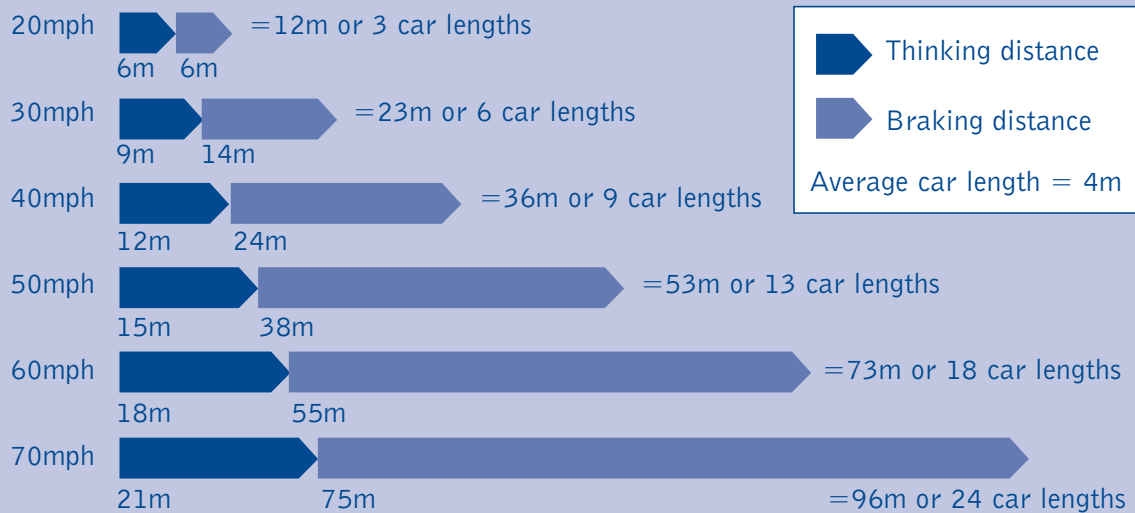




Teachers' Notes

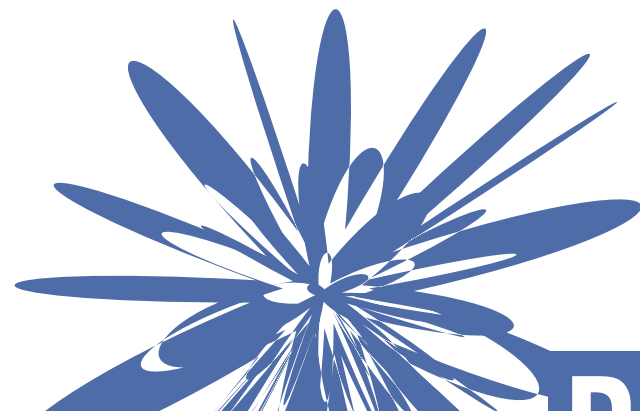
- ➔ Stopping distances are affected by:
 - ➔ Type of vehicle
 - ➔ Weather
 - ➔ Road surface
 - ➔ Worn or damaged tyres
- ➔ Larger vehicles and motorcycles need a greater distance to stop.

Typical Stopping Distances



Useful Websites

www.highwaycode.gov.uk





Suggested Lesson Plan



Aims

- ➔ To develop an awareness of stopping distances and times.

Learning Outcomes

- ➔ Understand that the time it takes for a car to stop depends on how fast it is travelling.
- ➔ Understand that stopping distance is made up of thinking distance and braking distance.

Resources

There are two alternative suggested lessons below requiring different resources:

Activity 1	Activity 2
<ul style="list-style-type: none"> ➔ Toy car ➔ Ramp (at least 1 metre long) ➔ Metre rule/Tape measure 	<ul style="list-style-type: none"> ➔ Trundle wheel/Tape measure ➔ Chalk

- ➔ Worksheet D1a – Stopping Distances.
- ➔ Glossary.
- ➔ Word Flashcards.

Suggested Timing

- ➔ 60 minutes.





Suggested Lesson Plan

Suggested Development of Lesson

Activity 1 – Classroom based activity

Teacher demonstration using a toy car and a ramp to show that stopping distances depend on the speed of travel.

- ➔ Discuss with the pupils what is meant by thinking distances and braking distances.
- ➔ Place the model car 10 cm from the bottom of the ramp and release it.
- ➔ Measure the distance the car travels after leaving the ramp.
- ➔ Repeat from 20cm, 30cm and so on up the ramp.
- ➔ Each distance should be done at least three times to eliminate possible experimental error with average distance being used as the result.
- ➔ Record the results on the board.
- ➔ Plot these results on a sheet of squared paper with distance up the ramp on the horizontal axis and stopping distance up the vertical axis.

Points to Consider:

- ➔ The pupils will need to be aware that the speed the car leaves the ramp is proportional to the distance of the starting point from the bottom of the ramp.
- ➔ This only measures braking distance. The model car doesn't have to think about stopping.
- ➔ It is friction in the wheels that stops the car, whereas it is friction in the brakes that stops a real car.

Activity 2 – Playground based activity

Pupil activity to show that stopping distances depend on the speed of travel. This activity could be done with several small groups or the whole class.

- ➔ Discuss with the pupils what is meant by thinking distances and braking distances.
- ➔ In the playground mark a line with enough space for the pupils to run before the line and stop after it.
- ➔ A pupil walks up to the line. As soon as he/she reaches the line they stop as soon as possible.
- ➔ Measure the distance taken to stop.
- ➔ The same pupil then jogs to the line. As soon as he/she reaches the line they stop as soon as possible.



Suggested Lesson Plan

- ➔ Measure the distance taken to stop.
- ➔ The same pupil sprints to the line. As soon as he/she reaches the line they stop as soon as possible.
- ➔ Measure the distance taken to stop.
- ➔ Each speed should be done at least three times to eliminate possible experimental error with average distance being used as the result.
- ➔ Repeat with other pupils.

Points to Consider:

- ➔ This only measures braking distance. The pupil doesn't have to react as they know they are going to stop.

Activities 1 and 2 – Follow up work

After completing activity 1 or 2 ask the pupils:

- ➔ What do we mean by thinking distance and braking distance?
- ➔ Why were the stopping distances different in each example carried out (e.g. walking in comparison to running or the car starting at the top of the ramp in comparison to the bottom)?
- ➔ What happens to the stopping distance as speed increases?
- ➔ Why do you think this happens?

KEY POINT: **Greater Speed** ➔ **Greater Stopping Distance**

- ➔ What would you expect to happen to the stopping distance if it was raining, foggy or night time and why?
- ➔ Complete Worksheet D1a.

Assessment

- ➔ Are the pupils aware that the faster the speed of travel the longer it takes to stop?

Curricular Links

- ➔ Environmental Studies – Knowledge and Understanding – Energy and Forces: Forces and their effects.
- ➔ Mathematics – Information Handling: Collect, organise and display.
- ➔ Mathematics – Number, Money and Measurement: Measure and estimate.



Name: _____

Date: _____

AIM: You are going to learn about stopping distances.

TASK Write the correct word in each space to complete these sentences:



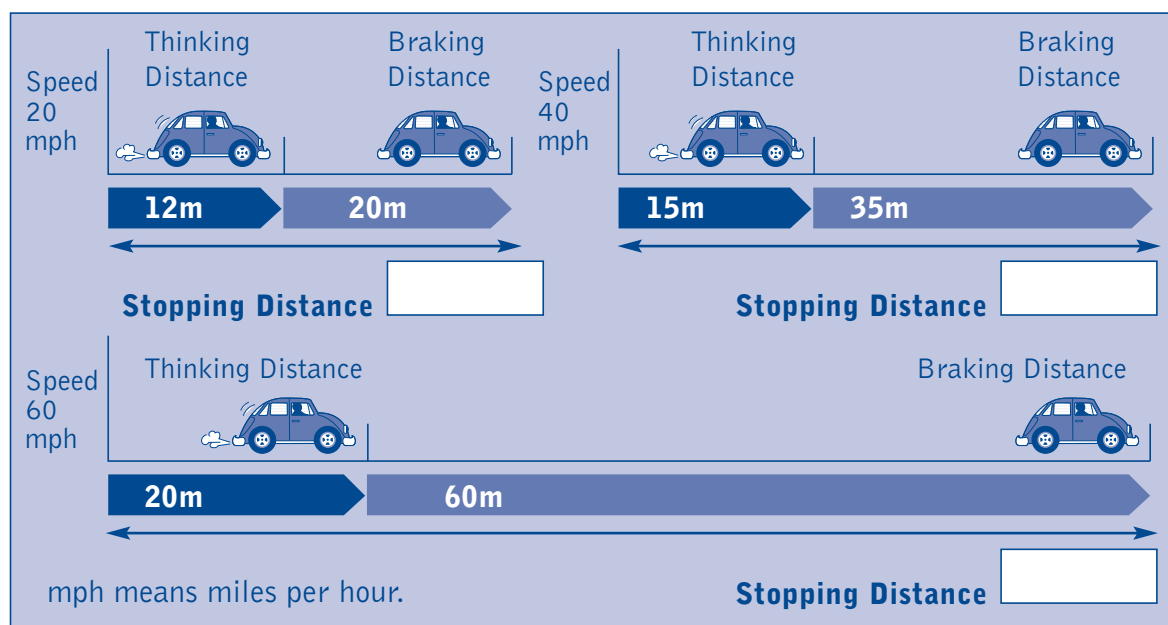
Thinking

Braking

Stopping

- The _____ distance is the distance that a vehicle continues to travel while the driver thinks about and processes the information needed to stop.
- The _____ distance is the total distance that a vehicle travels to come to a stop once the driver realises that the vehicle has to stop.
- The _____ distance is the distance that the vehicle continues to travel once the brakes are applied.

Look at the pictures below and for each one calculate the stopping distance.



The stopping distances in these examples are for a car in good condition, driven by an alert driver, on a dry, straight road. The stopping distance for a driver would increase if the car had, for example, bad brakes or the driver had been drinking and driving or was speaking on a mobile phone.

EXTRA

On the back of this sheet make a list of any other things you think might affect a driver's stopping distance.

REMEMBER
Drivers do need time to stop. You need to be a safe pedestrian.



