MR SULLY UNFOLDS PHYSICS

Stopping distances

AQA 4.5.6.3
Forces · Paper 2
Foundation & Higher

Name _____ Class _____ Date _____

When a driver sees a hazard, the car keeps moving while they react, then while the brakes work.

KEY IDEAS

- **Stopping distance = thinking distance + braking distance.**
- Thinking distance depends on speed and **reaction time** (typically 0.2–0.9 s). Tiredness, drugs, alcohol and distractions increase it.
- Braking distance depends on speed, wet or icy roads, and the condition of the brakes and tyres.

Section A · Recall

Grade 4–5

1 Define thinking distance and braking distance. [2]

2 Sort these factors into those that affect thinking distance and those that affect braking distance: icy road, tiredness, worn tyres, mobile phone, alcohol, worn brakes. [3]

Section B · Calculate

Grade 5–6

3 A car travels at 20 m/s. The driver's reaction time is 0.7 s. Calculate the thinking distance. [2]

4 The braking distance at 20 m/s is 30 m. Calculate the overall stopping distance. [1]

5 Describe a simple method to measure a person's reaction time. [3]

Section C · Stretch

Grade 7+

6 When a car brakes, explain what happens to its kinetic energy. [2]

7 Explain why large decelerations can be dangerous. [2]

Exam-style question

AQA style

8 A car of mass 1000 kg is travelling at 25 m/s when the driver brakes. It stops in 50 m.

a Calculate the kinetic energy of the car before braking. [2]

b Calculate the average braking force. [2]

c Explain why doubling the car's speed would roughly quadruple its braking distance. [2]

Total: _____ / 21

How confident am I?	Not yet	Nearly	Got it
I can define thinking, braking and stopping distance	☐	☐	☐
I can name factors that affect each	☐	☐	☐
I can link braking to kinetic energy and work done	☐	☐	☐