UNREAL FUTURES

CAREERS IN ADVERTISING

Educator's Guide

UNREAL ENGINE

UNREAL FUTURES
CAREERS IN ADVERTISING

The “Unreal Futures: Careers in Advertising” project helps students learn the latest tools in interactive 3D and apply them to solve real world, career-focused problems. This project gives students **a glimpse into the advertising industry with a hands-on, real-world advertising project**.

In this project, students will use Unreal Engine to create their own version of a digitally modified commercial advertisement. By doing so, students will not only learn that the real-time engines that power PC and console games are also used in a variety of other industries, but they will also get a behind-the-scenes look at the advertising industry itself through interviews with professionals.

In this way, students will be invited to engage in learning computer science, design, and physics as they apply their newfound knowledge in context to solve real-world problems.

Key Terms

Interactive 3D: a digital environment that allows for real-time, 3D interaction. Examples of interactive 3D include virtual reality, augmented reality, or various online games.

Real-time rendering: the process by which digital 3D images are converted (in real time) to 2D images, allowing for immediate feedback and live interaction.

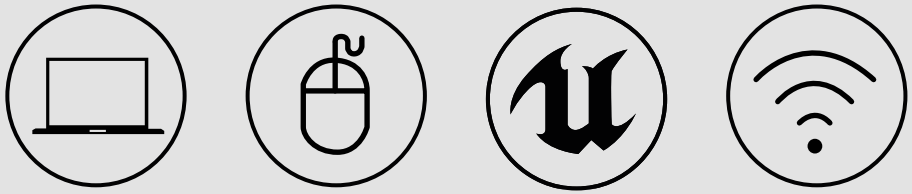
Unreal Engine: computer software specialized to render 3D images in real time.

Sequencer: A cinematic toolset that provides director-level control over cut scenes, dynamic sequences, and movies.

For more key terms, please refer to the **Creator’s Field Guide to Emerging Careers in Interactive 3D**, pg. 44

Student Technology Requirements

Recommended Hardware and Software Specifications



Computer (desktop or laptop)

Handheld mouse (strongly recomended)

Computer software (Unreal Engine)

Internet access

Description of class / learning environment

These lessons use a context-based approach to teach students about the applications of Unreal Engine within the context of how it is used in a variety of potential careers. Through this process students acquire real-world skills, culminating in the creation of a final rendered video project. In this way, the learning environment is designed to directly address the proverbial student question: "Why do I need to learn this?"

The final project encourages students to apply technical skills (navigating the Unreal Engine interface, basics of virtual cameras, lighting, animation, and rendering) to solve a real-world problem (digital production of advertisements). Thus, students will not only learn how to use new pieces of technology but will also apply their understanding within context, keeping in mind the constraints, limitations, and standard practices of a particular industry (advertising and marketing).

Towards completion of their final project, students will follow a self-directed, iterative series of steps summarized in Figure 1, with the teacher serving as a facilitator and extra guide.

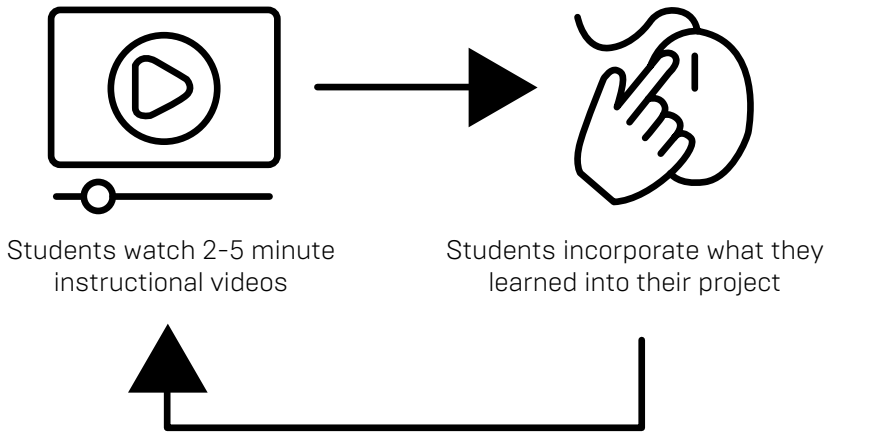


Figure 1: Overview of the learning environment and student journey. Students watch brief introductory videos and tutorials, guiding them through the creation of their final video project (digital advertisement).

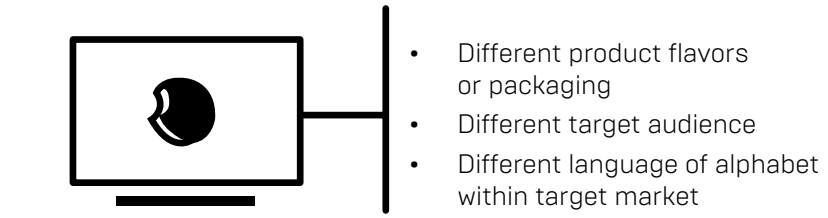
Lesson Overview

The world of game development is a multi-billion-dollar industry. The majority of students and young adults have experienced gameplay and understand the product. The software that powers the games, however, is much less understood by the average gamer.

The success and popularity of the games industry is based upon a suite of computer software that creates the visuals and handles the complex inputs and outputs inherent to gameplay. The goal of this lesson is to help students understand the computational engines behind game development and how these engines can be directly applied within a variety of other career fields, including healthcare, fashion, architecture, manufacturing, aerospace, marketing and advertising.

To do this, students will be introduced to Unreal Engine, computer software that specializes in real-time rendering of 3D images. While Unreal Engine is often associated with game development (it powers popular games like Fortnite™), the world of marketing and advertising has leveraged this computational engine to streamline the creation of product advertisements.

For example, when Oreo™ creates a product advertisement for their cookies, the brand often has to create a myriad of variations of the same ad (to account for different countries, languages, cultures, preferences, cookie flavors, and other market-specific variables).



Fully recreating each advertisement using a live action shoot to account for each variation is time consuming and costly. To innovate around these drawbacks, engines like Unreal Engine can be used to digitally modify existing ads (e.g. digitally swapping out the original Oreo package in the advertisement with a package of a different flavor, for a different audience), precluding the need to do a live reshoot of the full scene.

In this lesson, students will become proficient in navigating Unreal Engine and the animation editor, called Sequencer, to digitally modify a product advertisement. By doing so, students will learn that the computational engines that power the games industry (along with the engineering and mathematics required to develop the engines) are also used in a variety of other industries like advertising. They will also get a behind-the-scenes look at the advertising industry itself through interviews with professionals.

Essential Questions/Big Ideas

1. What is interactive 3D and how can it be applied to solve real-world problems?
2. Which careers rely on interactive 3D, and what are the skills I need to enter these fields?

Learning Outcomes/Objectives

1. Understand the basic principles of animation and interactive 3D by practicing the use of tools like Unreal Engine and Sequencer to become a creator of a 3D virtual environment.
2. Identify and describe the characteristics of the real world (lighting, materials, visual angles) that are necessary to create a realistic virtual 3D environment.
3. List and describe a variety of careers which rely on tools like Unreal Engine.
4. Revise and develop a solution to a real-world problem (creating a product advertisement) by breaking the problem down into smaller, more manageable steps that can be solved through computational thinking.
5. Analyze solutions to complex real-world problems by comparing and contrasting different solutions (real-time rendering vs. offline rendering vs. live recreation) and listing the constraints of each.
6. Context of Lesson: no prior knowledge is specifically required to complete this lesson.

Learning Activities

1. Students will be guided through a series of videos (Figure 1). The topics to be addressed within the videos include but are not limited to:
2. Overview, kickoff : introduces the concept of interactive 3D, the variety of careers that rely on this technology, and an example of the final shot they will be creating using Unreal Engine and interactive 3D.
3. Orientation to the Unreal Engine interface: tutorial on downloading and installing Unreal Engine, along with the basics of the interface and various controls.
4. Initiating the Unreal Engine project file: guides students through the import of their Unreal Engine project file, serving as the backbone upon which they will build their final project.
5. Basics of animation and virtual cameras: introduces Sequencer, Unreal Engine's editor that will be used to animate their scene, and virtual cameras to properly capture the action.
6. Virtual lighting and rendering: students walk through the process of lighting their scene, and then rendering it to create two variants of a 2D high-definition (HD) video of the cookie package, their final product.
7. Design challenges: students apply their technical skills to achieve additional artistic effects (modified lighting, objects, and creative animations).
8. Career-focused wrap up: students learn more about careers in advertising, hearing about exciting jobs and receiving advice directly from industry professionals.

Assessments

1. The assessments below are designed to address the learning outcomes.
2. Summative assessment of final rendered videos using the provided rubric (LO #1, 2, 4)
3. Pre- and post-surveys to assess if students learned about the characteristics of a realistic 3D environment (LO #2)
4. Pre- and post-surveys to assess if students learned about the various career applications for Unreal Engine (LO #3)
5. Pre- and post-surveys to assess if students learned about the differences, pros, and cons between Unreal Engine (real-time rendering), offline rendering, and live recreation (LO #5)

Rubric

Name: Date:

The goal of this project is to learn about Unreal Engine, Sequencer, and interactive 3D in order to become a 3D creator. Those viewing your final rendered project should be able to use the criteria below to assess what you have learned based on the quality

	Developing (1)	Competent (2)	Proficient (3)	Distinguished (4)	Score
Virtual lighting	Minimal changes to the lighting of the scene. Examples include only having 1 light source or not adjusting intensity, quality of the light source to achieve desired effects.	More advanced changes to the lighting of the scene. Examples include only having 1 light source but making adjustments to the intensity, quality of the light source to achieve desired effects.	Includes multiple lights or only 1 light source but with advanced adjustments to the intensity, quality of the light source to achieve desired effects.	Includes multiple lights with advanced adjustments to the intensity, quality of each light source to achieve desired effects.	
Virtual cameras and animation	Minimal additions to the camera animation of the scene. Examples include only having 1 camera angle, limited camera movement, and no animations or movements of the objects in the scene.	More advanced changes to the camera and animation of the scene. Examples include having multiple camera angles, addition of camera movement, and added animations and movements of the objects in the scene.	Includes having multiple camera angles, addition of camera movement, and significant added animations and movements of the objects in the scene.	Includes having multiple camera angles, addition of camera movement, and sophisticated added animations and movements of the objects in the scene).	
Creative design	Work entirely reflects the examples shown in the tutorial videos. No creative additions have been applied.	Work incorporates at least 1 creative addition. Examples include changes to the intensity or color of the light (to achieve mood), altering the animation of the objects (hop or skip instead of spin)	Work incorporates at least 2 creative additions. Examples include changes to the intensity or color of the light (to achieve mood), altering the animation of the objects (hop or skip instead of spin)	Work incorporates at least 3 creative additions. Examples include changes to the intensity or color of the light (to achieve mood), altering the animation of the objects (hop or skip instead of spin)	
Realism	Rendered scene appears to be digitally generated. Few modifications have been applied to achieve realism (lighting, shadows, reflections, depth of field)	Some modifications have been applied to achieve realism (lighting, shadows, reflections, depth of field) but shot still lacks realism.	Significant modifications have been applied to achieve realism (lighting, shadows, reflections, depth of field) and a casual view of the shoot might not reveal inconsistent lighting, movement, shadows that are not realistic.	Advanced modifications have been applied to achieve realism (lighting, shadows, reflections, depth of field) and even a dedicated view of the shoot might not reveal inconsistent lighting, movement, shadows that are not realistic.	
				Total Rubric Score	

Standards Mapping

ISTE Standards

Empowered Learner

1a: Students articulate and set personal learning goals, develop strategies leveraging 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

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.

4b: Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

4c: Students develop, test and refine prototypes as part of a cyclical design process.

4d: Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

Creative Communicator

6b: Students create original works or responsibly repurpose or remix digital resources into new creations.

6d: Students publish or present content that customizes the message and medium for their intended audiences.

Common Core Standards

CSS.MATH.CONTENT.7.G.A.2
Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions.

CCSS.MATH.CONTENT.8.G.A.1
Verify experimentally the properties of rotations, reflections, and translations.

CCSS.MATH.CONTENT.8.G.A.2
Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

National Core Arts Standards

MA:Cn11.1.7a
Research and demonstrate how media artworks and ideas relate to various situations, purposes and values, such as community, vocations, and social media.

MA:Cn11.1.8b
Analyze and responsibly interact with media arts tools, environments, legal, and technological contexts, considering ethics, media literacy, social media, and virtual worlds.

MA:Cn11.1.IIIa
Demonstrate the relationships of media arts ideas and works to personal and global contexts, purposes, and values, through relevant and impactful media artworks

MA:Cn11.1.IIIb
Critically investigate and strategically interact with legal, technological, systemic, and vocational contexts of media arts.

MA:Pr6.1.6a
Analyze various presentation formats and fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.

MA:Pr6.1.6b
Analyze results of and improvements for presenting media artworks.

MA:Pr6.1.7a
Analyze various presentation formats and fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.

MA:Pr6.1.7b
Analyze results of and improvements for presenting media artworks

MA:Pr6.1.8a
Design the presentation and distribution of media artworks through multiple formats and/or contexts.

MA:Pr6.1.8b
Evaluate the results of and implement improvements for presenting media artworks, considering impacts on personal growth and external effects

MA:Pr6.1.Ia
Design the presentation and distribution of collections of media artworks, considering combinations of artworks, formats, and audiences.

MA:Pr6.1.IIa
Curate and design the presentation and distribution of collections of media artworks through a variety of contexts, such as mass audiences, and physical and virtual channels.

MA:Pr6.1.IIIa
Curate, design, and promote the presentation and distribution of media artworks for intentional impacts, through a variety of contexts, such as markets and venues.

MA:Pr4.1.7
Integrate multiple contents and forms into unified media arts productions that convey consistent perspectives and narratives, such as an interactive video game.

MA:Pr4.1.I
Integrate various arts, media arts forms, and content into unified media arts productions, considering the reaction and interaction of the audience, such as experiential design.

MA:Pr5.1.6
Develop a variety of artistic, design, technical, and soft skills through performing various assigned roles in producing media artworks, such as invention, formal technique, production, self initiative, and problem-solving.

MA:Pr5.1.7
Exhibit an increasing set of artistic, design, technical, and soft skills through performing various roles in producing media artworks, such as creative problem solving and organizing

MA:Pr5.1.8
Demonstrate a defined range of artistic, design, technical, and soft skills, through performing specified roles in producing media artworks, such as strategizing and collaborative communication.

MA:Pr5.1.I
Demonstrate progression in artistic, design, technical, and soft skills, as a result of selecting and fulfilling specified roles in the production of a variety of media artworks.

MA:Pr5.1.II
Demonstrate effective command of artistic, design, technical and soft skills in managing and producing media artworks.

MA:Cr2.1.6
Organize, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering purposeful intent.

MA:Cr2.1.7
Design, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering expressive intent and resources.

MA:Cr2.1.8
Structure and critique ideas, plans, prototypes, and production processes for media arts productions, considering intent, resources, and the presentation context.

MA:Cr2.1.I
Apply aesthetic criteria in developing, proposing, and refining artistic ideas, plans, prototypes, and production processes for media arts productions, considering original inspirations, goals, and presentation context.

MA:Cr2.1.II
Apply a personal aesthetic in designing, testing, and refining original artistic ideas, prototypes, and production strategies for media arts productions, considering artistic intentions, constraints of resources, and presentation context.

MA:Cr2.1.III
Integrate a sophisticated personal aesthetic and knowledge of systems processes in forming, testing, and proposing original artistic ideas, prototypes, and production frameworks, considering complex constraints of goals, time, resources, and personal limitations.

Next Generation Science Standards

HS-ETS1-1
Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-2
Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3
Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

HS-ETS1-4
Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Accommodations and Modifications

Modifications for students with Individual Education Program plans (IEPs) may include extended time to complete the lesson, and planned, frequent breaks during the video tutorials and use of Unreal Engine. For students without access to the required technology, they may be asked to simply watch the tutorial videos and write a short essay on the key features of Unreal Engine, its use in a variety of industries, and how to create, design, and render a project through Unreal Engine and Sequencer.

If needed or desired, the challenge of the lesson may be increased by asking students to devise their own design challenges (increased camera angles/ activity, additional or more sophisticated animation, etc.). They may also be directed to the use of inquiry to obtain additional skills within Unreal Engine, such as incorporating visual scripting through Blueprint to make the level interactive or including artificial intelligence through Behavior Trees.

Resources

- **Example of the advertisement students will be generating and modifying**
- **"Sequencer Overview." Unreal Engine Documentation**
- **"The Art of Lighting | Pixar in a Box." Khan Academy, Khan Academy**
- **"Unreal Online Learning." Unreal Engine**
- **"Unreal Engine | YouTube channel." YouTube,**