

**Main Criteria:** Forward Education  
**Secondary Criteria:** National Curriculum for England  
**Subjects:** Mathematics, Science, Technology Education  
**Grades:** 11, 12, Key Stage 4

## Forward Education

### Autonomous Electric Vehicles of the Future

**National Curriculum for England**  
**Mathematics**  
 Grade **Key Stage 4** - Adopted: 2014

<b>PROGRAMME OF STUDY</b>	UK.MA.Y10-11.1.	Year 10-11 – Working mathematically
<b>STRAND</b>		Through the mathematics content, pupils should be taught to:
<b>STATUTORY REQUIREMENT</b>	MA.Y10-11.1.1.	Develop fluency

STATUTORY REQUIREMENT MA.Y10-11.1.2. Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of  $\pi$  {and surds}, use of standard form and application and interpretation of limits of accuracy.

<b>PROGRAMME OF STUDY</b>	UK.MA.Y10-11.1.	Year 10-11 – Working mathematically
<b>STRAND</b>		Through the mathematics content, pupils should be taught to:
<b>STATUTORY REQUIREMENT</b>	MA.Y10-11.1.2.	Reason mathematically

STATUTORY REQUIREMENT MA.Y10-11.1.2.4. Reason deductively in geometry, number and algebra, including using geometrical constructions.

<b>PROGRAMME OF STUDY</b>	UK.MA.Y10-11.1.	Year 10-11 – Working mathematically
<b>STRAND</b>		Through the mathematics content, pupils should be taught to:
<b>STATUTORY REQUIREMENT</b>	MA.Y10-11.1.3.	Solve problems

STATUTORY REQUIREMENT MA.Y10-11.1.3.1. Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.

STATUTORY REQUIREMENT MA.Y10-11.1.3.2. Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts.

<b>PROGRAMME OF STUDY</b>	UK.MA.Y10-11.1.	Year 10-11 – Working mathematically
<b>STRAND</b>		Through the mathematics content, pupils should be taught to:
<b>STATUTORY REQUIREMENT</b>	MA.Y10-11.1.4.	Mathematics

STATUTORY REQUIREMENT MA.Y10-11.1.4.1. Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions.

<b>PROGRAMME OF STUDY</b>	<b>UK.MA.Y10-11.3.</b>	<b>Year 10-11 – Algebra</b>
<b>STRAND</b>		<b>In addition to consolidating subject content from key stage 3, pupils should be taught to:</b>

STATUTORY REQUIREMENT MA.Y10-11.3.4. Use the form  $y = mx + c$  to identify parallel {and perpendicular} lines; find the equation of the line through two given points, or through one point with a given gradient.

STATUTORY REQUIREMENT MA.Y10-11.3.6. Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function  $y = 1/x$  with  $x \neq 0$ , {the exponential function  $y = k^x$  for positive values of  $k$ , and the trigonometric functions (with arguments in degrees)  $y = \sin x$ ,  $y = \cos x$  and  $y = \tan x$  for angles of any size}.

STATUTORY REQUIREMENT MA.Y10-11.3.8. Plot and interpret graphs (including reciprocal graphs {and exponential graphs}) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration.

**National Curriculum for England**

**Science**

Grade **Key Stage 4** - Adopted: 2014

<b>PROGRAMME OF STUDY</b>	<b>UK.SC.Y10-11.WS.</b>	<b>YEARS 10-11 - Working scientifically</b>
<b>STRAND</b>	<b>SC.Y10-11.WS.1.</b>	<b>The development of scientific thinking</b>
<b>STATUTORY REQUIREMENT</b>		<b>Through the content across all three disciplines, students should be taught so that they develop understanding and first-hand experience of:</b>

STATUTORY REQUIREMENT SC.Y10-11.WS.1.4. Explaining everyday and technological applications of science; evaluating associated personal, social, economic and environmental implications; and making decisions based on the evaluation of evidence and arguments.

<b>PROGRAMME OF STUDY</b>	<b>UK.SC.Y10-11.WS.</b>	<b>YEARS 10-11 - Working scientifically</b>
<b>STRAND</b>	<b>SC.Y10-11.WS.3.</b>	<b>Analysis and evaluation</b>
<b>STATUTORY REQUIREMENT</b>		<b>Through the content across all three disciplines, students should be taught so that they develop understanding and first-hand experience of:</b>

STATUTORY REQUIREMENT SC.Y10-11.WS.3.1. Applying the cycle of collecting, presenting and analysing data, including:

STATUTORY REQUIREMENT SC.Y10-11.WS.3.1.f. Presenting reasoned explanations, including relating data to hypotheses.

<b>PROGRAMME OF STUDY</b>	<b>UK.SC.Y10-11.WS.</b>	<b>YEARS 10-11 - Working scientifically</b>
<b>STRAND</b>	<b>SC.Y10-11.WS.4.</b>	<b>Vocabulary, units, symbols and nomenclature</b>
<b>STATUTORY REQUIREMENT</b>		<b>Through the content across all three disciplines, students should be taught so that they develop understanding and first-hand experience of:</b>

STATUTORY REQUIREMENT SC.Y10-11.WS.4.1. Developing their use of scientific vocabulary and nomenclature.

<b>PROGRAMME OF STUDY</b>	<b>UK.SC.Y10-11.B.</b>	<b>YEARS 10-11 - Biology</b>
<b>STRAND</b>	<b>SC.Y10-11.B.7.</b>	<b>Ecosystems</b>

STATUTORY REQUIREMENT SC.Y10-11.B.7.8. Positive and negative human interactions with ecosystems.

<b>PROGRAMME OF STUDY</b>	<b>UK.SC.Y10-11.C.</b>	<b>YEARS 10-11 - Chemistry</b>
<b>STRAND</b>	<b>SC.Y10-11.C.8.</b>	<b>Chemical and allied industries</b>

STATUTORY REQUIREMENT SC.Y10-11.C.8.3. Carbon compounds, both as fuels and feedstock, and the competing demands for limited resources.

<b>PROGRAMME OF STUDY</b>	<b>UK.SC.Y10-11.C.</b>	<b>YEARS 10-11 - Chemistry</b>
<b>STRAND</b>	<b>SC.Y10-11.C.9.</b>	<b>Earth and atmospheric science</b>

STATUTORY REQUIREMENT SC.Y10-11.C.9.2. Evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change.

STATUTORY REQUIREMENT SC.Y10-11.C.9.3. Potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate.

**National Curriculum for England  
Technology Education  
Grade Key Stage 4 - Adopted: 2014**

<b>PROGRAMME OF STUDY</b>	<b>UK.CO.</b>	<b>Computing</b>
<b>STRAND</b>		<b>All pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career. All pupils should be taught to:</b>

STATUTORY REQUIREMENT CO.2. Develop and apply their analytic, problem-solving, design, and computational thinking skills.