

Links to Curriculum-Graphing motion investigation

By Doaa George

Year 7	Year 8	Year 9	Year 10
Change to an object's motion is caused by unbalanced forces acting on the object			The motion of objects can be described using the laws of physics
Earth's gravity pulls objects towards the centre of the Earth			
Identify questions and problems that can be investigated scientific knowledge	Identify questions and problems that can be investigated scientific knowledge	People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions	People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions
Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed	Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed	Formulate questions or hypotheses that can be investigated scientifically	Formulate questions or hypotheses that can be investigated scientifically
In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task	In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task	Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods	Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods
Construct and use a range of representations, including graphs, keys and models	Construct and use a range of representations, including graphs, keys and models	Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and	Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and

to represent and analyse patterns or relationships, including using digital technologies as appropriate	to represent and analyse patterns or relationships, including using digital technologies as appropriate	record data	record data
Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions	Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions	Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies	Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies
Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method	Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence	Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
Use scientific knowledge and findings from investigations to evaluate claims	Use scientific knowledge and findings from investigations to evaluate claims	Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data	Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data
Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate	Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate	Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems	Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems
		Communicate scientific ideas and information for a particular purpose, including constructing	Communicate scientific ideas and information for a particular purpose, including constructing

		evidence-based arguments and using appropriate scientific language, conventions and representations	evidence-based arguments and using appropriate scientific language, conventions and representations
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Year 11	Year 12
Describes and analyses motion in terms of scalar and vector quantities in two dimensions and makes quantitative measurements and calculations for distance, displacement, speed velocity and acceleration	Describes and analyses qualitatively and quantitatively circular motion and motion in a gravitational field, in particular, the projectile motion of particles

Guidance

Stage	Demonstrated inquiry	Prescribed inquiry	Structured inquiry	Guided inquiry	Open inquiry
Formulate, question and predict	No question	Provided question	Sharpened question	Learner selects	Learner poses questions
Plan	No planning	Provided procedure	Discussion with teacher	Guided during planning	Learner determines plans
Conduct	Teacher conducts	Conducting and recording method told	Sharpened plan and conduct	Guided during conducting and recording	Learner conducts and records
Process and analyse	Teacher analyses	Analysis method told	Discussed analysis	Guided analysis	Learner analyses data studying trends
Reason, solve and link back	No problem solving	Teacher provides reasoning and links	Discussed reasoning and conclusion	Guided reasoning and formulating conclusion	Learner reasons to formulate conclusions
Communicate and justify	No conclusion	Teacher writes conclusion	Student writes	Guided justification and findings	Learner justifies findings and conclusions