

## Edexcel 360Science

Specific Reference & Topic	How Science Works Objective	Specific Learning Object	ASE Reference	Comments
B1 a: Topic 1 – Environment	1b 4a	Use secondary data to explain how human activity can affect the environment, especially changes in population size and in economic and industrial conditions.	SATIS 801 The Water Pollution Mystery SATIS 702 The Gas Supply Problem SATIS 908 Why not Combined Heat and Power? SATIS 910 Disposable Nappies	Good data analysis problem.
B1 a: Topic 1 – Environment	1c	Demonstrate an understanding of how computer models can be used to study populations, and show an awareness of the advantages and disadvantages of these models compared with real data.		
B1 a: Topic 1 – Environment	4a	Compare natural selection, select breeding and genetic engineering in terms of changing the characteristics of a species.	SATIS 309 Microbes Make Human Insulin	Factual. Useful discussion activity. Relevant.
B1 a: Topic 1 – Environment	4b	Discuss why Charles Darwin experienced difficulty in getting his theory of evolution through natural selection accepted by the scientific community in the 19 <sup>th</sup> century.		
B1 a: Topic 1 – Environment	4a 4b	Discuss the ethics and principles of organic farming and explain why organic products are more expensive than non-organic produce.	SATIS 110 Hilltop  SATIS 210 The Pesticide Problem SATIS 1201 Agrochemicals and the Environment  SATIS 505 Making Fertilisers	An agricultural problem related to trace elements in the ground. Useful discussion activity.  Data handling on advantages/disadvantages of nitrogen fertilizers. Highlights eutrophication.
B1 a: Topic 1 – Environment	4a	Understand that crop plants can be genetically modified and the reasons for doing so.		

B1 a: Topic 2 – Genes	4a	Describe some of the implications of the outcome of the Human Genome Project to include the use of DNA evidence in forensic science and medicine.		
B1 a: Topic 2 – Genes	4a	Discuss how the lives of two people, one suffering from cystic fibrosis and the other from breast cancer, would change if these diseases could be treated genetically.	SATIS 309 Microbes Make Human Insulin	Useful for comparing diabetes.
B1 a: Topic 2 – Genes	1d 4a 4c	Evaluate the potential for using transgenic animals, including the production of 'designer milk', e.g. milk containing human antibodies, low cholesterol milk.		
B1 a: Topic 2 – Genes	4a 4b	Describe the social and ethical concerns of cloning mammals, including the possibility of the cloning of human body parts for transplant surgery.	SATIS 206 Test Tube Babies	Still relevant – discussion activity on ethics.
B1 a: Topic 2 – Genes	1c 4b	Consider the contemporary scientific theory of 'designer babies' and explain why today's scientists are finding so much opposition to this being publicly accepted.		
B1 b: Topic 3 – Electrical and Chemical Signals	4a	Explain how manufactured sex hormones can be used for contraception and to treat infertility in women.		
B1 b: Topic 3 – Electrical and Chemical Signals	4b	Discuss the social and ethical implications of IVF treatment, including its use in mature clients.		
B1 b: Topic 3 – Electrical and Chemical Signals	4a 4b	Explain the advantages to people with diabetes of the use of human insulin produced by genetically modified bacteria.		
B1 b: Topic 4 – Use, Misuse and Abuse	4a	Explain the effects on nerve transmission or reaction times of: <ul style="list-style-type: none"> <li>• stimulants, including caffeine</li> <li>• sedatives, including barbiturates</li> <li>• painkillers, including paracetamol.</li> </ul>	SATIS 203 Drinking Alcohol	Still relevant, but needs updated guidelines for health.
B1 b: Topic 4 – Use, Misuse and Abuse	4a	Discuss the use of opiates and cannabinoids in pain relief for terminally ill patients, and the dangers of addiction.		
B1 b: Topic 4 – Use, Misuse	4a	Describe the uses of paracetamol and the dangers		

and Abuse		of overdose.		
B1 b: Topic 4 – Use, Misuse and Abuse	4b	Discuss why medical opinion on the use of cannabis for pain relief has fluctuated over the years.		
B1 b: Topic 4 – Use, Misuse and Abuse	1b 2b 4a 4b	Describe, using secondary data, the prevention and control (drug therapy) of TB including the emergence of drug-resistant TB, financing, supply of drugs and treatment regimes.  Interpret data on the number of cases of TB in the UK over a period of time.		
B1 b: Topic 4 – Use, Misuse and Abuse	1b 2b 3c	Explore secondary sources of data about the main physical and mental effects of the misuse of drugs and present the data in different ways to different audiences using ICT.	SATIS 508 Risks	Useful exploration of the concept of risk.
B1 b: Topic 4 – Use, Misuse and Abuse	2b	Use secondary data to explore the costs of developing new drugs.		
C1 a: Topic 5 – Patterns in Properties	1c	Understand that the periodic table is an example of how a scientific theory can predict the discovery of new elements.		
C1 a: Topic 5 – Patterns in Properties	1a	Use secondary data to explore how the periodic table was devised, with reference to atomic number.		
C1 a: Topic 6 – Making Changes	4a 4b	Discuss the differences between 'natural' and 'artificial' substances, including whether they can be distinguished or are chemically different, and any impacts on health.	SATIS 102 Food From Fungus	Useful starting point for consideration of alternative food sources.
C1 a: Topic 6 – Making Changes	1b	Interpret data linking a chemical in food with a health impact, recognising that a correlation does not imply a cause.	SATIS 14-16 Unit 901 The Cancer Detectives	Based on an actual case study on the causes of cancer of the oesophagus in Lin Xian.  Role play to analyse and produce actions based on the research.
C1 b: Topic 7 – There's One Earth	4c	Discuss how the idea of global warming went from a single scientist's idea to a widely accepted theory.	SATIS 1206 Green House Effect	Data and evidence to consider.
C1 b: Topic 7 – There's One	1c	Recognise that predictions about the amount of		

Earth		warming of the Earth are based on computer models, which carry uncertainties.		
C1 b: Topic 7 – There's One Earth	3c	Propose an argument, based on the precautionary principle, for how to combat global warming.		
C1 b: Topic 7 – There's One Earth	4a	Explain the importance of recycling waste products such as glass, metal and papers.		
C1 b: Topic 7 – There's One Earth	4b	Evaluate a range of economic, environmental considerations, of recycling and natural materials, such as glass, metal, or the desalinisation of water in hot countries.	SATIS 1106 Tin Cans	Introduction to the recycling process, and introduction questions.
C1 b: Topic 7 – There's One Earth	4b	Explore how sustainable development involves balancing the need for economic development, standards of living, and respect for the environment.	SATIS 101 Sulphurcrete  SATIS 901 Acid Rain  SATIS 505 Making Fertilisers  SATIS 702 The Gas Supply Problem	Experimental-enquiry based – linked to prevention of building erosion by acid rain. Some data about who is affected and how. Role-play discussion. Opportunities to discuss problems with eutrophication and suggest how modern farming can adapt to no fertilisers. Leaks, pipelines.
C1 b: Topic 7 – There's One Earth	4b	Explain why biofuels are sometimes an attractive alternative to fossil fuels.	SATIS 201 Energy from Biomass	Relevant.
C1 b: Topic 7 – There's One Earth	4a	Discuss the benefits and drawbacks of switching cars from petrol to hydrogen fuel.	SATIS 202 Electric Vehicles	Relevant.
C1 b: Topic 7 – There's One Earth	1b	Interpret and evaluate given data relating respiratory diseases such as asthma to atmospheric pollutants.		
C1 b: Topic 8 – Designer Products	4a	Explore how scientists sometimes create new materials with novel properties, such as Teflon™ and the adhesives on 'Post-it' notes, where the applications only emerge afterwards.	SATIS 510 Perkin's Mauve	Includes the story of how Perkins accidentally discovered mauve dye
C1 b: Topic 8 – Designer	3a	Explore the risks and uncertainties of nano-	SATIS 105 The Bigger the	Related to ethane production.

Products	4a	technologies, and how they are presented in the media.	Better	
C1 b: Topic 8 – Designer Products	4b	Discuss the social issues and possible harmful effects of ethanol in alcoholic drinks.	SATIS 203 Drinking Alcohol	Useful data.
C1 b: Topic 8 – Designer Products	4a	Design a list of properties for a product, based on its end use.	SATIS 102 Food from Fungus SATIS 910 Disposable Nappies	Useful starting point for alternative food technologies.
P1 a: Topic 9 – Producing and Measuring Electricity	2a 4a	Investigate practically or otherwise the voltage and current output, and advantages/disadvantages of battery technology (dry cell or rechargeable), including considerations of their cost/performance and impact on the environment.		
P1 a: Topic 9 – Producing and Measuring Electricity	4a 4b	Discuss the impact the electric telephone and electricity has had on making the modern world.	SATIS 804 Electrostatic Problems SATIS 1108 Telephone	Some good references. Background text on the development of the telephone.
P1 a: Topic 9 – Producing and Measuring Electricity	4a	Explore how a new technology, such as Maglev trains, develops as a result of scientific advances, such as the discovery of superconductivity.		
P1 a: Topic 9 – Producing and Measuring Electricity	1a 1b	Use data relating the size of electric circuits to the processing speed of computers and suggest future applications.		
P1 a: Topic 9 – Producing and Measuring Electricity	3c	Demonstrate an understanding of how ICT can be used to collect and display data from electric circuits for analysis, and compare this with traditional methods in terms of reliability and validity of data.		
P1 a: Topic 10 – You're in Charge	4a 4b	Evaluate whether renewable energies such as solar power and wind power can meet the UK's future electricity needs, and evaluate their economic, environmental and social impact.	SATIS 107 Ashton Island  SATIS 502 The Coal Mine Project	Smaller scale decision-making discussion activity.  Gives the alternative fossil fuels view.
P1 a: Topic 10 – You're in Charge	4a 4b	Consider the benefits and drawbacks when deciding about implementing technology, such as	SATIS 1109 Electricity Supply and Demand	Good background activity challenging pupils to manage

		a new national grid for distribution of electricity.	SATIS 908 Why not Combined Heat and Power?	the current grid system.
P1 a: Topic 10 – You're in Charge	4c	Explore how scientific ideas change over time in the context of the medical uses of electricity, real and imagined.		
P1 a: Topic 10 – You're in Charge	1b	Interpret data about the efficiency of solar cells and suggest why they are not yet in widespread use.		
P1 a: Topic 10 – You're in Charge	2a	Plan a way to test whether an energy efficiency measure, such as insulating a home, is cost-effective.	SATIS 106 The Design Game	Insulation-linked activity.
P1 b: Topic 11 – Now You See it, Now You Don't	3c	Discuss the evidence that microwave radiation from mobile phones or masts poses health risks, and how this has been reported in the media.		
P1 b: Topic 11 – Now You See it, Now You Don't	4a	Discuss the benefits and drawbacks to society of a technology that is based on the properties of waves.		
P1 b: Topic 11 – Now You See it, Now You Don't	1d	Suggest reasons why scientists find it difficult to predict earthquakes and tsunami waves, given appropriate data.	SATIS 1205 Earthquakes in Britain	Graph plotting to locate quake, detector building and emergency decision making.
P1 b: Topic 11 – Now You See it, Now You Don't	1b	Use data about seismic waves passing through the Earth to draw conclusions about the types of materials that are found in the planet's interior.		
P1 b: Topic 12 – Space and its Mysteries	4b	Discuss the possible social and economic benefits of knowledge about the universe and the technological advances that might accrue from its exploration.		
P1 b: Topic 12 – Space and its Mysteries	4c	Discuss the risks of a global catastrophe such as a comet hitting the Earth, taking into account the consequences, the chance of it occurring and any uncertainties.		
P1 b: Topic 12 – Space and its Mysteries	1b	Show an understanding of how data-logging and remote sensing can provide information about the universe without us travelling there.		

P1 b: Topic 12 – Space and its Mysteries	1a 1b 3c	Discuss and develop arguments for and against the idea that intelligent life exists elsewhere in the galaxy, using scientific evidence, and propose ways to find such life.		
P1 b: Topic 12 – Space and its Mysteries	4c	Be able to recognise that there are scientific questions that remain unanswered, such as the existence of extraterrestrial life and the nature of 'dark matter' that makes up much of the universe's mass.		
P1 b: Topic 12 – Space and its Mysteries	1c	Describe the origin, current state and fate of the universe using the main theories (Big Bang, oscillating and steady state), and explain the supporting evidence for these theories, including microwaves and red shift.		
B2: Topic 1 – Inside Living Cells	4a	Explain that micro-organisms use an external food source to obtain energy, changing some substances in the medium, and recall that this process is fermentation.		
B2: Topic 1 – Inside Living Cells	4a	Explain the advantages of using micro-organisms for food production.	SATIS 102 Food from Fungus	Useful starting point for activity.
B2: Topic 1 – Inside Living Cells	4c	Discuss why official advice on diet and exercise change over time and consider the scientific basis of current fashionable diets and advice.	SATIS 14-16 Unit 901 The Cancer Detectives  SATIS 703 Vegetarianism	Based on an actual case study on the causes of cancer of the oesophagus in Lin Xian. Role play to analyse and produce actions based on the research.
B2: Topic 2 – Divide and Develop	1b 4a	Explore the scientific evidence for the potential of stem cell research.		
B2: Topic 2 – Divide and Develop	4b	Explore the scientific evidence that contributes to the decision regarding the legality and age of termination of a foetus.		
B2: Topic 2 – Divide and Develop	2b	Interpret data on how environmental factors affect the distribution of plants.		
B2: Topic 2 – Divide and Develop	4a	Discuss fruit initiation in plants and how it can be manipulated with artificial hormones.		

B2: Topic 2 – Divide and Develop	1b	Explore the evidence that selective breeding (artificial selection) can be used to: <ul style="list-style-type: none"> <li>improve the quality of milk from cattle</li> <li>increase the number of offspring in sheep</li> <li>increase the yield from dwarf wheat.</li> </ul>		
B2: Topic 2 – Divide and Develop	4a	Describe the stages in the production of cloned mammals, including Dolly the sheep: the introduction of a diploid nucleus from a mature cell into an egg cell and stimulation of the diploid nucleus to divide. Discuss the risks associated with later embryonic development.		
B2: Topic 2 – Divide and Develop	4a	Discuss the potential benefits and ethical dilemmas posed by advances in genetic modification.	SATIS 309 Microbes make Human Insulin	
B2: Topic 2 – Divide and Develop	1b 4a	Explain the potential of gene therapy for the relief of symptoms of inherited diseases such as cancer.		
B2: Topic 2 – Divide and Develop	4b	Discuss the ethics and health concerns of using growth factors to enhance performance in sport.		
B2: Topic 3 – Energy Flow	4a 4b	Explore human exploitation of plants, including their use as a food source.	SATIS 102 Food from Fungus SATIS 505 Making Fertilisers	Useful starting point for activity.
B2: Topic 3 – Energy Flow	1b	Explore the evidence that a biosphere could be used to colonise Mars.	SATIS 906 IT in Greenhouses	Useful starting point to discuss the implications of production and maintenance of food sources on a new planet.
B2: Topic 3 – Energy Flow	4a 4b	Describe how the indiscriminate use of nitrogenous fertilisers led to environmental damage.	SATIS 505 Making Fertilisers	
B2: Topic 3 – Energy Flow	4a 4b	Human populations are increasing. Describe how they are using resources unsustainably, e.g. deforestation, which sometimes leads to massive environmental change.		
B2: Topic 3 – Energy Flow	1d 4a 4b	Describe how environmental changes, such as global warming, are threatening human life on the planet as we know it.		

B2: Topic 3 – Energy Flow	4b	Discuss the social and ethical considerations of the unequal distribution of food.	SATIS 208 The Price of Food	Relevant activity.
B2: Topic 3 – Energy Flow	4a	Explain how energy transfer can be maximised in food production using the examples of fish farms and greenhouses.	SATIS 906 IT in Greenhouses	
B2: Topic 3 – Energy Flow	4a	Discuss the ways in which food production can be maximised by the use of optimum feeding/growing conditions, and disease and predator control using the examples of fish farms and greenhouses.	SATIS 906 IT in Greenhouses SATIS 505 Making Fertilisers	
B2: Topic 3 – Energy Flow	2b 3c	Demonstrate an understanding of how secondary sources of data about global warming can be collected from the internet and briefly summarise the data using ICT.		
B2: Topic 4 – Interdependence	1b 2b	Use primary and secondary data to consider how human activity, including differing economical and industrial conditions, can affect the environment and cause changes in sizes of population.		
B2: Topic 4 – Interdependence	1b 3a 4b	Investigate, using primary and secondary data, the impact of human activity on the environment, including the pollution of air and of water, and the effects of air pollutants (including carbon dioxide, sulphur dioxide and carbon monoxide) and of water pollutants (including sewage, nitrates and phosphates).	SATIS 901 Acid Rain  SATIS 801 The Water Pollution Mystery SATIS 1103 Save the Salmon  SATIS 505 Making Fertilisers	Some data about who is affected and how. Role-play discussion.  Good data analysis problem.  Practical on acidity of water with a problem-solving challenge to reduce acidity.
B2: Topic 4 – Interdependence	1b 3a	Interpret data on environmental change.		
B2: Topic 4 – Interdependence	4b	Explain the importance of protecting natural populations.		
B2: Topic 4 – Interdependence	3a	Interpret data to show the impact of human activity on the environment. To include: <ul style="list-style-type: none"> <li>• living indicators, e.g. lichen distribution, incidence of skin cancer</li> <li>• non-living indicators, e.g. global temperature, ozone depletion.</li> </ul>		

B2: Topic 4 – Interdependence	4b 4c	Explore whether recycling reduces demand for resources and reduces the problem of waste disposal, including paper, plastics and metals.	SATIS 310 Recycling Aluminium	Useful activity – suggest consideration of cans rather than milk bottle tops.
B2: Topic 4 – Interdependence	4a	Consider conservation management techniques, including reforestation, coppicing, replacement planting and discuss how conservation can lead to greater biodiversity.		
C2: Topic 5 – Synthesis	4a 4c	Discuss how modern society depends on oil and predict the consequence when supplies begin to run out.	SATIS 205 Looking at Motor Oil  SATIS 702 The Gas Supply Problem	Vaguely relevant. Useful activity – practical.  Present content needs updating to link into the fact that we now need to import gas.
C2: Topic 5 – Synthesis	4a	Describe how vegetable oil can be hydrogenated to form hydrogenated vegetable oil and what this is used for in the food industry.		
C2: Topic 5 – Synthesis	1b 4a	Understand that chemists use information about known reactions to make new chemicals and predict the products of a reaction given the reactants and products of similar reactions.	SATIS 105 The Bigger the Better  School Chemistry Experiments 6.6 Preparation of a salt by reacting a metal, metal oxide or carbonate with an acid	Activity linked to ethene production and economies of scale.  Students could use information on making salts to plan and carry out their own synthesis.
C2: Topic 5 – Synthesis	1d 4b 4c	Discuss the problems of disposing of some plastics, including non-biodegradability and breakdown to toxic products.	SATIS 910 Disposable Nappies	Could be a useful discussion starting point.
C2: Topic 5 – Synthesis	4a	Discuss the issue of toxicity to humans in how chemists synthesise new substances.	SATIS 1002 Quintonal	Role-play debate about the safety of the plastics industry.
C2: Topic 5 – Synthesis	1b	Use information about a given reaction to predict the new products of a similar reaction.	School Chemistry Experiments 6.6 Preparation of a salt by reacting a metal, metal oxide or carbonate with an acid	Students could predict the outcome of a reaction having carried out a similar reaction.
C2: Topic 6 – In Your Element	1b	Identify an example of creative insight in the history of discovery of the elements or periodic table.		

C2: Topic 7 – Chemical Structures	1b 4b	Recognise the importance of chance in scientific discoveries such as Buckminster fullerenes.	SATIS 207 The Story of Fritz Haber	Useful to compare.
C2: Topic 7 – Chemical Structures	1d 4c	Describe how ideas, such as the effectiveness of homeopathic medicine, are difficult for scientists to accept when they conflict with established theories.		
C2: Topic 7 – Chemical Structures	1c	Demonstrate an understanding of the limitations of representing models of atoms and molecules in two dimensions, and how simulation software can create three dimensional representations to clarify understanding.		
C2: Topic 8 – How Fast? How Furious?	2b 2c	Demonstrate an understanding of how data from experiments about rates of reaction can be captured by data-logging, and how the data can be manipulated and displayed for analysis using spreadsheet software.	School Chemistry Experiments 13.4.1, 13.4.2 and 13.4.3 Rate of reaction between hydrochloric acid and marble chips	The loss of mass version of this investigation described in the book could be successfully carried out using data-logging equipment.