

```
define adaptable_procedure(speed)
```

```
run adaptable_procedure(2)
```

Computing Science Glossary

Condition An action triggered by a condition that may or may not happen.

PRIMM A strategy that promotes Predicting, Running, Investigating and Modifying code before Making something.

Algorithm Part of planning stage before programming written for another human to read.

Code Written for a digital device

USE MODIFY MAKE A strategy that promotes using and modifying code before creation

Procedure A set of instructions given a name that can be used multiple times by referring to the name. Sometimes called a sub routine.

Parameter changeable data that can be fed into a procedure when it is run

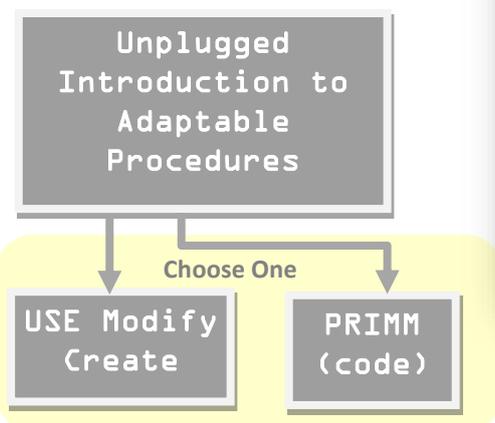
Orange Run Plan

Questions & Answers

How does this fit in with other game programming? See overview document
What age is this for? KS2 (7-11 year olds) who have completed earlier gaming challenges. This could also be used by Y7+ if they have never encountered adaptable procedures before). **How hard is this to teach?** Very easy as all the instructions are in the booklets. **How do we Assess learning?** Pupils use answers provided to mark their own work. **Is it in line with NC?** Yes see next page. **Why is there a choice?** All of the methods chosen have good research behind them but we don't know which are best or even if there is a best for all pupils. We do know that it helps pupils to encounter a variety of different types of method so they are continually challenged. If you work your way through all modules I recommend you switch strategies each time to keep the challenge high. **How creative is this?** This combines the best knowledge we have about how to learn something new with the opportunity at the end for pupils to create something that they want to create that uses their new knowledge.

Unplugged Introduction to Adaptable Procedures

Download the **AdaptableProcedures PowerPoint** Use the slides to remind pupils about basic procedures and then introduce the idea of an adaptable procedure. This includes key vocabulary such as parameters.



Adaptable procedures are ones where we can add information to the procedure every time we run it.

Define walk (wait time) -
 Move right leg forward
 Wait (wait time)+
 Move left leg forward
 Wait (wait time)

Walk (2 seconds)

Which will cause the procedure to walk faster
 walk (1 second) or
 walk (2 seconds) ?

Walk (1 second)

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Adaptable Procedures Slide Example

Booklet Choices You choose from one of the options above. Each option has its own booklet which guides pupils through the stages, making them think deeply about either the code or the algorithm before modifying it and having a choice of things to make. Pupils are instructed when to work in pairs and when to work alone, but you can direct otherwise if you wish. Separate the answer sheet (last pages of the booklet) into sections as pupils will need to mark their work as part of their learning process. If you are not sure which to choose download the booklets and look at the differences. You may wish to keep the last page and give out the hints yourself.

National Curriculum Programs of Study

(bold text is covered in this module)

Pupils should be taught to:

design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; **solve problems by decomposing them into smaller parts**

use sequence, selection, and repetition in programs; work with variables **and various forms of input and output**

use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Before the module

Read the planning and download the PowerPoint. Decide which booklet variation you are going to use and download and print it out one per pupil. Remove the answer sheets for pupils and sort them for pupils to access when they need to. Download the code for your version of Scratch 2 or 3 and place it on your network where pupils can access it, or note where it is on the Scratch website if using Scratch online.

Formative assessment support

If pupils are struggling to work together in a meaningful way then encouraging and rewarding positive attitudes to working collaboratively using the communicates stickers shown at the end helps.

Lots of misconceptions can be solved by reading the code or algorithm slowly and out loud to their partner or going back to role-play.

Classroom Organisation

In some sections pupils are asked to work with a partner of similar programming ability. If you are not sure what programming ability they are go with literacy skills as a starting place. Move partners around between modules so that pupils benefit from different interactions. There is some evidence that pupils work better with a colleague that they like.

Research Help

Get pupils to mark their booklets, collect in all the marks by sections. Collect the marks from the modify section and calculate a mean average for the whole class. Email or Tweet this to phil.bagge@code-it.me or @baggiepr stating clearly what age, module and version your class did. For example Y5 9-10 Years old Diving Beetle PRIMM Algorithm Mean average 5.2/9 for 32 pupils.

Resources

AdaptableProcedures PowerPoint
(15-20 mins)

PRIMM Algorithm & Code

Pupil booklets

Scratch 2 & 3 Code to download

Scratch 3 code on Scratch website

USE MODIFY CREATE

Pupil booklets

Scratch 2 & 3 Code to download

Scratch 3 code on Scratch website

All Resources at

<http://code-it.co.uk/goldgame/>

Further Research Reading



Use Modify Create

Irene Lee et al Computational thinking for Youth in practice (2011)

PRIMM Sentence

<https://blogs.kcl.ac.uk/cser/2017/09/01/primm-a-structured-approach-to-teaching-programming/>

Four levels of abstraction

This article includes an example of the four levels of abstraction and sign posts the work of Waite and Armoni

<http://code-it.co.uk/algprogdiff/>

I recognise there is more than one way to solve/describe a problem

I don't just accept the first solution

I look for a range of solution to the same problem

I can evaluate my solutions against a set criteria

Handles Ambiguity

Open Ended Problem Solver

I look for how a project can be extended

I can break complex problems into parts

I can design criteria to evaluate my creations



Evaluates

Insert picture of your students here



Copes with Complexity

I can discover / concentrate on the most important part of a problem

I can contribute useful ideas to a partner or group

I can identify patterns in problems & solutions

I can encourage others to share their ideas



Communicates



Adapts

I can adapt existing ideas to solve new problems

I lead using all the people talent in my group

Investigates

I can develop, test and debug until a product is refined

I learn from setbacks and don't let them put me off



Perseveres



I make predictions about what will happen

I can persevere even if the solution is not obvious

I repeatedly experiment through predicting, making, testing & debugging

@baggiepr code-it