

Cambridge NATIONALS LEVEL 1/2

CREATIVE iMEDIA



Unit R092 – Developing Digital Games
DELIVERY GUIDE

Version 1

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INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the requirements of this unit.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT AND WORK EXPERIENCE

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. We've also identified any potential work experience opportunities within the activities. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.



English



Maths



Work

Please note

The timings for the suggested activities in this Delivery Guide **DO NOT** relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website.

UNIT AIM

This unit builds on units R081 and R082 and learners will be able to apply the skills, knowledge and understanding gained in those units.

This unit will enable learners to understand the basics of creating digital games and their environments for the creative and digital media sector. It will enable learners to create a playable game from an existing design or brief. It will enable them to interpret a client brief, and to use time frames, deadlines and preparation techniques as part of the planning and creation process when creating a digital game.

On completion of this unit, learners will be aware of different types of digital games creation software, hardware and peripherals. They will be able to plan a digital game, create and edit the digital game and test the digital game with a client or focus group, identifying any areas for improvement.

Unit R092 Developing digital games

L01	Understand game creation hardware, software and peripherals
L02	Be able to plan the creation of a digital game
L03	Be able to create a digital game
L04	Be able to review the creation of a digital game

KEY TERMS

Explanations of the key terms used within this unit, in the context of this unit

Key term	Explanation
Algorithms	Algorithms are basically a series of steps in a sequence with a defined end point. Examples of where these could be used include scoring systems or speed of movement in the game. Refer to resource links for further information.
Collisions	This is another form of event when two sprites or game elements collide in the gameplay. An example would be the player character hitting a brick wall or other game hazard.
Events, actions and triggers	These are the results and interactions of gameplay. For example, a player may approach a door in the game, which is initially closed. The trigger may be proximity to the door the action is to open the door. An event is something (or a sequence) of things that happen in the game. Examples of events would be game start, game end and a key press. The way that events, triggers and actions are configured depends on what software is being used.
Game engine	This refers to the game creation software application. Examples would be GameMaker, MissionMaker, Unreal, Unity 3D.
Game environment	This is the setting for the gameplay and may be the 2D background or the 3D room. This is sometimes referred to as the game world. The player character is positioned in the environment or room. This term should not be confused with the game development environment, which would be the same as game engine.
Genre	The style of game. Examples would be arcade, FPS (first person shooter), role playing, adventure, MMORPG (massively multiplayer online role playing game).
Geometric parameters	These refer to the size and scale of the objects within the game environment or world. For example, the size of the player character must be appropriate to the game environment so that they can move through and around the game obstacles and objects.
Legislation	In game development terms, this applies to the use of any intellectual property and copyrighted material within the content of the game. For example, the use of established and well known characters such as Mario, Harry Potter or any Marvel superheroes in a new game would not be allowed. In terms of copyrighted material, this may restrict the use of some assets e.g. images, graphics, sounds and background music.
Narrative	This refers to the storyline that the game is based upon. Not all games have a narrative such as a basic racing game. However, as soon as there are multiple levels or strategies as part of the game then this becomes part of the storyline.
Object properties	These are defined in the game creation software. Every object in the game has a series of properties (e.g. size, colour, visibility and whether solid, open, closed). The initial state is defined in the game but events and triggers can modify one or more of these properties.
Pathways	These refer to the different options that the player could take to complete the game. For example, in an adventure game the player may want to fight every monster or enemy to develop their skills whereas another player may evade these and choose to search for treasures and hidden secrets instead.
Scripting	This refers to the programming of the game elements. As examples, this can define what happens in actions, events and interactions.
Simulator	In game development terms, this is a piece of software that simulates what the game would look and feel like on the target platform. It works a bit like 'preview in browser' when creating a website. For example, if the target platform was a smartphone then the simulator is likely to use a graphic image of the phone on the computer display screen with the game fitted inside the phone screen area. The icons for the phone buttons would represent the player interface so that playability and the user interface can be tested.

Explanations of the key terms used within this unit, in the context of this unit

Key term	Explanation
Sprites	A term used within GameMaker for any asset such as images, graphics and sounds. In more general terms, it is recognised as a (typically) small image that can be used as a game object or character.
Visual style	This is related to the genre and refers to what is shown on the game screen. Stylisation can also refer to colours, brightness and the overall visual content, which may be dark and moody to give a sinister feel for example.

MISCONCEPTIONS

Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	How can this be overcome?	Resources which could help
What are the genres of games as opposed to film or music?	<p>Discussion and explanation (review resource link). For example, should include the following genres:</p> <ul style="list-style-type: none"> • Action • FPS (first person shooter) • RPG (role playing game) • MMORPG (massively multiplayer online role playing game) • Puzzle • Strategy • Sport • Quest/adventure. <p>The content of the resource links can be displayed on a projector in the class. A discussion and explanation of these can then be included.</p>	<p>http://www.thocp.net/software/games/reference/genres.htm</p> <p>http://gaming.wikia.com/wiki/Computer_and_video_game_genres</p>
What is game narrative?	<p>Discussion about storytelling through game play. The resource links can be used by the teacher to gain a better understanding. It is suggested that this content is summarised into a short presentation that explains how some games have a story that unfolds during the gameplay, which is called the game narrative.</p>	<p>http://www.gamasutra.com/view/feature/4253/the_uneasy_merging_of_narrative_php?print=1</p> <p>http://hitboxteam.com/designing-game-narrative</p> <p>http://thegamedesignforum.com/features/narrative_in_games.html</p>
What are algorithms and how do they relate to game creation?	<p>Algorithms are basically a series of steps in a sequence with a defined end point. They are based on programming concepts which form the basis of game creation. Some game creation software will generate the algorithms in response to user defined processes in the creation software. Algorithms can be found in scoring systems, speed of movement or the player challenges and obstacles that are found in the game.</p>	<p>http://www.bbc.co.uk/guides/z3whpv4</p>

SUGGESTED ACTIVITIES

LO No:	1		
LO Title:	Understand game creation hardware, software and peripherals		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Investigating software for 2D games	<p>The teacher could facilitate a research activity to find out about the capabilities of a range of 2D and 3D game creation software applications.</p> <p>A web search using 'game creation software' is suggested. One of the results should be a list of game creation software applications at: http://www.pixelprospector.com/the-big-list-of-game-making-tools/</p> <p>Following this, learners should be encouraged to investigate a number of different software applications.</p> <p>This can also be completed using web research and include the following 2D software:</p> <p>GameMaker: http://www.yoyogames.com/studio</p> <p>Scratch: https://scratch.mit.edu/</p> <p>Construct 2: https://www.scirra.com/</p> <p>Gamesalad: http://gamesalad.com/</p> <p>Stencyl: http://www.stencyl.com/</p> <p>The results of this can be summarised in a table that includes the URL of the information found. This is important so that learners understand the importance of referencing their sources.</p>	1 hour	R081 LO2
See Lesson Element Exploring Game Creation Resources			

Title of suggested activity	Suggested activities	Suggested timings	Also related to
<p>Investigating software for 3D games</p> <p><i>See Lesson Element Exploring Game Creation Resources</i></p>	<p>The teacher could facilitate a research activity on 3D game creation software applications, such as:</p> <p>Kodu: http://www.kodugamelab.com/resources/</p> <p>Mission Maker: http://www.immersiveeducation.eu/index.php/missionmakerm</p> <p>Unreal: https://www.unrealengine.com/what-is-unreal-engine-4</p> <p>Unity 3D: https://unity3d.com/</p> <p>The results of this can be summarised in a table that includes the URL of the information found. This is important so that learners understand the importance of referencing their sources.</p>	1 hour	R081 LO2
<p>Investigating hardware and peripherals for creating digital games</p>	<p>This activity should look at the computer platform needed to develop the game together with any additional peripherals.</p> <p>One of the previous links could be reviewed in terms of the platforms supported by the software tools.</p> <p>Use the list of game creation software applications http://www.pixelprospector.com/the-big-list-of-game-making-tools/</p> <p>Review the columns titled 'available for' and 'exports to'.</p> <p>Conduct a class discussion on the different platforms for development and what platforms they can be exported to. Ensure that this discussion covers not just the computer platform for development purposes but also any peripherals such as:</p> <ul style="list-style-type: none"> • speakers to check/test game sounds • game interface controls, which may be different to just the mouse and keyboard. <p>A further web research activity could then be completed to look in more detail at an example software application such as GameMaker: http://www.yoyogames.com/studio/multiformat</p> <p>This will have a natural progression into the next activity.</p>	40 minutes	R091 LO1

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Investigating hardware and peripherals for testing digital games	<p>This activity will investigate the hardware and peripherals to test digital games, which is a different process to creating the game. Depending on what the target platform is then a simulator or actual test device may be required (e.g. a smartphone, gaming console).</p> <p>This could be achieved by a class discussion and cover:</p> <ul style="list-style-type: none"> • a target platform • speakers • headsets • game controllers. <p>Questions to ask may include what they use when playing existing games, whether on a console, handheld gaming device, computer or smart phone.</p>	20 minutes	R091 LO1

SUGGESTED ACTIVITIES

LO No:	2		
LO Title:	Be able to plan the creation of a digital game		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Client requirements	<p>Teachers could demonstrate different ways in which clients could specify what they want. Examples should include a client brief or commission that identifies what is required and for what purpose.</p> <p>The client requirements could be supported by other constraints (e.g. target platform, visual style and intended age rating). An alternative approach would be to verbally explain the requirements for a sample project brief and allow the learners to take notes.</p> <p>The teacher should also confirm who will be the target audience, which includes both the client and the player of the final game.</p>	30 minutes	R081 LO2 R091 LO2
Key aspects of game creation	<p>The teacher could describe how an initial game brief is developed into a game design document, which becomes the plan for its creation. This document could then be created and edited individually and in the learner's own style. Sub headings could be provided at this stage, which is based on a game concept using practice material. The sub headings can include:</p> <ul style="list-style-type: none"> • summary of the game concept • game objectives (e.g. what the player has to do) • a development of the game narrative or storyline • game genre and what visual style to be used • assets needed to create the game (e.g. sprites, images, graphics, sounds) • hardware and software to be used. <p>Discussion 'What is game narrative?'</p> <p>The teacher could explain that this is the storyline for the game. Choose a popular game and in a class discussion, think about how the game is introduced, what the player has to do and why. What is the ultimate goal that the player must do in order to win and what is their reward? Describe how some sports games have no story and narrative whereas adventure games with strategy and escalating levels have a well-defined narrative.</p> <p>Learners could split into groups in order to research the visual styles and genre of games. A web search on 'game genre' will be a good starting point. The visual styles depend on the genre of the game so this would be a secondary activity.</p> <p>Resource books on creating games http://www.amazon.co.uk/Game-Makers-Apprentice-Development-Beginners/dp/1590596153/ref=sr_1_1?ie=UTF8&qid=1434914793&sr=8-1&keywords=game+makers+apprentice http://www.amazon.co.uk/Computer-Game-Design-Course-Principles/dp/0500286582/ref=sr_1_1?ie=UTF8&qid=1434914982&sr=8-1&keywords=Computer+Game+Design+Course</p>	1 hour	R091 LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Test plans	<p>The teacher could describe the concept of formal games testing, which is different to just playing the games. The intention here is to try and find problems by breaking the game or rules. The aim is not to complete the level but to explore all aspects of a level regardless of time taken or score achieved.</p> <p>The structure of test plans should be described. This can include:</p> <ul style="list-style-type: none"> • what is to be tested • the pass/fail criteria • results of testing • improvements required. <p>The format of the test plan can be shown as a document table or spreadsheet.</p> <p>An activity could be a class discussion to think of what would need to be tested for a specific game, having demonstrated the gameplay first.</p>	45 minutes	R092 LO3
Structure of a new digital game <i>See Lesson Element Planning a game</i>	<p>The teacher could combine explanations of key game concepts with practical activities for completion. The four areas are:</p> <ul style="list-style-type: none"> • creating a game flow diagram • game pathways • character creation • scoring systems. 	2 hours 45 minutes	R081 LO3 R091 LO2
Legislation	<p>Teachers could identify key aspects of copyright, trademarks and intellectual property using data sheets from the UK Intellectual Property Office. www.ipo.gov.uk</p> <p>A key point is to apply this basic knowledge to game development. For example, learners could find out that any final game they create themselves becomes their own copyrighted material (but only on their own work and not that of any source images, graphics, sounds or other assets).</p> <p>Depending on the game creation software being used, there may be some additional copyright restrictions which also need to be investigated.</p> <p>Another aspect of intellectual property (IP) is that of games storylines and characters, which may have been taken from films and existing games. The impact of using this type of IP should be explained.</p> <p>Finally, the teacher should explain the role of PEGI certification for games using age ratings. http://www.pegi.info/en/index/id/33/</p>	30 minutes	R081 LO2 R091 LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Assets	<p>Source and store assets for the game (e.g. images, textures, video, sound, animation, scripting, sprites).</p> <p>Learners could begin to plan their own game and make a list of what assets they would need. Depending on what game software is to be used, this may be restricted to the assets from a built in library that includes game characters, objects and environments. However, other game development software allows the import of images, sound and video.</p>	30 minutes	

SUGGESTED ACTIVITIES

LO No:	3		
LO Title:	Be able to create a digital game		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
Features of game creation software	<p>The teacher could introduce some basic concepts and software features for game creation. This does not have to be specific to any game creation software and should include:</p> <ul style="list-style-type: none"> • use of libraries (e.g. for game rooms, scenes, characters and other game objects) • drag and drop functionality (e.g. how objects can be dragged into the game room or environment and positioned where needed) • object properties (e.g. whether it is solid so that the player cannot go past it or whether it is visible in the game. The initial state of the object such as open or closed can also be defined here) • events and actions. This is what happens at a certain time or following a defined trigger. Movement or any change in the object properties can be associated with this • triggers and different types (e.g. collision, keypress) • collisions (e.g. the player object with a solid wall or an enemy) in the game. <p>Resources (books) The Game Maker's Apprentice: Game Development for Beginners by Jacob Habgood and Mark Overmars Publisher: Apress; 3rd Edition 2007</p> <p>The Computer Game Design Course: Principles, Practices and Techniques for the Aspiring Game Designer by Jim Thompson Publisher: Thames and Hudson Ltd 2007</p>	45 minutes	
Exploring game creation software tools and techniques	<p>The teacher could direct learners to websites for a range of game creation software. These include:</p> <p>Using GameMaker https://www.yoyogames.com/learn</p> <p>Using Mission Maker http://mission-maker.software.informer.com/</p> <p>Using Scratch https://scratch.mit.edu/</p> <p>Scratch help (getting started guide, scratch cards, projects and tutorials) https://scratch.mit.edu/help/</p> <p>Scratch videos https://scratch.mit.edu/help/videos/</p> <p>See Lesson Element Game Creation Software</p> <p>A summary of the game creation interface, main tools and techniques could be identified and explained where appropriate.</p>	45 minutes	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Working with assets, object properties and interactions	<p>The teacher could demonstrate how to work with assets in GameMaker, which become the game objects. The properties of these objects can then be configured.</p> <p>Teachers could explain the different types of assets that could be imported, (e.g. images, graphics and sounds). The help documents within GameMaker can be used. The most relevant here is that on 'Defining Objects'.</p> <p>http://docs.yoyogames.com/</p>	30 minutes	R081 LO3 R082 LO1
Adding events, actions and creating game play controls	<p>Teachers could use the following GameMaker tutorial which is found in the learning section of the GameMaker website.</p> <p>http://help.yoyogames.com/entries/86019548--GMS-S-Player-movement-using-the-keyboard</p> <p>This tutorial covers:</p> <ul style="list-style-type: none"> • how to add events and actions • using the keyboard as an input device • setting up the keyboard input to move the player character • releasing the key to stop the player character from moving. <p>A series of documents on how to use GameMaker is also found at:</p> <p>http://docs.yoyogames.com/</p> <p>For example, these include how to define objects, events actions and creating rooms.</p>	2 hours	
Using algorithms	<p>The use of algorithms in game creation should be explained. This is basically a series of steps in a sequence with a defined end point.</p> <p>Examples of where these could be used include scoring systems or speed of movement in the game.</p> <p>For an introduction to the concept of algorithms:</p> <p>http://www.bbc.co.uk/guides/z3whpv4</p> <p>Note that these are coding concepts and links well with computing.</p>	40 minutes	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Saving and exporting the game	<p>Teachers could explain how to save the game that has been created in the native format of the game editor, so that it can be modified at a later stage. Version control should also be introduced at this point. Learners could then save/export a series of different versions of the game created.</p> <p>Teachers could explain the use of version control in the context of development for a digital game. The first draft of the game being saved as 'game_v_0.1' with subsequent versions v_0.2, v_0.3. Teachers could identify alternative file naming conventions such as using a date code yyyyymmdd such as mygame_20151001 (for 1 October 2015). The use of naming conventions and version control could apply equally to both file names and folders.</p> <p>Depending on what game editor/engine is being used, the teacher could then explain how to export the game in a different format that could be used on a different computer system or target platform. This will depend on the game editor, its version and any additional installed options.</p>	30 minutes	R081 LO3

SUGGESTED ACTIVITIES

LO No:	4		
LO Title:	Be able to review the creation of a digital game		
Title of suggested activity	Suggested activities	Suggested timings	Also related to
How to review a game	Teachers could demonstrate how a review should identify positives and negatives relating to the finished game, rather than the creation process. This could be achieved using examples of the teacher's own games or examples from the game creation software websites e.g. sample games made using GameMaker http://www.yoyogames.com/showcase or http://www.pegi.info/en/index/	20 minutes	R081 LO4
Working in a focus group for reviewing a game	Teachers could select a range of different games and allocate one to each of several groups of learners (e.g. with 3-4 learners in each group). The task would be for the learners to work as a focus group and test a game. Their results should form a critical review of the game, its gameplay, appeal, visual style and narrative as appropriate to the game chosen.	30 minutes	
Identifying improvements to a game	Learners could comment on the games as a group discussion since it is often easier to critically comment on somebody else's work. During this teaching phase, learners could use a template that asks key questions about the game and be prompted to identify areas that could be improved.	20 minutes	R081 LO4
Further development opportunities	Working independently, learners could review what opportunities exist for recreating the game in different game creation software. This would draw on the knowledge gained from LO1 in terms of the features and capabilities of 2D and 3D software. As an example, learners could investigate how the game could be re-developed from a 2D game into a 3D game, comparing the requirements for hardware, peripherals and software.	30 minutes	R092 LO1



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