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INTRODUCTION

Congratulations on purchasing this Weird Science product. This pack and its contents are designed to introduce your child to a world of weird science and wonderful discoveries. Always follow the instruction booklet carefully and have it on hand throughout each experiment. Have fun learning!

MAZE MANEUVERINGS

You will need: maze cards, command cards, avatar robot, card dashboard
Coding, in its most basic form, is a set of instructions to be followed. These instructions can be completed by a computer to complete a specific task or even whole strings of commands to reach a certain goal.

Your mission: Help your robot avatar navigate the maze by figuring out the order of commands to land on the finish square.

Getting started: Select a maze. Each challenge is harder than the last, so it is recommended to start with Challenge 1 and work up to Challenge 3.



CHALLENGE 1

CHALLENGE 2

CHALLENGE 3

Next, lay out your dashboard and spread out the command cards in front of you. Place your avatar robot on the arrow start space, being sure to align the direction of the robot's arrow the same as the start space's arrow.

How to navigate: Every move your robot avatar makes is determined by the command cards you place on the dashboard. The colour of the square the robot is currently on corresponds directly to the dashboard and what command cards are placed in the matching colour section.

For example, when the robot lands on a blue square, it must complete the two commands in the blue section of the dashboard, in the order they are placed. The colour square the robot avatar lands on after that sequence then determines the next 2 moves it will make and continues until the finish square is reached.

This also means that passing over a different colour square during a sequence does not mean you change commands midway through, only follow the colour on which you land.

The avatar robot can only move in the direction it is facing, and can only change direction with a Turn card.

White spaces do not initiate any series of commands and if landed on, your robot is stuck and the cards on your dashboard are incorrect and will need to be rearranged and the robot starting back at the beginning.

Clear spaces are out of bounds and unlike white spaces, cannot be travelled over. If the robot needs the cross a clear space, the sequence is incorrect and must be rearranged and restarted.

The robot must land exactly on the finish square to beat the challenge. Passing over it does not count because the whole sequence must be completed once started.



As an example, according to the above dashboard, if the avatar robot is on a blue square, it will be rotated right and then move one space forward in the direction it is now facing after being rotated. If the space it lands on is yellow, it will move another space forward and then not move according to the commands. Remember, you cannot move off the path into the clear spaces and landing on a white square will not trigger any commands and you are stuck and must restart and rearrange.

Maze Solutions:
Challenge 1: Stop, Stop, Forward, Forward, Turn Right, Forward
Challenge 2: Forward, Stop, Turn Left, Forward, Turn Right, Forward
Challenge 3: Forward, Turn Right, Stop, Turn Right, Forward

DECODING SECRET CIPHERS

You will need: tube, paper strips
Additional materials: pen or pencil, tape

One of the earliest encryption devices was the scytale, made over 2,000 years ago by ancient Spartans and Greeks. It was useful to convey secret messages about strategy and relay information between leaders during war. These messages could only be read using the specific scytale, and if the message fell into the wrong hands, it would look like nonsense.

Like in computer science, encryption is used to send important information from one point to another without being read or understood by unwanted eyes.

Your mission: Make your own cipher to write and decode secret messages that you have encrypted.

Getting started: Take the tube and wrap the paper strip tightly around the length of the tube so it lines up perfectly touching the coil before it. Use a small bit of tape to secure each end in place.



1. Starting with the first coil, write your message across the length of the tube adding one letter of the message per coil.

2. Untape and unravel your message and lay flat.

3. Write in additional nonsense letters to fill the spaces between the real message.

Pass your secret message off to a friend to decipher using the tube! You can also try cutting and using your own different sized strips of paper to make longer or shorter messages.

PIXEL PICTURES

You will need: pixel board, pixel beads

All images that you see on a screen are made up of very small square units called pixels. This explains why when you zoom in on an image far enough, the individual squares of single colours making up the image can be seen.

Computers also use algorithms to process and display information. In order to use an algorithm, you must know the rules and follow the code in order to get the desired end result.

Using the peg board and beads, follow the algorithms based on the following key to decode 3 different mystery images!

R - Red O - Orange Y - Yellow G - Green B - Blue K - Black X - No Bead

So for example, if an algorithm is X R R Y, you would skip the first peg, place two red, then one yellow across in a straight line from left to right.

You can sort the bead colours into the 6 rectangle compartments on the tray and place the peg board in the center square.

Algorithm 1:

X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 B B B B B B B B B B B B B B B B
 B B K K K B B B B K K K B B B
 X B K K K B B B B K K K B X X
 X B K K K B B B B K K K B X X
 X X B B B X X X X B B B X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
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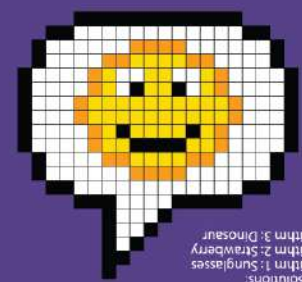
Algorithm 2:

X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X G X X X X X X X X
 X X X X X G G G G X X X X X X
 X X X X R R G G G R R X X X X X
 X X X R Y R R G R R Y R X X X X
 X X X R R R Y R Y R R R X X X X
 X X X X R R R R R R R X X X X X
 X X X X R Y R R R Y R X X X X X
 X X X X R R R Y R R X X X X X X
 X X X X X X R R R X X X X X X X
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 X X X X X X X X X X X X X X X X

Algorithm 3:

X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X X X X X X X X X
 X X X X X X X X O O X X X X X X
 X X X X X X X X O R O O X X X X
 X X X X X X X X O O X X X X X X
 X X X X X O Y O O O X X X X X X
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You try! Create your own pixel artwork and write your own algorithm. Pass the algorithm off to a friend, show them the key, and see if they can recreate your pixel art!



Pixel Solutions:
 Algorithm 1: Sunglasses
 Algorithm 2: Strawberry
 Algorithm 3: Diamond