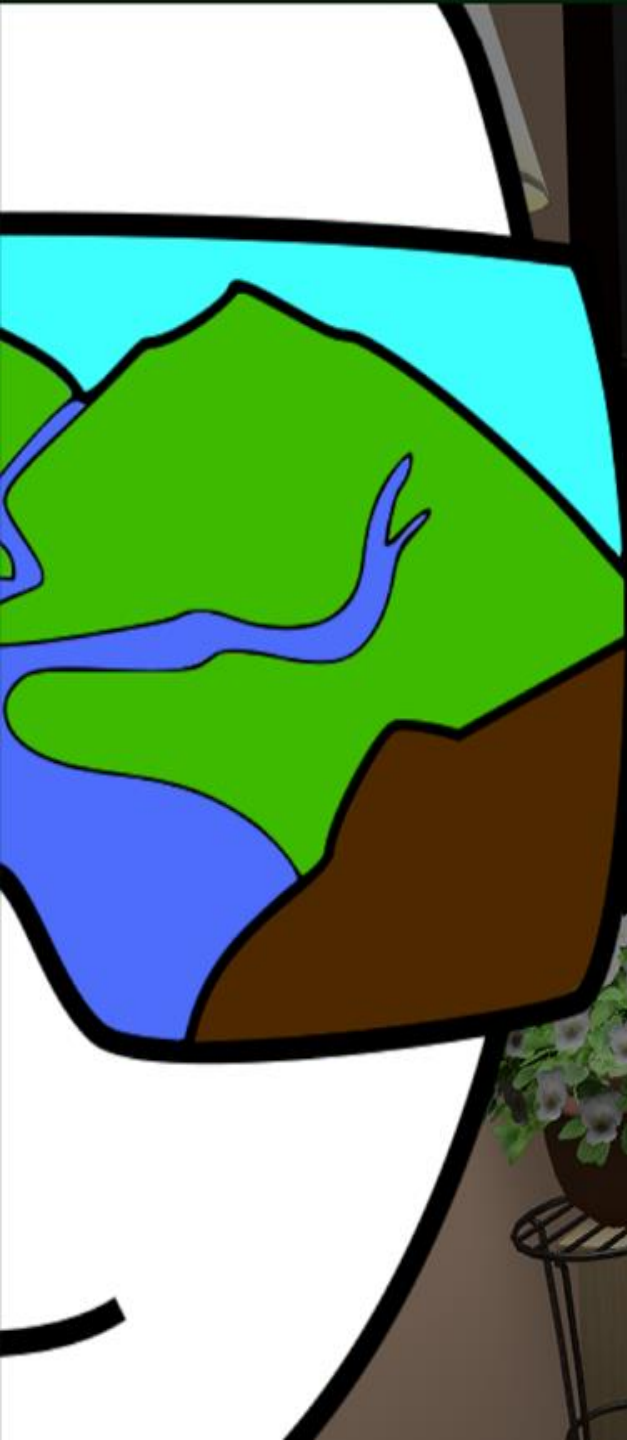


**HIKE IN THE
LEHIGH GAP**



TUTORIAL

RETURN



Tutorial Room Options



Game Controls List

Captions

☒ On / Off

☒ English ☐ Espanol

Options

Accessibility

Voice audio

☒ Enable

☐ English ☒ Espanol

Text size

T



T

Cancel

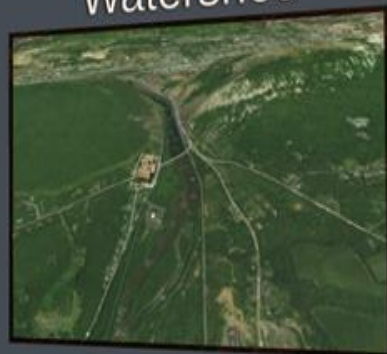


W Lehigh Watershed

LEHIGH WATERSHED: THE VR EXPERIENCE



Explore the
Lehigh River
Watershed



Hike in the
Lehigh Gap area



285 300 NW 330 345 N 15 30 NE 60 75 E 105 120 SE 150



Take a look around the target.
Can you name this place?

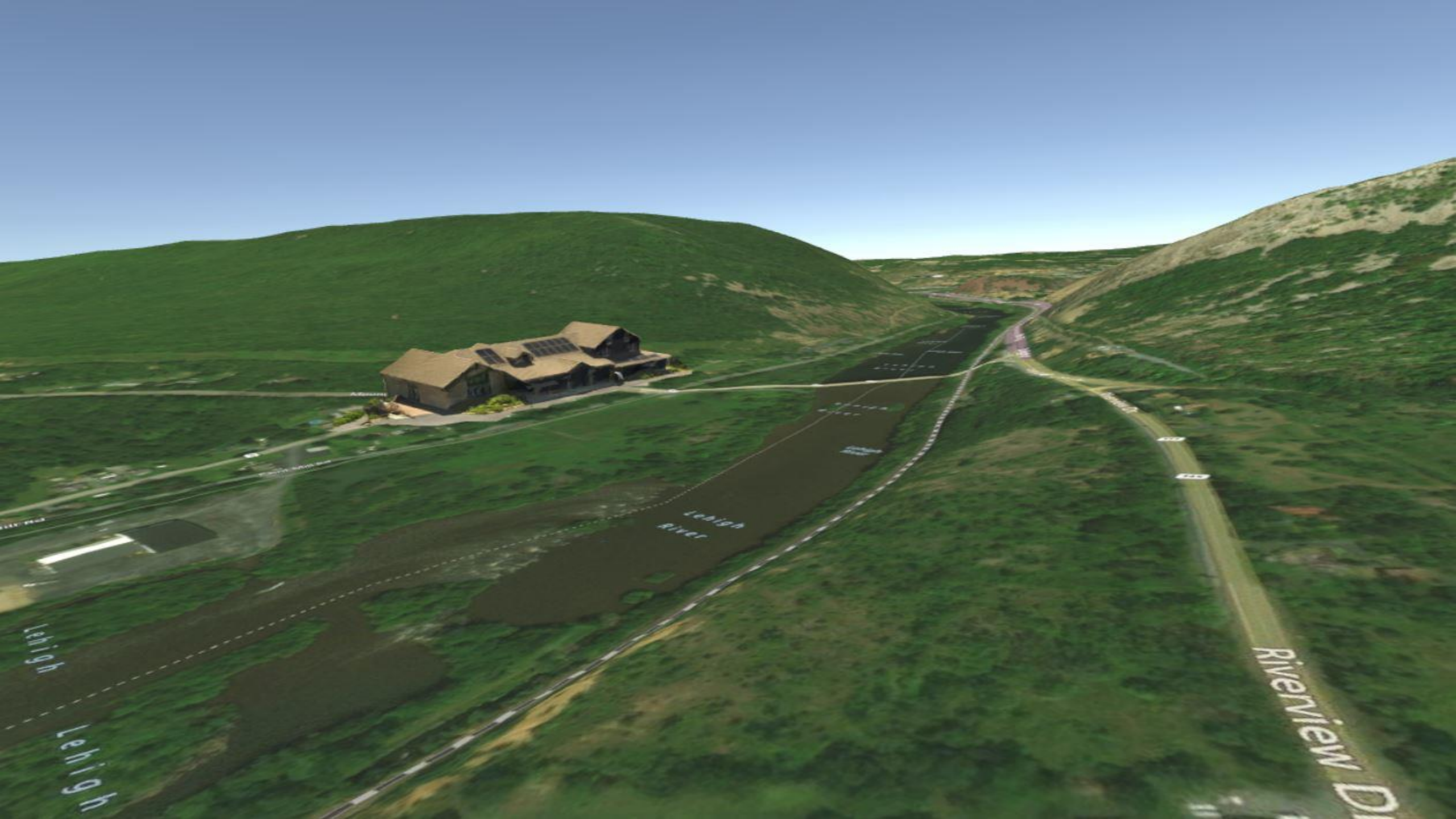
Building 21 HS

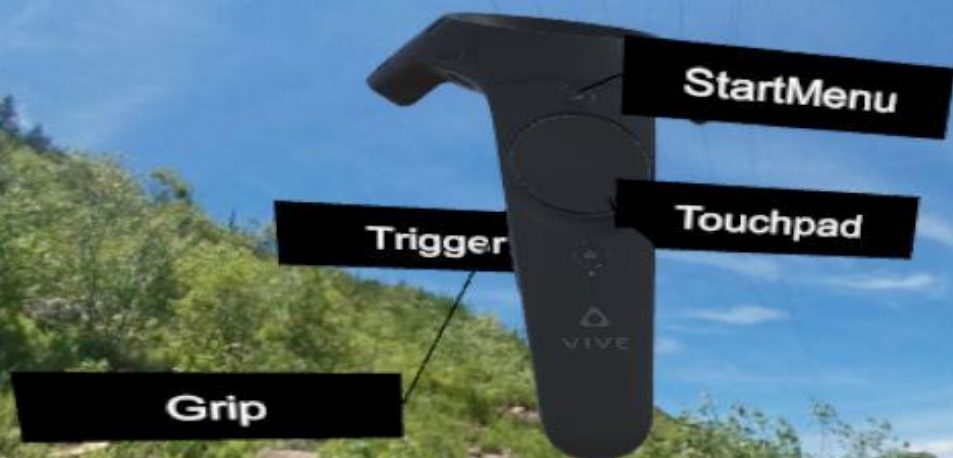
Blue Mt. Ski Resort

Dorney Park

Lehigh Valley Mall









For miller info, highlight with blue pen, then copy
the text and paste into word, or email, then
edit, read through, and e-mail sign-off

Lehigh Gap A Transportation Corridor



TABLE 1. *continued*

[illegible]

International Services
Library
College Gate
Westinghouse Building 1137
Burr Road, Pittsburgh, PA 15205
Attn: James Anderson, Jr.

Lehigh Gap combines natural and technological wonders

1. The first step is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

[illegible][illegible]



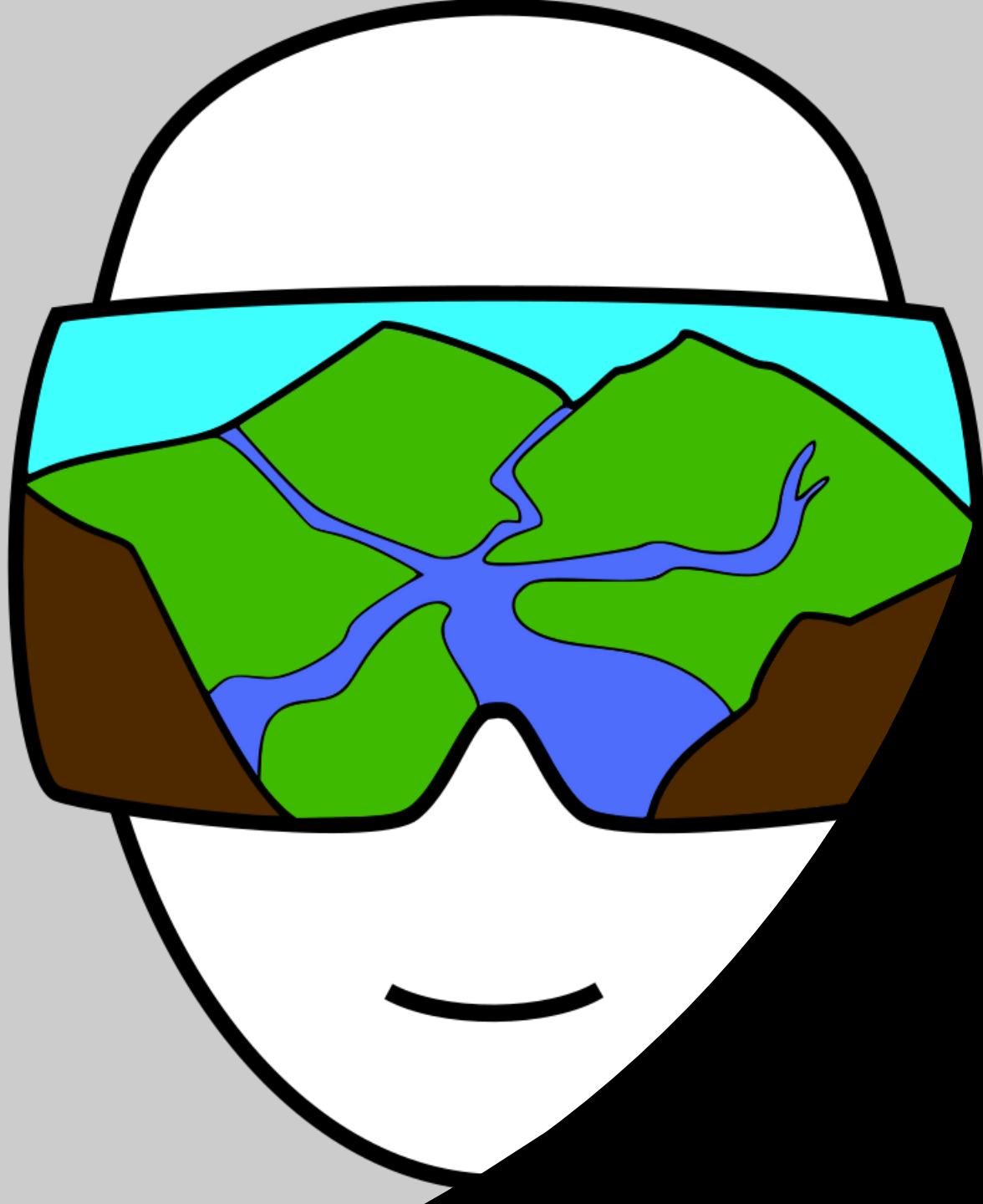


Anthracite, a black and shiny coal-like rock deriving from buried plants in a swamp environment, can be found on the ground below. It was spilled from trains going through the gap.



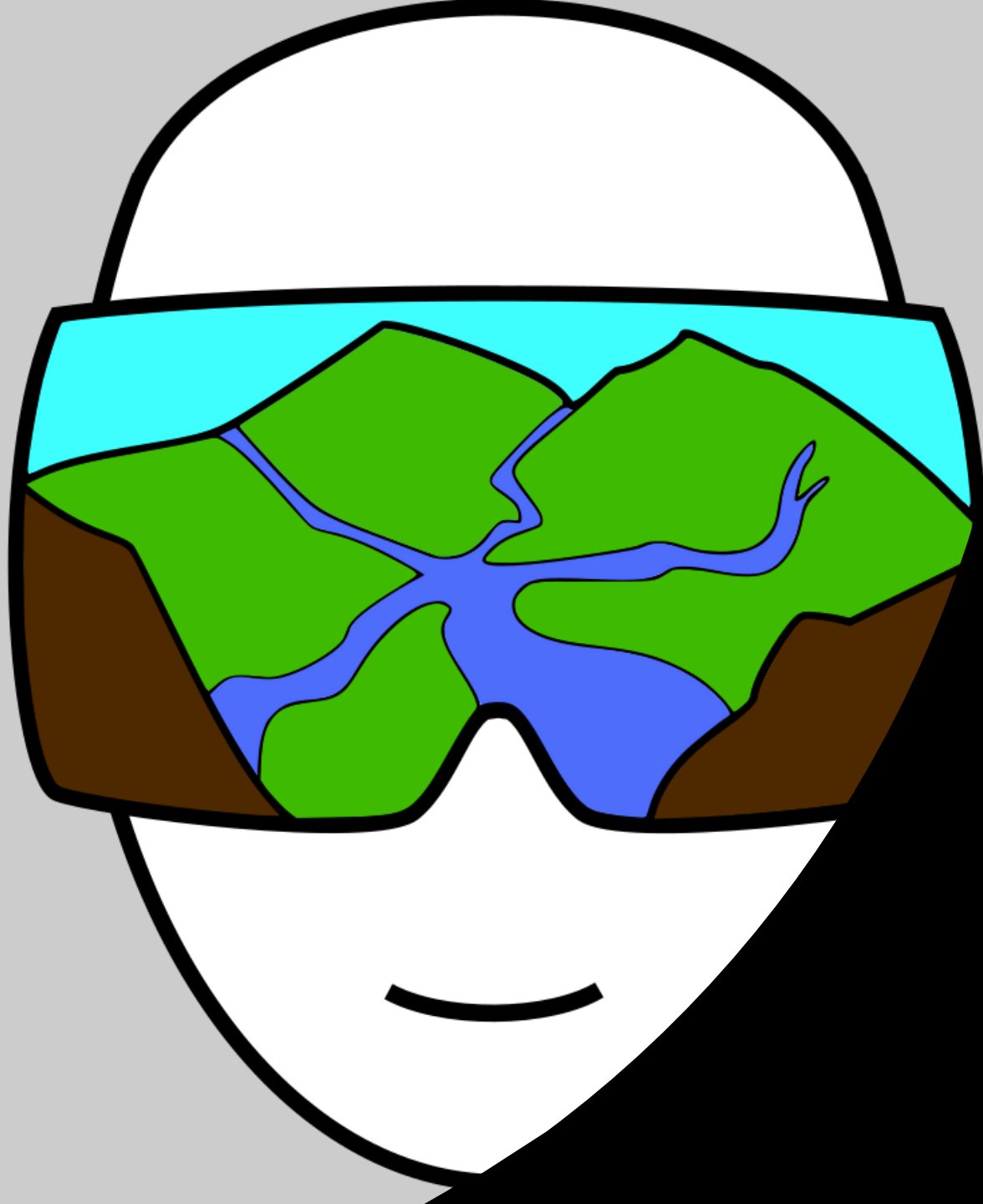


<https://www.youtube.com/watch?v=zLeIYTo-3bg>



What's next?

- Adding additional content
 - new version of the first field trip;
 - EES Geological field trip;
- Prototype testing in an urban high school with Oculus Go this Spring
- Continued development on modules – internal Lehigh support



THANK YOU!

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