CURRICULUM ALIGNMENT · AUSTRALIAN CURRICULUM: MATHEMATICS (VERSION 9.0)

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: Year 9. The lesson consolidates Year 8 content and offers an extension towards Year 10 in the Advanced group.

Year 9 content descriptions

Reference	Curriculum content	How the lesson addresses it	Where	Type
AC9M9A05	*"use mathematical modelling to solve applied problems involving change including financial contexts; formulate problems, choosing to use either linear or quadratic functions; interpret solutions in terms of the situation; evaluate the model and report methods and findings"*	Students build linear models of a real situation, use them to compare options, interpret the solutions and discuss the limits of the model.	GA, I, A, WCD, Test	Core
AC9M9M05	*"use mathematical modelling to solve practical problems involving direct proportion, rates, ratio and scale"* … interpret solutions and evaluate the model	Students model a real quantity that is directly proportional to distance and work with rates in context.	GA, HW, B, I, A	Core

Prior knowledge consolidated (Year 8)

Reference	Curriculum content	How the lesson addresses it	Where	Type
AC9M8A02	Graph linear relations; *"solve linear equations and one-variable inequalities"* graphically and algebraically, verifying solutions by substitution	Students solve linear equations and, in the Advanced group, one-variable inequalities in a real context.	GA, I, A	Prior knowledge
AC9M8M01	Solve problems involving the area and perimeter of irregular and composite shapes using appropriate units	Students find the distance travelled from speed–time graphs by splitting the area under the graph into simple shapes.	GA, HW, B, I, A	Prior knowledge
AC9M8M05	*"recognise and use rates to solve problems"* involving the comparison of two related quantities of different units	Students work with rates and compound units in a real context.	GA, HW, B, I	Prior knowledge

Extension (Year 10)

Reference	Curriculum content	How the lesson addresses it	Where	Type
AC9M10A02	*"solve linear inequalities and simultaneous linear equations in 2 variables"*; interpret solutions graphically and in terms of the situation	Students compare two linear models and, in the Advanced group, solve and interpret inequalities in context.	A	Extension

Core The lesson directly develops or assesses this content. Prior knowledge Content from an earlier year that the lesson consolidates. Extension Content beyond the grade level, reached mainly in the Advanced group.

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

Proficiencies, general capabilities and cross-curriculum priorities

Mathematics proficiencies

Understanding, fluency, reasoning and problem-solving, with an emphasis on reasoning and problem-solving in a real context.

General capabilities

Numeracy; Critical and creative thinking (evaluating a model and its assumptions).

Cross-curriculum priority

Sustainability: comparing the environmental impact of transport choices.

Cross-curricular links

Science (motion, energy) and Geography (environmental change and management).

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Source: Australian Curriculum: Mathematics Version 9.0, Years 8–10 content descriptions. Long content descriptions are quoted in part or summarised.

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