

STEM from Home

Unplugged Computational Thinking

Did you know that everyday tasks like tying a shoelace properly or making a sandwich involve aspects of computational thinking? Unplugged Computational Thinking allows us to take a complex problem, understand what the problem is and develop possible solutions or a set of rules to arrive at the solution. These solutions can then be presented in a way that a computer, a human, or both, can understand.

Your challenges include testing an algorithm using a given set of numbers and writing an algorithm to help your blindfolded friend draw a perfect square. You will also use your algorithm to code a Scratch Programme. Finally, you will figure out the most effective way to get three electric cars fully charged in the shortest time possible!

Main Activity: **Addition Adventures**

Introduction

You need to sum up all the numbers between 1 & 400. Can you do it in under 60 seconds? Mind-boggling, right?

Let's use computational thinking to crack this challenge.

What You Will Need

- A few sheets of paper
- Pens/pencils
- A calculator (optional)

What you will learn

1. You will learn to solve a mathematical problem using the 4 steps of computational thinking.
2. You will then learn to test an algorithm that will work for any number.
3. An algorithm is simply a finite number of steps defining a procedure for solving logical and mathematical problems. A recipe is a simple example of an algorithm because it says what must be done, step-by-step.
4. To understand an algorithm better. Click on [this link](http://computationaltales.blogspot.com/2012/01/ant-and-grasshopper-fable-of-algorithms.html) and read a well-loved fable with a twist

[Click here to start your addition adventure!](#)



Bonus Activities

Activity 1: Blind Fold Square

You have to conduct a Blind Fold Square game with your friend. The activity requires him/her to draw a square on the ground blindfolded. The friend will need to follow your instructions to draw the square. Remember you cannot tell the friend that a square is to be drawn. That is a secret!

You need to write out detailed instructions for the game.

What You Will Need

- Paper Pencil
- [Blind Fold Square Activity Worksheet](#)
- Blind Fold / Scarf
- A stick with which to mark the ground / chalk

Activity 2: Squares & Triangles

Introduction

In this activity, you will code an interactive game where a sprite will draw a Square or a Triangle based on an algorithm similar to the one you designed in the Blind Square Activity.

Let's get started! Take a look at the [Scratch Project here](#).

You can [access guidelines for the project here](#).



What you will learn

You will learn how to write an algorithm which can be used as a set of rules to play the game offline or create a game online.



What You Will Need

Hardware

A computer capable of running Scratch or Scratch 3 software (either online or offline).

Software

Access Scratch 3 either online at <https://scratch.mit.edu/> or download from <https://scratch.mit.edu/download>.

What you will learn

1. How to add, move or turn Sprites
2. How to ask questions, accept responses and evaluate responses to take a decision
3. How to define and use variables and blocks
4. How to use extensions in Scratch
5. Draw a triangle or a square using Pen commands

Challenge Activity: Charge Up!

3 friends decide to go on a trip in their new electric cars. Unfortunately, their car batteries are completely drained and need to be re-charged.

Here's the challenge:

It takes **3 hours** to fully charge a car's battery.

The problem is there are only **2 charging** points available and three cars to charge.

The cars don't have to be charged all in one go.

How soon can they leave with fully charged batteries?

Find a super time saving solution and then write out step-by-step instructions for the three friends.

