



Teaching Guide.

Loopy Games: An Iterative Game Design Workshop

Introduction

Loopy Games aims to help pupils design and create their own game using methodology that reflects the processes followed by the UK Games Industry. Developed in consultation and collaboration with Kuato Studios and the Video Games Ambassadors, this workshop brings industry expertise into the classroom.

The pupils begin the day by meeting a games industry professional and learning about how games are made. With their support, the pupils then develop and research their own game idea. Organised into groups, each team assigns specific roles to each pupil, mimicking industry practice where teams are made up of different specialists. Each pupil takes the responsibility for a different aspect of the game, namely: artwork, sound, game design and game mechanics. The roles are interchangeable and each pupil is able to develop their skills in a specific area, such as graphical editing, sound editing, programming and design.

An iterative methodology is used, where groups are given the opportunity to gather feedback and revisit their designs at each stage of the development process. The end result is a complex and engaging game, made possible only because of effective team work.

Computing Programmes of Study Links

2. Key Stage 2 pupils should be taught to:

- 2.1. design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- 2.2. use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- 2.3. use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- 2.5. use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- 2.6. select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

3. Key Stage 3 pupils should be taught to:

- 3.7. undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- 3.8. create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability

Progression Pathway bands covered

ALG = Algorithms: Pink, Yellow, Orange, Blue

Reference

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| OA2 | Uses diagrams to express solutions. |
| OA3 | Uses logical reasoning to predict outputs, showing an awareness of inputs. |
| YA2 | Designs simple algorithms using loops, and selection i.e. if statements. |
| YA3 | Uses logical reasoning to predict outcomes. |
| YA4 | Detects and corrects errors i.e. debugging, in algorithms. |
| BA1 | Shows an awareness of tasks best completed by humans or computers. |
| BA2 | Designs solutions by decomposing a problem and creates a sub-solution for each of these parts. |
| BA3 | Recognises that different solutions exist for the same problem. |

H&P = Hardware & Processing: Pink, Blue

Reference

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| PH1 | Understands that computers have no intelligence and that computers can do nothing unless a program is executed. |
| PH2 | Recognises that all software executed on digital devices is programmed. |
| BH1 | Understands why and when computers are used |

IT = Information Technology: Pink, Yellow, Blue

Reference

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| PI1 | Uses software under the control of the teacher to create, store and edit digital content using appropriate file and folder names. |
| PI2 | Understands that people interact with computers. |
| PI5 | Talks about their work and makes changes to improve it. |
| YI3 | Uses a variety of software to manipulate and present digital content: data and information. |
| YI4 | Shares their experiences of technology in school and beyond the classroom. |
| BI2 | Recognises the audience when designing and creating digital content. |
| BI3 | Understands the potential of information technology for collaboration when computers are networked. |
| BI4 | Uses criteria to evaluate the quality of solutions, can identify improvements making some refinements to the solution, and future solutions |
| PI1 | Uses software under the control of the teacher to create, store and edit digital content using appropriate file and folder names. |

P&D = Programming & Development: Pink, Yellow, Orange

Reference

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| PP1 | Knows that users can develop their own programs and can demonstrate this by creating a simple program in an environment that does not rely on text |
| PP2 | Executes, checks and changes programs |
| PP3 | Understands that programs execute by following precise instructions |
| YP2 | Uses logical reasoning to predict the behaviour of programs |
| YP3 | Detects and corrects simple semantic errors i.e. debugging, in programs. |
| OP1 | Creates programs that implement algorithms to achieve given goals. |
| OP2 | Declares and assigns variables. |

Computational Thinking Strands

AL – Algorithmic Thinking

Ref. Activity

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| AL1 | Writing instructions that if followed in a given order (sequences) achieve a desired effect |
| AL2 | Writing instructions that use arithmetic and logical operations to achieve a desired effect |
| AL14 | Designing algorithmic solutions that take into account the abilities, limitations and desires of the people who will use them; |

AB – Abstraction

Ref. Activity

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| AB1 | Reducing complexity by removing unnecessary detail; |
| AB2 | Choosing a way to represent artefacts (whether objects, problems, processes or systems) to allow it to be manipulated in useful ways; |

EV – Evaluation

Ref. Activity

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| EV1 | Assessing that an algorithm is fit for purpose; |
| EV2 | Assessing whether an algorithm does the right thing (functional correctness); |
| EV3 | Designing and running test plans and interpreting the results (testing); |
| EV4 | Assessment whether the performance of an algorithm is good enough; |
| EV7 | Assessment of whether a system is easy for people to use (usability); |
| EV8 | Assessment of whether a system gives an appropriately positive experience when used (user experience); |
| EV9 | Assessment of any of the above against set criteria; |

GE – Generalisation

Ref. Activity

- GE2 Adapting solutions or parts of solutions so they apply to a whole class of similar problems;
- GE3 Transferring ideas and solutions from one problem area to another

DE – Decomposition

Ref. Activity

- DE1 Breaking down artefacts (whether objects, problems, processes, solutions, systems or abstractions) into constituent parts to make them easier to work with

Learning Outcomes

1. Know that games are often developed by a team of people, each working on a different aspect of game development.
2. Know that there are different roles within game development and that these include (but not exclusive to):
 - a) Sound engineer
 - b) Artist
 - c) Game Designer
 - d) Programmer
3. Through group discussions, should be able to formulate and refine an idea for a game to be developed
4. To be able to carry out research into existing games
5. To be able to review and analyse their groups research findings
6. To be able to use their groups research findings to collaboratively design and finalise a game idea
7. To be able to apply decomposition skills to an existing game to identify how it works
8. To be able to use independent enquiry, decomposition and problem solving skills to complete an existing (partially built) game.
9. To be able to take on the role of an artist and:
 - a) Decide which game artwork is needed
 - b) Select suitable software to meet the needs of the task
 - c) Use independent enquiry to develop their own skills in using the software selected
 - d) To be able to create their own artwork
 - e) To be able to edit existing artwork
 - f) To understand the different file formats and to be able to select the most suitable one.
 - g) Be able to collaborate with their peers to ensure their artwork is effectively embedded into the final game.
10. To be able to take on the role of sound engineer and:
 - a) Decide which game sounds are needed
 - b) Select suitable software to meet the needs of the task
 - c) Use independent enquiry to develop their own skills in using the software selected
 - d) Be able to create and record new sounds
 - e) Be able to edit existing sounds

- f) To understand the different file formats and be able to choose the correct one.
 - g) To be able to test, review and improve their sound.
 - h) Be able to collaborate with their peers to ensure their sounds are effectively embedded into the final game.
11. To be able to take on the role of games programmer and:
- a) Decide which aspects of the game require programming, and plan their algorithms
 - b) Use independent enquiry to develop their own skills in using the game development software selected
 - c) Be able to collaborate with their peers to ensure that their sounds and artwork are effectively embedded into the final game.
 - d) Be able to program the objects within the game to ensure it is playable and meets the design requirements
 - e) Be able to test and debug their game to ensure it is error free
12. Be able to collaborate with their group members to test and review their gam

Session Overview

SESSION 1

| Session Content / Activity | Resources Used | Prog. Pathway | Comp. Thinking | Computing POS Link |
|---|------------------------------|---|----------------|--------------------|
| Settle, welcome and introduction | DSH_WelcomeIntroduction.pptx | | | |
| Who plays games? Which ones do you play? Use slide 2 to encourage pupils to share their own experiences of gameplay outside the classroom. Then use slide 3 to highlight that the games they have been playing have all been developed by groups and teams of people. Use this to lead into and introduce the visiting speaker or the video | Loopy Games.pptx | IT Y14 | GE3 | |
| If you have been able to organise a visiting speaker (see supplementary guidance document) then let them introduce themselves to the class. Their talk should include: <ul style="list-style-type: none"> • Their job title, role and description • A brief outline of a typical day in their life • Who they work with/for and the game (s) they have been involved in developing • The key things that make a good game – important factors for every games designer to consider. <p>If you have been unable to organise a visiting speaker than use the alternative videos provided. The video alternatives have been organised into 3 clips. Clip 1 – introducing a games developer and what they do; Clip 2 – example of a game they have developed; Clip 3 – the key things that make a good game. It is recommended that the teacher pauses after the second clip to engage the class in a discussion about what their thoughts are and what types</p> | Loopy Games.pptx | H&P PH1, PH2, BH1 IT PI1, PI2 | GE3 | 2.1, 2.6, 3.7, 3.8 |

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| of games they might be interested in developing. This is an opportunity to motivate pupils and develop their enthusiasm for the work ahead. Shortly before beginning the idea generation process show the third clip. | | | | |
| Organise the class into groups of 4 and encourage them to brainstorm some ideas that they would like to turn into a game. If a visiting speaker attended then they may circulate amongst the groups listening to group ideas and sharing suggestions. Each group should attempt to finalise at least one idea that they would like to develop further. | Loopy Games.pptx | <u>ALG</u> OA2, YA2 <u>IT</u> BI2 | AL14 | 2.1, 3.7 |
| Researching the game idea is an important process in games design. You need to be able to establish the feasibility of the idea, and it's always a good idea to check out your competitors! Encourage the group to search for existing games that are similar to their own idea. For this task, each member of the group needs to investigate a different game. It is possible that one pupil may research a game on a tablet device, another on a games console whilst a third plays an online version. Encourage pupils to take these decisions independently and allow them to immerse themselves in gameplay for a few minutes before giving them the worksheet (Activity 2 – Game Research). Each pupil needs to complete the worksheet for themselves and should jot down notes of things they would like to use and others that they would want to avoid in their own game. Encourage pupils to think of specific and individual features of the game. | Loopy Games.ppt Activity 2 – Games Research.docx | <u>IT</u> BI4, BI3, BI2, YA3 | DE1, EV4, EV7, EV8 | 2.1, 2.5, 2.6, 3.7, 3.8 |
| Groups now need to come together, with each member sharing the results of their research with their peers. Collaboratively, they should record which features out of those discovered by the research should be included within the final game. | Loopy Games.ppt Activity 2 – Games Research Group Feedback.docx | <u>IT</u> BI4, BI3, BI2, PI5, YI4 | DE1, EV4, EV7, EV8 | 2.1, 2.5, 2.6, 3.7, 3.8 |

SESSION 2

| Session Content / Activity | Resources Used | Prog. Pathway | Comp. Thinking | Computing POS Link |
|--|------------------|---|----------------------------------|-------------------------|
| Recap and discuss pupils ideas established from the first session. They should now move onto designing their game. Distribute one worksheet (Activity 3 – Game Design) per group. It is recommended that the first task on this sheet is completed as a collectively as a group. Some groups may then wish to divide the later parts of the worksheets between themselves. With individual pupils taking responsibility for artwork and game mechanics. Pupils may wish to watch the third video clip again during this process to remind them about the key things that make a good game. | Loopy Games.pptx | <u>ALG</u> OA2, OA3, YA2, YA3, YA4, BA1, BA2, BA3 <u>IT</u> YI3, YI4, BI2, BI4 | GE2, GE3, DE1, AL1, AL2, AL14 | 2.1, 2.5, 2.6, 3.7, 3.8 |
| Once the designs have been completed, encourage each group to pitch their idea to the rest of the class. It is important for each pupil to play an active part in listening as well as presenting. Each group will need to have an appointed scribe that notes down the comments being made by the class in feedback to their design idea. | Loopy Games.pptx | <u>ALG</u> OA2, OA3, YA2, YA3, YA4, BA1, BA2, BA3 <u>IT</u> YI3, YI4, BI2, BI4 | AL14 | 2.1, 2.6, 3.7, 3.8 |
| Once the presentations are complete give pupils the opportunity to review and finalise their designs. | Loopy Games.pptx | | AL14 | 2.1, 2.5, 2.6, 3.7, 3.8 |
| The next aspect is skills development. Note that if some groups haven't made many changes to their designs then they may be ready to move onto this before the others in the class. It is a good idea to allow them to move ahead with this rather than be held back to wait for the others. | Loopy Games.pptx | <u>P&D</u> PP1, PP2, PP3, YP2, YP3, OP1, OP2 | AL1, AL2, AL14, DE1, GE2, GE3 | 2.1, 2.2, 2.3,, 3.8 |
| Pupils should open and run the game Spiffy's Adventure in GameMaker (alternatives can be used if you wish). Each pupil should independently play the | | | | |

game and then explore the project file to see if they can identify how the game works and is put together. However, upon play the pupils will notice that the game isn't a full and complete game. What's missing? Ask them to discuss this in their groups. Can they support each other to add the missing features into the game?

Note – this doesn't need to be taught using the traditional 'demo and do' method. Rather allow pupils the opportunity to discover this for themselves and to teach each other how it works. Point them in the direction of the help files and useful online tutorials and resources that they can turn to for support.

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| Quick review of their final game idea. Based on what they have learnt with GameMaker, do they wish to make any further changes? | Loopy Games.pptx | <u>ALG</u> OA2, OA3, YA2, YA3, YA4, BA1, BA2, BA3 <u>IT</u> YI3, YI4, BI2, BI4 | AL1, AL2, AL14, DE1, GE2, GE3 | 2.1, 2.5, 2.6, 3.7, 3.8 |
|---|------------------|---|----------------------------------|-------------------------|

SESSION 3

| Session Content / Activity | Resources Used | Prog. Pathway | Comp. Thinking | Computing POS Link |
|---|------------------|--|---|-----------------------------------|
| <p>The group is going to collectively develop a game together. Developing a game in this way reflects the way that most games are developed in industry. Usually teams work together on games, with different individuals taking the responsibility for different aspects of the game.</p> <p>The group may want to decide upon their own roles and divisions (and they may change these), but the ones suggested reflect the most common job descriptions within the games industry. It will be important for the pupils to find a way to work collaboratively together. Each individual will be responsible for producing an aspect of the game. All the individual components of the game will ultimately need to come together as part of the game project. There are various methods that can be used for this transfer of data, it is advised that the teacher uses a method that works best in their school.</p> <p>Give each pupil a job description sheet ("Activity 4 – xxx"). They should use this for</p> | Loopy Games.pptx | <u>ALG</u> OA2, OA3, YA2, YA3, YA4, BA1, BA2, BA3 <u>IT</u> PI1, PI2, PI5, YI3, YI4, BI2, BI3, BI4 <u>P&D</u> PP1, PP2, PP3, YP2, YP3, OP1, OP2 | AL1, AL2, AL14, DE1, GE2, GE3, AB1, AB2 | 2.1, 2.2, 2.3, 2.5, 2.6, 3.7, 3.8 |

guidance on how to get started with creating their game components.

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| <p>Once the groups have a workable version of their game, they should come together to test it. Does it work? Can it be improved? How? Do they now need to adapt their job roles to complete/improve the game further?</p> | <p>Loopy Games.pptx</p> | <p><u>P&D</u> PP2, YP3 <u>IT</u> PI5, BI4</p> | <p>EV1, EV2, EV3, EV4, EV7, EV8, EV9</p> | <p>2.1, 2.3, 2.6, 3.7, 3.8</p> |
| <p>After making the improvements, encourage pupils to evaluate the game independently an in their groups. They should consider their original expectations and the final outcomes. You may wish to encourage them to develop their own success criteria to evaluate their game against.</p> | <p>Loopy Games.pptx</p> | <p><u>IT</u> PI5, BI4</p> | <p>EV1, EV2, EV3, EV4, EV7, EV8, EV9</p> | <p>2.1, 2.3, 2.6, 3.7, 3.8</p> |
| <p>Finish the day with a 'show and tell'. Each group should present their game to the class.</p> | <p>Loopy Games.pptx</p> | | <p>EV1, EV2, EV3, EV4, EV7, EV8, EV9</p> | <p>2.1, 2.3, 2.6, 3.7, 3.8</p> |

This work and the evaluation process can continue to be developed further here. For example, collecting peer feedback as part of the show and tell process would be a good idea. To then independently decide how to react to this feedback and improve their game as a result would result in a better game.

Files/Resources

| Filename | Resource Type | Purpose/Description |
|---|---------------|---|
| Activity 1 – Game Concept | Worksheet | Worksheet to help establish initial ideas |
| Activity 2 – Game Research Group Feedback | Worksheet | Worksheet to gather research results |
| Activity 3 – Game Design | Worksheet | Worksheet to help design the game, designed to be worked on collaboratively |
| Activity 4 – Artist | Helpsheet | Information sheet |
| Activity 4 – Games Programmer | Helpsheet | |
| Activity 4 – Planning Algorithms | Worksheet | Worksheet to design the game mechanics |
| Activity 4 – Sound Engineer | Helpsheet | |
| Loopy Games | PowerPoint | Main teaching slide deck |
| Making Games in GameMaker | PowerPoint | Helpsheet – how to use GameMaker |
| Spiffy’s Adventure | Sub-directory | Game Maker Project files |

PLEASE NOTE: The activities outlined in this workshop pack are a suggested outline of how the workshop can be delivered. It is envisaged that teachers will adapt the resources and the organisation of them according to the needs of their class.