Title: Speed Distance and time.

Topics: Speed, distance and time, generating and recording data, generating and interpreting graphs and using formula.	**Time**: minutes	**Age**: 13-14

Differentiation:	**Guidelines, ICT support etc.:**
There are differentiated worksheets available and the task allows students the opportunity to carry out the activities at different levels.	It is possible to use either a ticker tape or light gates to help gather data and further differentiate this task. Teachers report that using different vehicles allows students to discuss differences inresults.

Equipment needed for this activity:	**Learning outcomes for this activity:**
2 x wooden ramp 1 x trolley Textbooks 1 x metre rule 1 x stopwatch 1 x table template 2 x activity sheet 1 x graph axis <u>Health and Safety</u>: There are no particular health and safety issues relevant to these activities.	Students will be able to define speed and interpret the terms needed from the text. Students should able to fit speed, distance and time into the equation. Be able to plot a distance time graph. Students will have the opportunity to manipulate the equation to calculate distance/time. Be able to convert units into those required.

Lesson description

Starter Activity (20 minutes)

Pupils enter the classroom put away coats and bags and begin work on Speed distance and time worksheet. (10 minutes)

Pupils are asked to identify descriptors of Speed, Distance and Time.

For most able and talented a discussion of the light year being a unit of distance rather than time allows for a common misconception to be tackled.

Main Activity (40 - 80 minutes)

An explanation of practical is given; students have the length of the Top Gear theme song to gather equipment.

Students are asked to set up a ramp and at its base they measure a 3 meter distance.

They release a small car and when it reaches the bottom of the bottom of the ramp they note the time taken for it to travel the fixed 3 meters.

They repeat this 3 times for each of 3 heights and record the time taken.

At this point they have gathered the data needed to complete the rest of the task.

<u>Extension</u>

More able pupils at this point may be asked to consider any issues with the design of the experiment or they could be asked to suggest improvements.

Work sheet activity (20 minutes)

Pupils are asked to complete the activity work sheets individually, pupils are asked to record results, calculate speed, decide which type of graph is most appropriate then draw the graph.

Extension activity

Pupils who complete the work quickly are asked to work on the extension (speed camera) tasks provided.

Plenary Activity (20 minutes)

Pupils are asked about the procedure carried out; they are asked to consider the reason for any odd results. For high ability pupils vocabulary such as energy is lost, kinetic energy and reaction time should be encouraged.

All pupils must consider the possibility of light gates as a possible technology which might eliminate some issues.

On the bell pupils pack and leave.

Speed Distance Time

U A Q P T Z I B D S D H T A J P P U V E	SPEED
N M X Q B N E U F M N I Q I M C L Y H T	HOURS
N X E B K F F L D N C V Y H I O L O G F	DISTANCE
D N J T W O H Y E A R S M F L P L B M D	DAYS
K C L D E E V D X A N J E A I C A X N I	METERS PER SECOND
Y E L B A R P V K M Z P T Q M I U I H S	MILIMETERS
V N G O K S S L X C L Z E W E X T H Y T	LIGHTYEARS
E T M J R Z L P Z M A R R O T S A O A A	METERS
B I I J J K U I E D M J S R E A P U B N	KILOMETERS
F M N W L I M K G R J K P F R R N R D C	SECONDS
J E U A R E N I O H S R V S S T J S S E	MINUTES
R T T T G Q K L X H T E X T T H L F P A	YEARS
H E E U R X Y O Q Y P Y C G F I Q L E M	CENTIMETERS
I R S O K X Y M S X E M E O E S M Z E U	TIME
F S M S S W V E W N R I N A N J C E D A	
U L Q V U X N T N L N I F R R D G L N W	
X F F X W X B E S K I C T T D S O T M P	
M R J A M P B R T D A Y S T J C W F J E	
Y S E C O N D S A U J F W G D N L N H Y	
I J Y Y O K W S K N X W E F O B X U G Y	

In the word search above try to find the 14 key words which are hidden.

Can you identify which of the words are…

Units of time -

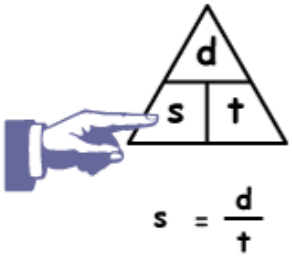
Units of Distance -

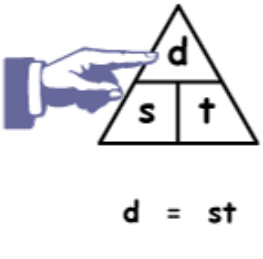
Units of Speed -

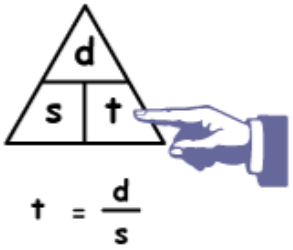
Speed Distance and Time work sheet.

Time taken to travel 3 meters from the bottom of the ramp.

	Time taken :1	Time taken : 2	Time taken : 3	Average time
Height 1				
Height 2				
Height 3				







Average speed height 1

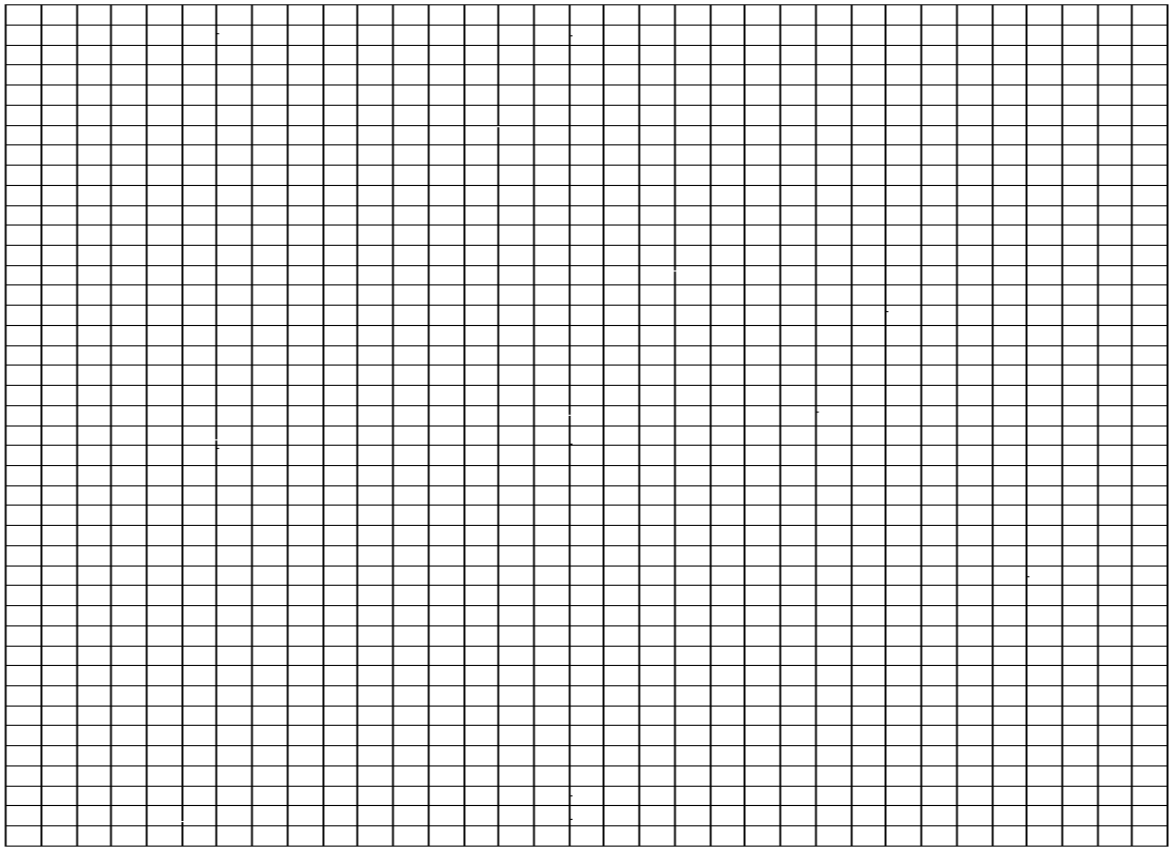
Answer_____

Average speed height 2

Answer_____

Average speed height 3

Answer_____



One the graph paper above please plot what you think is the best type of graph to show relationship between the height of the ramp and the speed of the car.

Speed Camera Activity

Car 1

A speed camera takes 2 pictures of a car travelling past it. Picture 1 shows the car passing point A while picture 2 shows the car passing point B. The distance between the points is 300 metres. It took Car 1 30 seconds to travel between the points, what speed was the car travelling?

Metres per second

Picture 1

Picture 2

Car 2

A speed camera takes 2 pictures of a car travelling past it. Picture 3 shows the car passing point A while picture 4 shows the car passing point B. The distance between the points is 0.5 km. The car was travelling at 50 metre per second. How long did it take Car 2 to pass between the two cameras?

minutes

Picture 3

Picture 4