University Learning in Schools

Computing

Games Programming in Scratch

Module Rationale

The Brilliant Club

Department for Education

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Module Rationale

Title of Module: Games programming in Scratch
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Module Rationale	
Why did you chose your particular theme (consider: **inspiration, ambition, creativity, new ways of thinking, pragmatism, tailoring research to exam requirements**)?	Provide context to STEM and a Mathematical focus when using computer programs. Creativity, understanding and problem solving tested and used when identifying **solutions as well as problems** when programming.
What did you hope to achieve? (i.e. what was your over-arching objective?)	Providing pupils with the opportunity to utilize problem solving when looking at various different programming tasks. This is a required skill when looking to more toward GCSE and programming at Degree level.
How did you decide on the time frame for your module? (To fit to a half-term? To fit with an assessment cycle? Based module on x number of lessons of y length over z number of weeks)	The module was planned to fit most half terms. With the subject often offering more project based units, we felt 6 would be appropriate. We did add a lesson in for game improvements as this would allow the teacher to structure

	differentiated tasks for pupils. E.g. Completing aspects or adding improvements.

Overview of Module What are the components? **Programming, Maths and Physics.**	
Lesson plans/rationale	Lesson plans included in each lesson folder. Also act as a prompt sheet for the teacher. See **below** for lesson brief.
Presentations	Presentations included in each lesson folder. Notes included helping highlight key concepts, actions and questions. See **below** for lesson brief.
Resources required for pupils (books, lab equipment, computer facilities, etc.)	Pupils and teacher will need access to the Scratch program, a computer and preferably a MLE or VLE so they can download the assessment sheet to work on at the end of the module.
Resources provided in lessons by teacher (text extracts, images, journal articles, etc.)	Resources have been supplied for each lesson consisting of worksheets for each lesson. See **below.** Teachers could also use the internet to show videos of flight particularly in accordance with the gravity lesson.

Unit overview
Individual Lesson Objectives, Key Questions and Key Concepts & Terminology
NB - This will be your final scheme of work (in medium-term plan form). By using this table, your scheme of work will fit into the proforma for dissemination.

Lesson	Objective	Key Question(s)	Key Concepts & Terminology
1	Understanding algorithms and how we can use them to solve problems.	How can we solve problems? Are problems a good thing?	Algorithms, Flowcharts.
2	Understanding and creating movement for Flappy Bats game.	What axis should affect the bats movements?	Movement, Co-Ordinates, X&Y Axis, Loops.
3	Creating obstacles and the movement needed.	How can we apply what we have learned from movement with the bat, to our obstacles?	Movement, Co-Ordinates, X&Y Axis, Loops, Collision.
4	Understanding how variables can be used in the Flappy Bats game.	How have you used variables in other lessons?	Variable,
5	Understanding what gravity is and how it can be used in a game.	What is gravity? How can it be applied to your game?	Gravity, Gravitational Potential, Speed, Forces.
6	Identifying and applying improvements to the Flappy Bats Game.	What improvements could you make to your game? Can you construct the algorithm?	Improvement, Playability, Difficulty.
7	Complete Flappy Bats assessment.	Have you explained your code in detail?	

Evaluation *What is the impact of the module? Consider the impact, if any, that planning, teaching and assessing the module has made on both* ***pupil*** *and* ***teacher*** *in each category:*		
Impact	**On pupil**	**On teacher**
Subject skills learned	Pupils have gained a greater understanding of the programming platform they have been using. We have also been able to factor in knowledge of forces and variables which lend themselves to other STEM subjects.	My own knowledge of common misconceptions and pitfalls has increased as a product of this module. With greater exposure and more risks taken the module allows the teacher to develop their own pedagogical knowledge in terms of programming. It has allowed me to build my knowledge and capability in the programming language, identifying errors faster than before.
New conceptual understanding or new ways of thinking	Pupils have gained knowledge of how programs can be broken down into smaller programs More importantly pupils have gained a greater understanding of how to solve problems using algorithms.	It has also impacted on my ability to liaise with other subjects; something that I feel should be done more often in regards with a STEM subject. This has changed my approach to teaching programming in any language.

Reflection		
Stop	**Start**	**Carry on**
What should be excised or not repeated?	What should teachers add to the module next time it is taught?	What aspects worked well and should definitely be repeated next time the module is taught?
N/A	• Their own take on assessment material. I am aware one size does not fit all. • More time, lessons or material for game improvement. HA pupils may be able to radically improve their games with just that little bit extra time.	• The gravity lesson worked extremely well once they understand the underpinning principles. Cohesion with Science is needed. • A theme for the project is a necessity! Pupils loved a sense of needing to create their game for a purpose.