CURRICULUM ALIGNMENT · CAMBRIDGE IGCSE MATHEMATICS (0580)

# Are Electric Cars Really Cleaner?

Grade 9 · Two 60-minute lessons · SDG 13 Climate Action · SDG 11 Sustainable Cities and Communities

Are electric cars always better for the environment than gasoline cars? In this lesson, students use real-world data and mathematical models to investigate the question, and discover that the answer depends on more than they might expect. Along the way, they work with speed–time graphs, linear equations and inequalities, and use their results to discuss how mathematics can support better decisions for people and the planet.

**Curriculum level:** Grade 9, typically the first year of a two-year Cambridge IGCSE Mathematics (0580) course. References are to the 0580 syllabus for examination in 2025, 2026 and 2027 (C = Core, E = Extended).

## Subject content

| Reference | Curriculum content | How the lesson addresses it | Where | Type |
|---|---|---|---|---|
| **C2.1 / E2.1** | *"Substitute numbers into expressions and formulas."* | Students substitute values into formulas to make estimates in a real context. | GA, B, I, A | Core |
| **C2.5 / E2.5** | *"Construct expressions, equations and formulas." "Solve linear equations in one unknown." "Solve simultaneous linear equations in two unknowns."* | Students construct equations for a real situation and solve them to find when one option becomes better than the other. | GA, I, A, Test | Core |
| **E2.6 (C2.6)** | E: *"Construct, solve and interpret linear inequalities."*<br>C: *"Represent and interpret inequalities, including on a number line."* | Students use linear inequalities to find limits that keep a real-world quantity within a target, and explain what the solutions mean. | A | Core |
| **E2.9 (C2.9)** | E: *"Calculate distance travelled as area under a speed–time graph."*<br>C: *"Use and interpret graphs in practical situations including travel graphs and conversion graphs."* | Students calculate distance from speed–time graphs (Extended content; Core students meet it through area of shapes). | GA, HW, B, I, A | Core |
| **C3.5 / E3.5** | *"Interpret and obtain the equation of a straight-line graph"* (in the form $y = mx + c$) | Students interpret the gradient and intercept of linear models in a real context. | GA, I, A, Test | Applied |
| **C5.2 / E5.2** | *"Carry out calculations involving the perimeter and area of a rectangle, triangle, parallelogram and trapezium."* | Students find the distance travelled from speed–time graphs by splitting the area under the graph into simple shapes. | GA, HW, B, I, A | Applied |
| **C1.12 / E1.12** | *"Use common measures of rate." "Apply other measures of rate."* | Students work with rates and compound units in a real context. | GA, HW, B, I | Applied |
| **C5.1 / E5.1** | *"Use metric units of mass, length, area, volume and capacity in practical situations"* | Students convert between units before using their models. | B, I, A | Applied |

Core The lesson directly develops or assesses this content. Applied Students use this content in a new, real-world context.

**GA** Guided Activity (teacher-led) · **B / I / A** Differentiated group activity: Base, Intermediate, Advanced · **HW** Homework · **WCD** Whole-Class Discussion · **Test** Pre-/Post-test

## Assessment objectives and wider connections

**AO1 Knowledge and understanding of mathematical techniques**

Area calculations, substitution, solving linear equations and inequalities.

**AO2 Analyse, interpret and communicate mathematically**

Interpreting models in context, explaining and justifying results.

**Problem solving in context**

Students build and use a mathematical model of a real situation and judge whether their results make sense.

**Cross-curricular links**

Physics (motion and speed–time graphs), Environmental Management and Global Perspectives (energy and climate).

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