# Transition Unit
# Having fun with computer programming and games

**NCCA**
An Chomhairle Náisiúnta Curaclaim agus Measúnachta
National Council for Curriculum and Assessment

## Area of Study

## Top up and Tasters

## Overview

The goal of this transition unit is to introduce students to computer programming and games in a fun and exciting way. The Scratch software used in this transition unit was designed with this goal in mind. Students will be able to write their own programs, animations and stories in a matter of minutes. Students will learn how to plan and design projects. They will learn how to work together on a plan in teams and they will have the opportunity to present their work to their peers and teachers. They will learn how to respond and react to feedback. They will research a project on the Internet and learn how to evaluate information on websites.

## Related learning

This transition unit links well with the NCCA ICT framework. It supports the development of skills needed for senior cycle Mathematics, such as problem solving and data management. In addition, the research and internet skills developed though this TU will benefit students in completing project work in many other subjects.

## Outline of the unit

All the lesson plans and materials needed to teach this transition unit are available to down load free of charge from http://www.scratch.ie or on CD Rom available from clare.mcinerney@lero.ie

These times are guidelines only. The choice of modules and the order in which they are taught is at the teacher's discretion. Core modules are marked *.

**\* Module 1: Getting Started**
**Total Estimated Time = 4 hours 20 minutes**

The goal of Module 1 is to introduce computers and the Scratch tool to students, to allow them to introduce characters and sound in Scratch.

Lesson 1 Computers Rule the World 20 minutes
Lesson 2 Say "Hello" to Scratch 40 minutes
Lesson 3 Playing with Pictures 40 minutes
Lesson 4 Tell me what to do 40 minutes

Lesson 5 Playing with Music 120 minutes

## * Module 2: Drawing Shapes and Repeating
## Total Estimated Time = 2 hours 40 minutes

The goal of Module 2 is to allow students draw different shapes in Scratch and to learn about repetition.

Lesson 1 Think Like a Computer 80 minutes
Lesson 2 Could You Repeat That Please? 40 minutes
Lesson 3 Over and Over Again 40 minutes

## Module 3: Searching and Sorting
## Total Estimated Time = 4 hours

The goal of Module 3 is to teach students how to search and sort data using a Battleships game. Students are guided on how to search for information on the Internet.

Lesson 1 Where are you now? 80 minutes
Lesson 2 Me First! Sorting 80 minutes
Lesson 3 CSI – Finding Information on the Internet 80 minutes

## * Module 4: Build a Game
## Total Estimated Time = 2 hours 40 minutes

The goal of Module 4 is to allow students to build a game in Scratch and to teach students how sounds and images are stored and how they can record and import sounds into Scratch.

Lesson 1 Game On 40 minutes
Lesson 2 Game Over 40 minutes
Lesson 3 Look at Me 40 minutes
Lesson 4 I Can't Hear You 40 minutes

## Module 5: Revision with Scratch Cards
## Total Estimated Time = 4 hours

Students revise some basic Scratch ideas using 3 different levels of cards: easy, difficult and extreme. This will require printing and cutting out the Scratch cards but it can be a lot of fun.

Lesson 1 Scratch Cards Easy 40 minutes
Lesson 2 Scratch Cards Difficult 80 minutes
Lesson 3 Scratch Cards Extreme 120 minutes

## Module 6: Changing Things
## Total Estimated Time = 2 hours 40 minutes

This module gives students the opportunity to modify existing programs. This is a very popular module with students.

Lesson 1 I Like Mine Better 1 80 minutes
Lesson 2 I Like Mine Better 2 80 minutes

## Module 7: Solving Complex Problems
## Total Estimated Time = 2hours

Module 7 introduces two complex computer science problems, The Towers of Hanoi and The Travelling Salesman Problem to students.

Lesson 1 The Towers of Hanoi 40 minutes
Lesson 2 The Travelling Salesman Problem 80 minutes

## Module 8: Research Project
## Total Estimated Time = 8+ hours

Students are divided into groups and research a topic on the Internet. They present their research topic to the class.

Lesson 1 Getting Started 40 minutes
Lesson 2 Research Time 240 minutes
Lesson 3 What is a good Presentation? 120 minutes
Lesson 4 Presentation Time 80+ minutes

## Module 9: Advanced Game
## Total Estimated Time = 2 hours 40 minutes

In this module students implement an Advanced Game in Scratch.

Lesson 1 Advanced Game Design 40 minutes
Lesson 2 Advanced Game Improvements 40 minutes
Lesson 3 Advanced Game Finishing Touches 40 minutes
Lesson 4 Advanced Game Testing 40 minutes

## * Module 10: Scratch Project
## Total Estimated Time = 12+ hours

Students are divided into groups and work on their final project.
Lesson 1 Getting Started 40 minutes
Lesson 2 Sharing – Setting Up a Scratch Account 40 minutes
Lesson 3 Create 480+ minutes
Lesson 4 Publish and Present 80 minutes
Lesson 5 Presentations 80 minutes

These times are guidelines only. The choice of modules and the order in which they are taught is at the teacher's discretion.

## Breakdown of the unit

**Total Estimated Time for 10 Modules = 45 hours**

This TU is presented in modules. A teacher may select which modules to teach depending on students' interests and time available.  If time is limited the following core modules are recommended:

**Core Modules**
Module 1.  Getting Started  - 4 hours 20 minutes
Module 2.  Drawing Shapes and Repeating  - 2 hours 40 minutes
Module 4.  Build a Game - 2 hours 40 minutes
Module 10. Scratch Project  - 12+ hours (can be done in students' own time)

## Aims

*This transition unit aims to*
- introduce students to basic programming concepts in a fun and exciting way
- encourage students to work in teams to create exciting animations, games and stories
- present students with the opportunity to explore their creative and artistic side by creating interactive projects.

## Learning Outcomes

*On completion of this unit students should be able to:*

- solve problems by analysing a problem and breaking it down into its constituent parts

- design a high level solution to a problem

- implement the solution to a particular problem in Scratch using programming concepts

- implement the solution to a particular problem in Scratch using mathematical and computational ideas

- update, modify and maintain existing software projects in Scratch

- explain computer science challenges that face computer science researchers today

- conduct Internet research and evaluate Internet websites

- demonstrate good teamwork skills

- make a presentation to their classmates

- give and receive constructive feedback on their project work.

| Key skills | How evidenced |
| --- | --- |
| information processing | Through the activities and worksheets students are guided in how to research and record information on the Internet for research projects. They are also helped in developing the skills to evaluate and extract appropriate information. |
| critical and creative thinking | The students will get the opportunity to incorporate creative thinking into their Scratch projects and research projects. Critical and creative thinking will also be encouraged when providing feedback to class mates on student research projects. |
| communicating | Presenting a research project and a Scratch project to the class. Working in teams to build a Scratch project. Providing feedback and suggestions to classmates. |
| working with others | Planning and designing a Scratch project will give students an excellent insight into working with others. They will learn how to organise and delegate work within a group, and how to take responsibility for tasks and complete them to agreed deadlines. |
| being personally effective | Writing computer programmes, animations, games and stories will give students a great sense of achievement as they will be able to incorporate their ideas and designs and see them coming to life in a finished product. They will also gain skills of personal effectiveness as they plan and manage their projects and meet agreed deadlines. |

## Learning approaches

A wide variety of methodologies will be used including cooperative learning, self-directed and independent learning, group work, pair work, discussion, debate, project work and research, use of ICT for research and presentations, use of digital cameras. Cross curricular linkages across learning will be fostered and cross application of skills learned.

## Assessment approaches

Students will be assessed on the following units:

1. Research Project, Research Project Presentation, Research Project General
2. Advanced Game Testing
3. Scratch Group Report, Scratch Project Presentation, Scratch Project General

Assessment tools are available in Appendix 1 of the materials on www.scratch.ie or on the CD and are also attached to this document.

## Evaluation methods

Student Evaluation:
   See Student Questionnaire (attached here appendix 2)

Teacher Evaluation:
   See Teacher Questionnaire (attached here appendix 2)

These and other appendices are available in the teaching resource on www.scratch.ie or on your CD.

## Resources

To download the teaching resource please go to http://www.scratch.ie and click on Scratch teaching materials. You must register there to access all the lesson plans, but this is free of charge.

To download the Scratch software go to the Scratch MIT Website http://scratch.mit.edu.

If you would like a CD, please contact clare.mcinerney@lero.ie or Clare McInerney at 061 202434.

For more information regarding the materials, professional development or any other queries please contact

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