



**UNREAL
ENGINE**

VIRTUAL HISTORY

MUSEUM

Using Unreal Engine 4

Grade 9

The Virtual History Museum project allows students to share what they learn about History using interactive 3D. The goal is to use Unreal Engine to teach others about the historical subject they are learning. Through Project-Based Learning (PBL) and the mastery of basic Unreal Engine skills students create a Virtual History Museum to share their knowledge. American History is the focus of this example, but any content area can be used. The final product of this lesson will have a playable character walking around a room with student work or content images displayed within a virtual environment.

Description of class / learning environment

The American History course follows the curriculum standards presented by the state of Ohio. The content is taught through a combination of thematic and chronological teaching practices. This lesson begins with Women's History, where students begin learning about events starting in the 1830s and ends with present day events.

Driving questions for the course include: What has changed? What has stayed the same? What do you see in the future based on what you learned? Students are required to answer these questions in an essay that can then be included within their virtual world.

Although students choose to attend the Dayton Regional STEM School and are chosen through a lottery system, not all students are excited to incorporate the STEM fields into their history class. This makes it important to allow students to add other assignments, such as written responses, presentations, posters that they create, etc. into their virtual world so that students who are excited about the history content as well as those who want to focus on game design, architecture or interior design remain engaged throughout the project. Students will need access to a computer and Unreal Engine 4 software in order to complete this lesson. A laptop computer will suffice, and a computer mouse is strongly recommended.

Lesson Overview

The purpose of this lesson is to motivate students to learn academic content by including interactive 3D skills and the acquisition of real-world skills into the creation of a final product.

The final project encourages students to engage with an audience—in this case, players of their Level or virtual environment. This requires that students demonstrate an understanding of both the content and the technology, Unreal Engine.

The teacher can serve as a facilitator supporting the students, sharing the tutorials and demonstrating techniques by walking students through the skills needed to complete the project. It is important to encourage peer assistance because some students will pick up the skills faster than others.

Students can share their completed product with classmates who can experience their virtual environment by having a playable character walk around their museum (virtual space.) It is possible to publish the virtual world; however, that is beyond the scope of this lesson. An additional way for students to share their Virtual Museum with the world is to have students screen-record themselves experiencing the interactive 3D space, and possibly narrating what they learned about the content and the creation of the space.

Authenticity is ensured as students take ownership of learning skills that are applicable in the interactive 3D industry. Students are able to use their own creativity as they create a virtual museum. Since most people understand what a museum is and what it looks like, students can spend their time applying original ideas associated with architectural design, interior decoration and interactive 3D mechanics.

Since the final products will be shared among students, a natural competition exists to motivate student learning. Students will be able to apply what they already know about their own video game experiences to their virtual world while using the same technology that professionals in the industry use.

Essential Questions/Big Ideas

- How can we use interactive 3D technology and history to engage with others about what has changed, what has stayed the same, and what students see in the future based on what they have learned?
 - How can we teach others what we have learned about history in a fun, relevant, and interactive way?
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Learning Outcomes/Objectives

The student will be able to:

- Create a virtual environment within Unreal Engine
- Place images and objects within a virtual world
- Teach others what was learned about the historical content they studied
- Teach others what was learned about Unreal Engine

Context of Lesson: For this example students have learned about Women's History, beginning with the 1830s up to present day.

Objective: After learning about significant events in America concerning this subject, students will be able to make connections between the past and present by using evidence to complete an essay.

Learning Activities

1. Students will research and develop a presentation related to women's history including:
 - a) What has changed?
 - b) What has stayed the same?
 - c) What students see in the future based on what they have learned?
2. Create a virtual history museum by incorporating interactive 3D skills within a virtual environment.
 - a) Include at least three historical artifacts, such as posters, in your virtual environment using the Sprite Action Function.

Once their virtual environment is complete, students will screen-record a playable character walking throughout their virtual history museum. This will include narration of Unreal Engine 4 skills and an explanation of historical content that answers the questions posed.

Resources

To learn additional basic skills in Unreal Engine, including how to set up an account with Epic Games, look to the tutorials found here:

https://docs.unrealengine.com/en-US/Engine/QuickStart/index.html?utm_source=launcher&utm_medium=ue&utm_campaign=uelearn

Assessments

At the conclusion of the lesson, students will demonstrate an understanding of basic skills in Unreal Engine after completing a room as part of a virtual history museum.

- Create a virtual environment (room) in Unreal Engine
- Meet with each student to discuss goals and potential struggles as the student completes the final virtual history museum Level (exhibit).
- Perform a summative assessment of the student's final exhibit by grading the screen recording.
 - This should include a narration of the applicable skills that students demonstrate in Unreal, as well as the historical content that the student is sharing.
- Assess Social Studies assignments, such as the written response or images students will post within their museum.

Rubric

Name:

Date:

Period:

American History Unreal Project - Women's History

The goal of the project is to engage others in Women's History by explaining what has changed, what has stayed the same, and what you learned. When people explore your virtual environment, they should be taught what you learned throughout the unit.

	Developing	Competent	Proficient	Distinguished
Research	1 - 2 citations included but do not follow citation guidelines	2 historic sources used but citations are incomplete, not entirely accurate.	3 historic sources used but citations have 1 - 2 minor errors.	At least 3 historic sources used with proper citation
Virtual Environment Content	Project does not work, or has major flaws that prevent its intended use.	Project demonstrates basic functionality, and has only minor flaws. Virtual environment showcases some elements of the research.	Project functions in the way the student intended and provides general guidance for the end user. The user learns about the history through navigating the virtual environment.	Project is functional and refined, with extra features that exceed the requirements. The user is clearly engaged with the content presented. .
Aesthetics/ Design	Project requires more attention to the look and feel of the experience as well as the general design.	Project shows some attention to aesthetics and thoughtful design but is incomplete or lacking in some aspects of layout and design.	Project is well organized and pleasing to the eye; easy to navigate and understand. Demonstrates thoughtful design.	Project is well organized, makes good use of space; great use of available and user-created assets; world is inviting and thoughtful, and intentional design is apparent.
Screen Recording	Screen recording is sloppy and requires attention.	Screen recording shows basic content but more attention to recording / editing required.	Screen recording does a good job of showcasing the project but could be enhanced with editing features.	Screen recording is professional in terms of recording and editing. Exeplary job!

Standards Mapping

ISTE Standards

Empowered Learner

- 1a: Students articulate and set personal learning goals, develop strategies to leverage technology to achieve them, and reflect on the learning process itself to improve learning outcomes.
- 1c: Students use technology to seek feedback that informs and improves their practice, and to demonstrate their learning in a variety of ways.
- 1d: Students understand the fundamental concepts of technology operations; demonstrate the ability to choose, use and troubleshoot current technologies; and are able to transfer their knowledge to explore emerging technologies.

Knowledge Constructor

- 3a: Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
- 3c: Students curate information from digital resources, using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
- 3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

Innovative Designer

- 4a: Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
- 4c: Students develop, test and refine prototypes as part of a cyclical design process.

Creative Communicator

- 6a: Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.
- 6b: Students create original works, or responsibly repurpose or remix digital resources into new creations.
- 6c: Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
- 6d: Students publish or present content that customizes the message and medium for their intended audiences.

Global Collaborator

- 7a: Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
- 7b: Students use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
- 7c: Students explore local and global issues, and use collaborative technologies to work with others to investigate solutions.

Common Core Standards

Key Ideas and Details

CCSS.ELA-LITERACY.RH.9-10.1

Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2

Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3

Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

Craft and Structure

CCSS.ELA-LITERACY.RH.9-10.4

Determine the meanings of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.5

Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6

Compare the points of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

Integration of Knowledge and Ideas

CCSS.ELA-LITERACY.RH.9-10.7

Integrate quantitative or technical analysis (such as charts, research data) with qualitative analysis in print or digital text.

CCSS.ELA-LITERACY.RH.9-10.8

Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.RH.9-10.9

Compare and contrast treatments of the same topic in several primary and secondary sources.

Grade 7 World History (Ohio) Standards, retrieved from <http://education.ohio.gov/getattachment/Topics/Learning-in-Ohio/Social-Studies/Ohio-s-Learning-Standards-for-Social-Studies/SSFinalStandards01019.pdf.aspx?lang=en-US>

18. Movements such as the Harlem Renaissance, African American migration, women's suffrage and Prohibition all contributed to social change.
27. Following World War II, the United States experienced a struggle for racial and gender equality and the extension of civil rights.

Interdisciplinary and 21st Century Connections

This lesson provides the flexibility for an interdisciplinary approach. The rooms within the virtual museum can contain any content, not simply historical content. The writing portion of the lesson aligns well with a Language Arts class, and the tutorial completion aligns with a Technical Reading and Writing class. Any Game Design class will naturally fit as well.

The 21st century skills that students will demonstrate during this lesson are:

- Critical thinking
- Creativity
- Communication
- Information literacy
- Technology literacy
- Flexibility
- Initiative

Modifications and Accommodations

Modifications for students with IEPs may include extended time to complete the lesson, shortened essay requirements or fewer artifacts required within the virtual exhibit. For students who cannot use technology, an alternative assignment, such as a short story describing what a patron within their virtual museum may experience, or a hand-drawn representation of the museum, may suffice.

Challenges to pose to gifted students may be an increase in artifacts within the museum, the teaching of skills to others, or the use of inquiry skills to obtain additional skills within the Unreal Engine, such as incorporating visual scripting through Blueprint to make the level interactive, the inclusion of Artificial Intelligence through Behavior Trees, or 3D modeling.



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