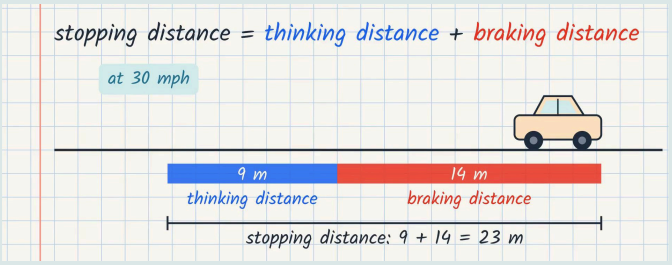
Stopping distances

thinking distance, braking distance, speed

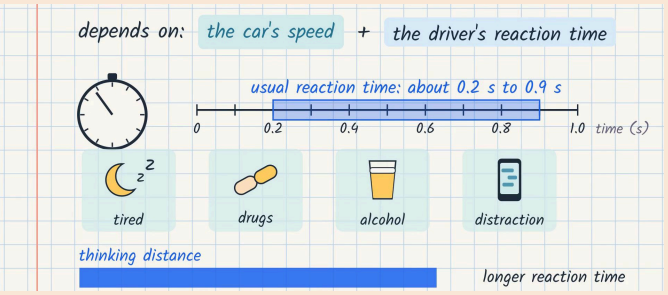
sansara academy
Summary sheet

1 The two parts



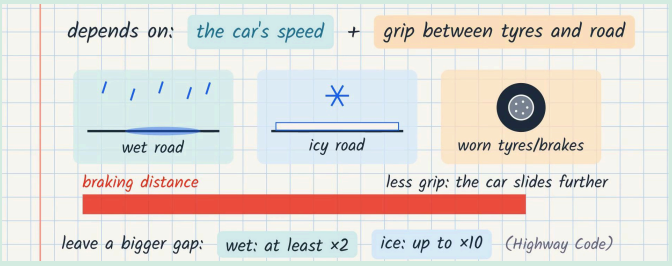
- **Stopping distance = thinking distance + braking distance.**
- **Thinking distance**: how far the car goes while the driver reacts. **Braking distance**: how far it goes once the brakes are on. At 30 mph: about 9 m + 14 m = **23 m**.

2 Thinking distance



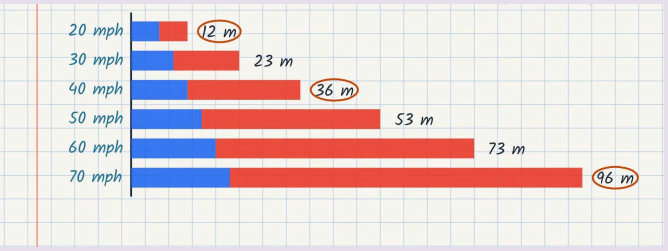
- Depends on **speed** and **reaction time** (usually about **0.2 s to 0.9 s**). Tiredness, drugs, alcohol and distractions make reaction time longer.
- **Ruler-drop test**: the further the ruler falls before you catch it, the slower your reaction. Same hand, same starting point; repeat and take a mean.

3 Braking distance



- Depends on **speed** and the **grip** between tyres and road.
- **Wet or icy roads** and **worn brakes or tyres** make it longer. Highway Code: leave at least double the gap when wet, up to ten times on ice.

4 Higher speeds



- Typical stopping distances: **20 mph about 12 m**, 40 mph about 36 m, **70 mph about 96 m** (nearly a football pitch).
- Double the speed (20 to 40 mph): thinking distance **×2** (6 m to 12 m), braking distance about **×4** (6 m to 24 m).

$$s = v\,t$$

thinking distance = speed × reaction time

Exam tip

Don't just write "it increases". Say what increases, and by how much: "doubling the speed doubles the thinking distance".

Check yourself

1. Name one factor that affects thinking distance but not braking distance.
2. A car travels at 20 m/s. The driver's reaction time is 0.5 s. What is the thinking distance?

Answers: 1. e.g. tiredness, alcohol, drugs, a distraction (reaction time) 2. $s = v\,t = 20 \times 0.5 = 10$ m