



STEM @ HOME

SENTINUS



THIS WORKBOOK BELONGS TO

NEED FOR SPEED

WHAT IS SPEED?

Speed is a measure of how fast something is moving.

Speed is the distance that an object moves in a given amount of time.

DISCUSSION TIME

What are the fastest things you can think of?

HOW DO WE CALCULATE AN OBJECTS SPEED?

$$\text{Speed} = \text{Distance} \div \text{Time}$$

Speed is usually measured in meters per second, we write this like m/s.

This means that for our calculations, our distances should always be in meters and our time should be in seconds

EXAMPLE

If a train travels 10 meters in 5 seconds what is its speed?

Distance: 10 meters

Time: 5 seconds

$$\text{Speed} = \text{Distance} \div \text{Time}$$

$$\text{Speed} = 10 \div 5$$

$$\text{Speed} = 2 \text{ m/s}$$

CAN YOU WORK OUT THE SPEEDS BELOW?

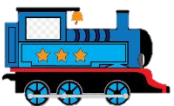


It takes a rabbit 2 seconds to run 30 meters.

What is the rabbits speed?

Distance :

Time :



A train takes 5 seconds to travel 250 meters.

What is the trains speed?

Distance :

Time :



A plane can travel 1km in 5 seconds.

What is the planes speed?

Distance :

Time :



Remember the
Distance needs
to be in meters

SPEEDY STORIES

Write a story about a time you were moving fast.

You could be on a train, riding a rollercoaster, running or any other time you remember going fast.

Once your story is done illustrate it by drawing a picture in the box below.



CAN YOU ANSWER THE SUMMARY QUESTIONS?

WHAT IS THE EQUATION TO CALCULATE SPEED?

YOUR ANSWER

WHAT IS UNIT SPEED USUALLY MEASURED IN?

YOUR ANSWER

WHICH WAS FASTER THE TRAIN OR THE PLANE IN YOUR CALCULATIONS?

YOUR ANSWER

FRACTIONS

A fraction is part of a whole number, and a way to split a number into equal parts.

All Fractions are made up of 2 components:

NUMERATOR

How many fraction pieces you have



1

DENOMINATOR

How many fraction pieces your whole number is broken into



2

MY NAME AS A FRACTION

WRITE YOUR NAME HERE

MY NAME HAS THIS
MANY EQUAL PARTS
(LETTERS) :

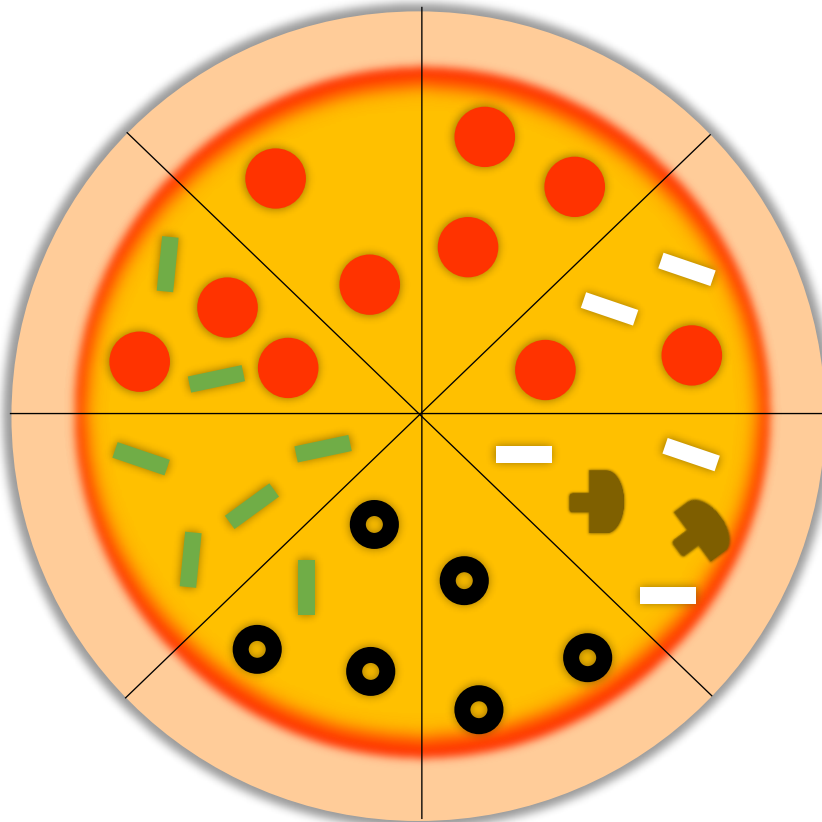
EACH LETTER OF MY
NAME REPRESENTS
THE FRACTION:

THE FRACTION OF
VOWELS IN MY
NAME IS:

THE FRACTION OF
CONSONANTS IN MY
NAME IS:

A SLICE OF THE FRACTION

Can you work out the fractions and fill in the blanks below?



Pepperoni



Olives



Peppers



Onion



Mushrooms



Pepperoni : $\frac{4}{8}$ or $\frac{1}{2}$

Pepperoni & Peppers :

Peppers :

Peppers & Olives :

Olives :

Onions & Mushrooms:

Mushrooms :

Onions & Pepperoni :

Onions :

ART WITH FRACTIONS

When a fraction cannot be reduced it is in its lowest term.

E.G $\frac{3}{6} = \frac{1}{2}$

Colour all the lowest term fractions yellow.

Colour the rest blue.

$\frac{2}{4}$	$\frac{3}{6}$	$\frac{4}{8}$	$\frac{2}{6}$	$\frac{2}{8}$	$\frac{6}{8}$	$\frac{2}{10}$	$\frac{4}{10}$	$\frac{2}{4}$
$\frac{3}{6}$	$\frac{2}{4}$	$\frac{2}{6}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{2}{8}$	$\frac{6}{8}$	$\frac{2}{10}$	$\frac{4}{5}$
$\frac{4}{8}$	$\frac{4}{6}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{2}{8}$	$\frac{1}{5}$	$\frac{2}{10}$
$\frac{2}{6}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{4}{10}$	$\frac{2}{5}$	$\frac{6}{10}$
$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{3}{5}$	$\frac{8}{10}$
$\frac{2}{6}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{4}{10}$	$\frac{2}{5}$	$\frac{6}{10}$
$\frac{4}{8}$	$\frac{2}{6}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{2}{8}$	$\frac{1}{5}$	$\frac{2}{10}$
$\frac{3}{6}$	$\frac{2}{4}$	$\frac{2}{6}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{2}{8}$	$\frac{6}{8}$	$\frac{2}{10}$	$\frac{4}{5}$
$\frac{2}{4}$	$\frac{3}{6}$	$\frac{4}{8}$	$\frac{2}{6}$	$\frac{2}{8}$	$\frac{6}{8}$	$\frac{2}{10}$	$\frac{4}{10}$	$\frac{2}{4}$

WHAT WAS THE PICTURE?

CAN YOU ANSWER THE SUMMARY QUESTIONS?

WHAT IS 0.5 EXPRESSED AS A FRACTION?

YOUR ANSWER

WHAT FRACTION OF YOUR PIZZA CONTAINED OLIVES?

YOUR ANSWER

CAN YOU THINK OF WHEN YOU COULD USE FRACTIONS OUTSIDE OF SCHOOL?

YOUR ANSWER

IF YOU HAD TO SHARE A CAKE EQUALLY WITH 2 FRIENDS HOW MUCH CAKE WOULD YOU EACH GET?

YOUR ANSWER

CODING

Computers cannot function on their own, they can't do anything without a person telling them what to do.

The person who tells a computer what to do is a PROGRAMMER. A programmer uses code to tell the computer exactly what to do.

A computer always follows a code exactly in the order it is written. This means the code has to be written in the correct order or it will not work properly. The order that a computer follows the code is called a SEQUENCE. If the sequence is not correct, the program will not function properly.

For example, when putting on your shoes and socks you would not put your shoes on and then put on your socks. It is important to do it in the correct sequence to get the desired outcome, put on your socks first and then your shoes.

CODING DEFINITIONS

SEQUENCE

Step by step instructions to follow in order

LOOP

Repeating a step more than once

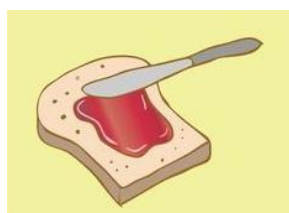
BUG

An error or mistake in the code

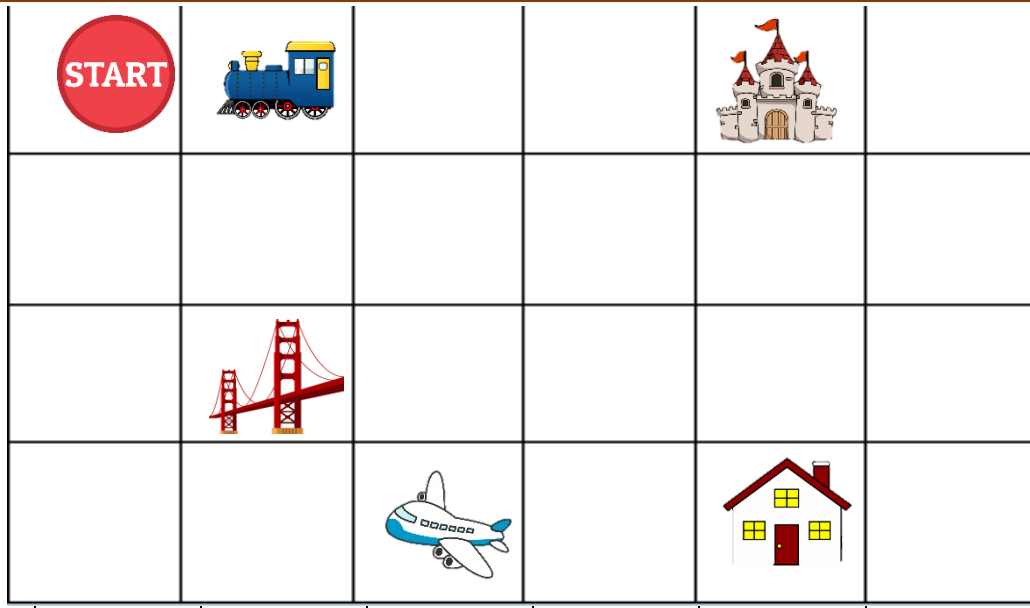
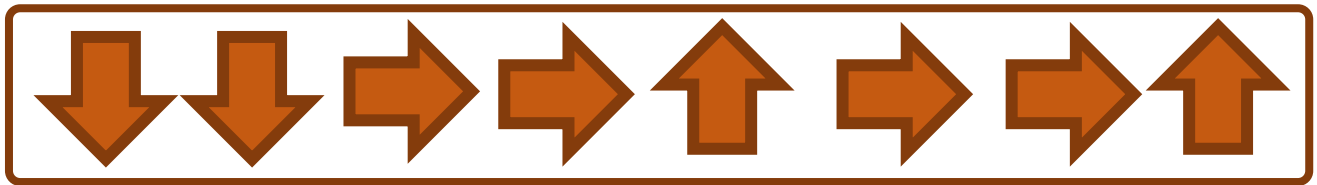
DEBUG

Finding and fixing the error in the code

CAN YOU NUMBER THE PICTURES BELOW TO PUT THE SEQUENCE IN ORDER?

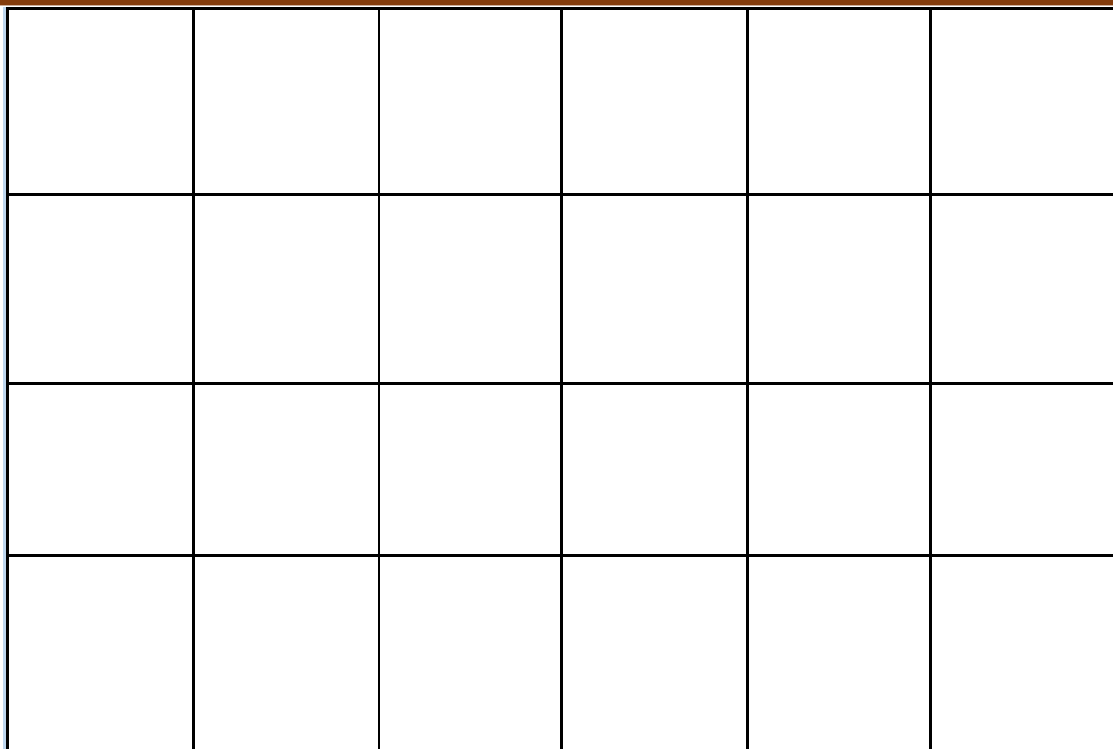


FOLLOW THE SEQUENCE ON THE MAP BELOW



WHICH SQUARE DID YOU FINISH IN?

MAKE YOUR OWN SEQUENCE AND SEE IF A VOLUNTEER ENDS IN THE CORRECT SQUARE



CODING WITH BINARY

BINARY is a simple computer programming language.

The binary system is a way to write code using only two digits: 0 and 1.

These are used in computers as a series of "off" and "on" switches to tell the computer what to do.

Binary code has its own alphabet, are you able to write your name in binary?

Pick one colour to be 1, a different colour to be 0 and black or white to be a space then code your name below.


Why not write a coded message for someone in your house or a friend?

A	1000001	N	1001110
B	1000010	O	1001111
C	1000011	P	1010000
D	1000100	Q	1010001
E	1000101	R	1010010
F	1000110	S	1010011
G	1000111	T	1010100
H	1001000	U	1010101
I	1001001	V	1010110
J	1001010	W	1010111
K	1001011	X	1010111
L	1001100	Y	1011001
M	1001101	Z	1011010

[illegible]

THERE ARE LOTS OF PROGRAMMING LANGUAGES.

Do you already know any?

Use the an iPad or computer to find the names of other languages and write them here. 

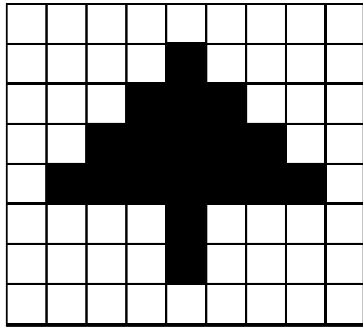
[illegible]

CAN YOU CRACK THE CODE?

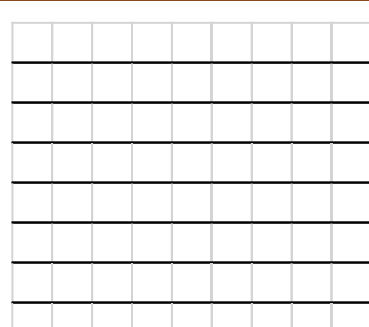
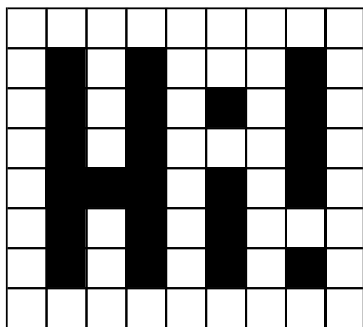
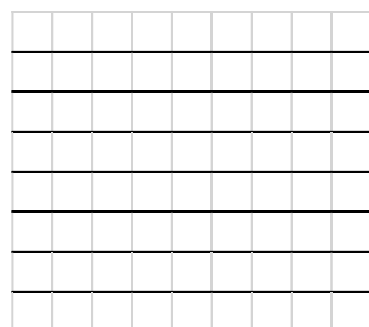
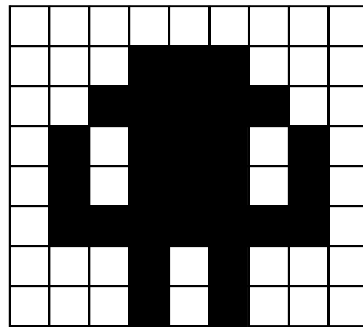
We learnt before that the computer translates our 1's and 0's in binary code into 'on' and 'off'.

Now it's your turn to be the computer can you complete the codes below?

EXAMPLE

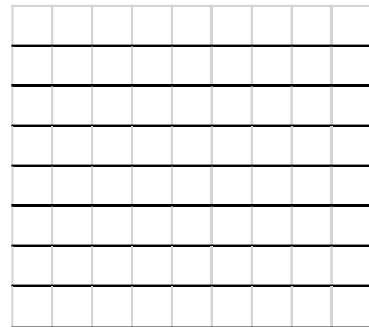
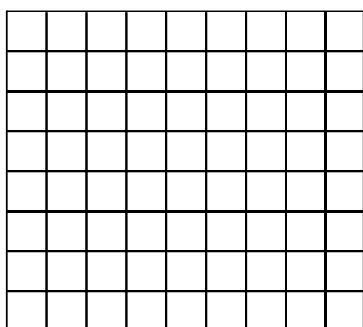


0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	1	1	1	0	0	0	0
0	0	1	1	1	1	1	0	0	0
0	1	1	1	1	1	1	1	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0



Write your own code and see if anyone in your house can draw the right picture!

(It might be helpful to draw your picture out first on a scrap of paper to plan your code)



CAN YOU ANSWER THE SUMMARY QUESTIONS?

IN YOUR OWN WORDS, WHAT IS CODING USED FOR?

YOUR ANSWER

WHICH TWO NUMBERS DOES BINARY USE FOR PROGRAMMING?

YOUR ANSWER

CAN YOU WRITE 'HELLO' BELOW USING THE BINARY ALPHABET?

YOUR ANSWER

FORCES

Forces are pushes and pulls in a particular direction.

Forces are shown by arrows in diagrams.

The direction of the arrow shows the direction in which the force is acting. The bigger the arrow, the bigger the force.

If two forces are BALANCED, it means the forces are the same size but are acting in opposite directions.

If two balanced forces are acting on an object, that object will not change its motion. If it is still, the object will stay still or if it is moving, it will continue moving in the same direction and at the same speed.

CAN YOU WORK OUT THE BRAKING FORCE NEEDED TO BALANCE THE DRIVING FORCE?



When two forces acting on an object are not equal in size, we say that they are unbalanced forces. Unbalanced forces change the way something is moving.

They can make objects start to move, speed up, slow down or change direction.

CAN YOU CALCULATE THE DIFFERENCE BETWEEN THE BRAKING FORCE AND DRIVING FORCE?



When something is in water, there are two forces acting on it. Its weight and the force of the water pushing up, the upthrust.

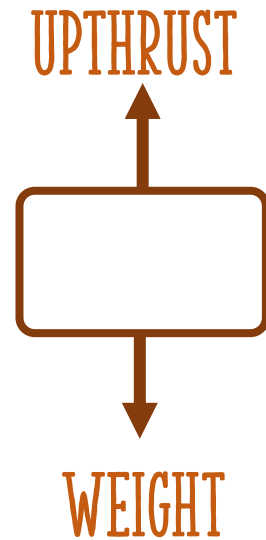
If the weight is equal to or less than the upthrust, it floats.

Things that float are buoyant.

If the weight is greater than the upthrust, it sinks.

$\text{WEIGHT} \leq \text{UPTHRUST} = \text{FLOAT}$

$\text{WEIGHT} > \text{UPTHRUST} = \text{SINK}$



WILL THEY FLOAT OR WILL THEY SINK?

Calculate the forces and determine if the object will float or sink.

4×9

$20 + 19$

FLOAT OR SINK?

$16 \div 4$

3×3

FLOAT OR SINK?

$14 + 14$

$66 - 38$

FLOAT OR SINK?

WILL IT FLOAT?

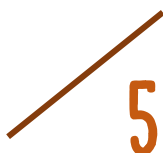
Now that we know how objects float let's experiment to see if we can predict which objects will float and which will sink.

OBJECT	PREDICTION	OUTCOME

CALCULATE HOW ACCURATE YOUR PREDICTIONS WERE

How many objects did
you predict correctly?

What is this as a percentage?

5

=

CHANGING PROPERTIES

Imagine a ball of play-doh, what do you think will happen if it is dropped in a basin of water?

How could you change the play-doh to make it float?

(Write as many options as you can think of)

GIVE IT A GO - WHICH OF YOUR IDEAS WORKED AND WHICH DIDN'T?

What do you think will happen to an orange if it is put in water?

How could you change the orange to make it sink?

(Write as many options as you can think of)

GIVE IT A GO - WHICH OF YOUR IDEAS WORKED AND WHICH DIDN'T?

CAN YOU ANSWER THE SUMMARY QUESTIONS?

HOW IS A FORCE SHOWN ON A DIAGRAM?

YOUR ANSWER

IN YOUR OWN WORDS, WHAT ARE BALANCED FORCES?

YOUR ANSWER

HOW SHOULD WEIGHT AND UPTHrust BE RELATED FOR AN OBJECT TO FLOAT?

YOUR ANSWER

BONUS TOPIC : MOVIES

Today we are going to talk all about movies.

DISCUSSION TIME

WHAT WAS THE LAST MOVIE YOU
WATCHED?

ARE THERE ANY KINDS OF MOVIES
THAT YOU DISLIKE?

WHY DO YOU DISLIKE THEM?

IF A BOOK IS MADE INTO A MOVIE
WHICH DO YOU PREFER TO DO FIRST:
WATCH THE MOVIE OR READ THE
BOOK? WHY?

HAVE YOU EVER SEEN A MOVIE
MORE THAN ONCE?

DO YOU PREFER WATCHING A MOVIE AT HOME OR AT THE CINEMA?

EXPLAIN YOUR ANSWER


COMPLETE THE MOVIE SCRIPT

Use your imagination to complete the movie script below. When writing a script, it is important to show which character is saying the line and any important descriptions of what you would see on the screen. Once you're finished writing, draw your scene.

Max : Did you see that?

Lucy : See what?

Max points behind Lucy, Lucy turns around and looks shocked.



MOVIE REVIEW

Using a computer or tablet make a presentation reviewing a movie you have watched that you could present to the class.

YOUR REVIEW MUST INCLUDE:

- The movie's title
- A short summary of the movie
 - This should be no more than 30 words and not give away any information that would spoil the movie for someone who hasn't seen it.
- A slide covering what you thought of the movie
 - Use as many descriptive words as you can
- 3 Reasons to explain why you liked/disliked the movie

WHY NOT INCLUDE:

- A picture from the movie
- A short clip from the movie
- A character study on your favourite character
 - What are they like?
 - How did they feel during the film?

STOP MOTION SCENE

Recreate a scene from your favourite movie. Stop motion is a way of making a movie from many still images. The images are put together one after another, and then played at a fast speed to give the illusion of movement.

CAN YOU ANSWER THE SUMMARY QUESTIONS?

CAN YOU THINK OF ANY OTHER METHODS PEOPLE USE TO MAKE MOVIES?

YOUR ANSWER

IF A MOVIE LASTS 1 AND A HALF HOURS HOW MANY MINUTES IS THAT?

YOUR ANSWER

CAN YOU NAME A COMPANY THAT MAKES ANIMATED MOVIES?

YOUR ANSWER

ENJOY THIS RESOURCE?

Contact us to see what else we have to offer your class!

Our new STEM Gem's programme guide students through 8 different STEM themes incorporating a range of NI curriculum areas, with group activities for the classroom and individual work for both school and home.

CONTACT US:

ADDRESS: Sentinus
19A Ballinderry Rd
Lisburn
BT28 2SA

TELEPHONE: 028 92 627 755

EMAIL: Info@sentinus.co.uk

WEBSITE: www.sentinus.co.uk

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