

Planning Activity from CPD day 2019/2020

This is a support document to explain how teachers used the attached Learning Outcomes to develop a plan for the three-year cycle of Junior Cycle Science. This is one approach that a science department might use.

During this planning activity teachers were encouraged to think about the process of developing their students as scientists, through the lens of skill development.

1. Start with the red learning outcomes (below). This set of learning outcomes might assist in developing students' research skills. Print out and cut up one sheet of the learning outcomes. As a department discuss where in the three years you might facilitate the learning and skill development that is in each learning outcome. We suggest that you lay them out on a large A3 sheet as shown in the example below.

Year 1	Year 2	Year 3
<p>BW 5. Students should be able to conduct a habitat study, research and investigate the adaptation, competition and interdependence of organisms within specific habitats and communities</p> <p>CV 10. Students should be able to evaluate how humans contribute to sustainability through the extraction, use, disposal, and recycling of materials</p>	<p>PW 4. Students should be able to research and discuss a technological application of physics terms of scientific, societal and environmental impact</p>	<p>BW 3. Students should be able to explain human sexual reproduction; discuss medical, ethical, and societal issues</p>

2. You might choose to engage with different parts of a learning outcome on a number of occasions over the three years of Junior Cycle. Print out and cut up another sheet of red learning outcomes, so you have two of the one you want to facilitate in different years. Place it under both years but highlight the parts you are engaging with in each year. An example is shown below.

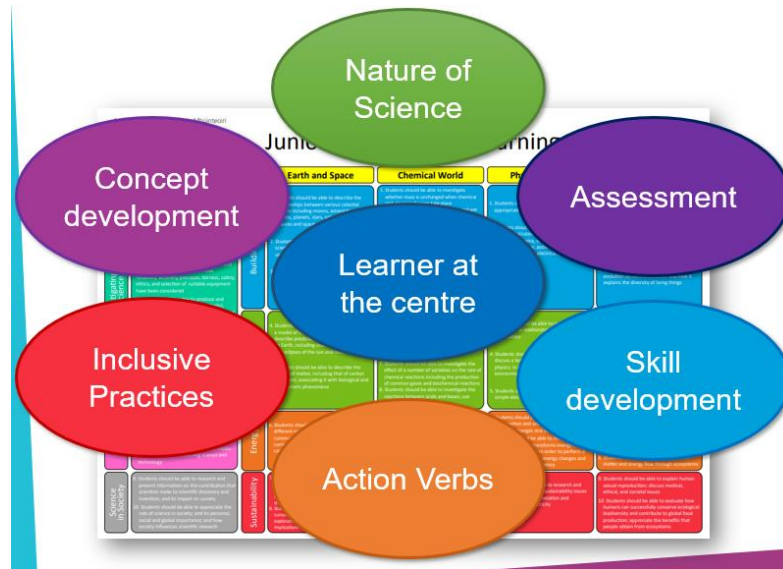
Year 1	Year 2	Year 3
<p>BW 5. Students should be able to conduct a habitat study, research and investigate the adaptation, competition and interdependence of organisms within specific habitats and communities</p>	<p>PVW 4. Students should be able to research and discuss a technological application of physics terms of scientific, societal and environmental impact</p>	<p>BW 9. Students should be able to explain human sexual reproduction, discuss medical, ethical, and societal issues</p>
<p>CW 10. Students should be able to evaluate how humans contribute to sustainability through the extraction, use, disposal, and recycling of materials</p>	<p>SW 7. Students should be able to illustrate how earth processes and human factors influence the Earth's climate, evaluate effects of climate change and initiatives that attempt to address those effects</p>	<p>SW 7. Students should be able to illustrate how earth processes and human factors influence the Earth's climate, evaluate effects of climate change and initiatives that attempt to address those effects</p>
<p>E&S 6. Students should be able to research different energy sources, formulate and communicate an informed view of ways that current and future energy needs on Earth can be met</p>	<p>SW 8. Students should be able to examine some of the current hazards and benefits of space exploration and discuss the future role and implications of space exploration in society</p>	
<p>PW 8. Students should be able to research and discuss the ethical and sustainability issues that arise from our generation and consumption of electricity</p>		

- Next apply the same procedure to the green learning outcomes. This set of learning outcomes might assist in developing students' investigation skills.
- Finally use the blue learning outcomes (attached below) to fully populate your three-year plan.

As you develop your three-year plan you might like to discuss in your department the following questions:

- What does being a researcher/investigator look like in 1st, 2nd or 3rd year?
- What skills are you hoping to develop?
- How will you develop those skills?
- How will you assess the skills?
- What evidence will you gather?
- What else is happening at different times of the year (Science week, CBA's, Space week etc.)?

- This visual might support some of your discussions.



To further develop your plan, you might develop Units of Learning. For further support with developing Units of Learning, and to see an example of a Unit of Learning, use the links below.

1. [Video to support developing a Unit of Learning and a facilitators guide](#)

Science

▶ Planning Next Steps

Planning Next Steps

Planning a Unit of Learning

www.jct.ie

File type: YouTube

Click image to play

Facilitator Guide

Activity	Some Guidance	Suggested Length of Activity
Watch the	At the suggested pause, ensure that each person has access to a Learning	

File type: PDF

Click to view or download

2. [Example of a Unit of Learning](#)



Contextual Learning Outcomes used in The Planning ActivityE
&
S

1. Students should be able to describe the relationships between various celestial objects including moons, asteroids, comets, planets, stars, solar systems, galaxies and space

E
&
S

2. Students should be able to explore a scientific model to illustrate the origin of the universe

E
&
S

4. Students should be able to develop and use a model of the Earth-sun-moon system to describe predictable phenomena observable on Earth, including seasons, lunar phases, and eclipses of the sun and moon

E
&
S

5. Students should be able to describe the cycling of matter, including that of carbon and water, associating it with biological and atmospheric phenomena

CW

2. Students should be able to develop and use models to describe the atomic nature of matter; demonstrate how they provide a simple way to account for the conservation of mass, changes of state, physical change, chemical change, mixtures, and their separation

CW

3. Students should be able to describe and model the structure of the atom in terms of the nucleus, protons, neutrons and electrons; comparing mass and charge of protons, neutrons and electrons

CW

4. Students should be able to classify substances as elements, compounds, mixtures, metals, non-metals, solids, liquids, gases and solutions

CW

5. Students should be able to use the Periodic Table to predict the ratio of atoms in compounds of two elements

CW

9. Students should be able to consider chemical reactions in terms of energy, using the terms exothermic, endothermic and activation energy, and use simple energy profile diagrams to illustrate energy changes

PW

1. Students should be able to select and use appropriate measuring instruments

PW

2. Students should be able to identify and measure/calculate length, mass, time, temperature, area, volume, density, speed, acceleration, force, potential difference, current, resistance, electrical power

PW

5. Students should be able to design and build simple electronic circuits

PW

6. Students should be able to explain energy conservation and analyse processes in terms of energy changes and dissipation

PW

7. Students should be able to design, build, and test a device that transforms energy from one form to another in order to perform a function; describe the energy changes and ways of improving efficiency

BW

2. Students should be able to describe asexual and sexual reproduction; explore patterns in the inheritance and variation of genetically controlled characteristics

BW

3. Students should be able to outline evolution by natural selection and how it explains the diversity of living things

BW

4. Students should be able to describe the structure, function, and interactions of the organs of the human digestive, circulatory and respiratory systems

BW

8. Students should be able to explain how matter and energy flow through ecosystems

Suggested Learning Outcomes for Developing the Skill of Researching

E & S 6. Students should be able to research different energy sources; formulate and communicate an informed view of ways that current and future energy needs on Earth can be met

E & S 7. Students should be able to illustrate how earth processes and human factors influence the Earth's climate, evaluate effects of climate change and initiatives that attempt to address those effects

E & S 8. Students should be able to examine some of the current hazards and benefits of space exploration and discuss the future role and implications of space exploration in society

CW 10. Students should be able to evaluate how humans contribute to sustainability through the extraction, use, disposal, and recycling of materials

PW 4. Students should be able to research and discuss a technological application of physics in terms of scientific, societal and environmental impact

PW 8. Students should be able to research and discuss the ethical and sustainability issues that arise from our generation and consumption of electricity

BW 5. Students should be able to conduct a habitat study; research and investigate the adaptation, competition and interdependence of organisms within specific habitats and communities

BW 6. Students should be able to evaluate how human health is affected by: inherited factors and environmental factors including nutrition; lifestyle choices; examine the role of micro-organisms in human health

BW 9. Students should be able to explain human sexual reproduction; discuss medical, ethical, and societal issues

BW 10. Students should be able to evaluate how humans can successfully conserve ecological biodiversity and contribute to global food production; appreciate the benefits that people obtain from ecosystems

Suggested Learning Outcomes for Developing the Skill of Investigating

E & S 3. Students should be able to interpret data to compare the Earth with other planets and moons in the solar system, with respect to properties including mass, gravity, size, and composition

CW 1. Students should be able to investigate whether mass is unchanged when chemical and physical changes take place

CW 6. Students should be able to investigate the properties of different materials including solubilities, conductivity, melting points and boiling points

CW 7. Students should be able to investigate the effect of a number of variables on the rate of chemical reactions including the production of common gases and biochemical reactions

CW 8. Students should be able to investigate the reactions between acids and bases; use indicators and pH scale

PW 3. Students should be able to investigate patterns and relationships between physical observables

BW 1. Students should be able to investigate the structures of animal and plant cells and relate them to their functions

BW 5. Students should be able to conduct a habitat study; research and investigate the adaptation, competition and interdependence of organisms within specific habitats and communities

BW 7. Students should be able to describe respiration and photosynthesis as both chemical and biological processes; investigate factors that affect respiration and photosynthesis

Nature of Science Learning Outcomes used in the Planning Activity

NOS

1. Students should be able to appreciate how scientists work and how scientific ideas are modified over time

NOS

6. Students should be able to conduct research relevant to a scientific issue, evaluate different sources of information including secondary data, understanding that a source may lack detail or show bias

NOS

7. Students should be able to organise and communicate their research and investigative findings in a variety of ways fit for purpose and audience, using relevant scientific terminology and representations

NOS

8. Students should be able to evaluate media-based arguments concerning science and technology

NOS

9. Students should be able to research and present information on the contribution that scientists make to scientific discovery and invention, and its impact on society

NOS

10. Students should be able to appreciate the role of science in society; and its personal, social and global importance; and how society influences scientific research

NOS

2. Students should be able to recognise questions that are appropriate for scientific investigation, pose testable hypotheses, and evaluate and compare strategies for investigating hypotheses

NOS

3. Students should be able to design, plan and conduct investigations; explain how reliability, accuracy, precision, fairness, safety, ethics, and selection of suitable equipment have been considered

NOS

4. Students should be able to produce and select data (qualitatively/quantitatively), critically analyse data to identify patterns and relationships, identify anomalous observations, draw and justify conclusions

NOS

5. Students should be able to review and reflect on the skills and thinking used in carrying out investigations, and apply their learning and skills to solving problems in unfamiliar contexts