Visualizing Archaeology with Digital Reconstruction

Overview

- Visualising Archaeology goals and examples
- Issues in digitising archaeology
- Digital modelling and architectural reconstruction
- Artefact digitisation, reconstruction and placement
- Exploration and interaction
- Creating Characters
- Communication and dissemination
- Resources

Archaeology

the study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains.

- Remains
- Artefacts
- Buildings

Visualising Archaeology

Examples

- Prisoner of War Camp – Highlanders museum
- St Andrews Cathedral
- Iron Age Roundhouse
- St Madoes Stone
- Perth 1540
- Callanish landscape

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- Visualising Archaeology goals and examples
- **Issues, guidelines and best practice**
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Issues, Guidelines and Best practice

- London Charter
- Seville Principles

London Charter 2006

- Charter for the computer-based visualisation of cultural heritage.
- Focus on being transparent about the evidence behind a reconstruction.
- http://www.londoncharter.org/

Seville Principles 2011

- International principles of virtual archaeology.
- Builds on the proposals in the London Charter.
- http://smartheritage.com/seville-principles/seville-principles

Interdisciplinarity

Among the experts … it is essential to ensure the specific presence of archaeologists and historians, preferably those who are or were responsible for the scientific management of the excavation work or archaeological remains to be reconstructed.

Purpose

Any proposed computer-based visualisation will always aim to improve aspects related to the research, conservation or dissemination of archaeological heritage. The overall aim of the project must be encompassed within one of these categories

1) research
2) conservation
3) dissemination

The category concerning dissemination includes both educational projects, whether formal or informal education, and recreational projects (cultural tourism)

Complementarity

The application of computer-based visualisation for the comprehensive management of archaeological heritage must be treated as a complementary and not alternative tool to other more traditional but equally effective management instruments.

Computer-based visualisation should seek forms of collaboration with other methods and techniques of a different nature to help improve current archaeological heritage research, conservation and dissemination processes. To do so, compliance with “Principle 1: Interdisciplinarity” will be fundamental.

Nevertheless, computer-based visualisations might be an alternative approach when original archaeological remains have been destroyed (e.g. due to the construction of large infrastructures), are placed in areas with difficult accessibility (e.g. without roads) or at risk of deterioration due to the huge influx of tourists (e.g. rock paintings).

Authenticity

Computer-based visualisation normally reconstructs or recreates historical buildings, artifacts and environments as we believe they were in the past. For that reason, it should always be possible to distinguish what is real, genuine or authentic from what is not. In this sense, authenticity must be a permanent operational concept in any virtual archaeology project.

Historical Rigour

To achieve optimum levels of historical rigour and veracity, any form of computer-based visualisation of the past must be supported by solid research, and historical and archaeological documentation.

The historical rigour of any computer-based visualisation of the past will depend on both

a) the rigour with which prior archaeological research has been performed

b) the rigour with which that information is used to create the virtual model.

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Architectural Reconstruction

- Gather **all** available evidence

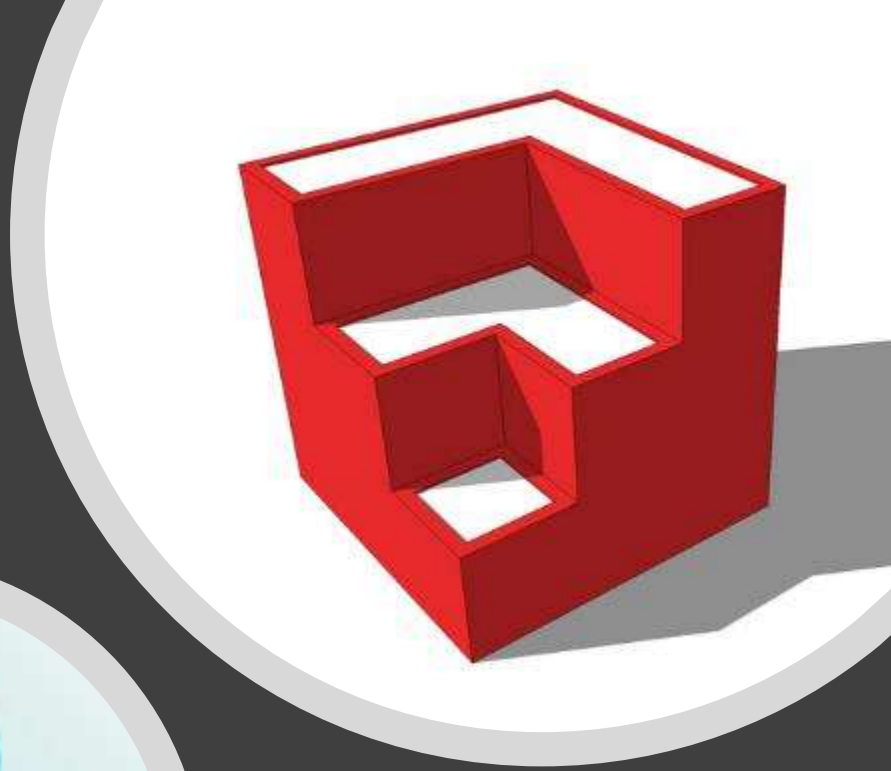
- **Archaeological Evidence**
- Maps
- Scale plans and elevations
- Look at Comparisions sites
- Photos and illustration
- Written evidence

Architectural Reconstruction

- Archaeological evidence can be transformed into virtual landscape and structures and built upon to create a better understanding of the past and better visualise sites for education and further research.

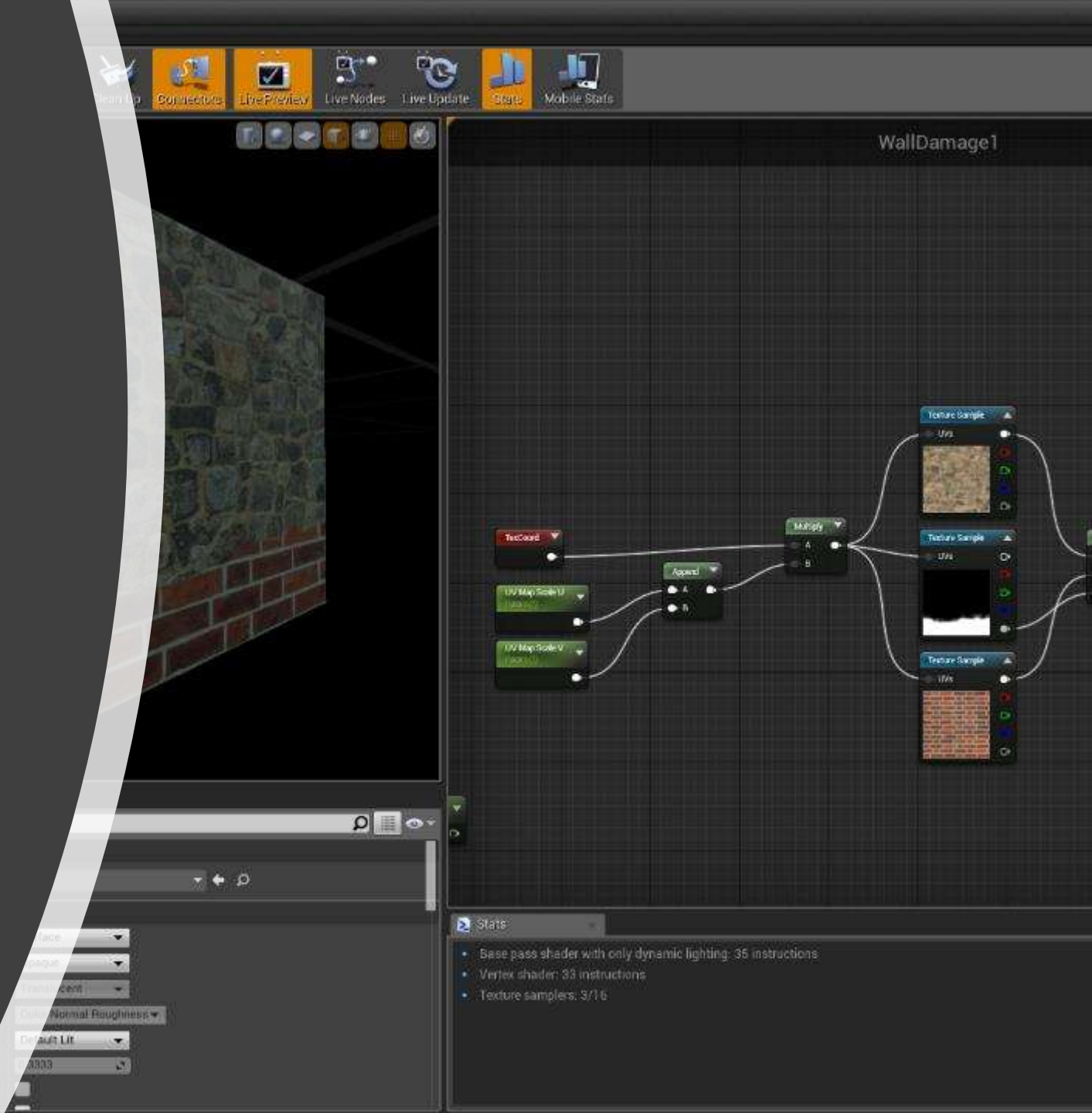
Mesh Creation

- **Software Examples**
- Blender
- SketchUp
- 3ds MAX



Materials and Textures

- UV Mapping
- A **UV map** is the flat representation of the surface of a 3D model used to easily wrap textures. The process of creating a **UV map** is called **UV unwrapping**. The U and V refer to the horizontal and vertical axes of the 2D space, as X, Y and Z are already being used in the 3D space.
- This can be done in **Blender, Unreal Engine 4** or **Autodesk MAYA, Substance Paint**



Workflow Example

- **Import .fbx files to Unreal Engine 4**
- FBX is a file format owned and developed by Autodesk. It is used to provide interoperability between digital content creation applications such as MotionBuilder, Maya, 3ds Max, SketchUp and Blender.
- Unreal Engine features an FBX import pipeline which allows simple transfer of content from any number of digital content creation applications that support the format.
- The advantages of the Unreal FBX Importer over other importing methods are:
  - Static Mesh, Skeletal Mesh, animation, and morph targets in a single file format.
  - Multiple assets/content can be contained in a single file.
  - Import of multiple LODs and Morphs/Blendshapes in one import operation.
  - Materials and textures imported with and applied to meshes.

Development phases

1. Create simple accurately scaled models.

2. Add items to interiors, placeholder characters.

3 Materials and textures.

4. Develop interaction system, add interactions to objects, information panes, integrate dialogue system.

5. Polish existing assets (recreate/improve).

6. Create multi-camera setup, produce video, produce photospheres.

Asset lifecycle

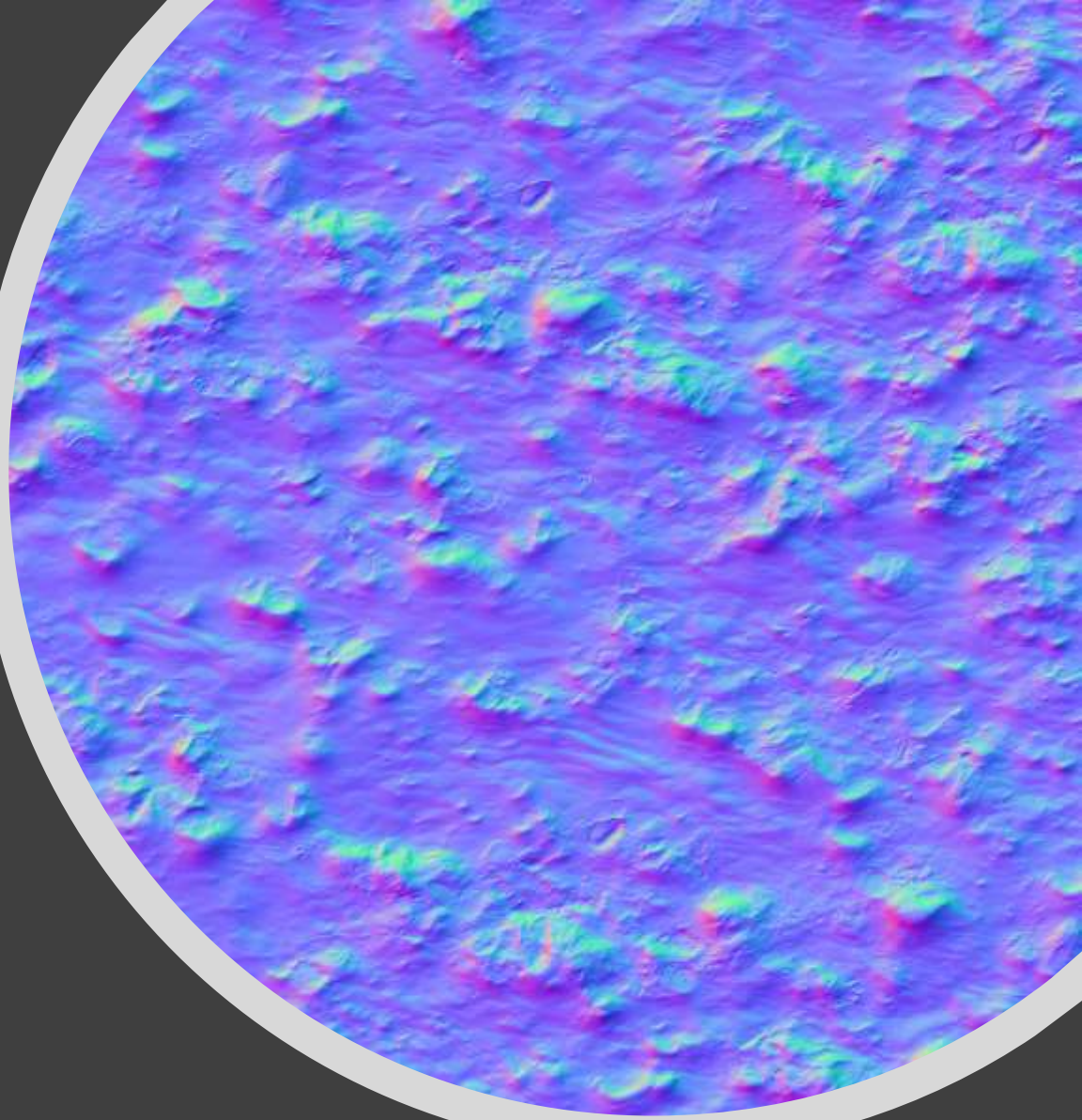
EVIDENCE

CREATION OF ASSETS

MATERIALS & TEXTURE

CHARACTERS & ANIMATION

ASSETS INTO **GAME ENGINE**



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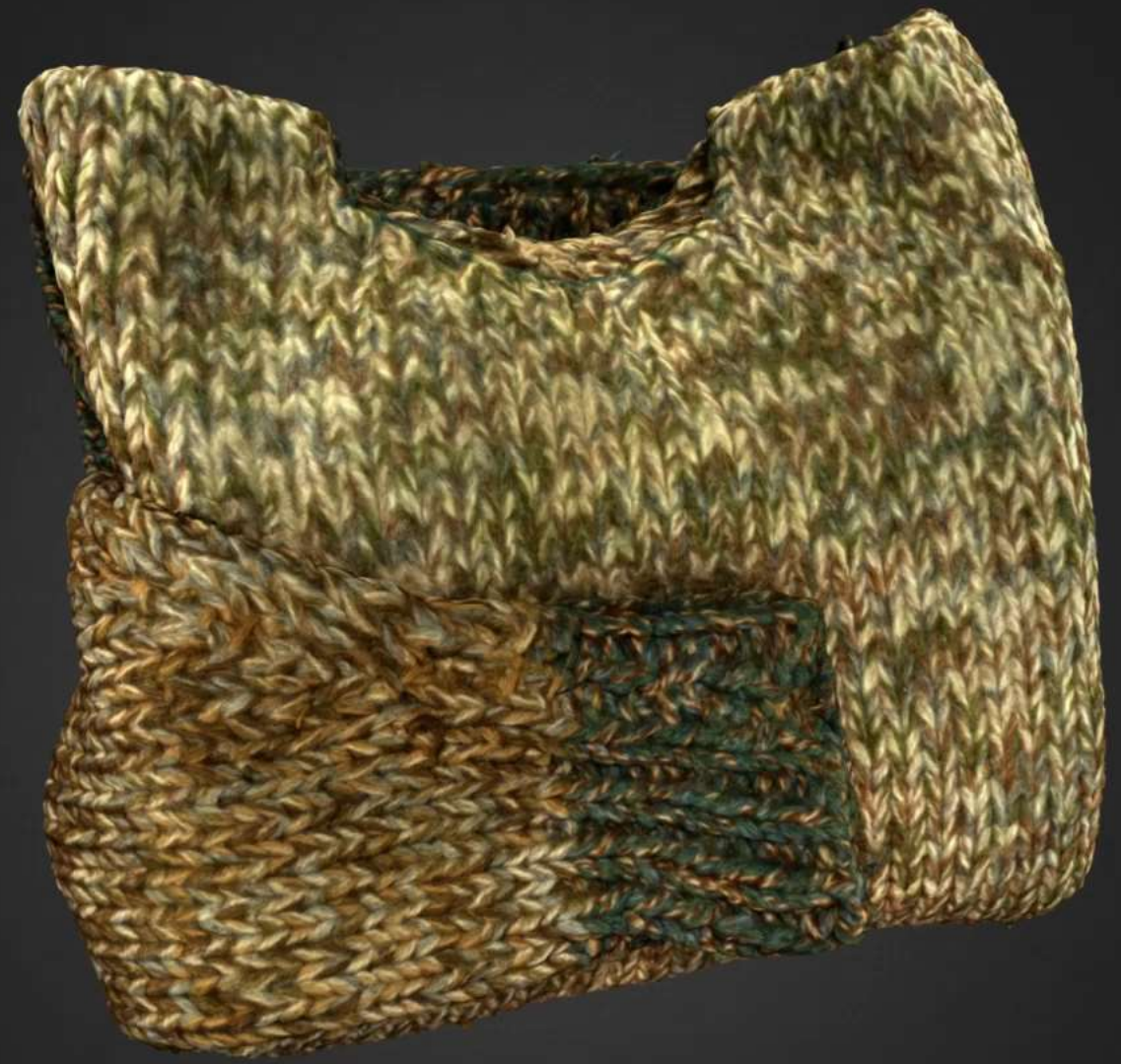
Wool Jersey
by Open Virtual Worlds



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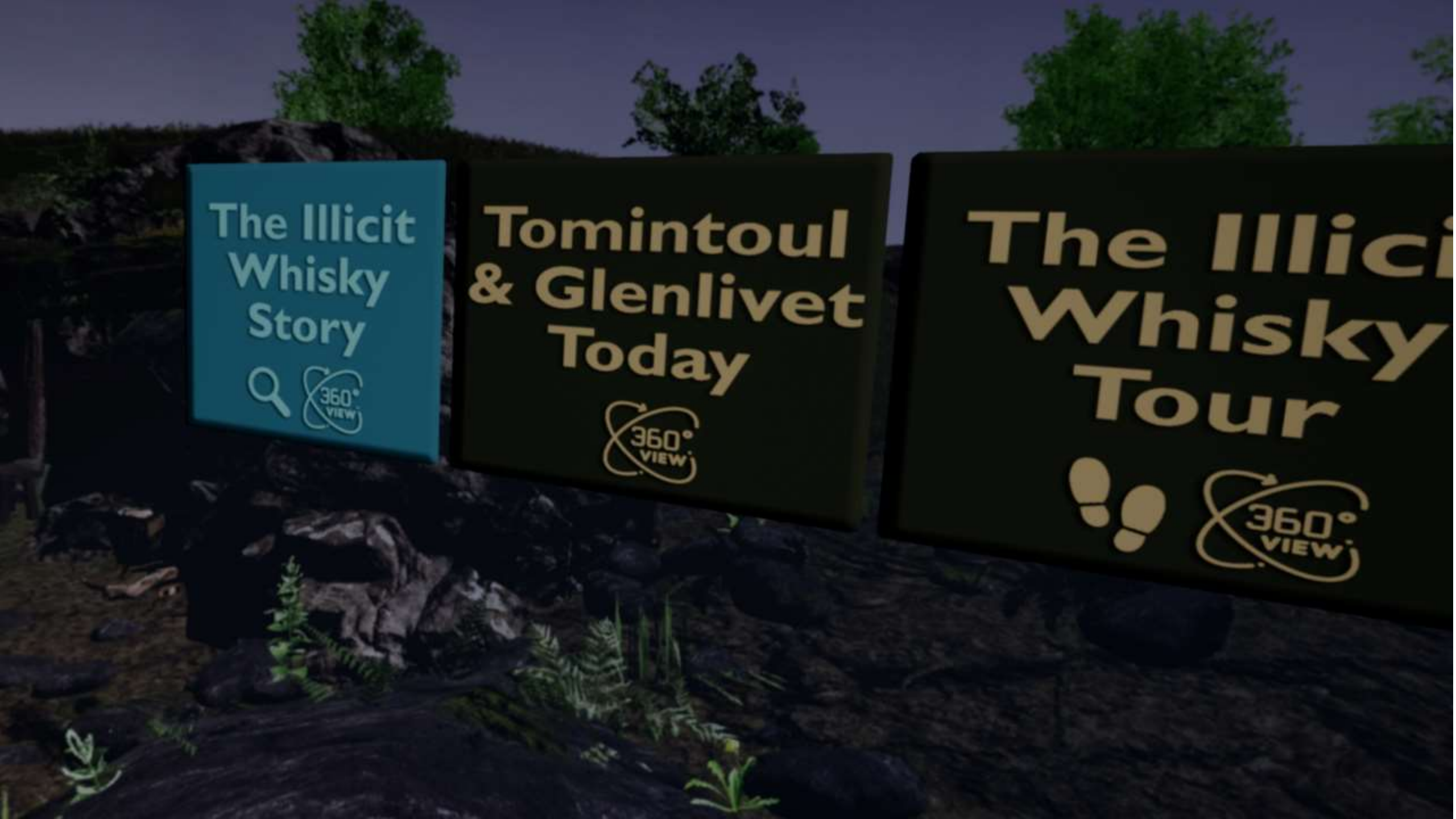
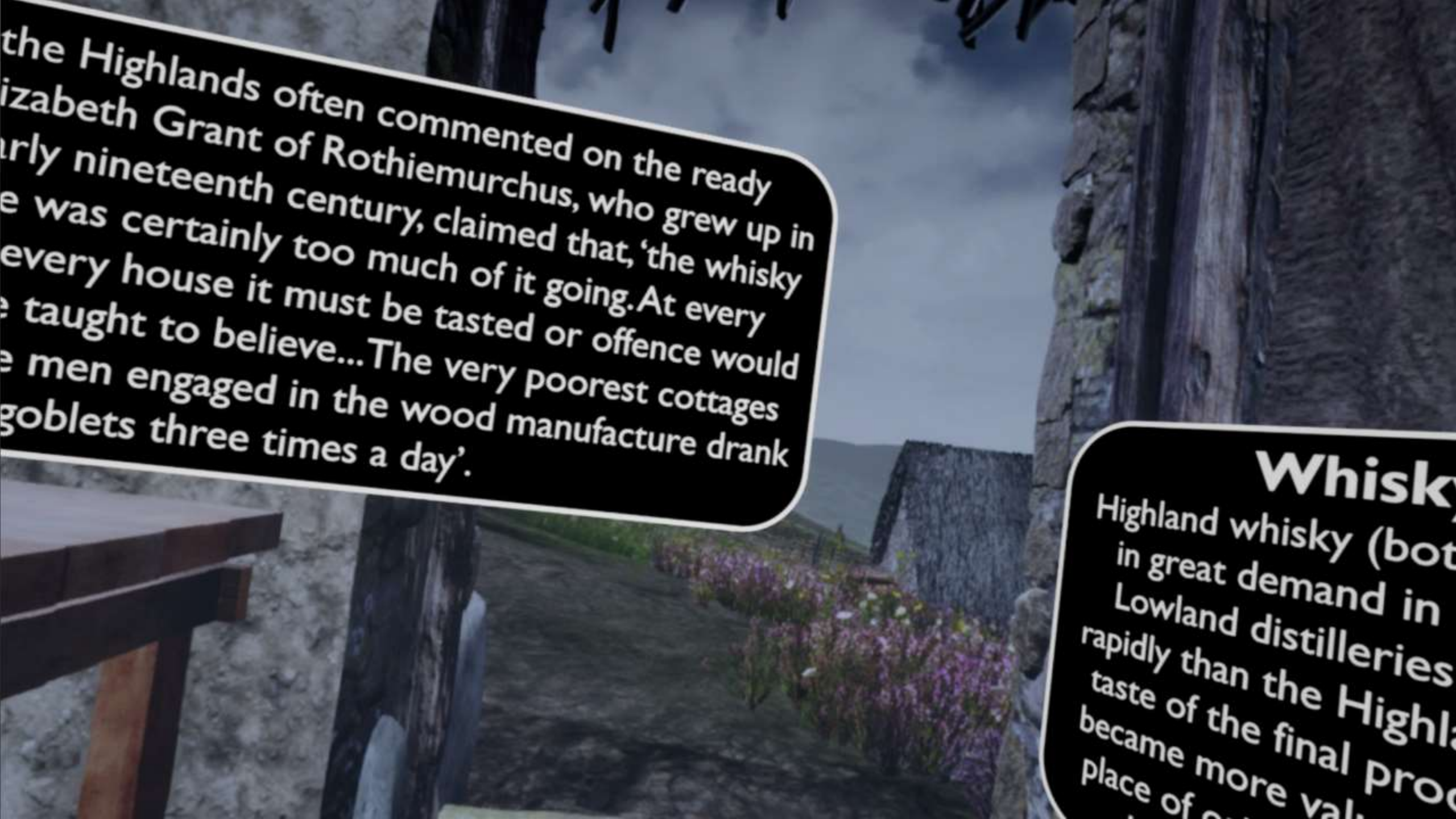
The
Illicit Still
Experience


STEP 5


The Illicit Whisky Story
360° VIEW
Tomintoul & Glenlivet Today
360° VIEW
The Illici Whisky Tour
360° VIEW


the Highlands often commented on the ready
izabeth Grant of Rothiemurchus, who grew up in
rly nineteenth century, claimed that, 'the whisky
e was certainly too much of it going. At every
every house it must be tasted or offence would
e taught to believe... The very poorest cottages
e men engaged in the wood manufacture drank
goblets three times a day'.
Whisk
Highland whisky (bot
in great demand in
Lowland distilleries
rapidly than the Highl
taste of the final proc
became more val
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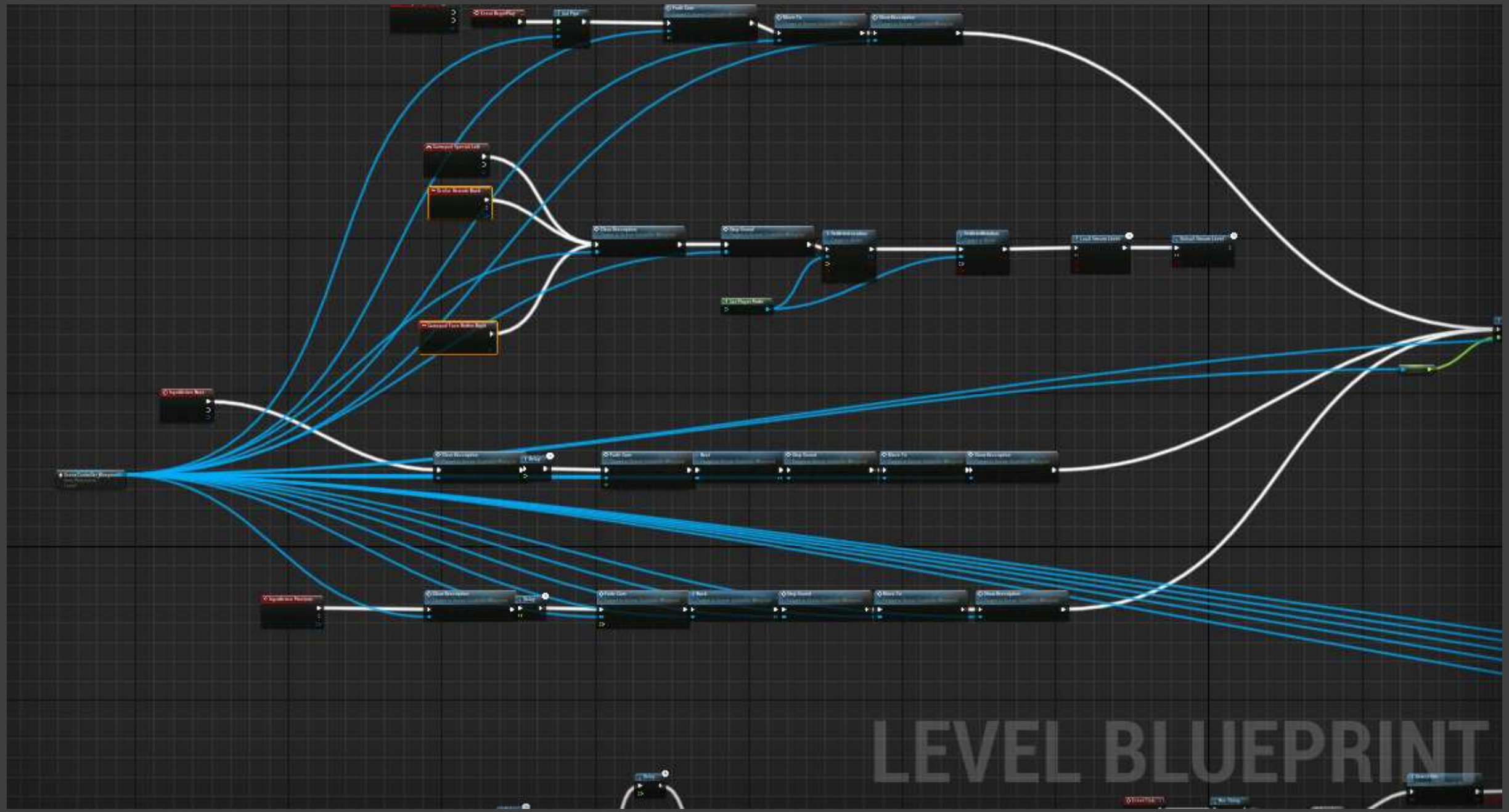
Walk Around
Previous
Back to Start Menu


LEVEL BLUEPRINT

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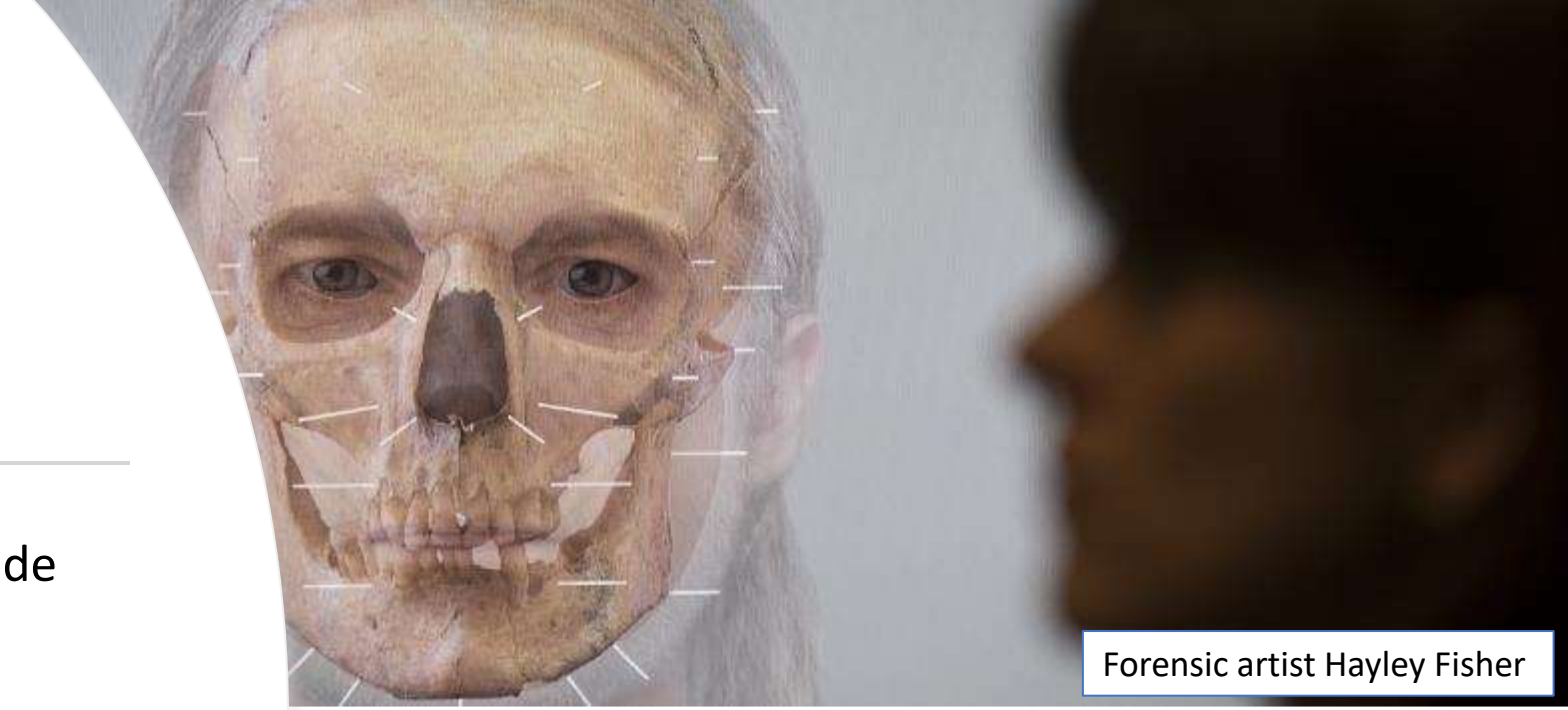
Creating Characters

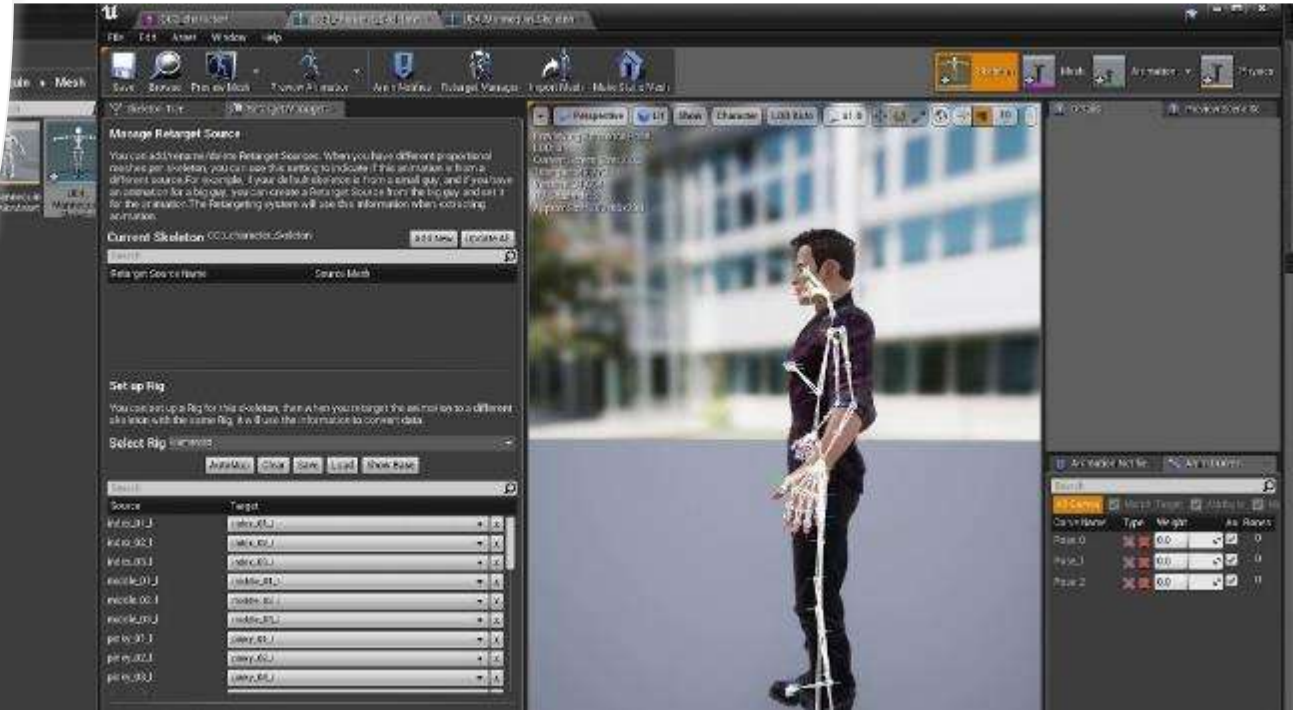
- Characters add life to a virtual scene
- Animation can help tell a story

Creating Unique Characters

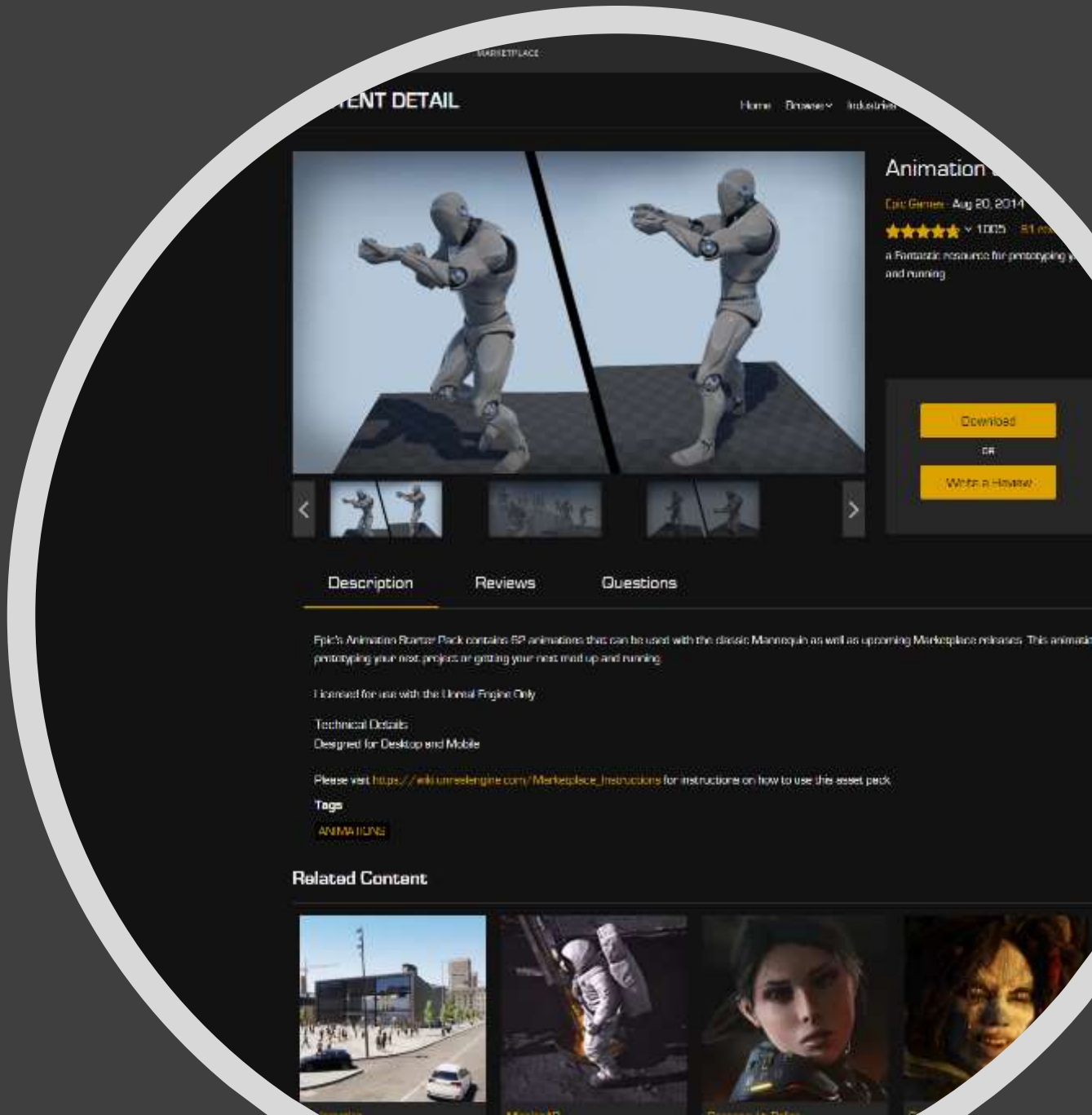
- Archaeological evidence can also provide us with an insight into lifestyle of people living on a site.
- Textiles
- Human remains
- Pottery
- Trade



Forensic artist Hayley Fisher

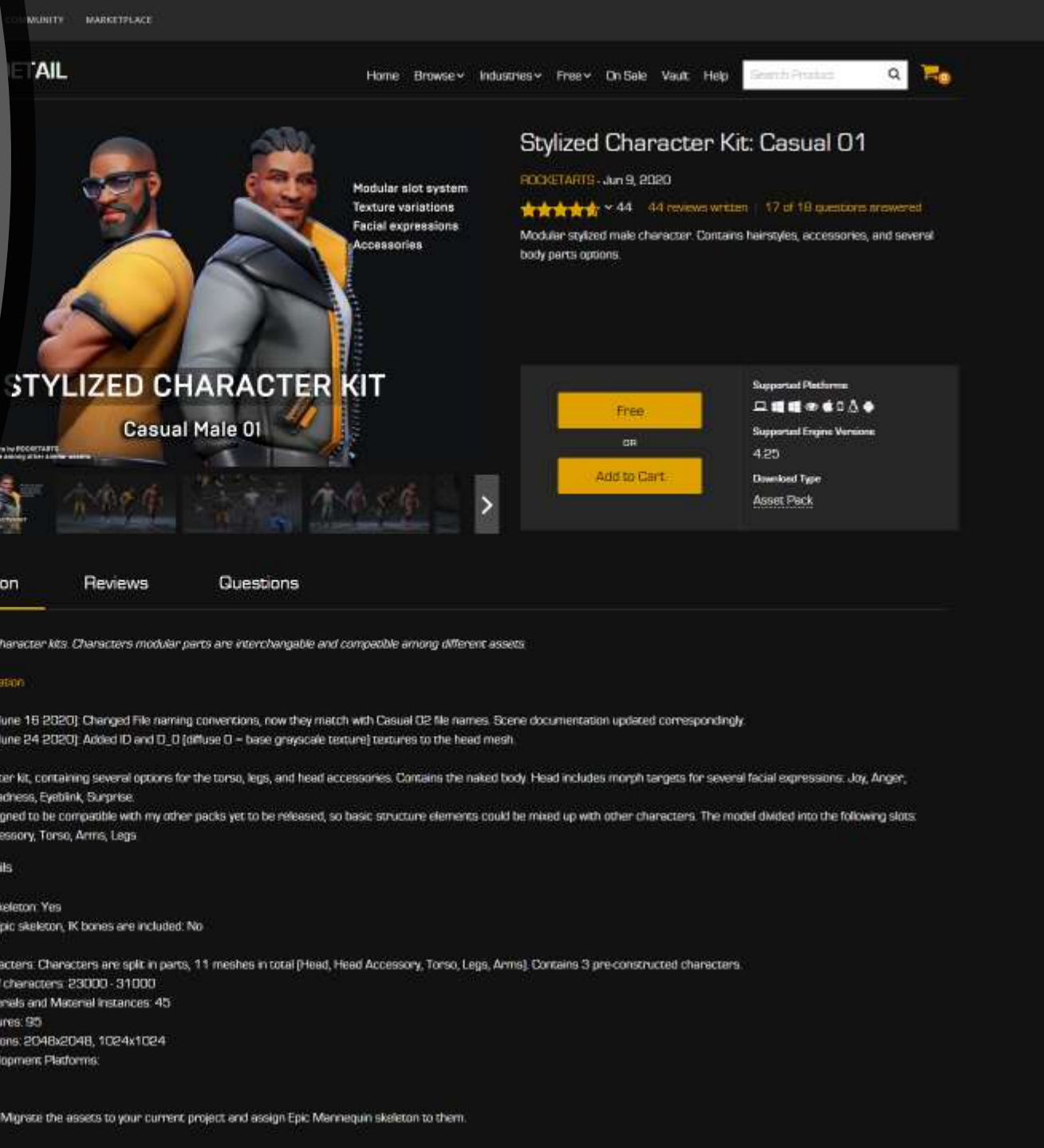


Animation starter Packs



Modular Packs

Character Kits



Communication and dissemination

- Museum Exhibit
- Image gallery
- Spherical images
- Virtual Tour
- Video
- Web exploration
- Steam exploration
- Twitch streaming
- Exhibitions
- Conferences
- Press
- Radio
- TV
- Social Media

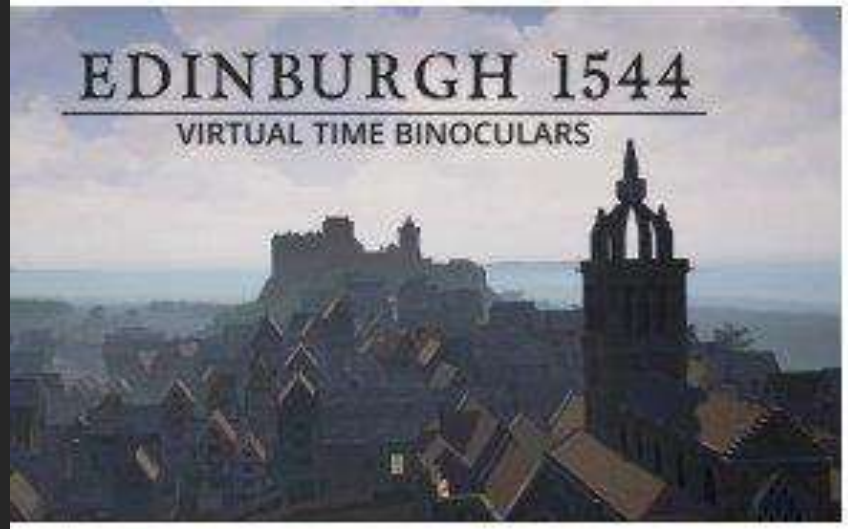
Create interest in your project

al Time Binoculars - Edinburgh 1544

mart History 67.2K views

Edinburgh 1544 Townscape

Smart History 42.2K views



burgh 1544 - Location Compilation

mart History 3,555 views

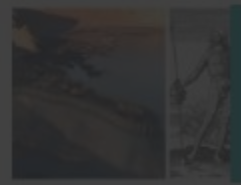
Grassmarket - Edinburgh 1544

Smart History 1,774 views

Heritage Trust.

The project has been credited with piecing together the everyday life of the Picts with its findings used to inform the digital reconstruction.

The lost Pictish settlement at Lair, Glen Shee, has been reconstructed in virtual reality to extraordinary effect. Reconstruction by Jack Horsburgh, still image courtesy of Perth and Kinross Heritage Trust. Copyright: Other 3rd Party



Read More
The Picts: How their mysterious world is being illuminated like never before

David Strachan, director of Perth and Kinross Heritage Trust, said that people all over the world could now get an insight of this remarkable site.

He added: "The digital reconstruction in Virtual Reality of the sites excavated in Glen Shee really brings to life what otherwise are fairly technical plans and maps of the findings.

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Publicity


Museum
Perth &
CARVED
ULDER
ROMAN AL
SLAB
CT AN OBJECT TO INTERACT


Picts
PIXELS

Exhibits

Demos

- Video showcase: https://youtu.be/wRgbxX1IwsM
- Interactivity Demo Video: https://youtu.be/3pt5BGYwCvc
- Roundme tour: https://roundme.com/tour/399204/view/1392126
- Screenshots: https://photos.app.goo.gl/KpuvSFThMp3bXDdw7
- Cineg listings:
  - https://cineg.org/galleries/layergallery.php?title=Layer&id=18
  - Cineg map: https://cineg.org/map/?mapid=5

Communicating Archaeology

- Demonstrate the use of images to effectively communicate archaeological concepts
- Use social media to disseminate archaeological concepts
- Create basic maps
- Assess various audiences for archaeological communication
- Use digital media to communicate archaeology

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Resources - Research

- Canmore - canmore.org.uk
- National Library of Scotland - nls.uk/digital-resources
- Your friendly Archaeologists and Historians

Digital gallery

View digitised items from our collections

eResources

Access thousands of books, jo and databases

Map images

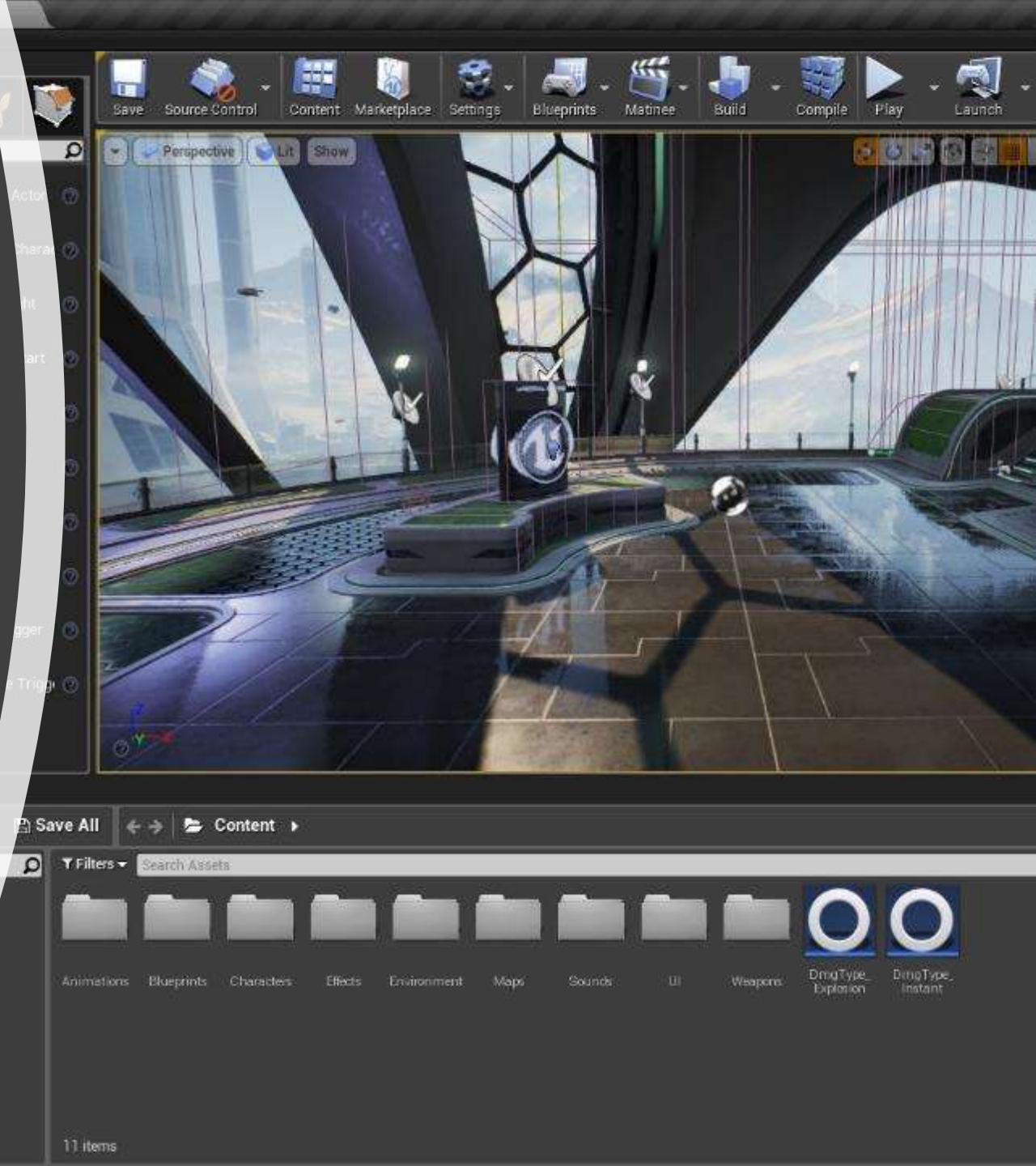
View thousands of maps online

Moving images

Watch films in the Moving im

Resources - Software

- Blender
- SketchUp
- 3ds Max
- Fusion 360
- Mudbox
- Substance by Adobe
- Unreal Engine 4



Resources - Assets

- Textures.com
- Sketchfab
- Unreal Engine 4 Marketplace
- CGtrader
- Free3D
- Turbosquid