

STEAM EDUCATION FOR SUSTAINABLE DEVELOPMENT and FUTURES LITERACY

SGD13 Climate Action and Sustainable Development



Programme Phase: Strand 1 Earth Systems, Life and Environment

Leaving Certificate Support Lessons

TOPICS: Biodiversity, Environment, Science, Sustainability



SDG 13 Strand 1 Support

Climate Action and Sustainable Development



Climate Action & Sustainable Development

Strand 1

Earth Systems, Life and Environment

Seven Supporting Lessons



Module Summary: Strand 1 CASD Support

This curated set of seven lessons from Muinín Catalyst programmes is designed to support learners and teachers engaging with Strand 1 of the Climate Action and Sustainable Development (CASD) Senior Cycle subject.

Grounded in sustainability, systems thinking, and innovation, the lessons provide scaffolded activities that support learners to explore the complexity of Earth systems, biodiversity, and the interdependence of life and environment. Lessons cultivate 21st-century skills that help learners connect scientific understanding with purposeful climate action.

The lessons draw on design thinking and inquiry-based learning, empowering young people to co-create practical responses that balance human needs with planetary boundaries.

For teachers, the seven lessons offer ready-to-use resources and structured support that align with the NCCA's vision for a values-led, student-centred Senior Cycle. They promote reflection, collaboration, and active citizenship while equipping educators to facilitate meaningful conversations about climate, biodiversity, and sustainability.

For learners, the lessons are an invitation to see themselves as change-makers—connecting knowledge of Earth systems and ecosystems with purposeful action. Through this journey, learners build not only scientific understanding but also the confidence, empathy, and resilience required to navigate a rapidly changing world.

These lessons bridge curriculum and action, helping schools embed Strand 1 in a way that nurtures knowledge, skills, and values, while inspiring hope and empowering students to become ethical leaders and active stewards of the environment. The seven supporting lessons and resources are aligned to support specific learning outcomes from in the [CASD 25 / 26 Through Route](#)

S1.3, and 3 lessons taken from our [game design programme, Climate Change \(CCE\)](#) see here for [programme overview](#)

S1.3: CCE: Lesson 2 What is Climate Change?

In this lesson, learners are introduced to the foundational concepts of Climate Change.

Learners will be introduced to the difference between weather and climate, begin to understand the changes in patterns and recognise the impacts that this can have.

Resources: Video: What is climate change? Part 1 and 2, Worksheet: Activity Question, Discussion Questions and Infographic: Impact of 2C vs 1.5C, Support: CCE 2 - 4 Teachers' Guide

S1.3: CCE: Lesson 3: The Cause of Current Climate Change

In this lesson, learners are introduced to the current causes of climate change. Through an exploration of the process of energy transport (radiation), the relationship between greenhouse gases and how heat is trapped, learners will develop an awareness on the causes of global warming and how this contributes to contemporary climate change.

Resources: Video: 'The Cause of Current Climate' Change, Support: CCE 2 - 4 Teachers' Guide

Week 27: Three lessons from our '[Seeding Sustainability](#)' Programme's Module 3, [Examining Edible Medicinal Flora](#) supplement learners ability linked to biodiversity

S1.6 Lesson 1: Biota, Flora and Fauna

Flora and Fauna also contribute significantly to the ecosystem of the Earth. This lesson will build and consolidate key vocabulary that learners will use throughout the micro-module. It encourages the development of research skills to develop an awareness of the different types of edible plants that can be found growing in Ireland.

Resources: Worksheet: Wild Irish Edibles, Flipped Classroom Task: Biota, Flora and Fauna

S1.6 Lesson 2: Habitats

Over 100 habitat types have been classified in Ireland, boasting a rich array of flora and fauna. This lesson asks learners to use independent and collaborative research skills to discover information about habitats in Ireland and the different types of flora and fauna that can be found in each.

Resources: Worksheet: Habitats, Flora and Species Webquest

S1.10 Lesson 3: Local Flora/ Fauna Scavenger Hunt

Flora and fauna is linked with the air we breathe and the food we eat and are interdependent. This lesson connects learners with their local, natural place as they are tasked with identification, information-gathering and evaluation of local flora and fauna.

Resources: Worksheet: Local Flora/ Fauna Scavenger Hunt, Optional Extra Worksheet: Web Quest: 1 Wild Irish Edibles (Lesson 1)

Week 29: 2 lessons from our [Eco-Agency: Youth Led Climate Action programme](#), which can be found [here](#)

S1.12 Lesson 12 Eco Agency: Youth Movement for the European Nature Restoration Law

In this lesson, learners are introduced to the Youth Movement around the European Nature Restoration Law. Learners will delve into the law's details, its roles in health and conservation, and its connections to the UN Sustainable Development Goals and Earth Charter.

Resources: **Worksheet: Introduction to Youth movement for the European Nature Restoration Law, Mind Mapping, Teachers' Guide: Meditation Script, Introduction to Youth movement for the European Nature Restoration Law, Discussion Cards**

S1.12 Lesson 13: Eco Agency: The European Nature Restoration Law

In this lesson learners will learn more about the law, how it supports health and planetary conservation and explore it's links to the UN Sustainable Development Goals and the Earth Charter.

Resources: **Worksheet: Law for Nature Instructions including Goals and Pillars, Teachers' Guide The European Nature Restoration Law: Planetary conservation and health, Information Cards 1 & 2**

Using the Resources:

If you wish to use these resources, we can offer an induction and online support throughout the module to help you plan integration into your projects and timetable. To register for this option, please contact us e:hello@futurefocus21c.com For more information on the resources please visit www.muinincatalyst.com

Setting up an online learning environment for the lessons on this module:

Our lessons integrate the use of virtual learning environments. To ensure seamless use of our lessons, a module should be set up on your school's virtual learning environment, such as Teams, Google Classroom, etc. Learners are encouraged to upload documents to share with their peers. If your virtual learning environment does not support document sharing, we recommend OneDrive or Google Drive.

You can also use Google Sites or Microsoft Sway to encourage learners to present their work over the year - this can easily be set up to reflect the aims of TY and provide a showcase for their work as well as assessment tool.

Setting up a Canva Education account:

As our lessons integrate design, activities and additional activities may refer to Canva. Educators and schools can open a free Canva for Education account by registering [here](#): Canva for Education provides primary and secondary school teachers and students with premium features and templates. You can then also set up lessons and invite your learners to the class.

Expertise in developing the resources including design, layout and overarching pedagogical framework have been developed by Future Focus21c. Future Focus21c is Rebecca White and Anita McKeown, and a network of collaborators and content developers, nationally and internationally. Anita and Rebecca, have close to 5 decades of experience between them working across the arts, education, inclusive design place-based regeneration, STEAM education and sustainability, in both formal and informal settings with diverse learners and communities.

- Dr Anita McKeown, FRSA, FIPM, FGI, MEI, is an award-winning artist|scholar and STEAM educator, co-designing values-based leadership through education and community processes at the intersection of art, equitable placemaking, Open Source Culture and Technology (ethical and ecological implications). She is also a certified as a Earth Charter Education for Sustainable Development Educator; Inclusive Teaching and Learning Educator, Enterprise and Innovation educator, Trauma-informed practitioner and VUCA world design
- Ms. Rebecca White: is an educator, consultant, trainer and curriculum developer, focusing on STEAM education, project-based, student-led learning and professional development for place-based learning. She is the Senior Learning Advisor for the Ocean Race and an Award-Winning Programme Developer
- External Expertise: We engage with external experts to bring contemporary and real-life knowledge to our resources. By working with these experts, we can ensure that our resources include future-focused learning and innovative ideas to expose learners to world-leading research in a digestible and accessible format. Learners are encouraged to critically think about and engage with knowledge and content in a learner-led and project-based manner.

For more information or to access online support in integrating the programme into your existing teaching please contact: hello@futurefocus21c.com

References and full programmes can be found here www.muinincatalyst.com/courses

CCE L2WS: ACTIVITY 2 DISCUSSION QUESTIONS



As you watch the video: 'What is Climate Change?' (Part 2), make notes here or in your notebooks under the following headings:

- Global climate changes

- Changes in nature
 - melting ice

 - species migration

 - species disruption

- Paris Agreement

Use the Infographic on the next page to discuss and answer the following questions below:

- What does it mean to lose more plant and insect species?

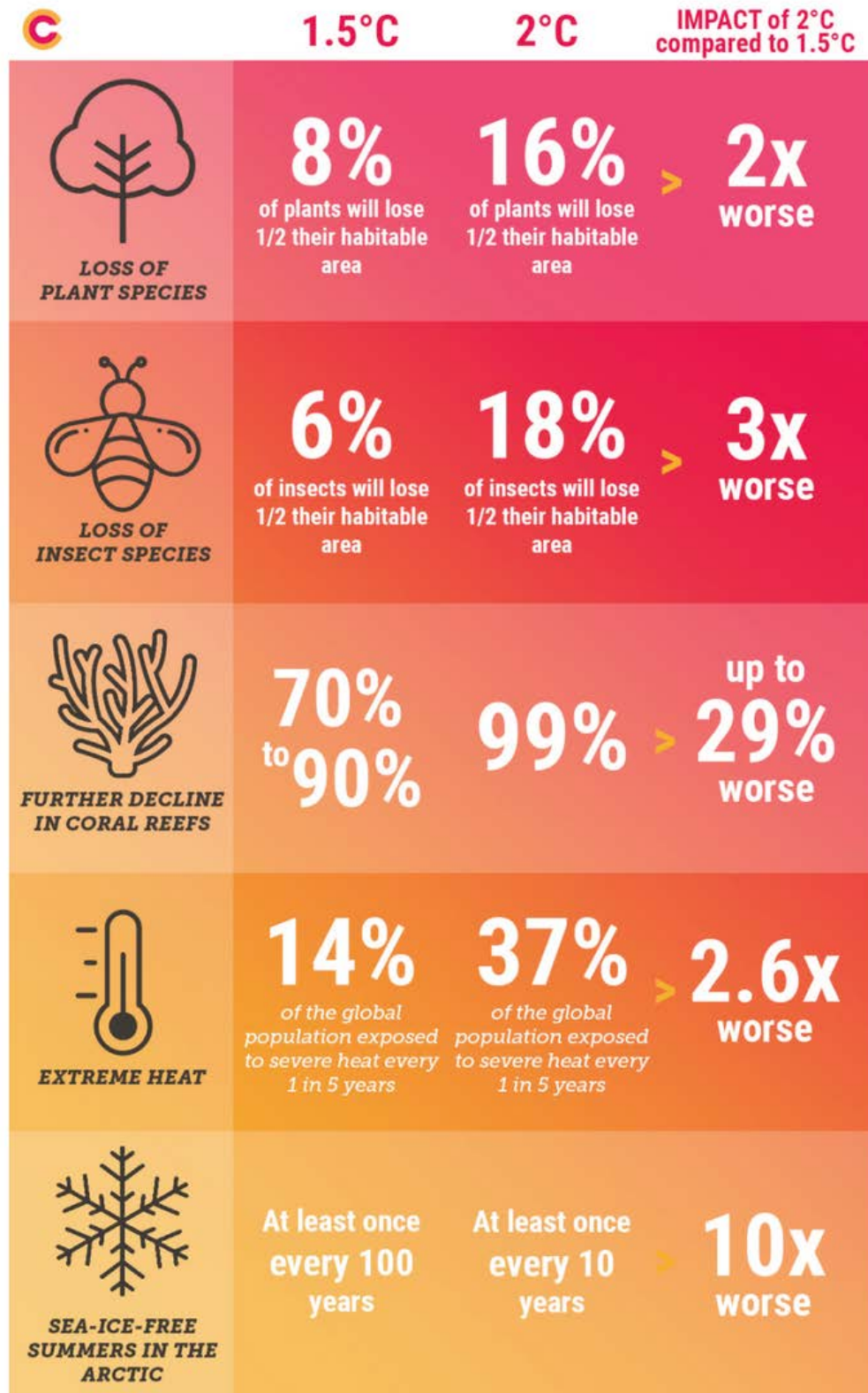
- What happens to these species?

- Why are coral reefs so badly affected by climate change?

- Why is it a problem to lose more ice?

CCE L2WS: ACTIVITY 2 DISCUSSION QUESTIONS

13 CLIMATE ACTION



C CLIMATECOUNCIL.ORG.AU | crowd-funded science information

Adapted from **WRI (07/10/18)** based on data from **IPCC (10/2018)**.

<https://www.climatecouncil.org.au/resources/infographic-the-difference-between-1-5-and-2-degrees-warming/>

MM3 L1 WS: BIOTA, FLORA AND FAUNA



FLIPPED CLASSROOM TASK (BIOTA, FLORA AND FAUNA)

Task:

Create a digital vocabulary guide on the theme of “Biota, Flora and Fauna”. This could be in the form of a Word or Excel document, a Google Jamboard, or a Mind Map.

Using a dictionary look up the following words.

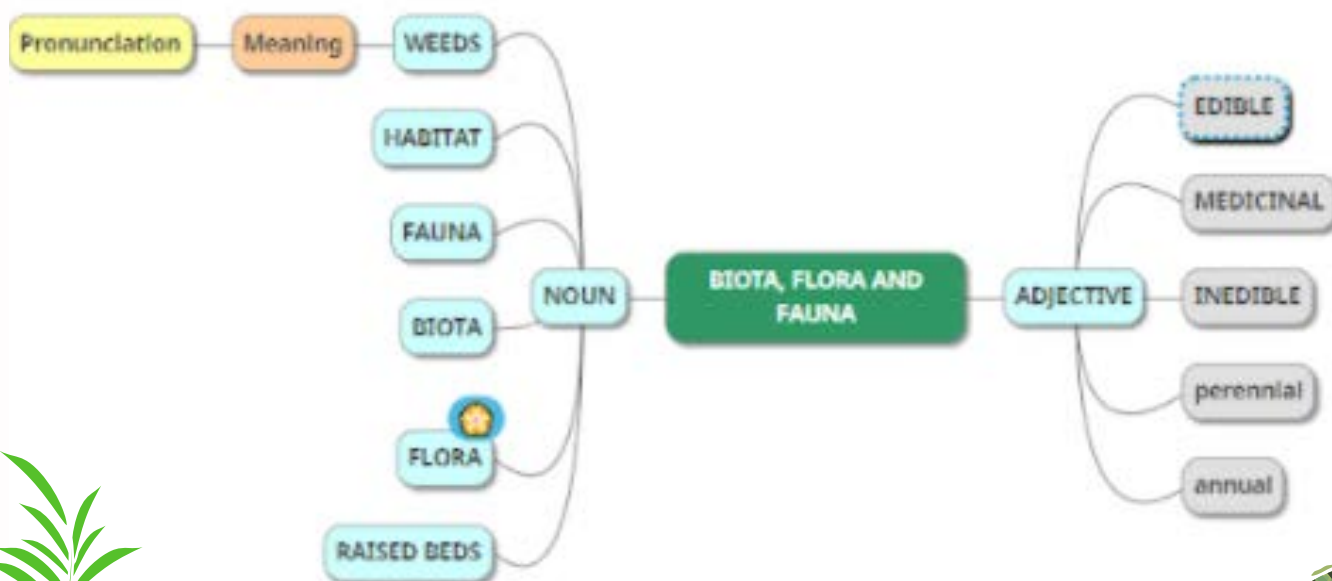
- Identify the part of speech (action/state word - verb, describing word - adjective etc.)
- In your own words define the meaning and give an example in context

VOCABULARY

biota	perennial	herbs
flora	annual	edible/inedible
fauna	raised plant beds	medicinal
habitat	weeds	pollinator

Here is a Word table and Mind Map example of how you could create your digital vocabulary guide.

WORD	PART OF SPEECH	MEANING	CONTEXT
biota	noun	The animal and plant life of a particular region, habitat, or geological period.	We still have a lot of the Earth's biota to save.





WILD IRISH EDIBLE FLORA WORKSHEET

NB: You should only harvest and consume plants if you are 100% certain that it is okay to do so.

Ireland has an array of delightful edibles.

1. Look at the following images of Irish edibles and match them to what you think they could be used to make.

SALADS	SOUPS	PESTOS	COFFEE/TEA
 Dandelions	 Sea Spaghetti	 Stinging Nettles	
 Curly Dock Leaves	 Wild garlic	 Hawthorn Leaves/Flowers	
 Wood Sorrell	 Bramble Leaf	 Wild Mint	

2. Now access the following Website and check your ideas. Were you correct?

<https://www.wildernessireland.com/blog/wild-foraging-ireland/>

3. Paired Discussion:

- What did you learn that was interesting or surprising?
- Which would you like to try?
- Have you tried any of these before?
- How do you think you could use these ingredients to make a new drink or snack?
- Would any of these edibles work well in ice cream? What kind of flavours would they add?





WILD IRISH EDIBLE FLORA WORKSHEET: ANSWER SHEET

Salads

Dandelions
Fresh Hawthorn Leaves and flowers
Wild garlic
Curly Dock Leaves

Soups

Wild Garlic
Stinging nettles
Sea spaghetti

Pestos

(base of greens or leaves, some kind of nut (pine nuts, walnuts, almonds, whatever you like), and olive oil. Cheese is optional but generally preferred.)

Wood Sorrell
Wild Garlic

Tea/Coffee

Wild Mint
Stinging Nettles
Bramble leaf tea
Roasted Dandelion Root

Encourage learners to make / taste an edible recipe from the list ensuring that the core ingredient is the correct species.





WEBQUEST

ANSWER SHEET

1. What are the 2 examples of major habitats of Ireland? Grassland, Heath, Bog
2. Identify one edible flora from each major habitat.
 - Learners' own answers - must provide proof of research that plant is edible
3. What is an “open water” habitat?
 - What does it include? “Open water” habitat rivers, canals, lakes, reservoirs, ponds and, uniquely, turloughs
 - What species of flora is found here that is edible? Students own answers - must provide proof of research that plant is edible
4. What is a “coastal” habitat?
 - What does it include? “Coastal” muddy shores, rocky shores, sandy shores, shingle beaches, brackish water bodies, saltmarsh, maritime flushes and streams, sea cliffs and sand dunes and machair
 - What species of flora is found here that is edible? Learners' own answers - must provide proof of research that plant is edible





WEBQUEST

You are going to conduct some investigation and research. You will do this in pairs. You will use the internet and/or library to source information and you must show evidence of evaluating your sources (C.R.A.A.P. Test).

STEP 1

There are 5 questions to research. BEFORE you begin, read through the questions and highlight the key words in each. These are the words you will use to help narrow down your search for information.

1. What are the 2 examples of major habitats of Ireland?
2. Identify one edible flora from each major habitat.
3. What is an “open water” habitat?
 - a. What does it include?
 - b. What species of flora is found here?
 - c. Which species found here are edible?(If any)
4. What is a “coastal” habitat?
 - a. What does it include?
 - b. What species of flora is found here?
 - c. Which species found here are edible?(If any)
5. Draw or make a list to show where these habitats are in your local area/county/country.

STEP 2

Organise your notes into a short presentation of your findings. Remember to show evidence of your CRAAP Test in the sources you referenced.

STEP 3

Present your findings to a small group. Compare your information and add to your notes if there are any interesting or relevant points from other group members.





SCAVENGER HUNT

Colours are very important in the natural world. They attract different living creatures for different reasons.

Walk around the assigned area and see what you can find.

- Can you find different examples of flowers/plants (FLORA) with the following colours? (see example below)
- Take a photograph and/or make a sketch of what you find.
- Note shapes, size and scents.
- Observe what insects/birds and other wildlife (FAUNA) is attracted to them.



A white flower
Often attractive to beetles, moths, butterflies and flies



A pink flower
Often attractive to butterflies and moths



A red flower
Often attractive to birds



An orange flower
Often attractive to birds and some butterflies



A yellow flower
Often attractive to bees, butterflies, hoverflies and wasps



A blue flower
Often attractive to bees



A purple flower
Often attractive to bees, wasps and butterflies



A green flower
Thought to be the first flower colour



A multicoloured flower

Image for this [Flower Scavenger Hunt](#) from Chelsea Physic Garden, 2020

As part of the scavenger hunt, try to find 3 of the edibles you matched on the WILD IRISH EDIBLE FLORA WORKSHEET.

- What did you find?
- Where did you find them?
- What did you observe?
- Would any of them work as an ice-cream ingredient? Why/why not?



MM3 L3 WS: LOCAL FLORA & FAUNA

15 LIFE ON LAND



Optional Extra Worksheet: Edible Flora (Web Quest 1)

Can you find these flowers online and gather some information about their edible / medicinal uses?



Top row - left to right: Apple blossom, Borage, Dianthus, Chives, Cornflower.

Bottom row - left to right: Courgette, Dill, Forget-me-not, Lavender, Marigold



Top row - left to right: Bergamot, Nasturtium, Nigella, Oregano, Pansy

Bottom row - left to right: Roses, Sage, Strawberry, Sunflower, Tulip



Use the Chelsea Physic Garden plant collection website to find their scientific names <https://cpg.gardenexplorer.org/>

Discussion: What do you think they taste like? How do you think they could be used for eating and drinking?



After your discussion visit this website and compare your ideas from the discussion to the information on the site. You can also use this information to help create the directory.

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



Why are young people important?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



What is nature restoration and
why do we need it?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



What might be are the
economic costs and
benefits of the Nature
Restoration law?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



What role did young people play
in the passing of the law?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



How might this law align or link to
the Sustainable Development
Goals and the Earth Charter.

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



What do you know about the
European Nature Restoration Law?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



How serious do you think the
problem of ecosystem degradation is
and why should we urgently act?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



How might this law align or link to
the Sustainable Development
Goals and the Earth Charter.

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



How does it make you feel
knowing that young people have
the power to make such
meaningful change?

DISCUSSION: ECO ANXIETY

3 GOOD HEALTH
AND WELL-BEING



What else would you like to know
about this and how might you find
out?



Mind Map Information

1. Choose the topic of the mind map and place it in the middle of the drawing
2. Come up with three to five main ideas, then evenly space them in a circular formation around the mind map topic
3. Draw a line from the mind map topic to each main idea
4. Brainstorm supporting details such as ideas, tasks, and questions for each main idea
5. Draw lines connecting each main idea to its supporting details.

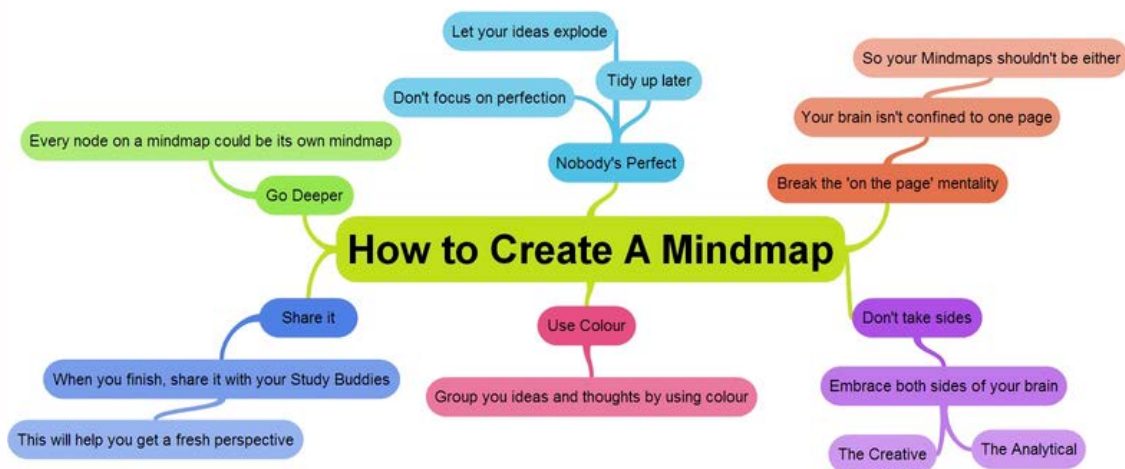


Image Credit : <https://www.software4students.co.uk/goconqr/mind-maps/>

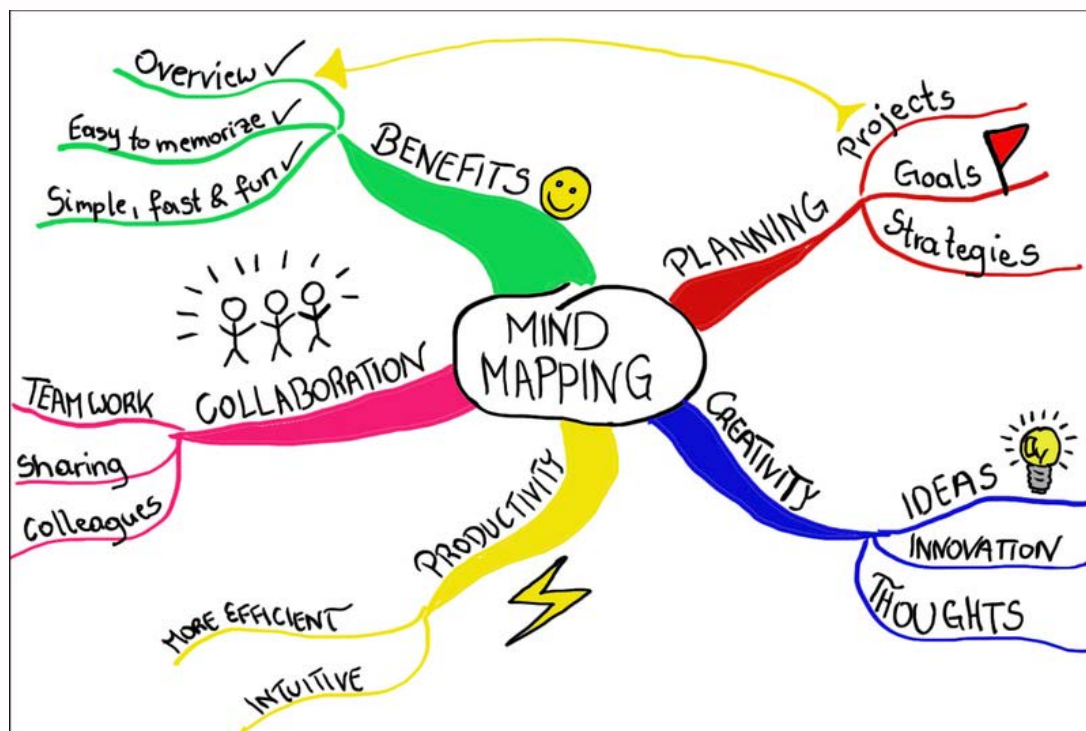


Image credit: Mindmeister.com

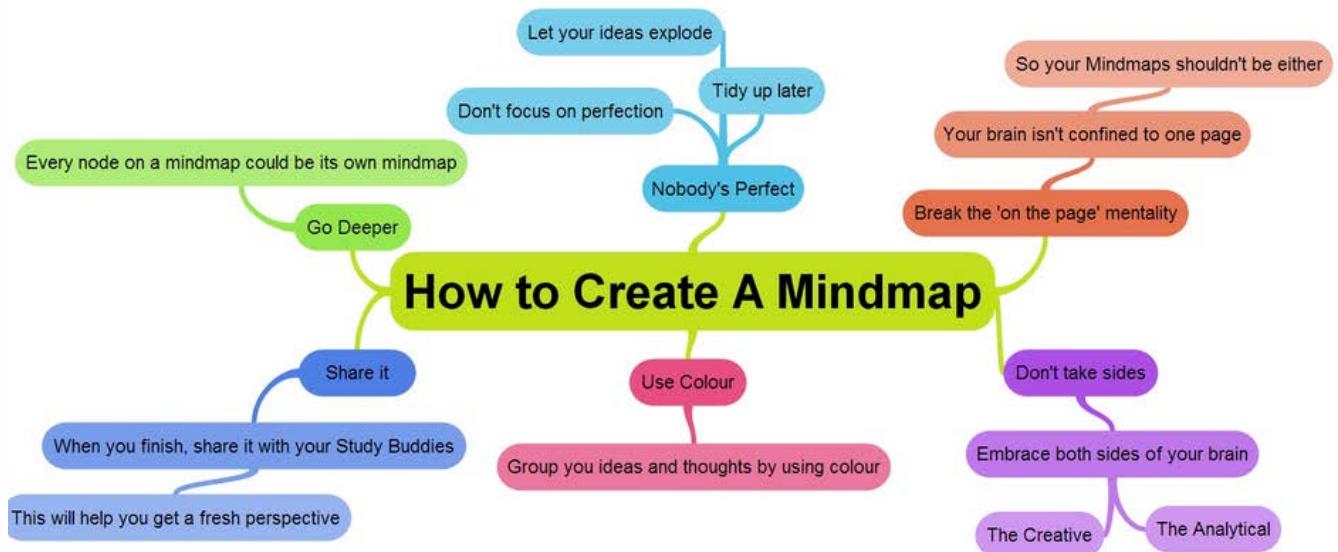


Image Credit : <https://www.software4students.co.uk/goconqr/mind-maps/>

Activity 2 Mind Map Information

1. Choose the topic of the mind map and place it in the middle of the drawing
2. Come up with three to five main ideas, then evenly space them in a circular formation around the mind map topic
3. Draw a line from the mind map topic to each main idea
4. Brainstorm supporting details such as ideas, tasks, and questions for each main idea
5. Draw lines connecting each main idea to its supporting details.

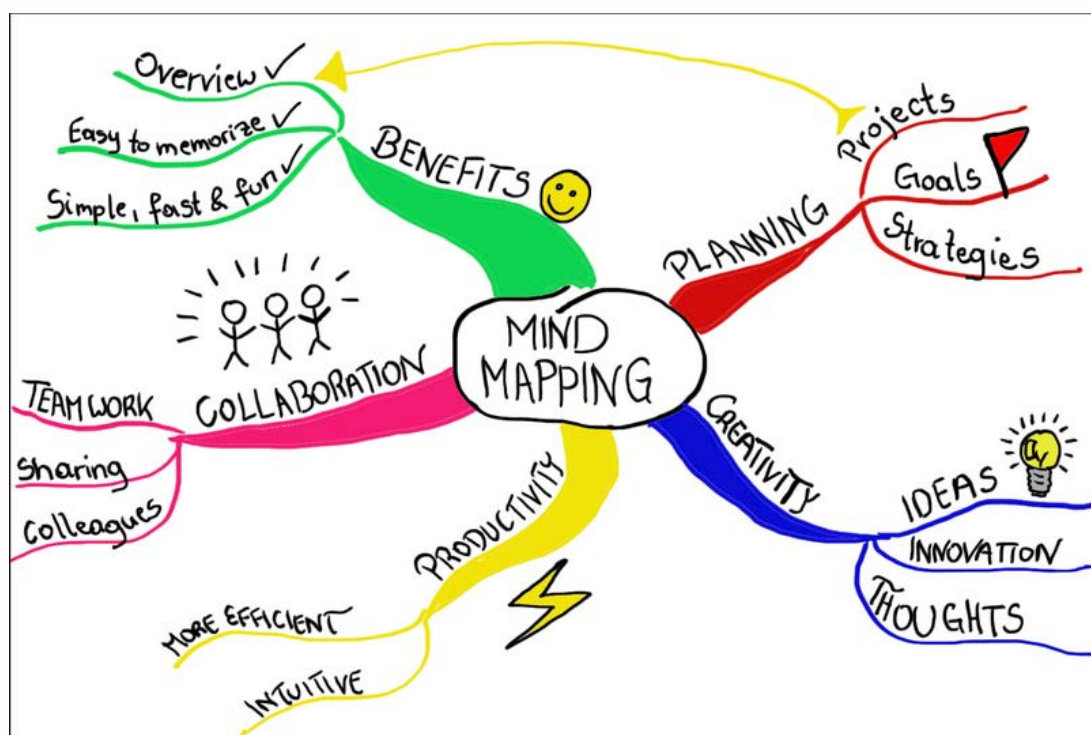


Image Credit: Mindmeister.com



Planetary conservation and health

Goals and Pillars



Pillar 1.4

Respect and Care for the Community of Life: Secure Earth's bounty and beauty for present and future generations.



Pillar 2.6

Ecological Integrity: Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach.



Pillar 4.13 Democracy, Non - violence and Peace

Transparency and Participation: Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice.



Pillar 4.14 Democracy, Non - violence and Peace

Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life.



Pillar 4.16 Democracy, Non - violence and Peace

Promote a culture of tolerance, nonviolence, and peace



Law for Nature: Instructions

Step 1: Form groups of 3.



1. A Leader - responsible for organising the group and the distribution of tasks include self and final review of all tasks.
2. A Speaker/ Summariser - responsible for completing allocated tasks and summarising the group's work.
3. A Note Taker - responsible for noting key information from the group's collaboration and preparing them for the speaker.

Step 2: Distribute the information for reading so each member has something to read but is not the same for all. Reading materials include:

1. Factsheet page 1 & 2 digital or handout
2. Information card 1 & 2 handout
3. Goals & Pillars handout

Example:

- one person read Factsheet page 1
- another reads page 2
- the third reads the information cards



Step 3: After reading, share what you understood from your text with each other and take notes from each sharing. Use the note page to collate the groups notes and link what you have learned to how this law aligns with the Un Sustainable Development Goals and the Earth Charter Pillars.

Step 4 Together create construct a concise summary for the speaker to share with the class and share your summary with the class as directed.

Extension Class only:

Step 5: Join another group and take turns to share your groups summary. Listeners to ask at least one follow up question.