



**12 Lessons (24 Cards - 30 minute projects)  
Learning Objectives**

Lesson 1: Cards 1, 2	Draw you own submarine sprite Code the sub to hide in deep water Code visibility with the <i>abs</i> function
Lesson 2: Cards 3, 4	Draw a Star and Squares on a grid Define new blocks procedures Correlate copybook and code
Lesson 3: Cards 5, 6	Modularise drawing a house Colour its background Use broadcasts and procedures
Lesson 4: Cards 7, 8	Create a Snowfall Clone bubbles on a fish Clone sprites
Lesson 5: Cards 9,10	Report the sprite's location Move vertices, change angles Use the <i>attribute reporter</i> (1)
Lesson 6: Cards 11,12	Resize a square with the keyboard Discover like Pythagoras did Use the <i>attribute reporter</i> (2)
Lesson 7: Cards 13,14	Code an increasing graph of points Code an decreasing graph of points Use the <i>attribute reporter</i> (3)
Lesson 8: Cards 15,16	Code the factors of a number Code Greatest Common Factor List the factors of a Number
Lesson 9: Cards 17,18	Create new sprite (a fly) Animate a scene with frog and fly Make a sprite follow another
Lesson 10: Cards 19, 20	Use the Ghost effect Draw a shape through transparency Create a toggle key
Lesson 11: Cards 21,22	Create a Maths Picture Quiz Code the Score Create parallel lists of Q & A
Lesson 12: Cards 23,42	Grow a Polygon from a Triangle Define a 'draw circle' new block Create parallel lists of Q & A

**Maths Labels Aligned to the Flip-Cards**

NUMBER:	Cards: (7,) (8), 15, 16
SPATIAL AWARENESS:	Cards: 10, 24
SHAPE:	Cards: 4, 11, 23,
ALGEBRA:	Cards: 3, 5, 9, 13, 14
MEASUREMENT:	Cards: (10,) 12, 20
DATA:	Card: -

**COMPUTATIONAL THINKING CONCEPTS  
for 12-13 Year Olds using SCRATCH CODE**

When it comes to Scratch, Computational Thinking can be described as the learning and development that takes place with Scratch. In their definition, the developers of Scratch see it as a set of concepts, practices and perspectives. The concepts can be listed as: **sequences, loops, parallelisms, events, conditionals, operators and data.** Procedures (more blocks) were introduced as a new feature in Scratch 2.0 and procedures are included here as they are well within the capability of this age group to understand. For 12-13 year olds all the computational thinking concepts can be identified with a colourful code block in one of the Scratch palettes. The concepts are listed showing where they are used during the lessons.

(Card Numbers in brackets)

**Sequence** (new occurrences only) using **broadcasts**

to modularise long scripts (5, 6)

the *attribute reporter* when reporting

an attribute of another sprite (9, 10, 11, 12, 13, 14)

**Procedures\*** **define a (New Block) procedure:**

(New Blocks)

to draw a Star (3), to draw a Square (4)

**Loops** **Repeat until loop** (for length of list 3, 18),

lists  
and  
procedures

**Loops** containing \*procedure to draw a square (4),

**Nested loops** with offset value (15),

with \*procedure to Grow & Rotate in a Design (23)

**Parallelism** **Events** e.g. Flag clicked, Key press etc.

causing several things to happen simultaneously

**Events** Flag clicked, Key press, Sprite clicked,

Send/Receive Broadcast (5, 13, 14, 15, 18 ),

Create/Start as a clone (7, 8, 11, 12),

**Conditionals** **If/Then** with direction keys, simulate gravity (1),

If<Greater/ Equal (1),

If/Then/Else If <correct input> (5, 6)

**Operators** **Arithmetic:** +, -, x, ÷ (10,12, 3,14, 20, 24),

random nos. for time, position, rotation, opacity (7)

use of *abs function* to show distance from origin (2)

**Data** **Variables: (many) Make, Set, Change,**

Variable values Min & Max set by slider

**Lists: Create with a Variable,** with list items using

*length of list* for repeats in a loop (15),

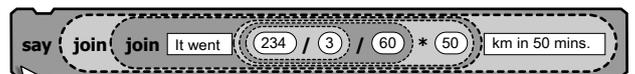
use *picture indexes* in lists for Q & A (21, 22, )

an example of Thinking made Visual with Code



Here is a Maths Problem and its Solution in Code.

A car travelled 234 Km in 3 hours. At that rate, about how far did it travel in 50 minutes?



What makes this the correct solution?

What exactly will the code make sprite say?

<b>LOGICAL REASONING:</b>	Cards 2, 7, 8, 18, 19 (Boolean thinking), 21, 22
<b>Scratch GRAPHIC EDITOR SKILLS:</b>	Card 1, (5,) 6, 17,