

# Design and Make a Ramp



## Science:

The investigating slopes activity is a common primary school science experiment teaching content areas of **energy and forces (gravity and friction)** as we **as materials (properties and characteristics)**.

The aim for senior classes is to dig deeper and make connections between changing of slopes and the distance an object travels down the slope using maths to explain their understanding. Use the design and make approach to start your problem. Allow children to:

**Explore:** Play with a variety of materials to make a slope, different heights of slopes and different items that may or may not roll down the slope.

**Design:** Draw a sketch, with measurements of the height and angle of slopes as well as the name of different angles included

**Make:** Students can make their slope and test each slope for distance travelled. They should keep one variable the same each time. For example, the vehicle stays the same and change the height/angle of the slope OR change the vehicle and keep the height/angle of slope the same. Children could also change the type of material in each slope

**Evaluate:** How close were we with our estimates? Did we notice any relationship between height/angle of slope and distance of vehicle travelled? Could we investigate the time it takes for the vehicle to come to a stop based on the height or angle of the slope? Is there a relationship between these values? How far is the furthest? Can you improve your ramp? Can you increase your best distance? (Class competition)

## Maths:

### Data (Representing and Interpreting Data):

- collect, organise and represent data using pictograms, single and multiple bar charts and simple pie charts (5<sup>th</sup>) and trend graphs (6<sup>th</sup>)
- read and interpret pictograms, single and multiple bar charts, and pie charts (5<sup>th</sup>) and trend graphs (6<sup>th</sup>)
- explore and calculate averages of simple data sets

### Measures (Length):

- select and use appropriate instruments of measurement
- estimate and measure length using appropriate metric units
- rename measures of length (e.g.  $23\text{ cm} = \frac{23}{100}\text{ m} = 0.23\text{ m}$  OR  $1\text{ m } 11\text{ cm} = 1\frac{11}{100}\text{ m} = 1.11\text{ m}$ )

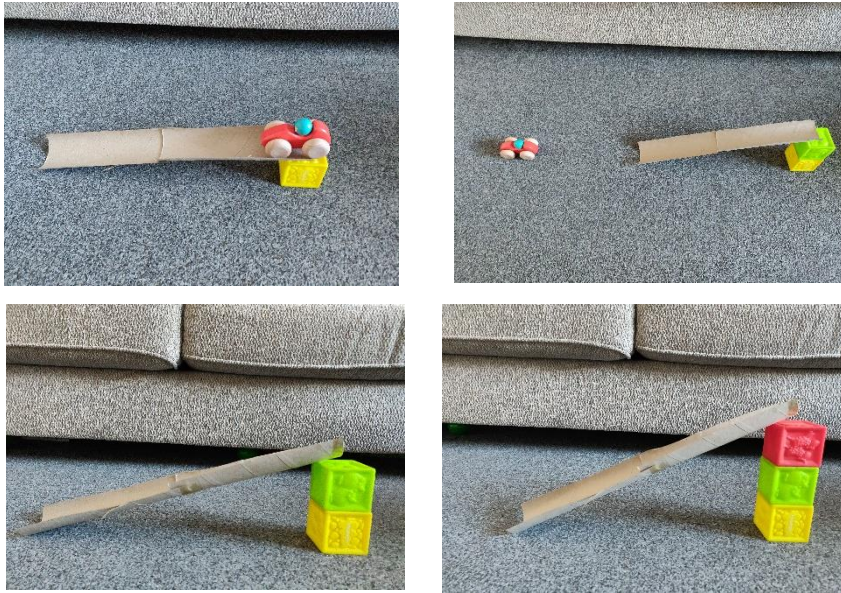
### Shape and Space (Lines and Angles):

- estimate, measure and construct angles in degrees
- recognise, classify and describe angles and relate angles to shape

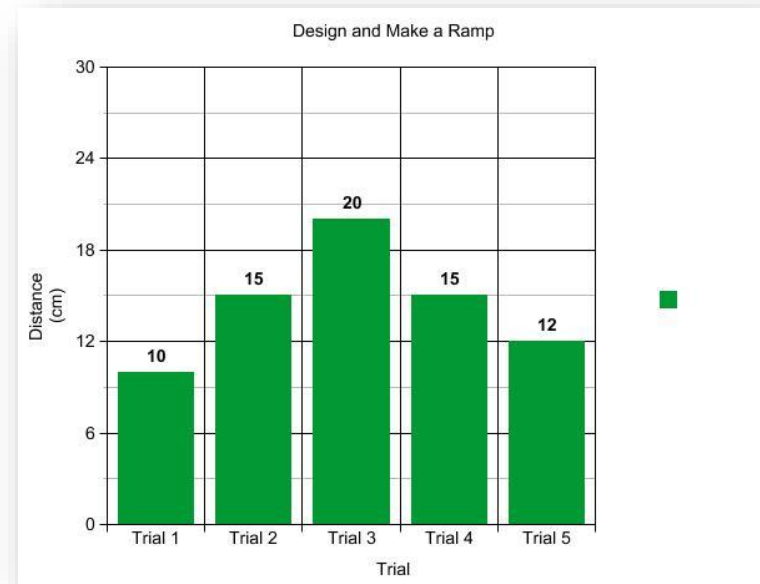
## Encourage Pupils to come up with their own inquiry questions.

### The following are only suggestions:

1. What is the relationship between the height of the slope and distance travelled by the car/marble?
2. What is the effect of rough or smooth materials on the distance travelled?
3. Does the size of the car/marble affect how far it travels?
4. Does the weight of the object affect how far it can travel?
5. What makes the best ramp? What do we mean by best?
6. Competition, who in the class can get the ball/car to travel the furthest? How did you improve your ramp design?



Images of Different Slope heights and angles



Online Graph Tool  
<https://nces.ed.gov/nceskids/createagraph/default.aspx>

	Height	Angle of slope (5 <sup>th</sup> and 6 <sup>th</sup> )	Distance
Trial 1			
Trial 2			
Trial 3			
Trial 4			
Trial 5			
Average (5 <sup>th</sup> and 6 <sup>th</sup> )			

Sample Data collection sheet