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|  **Subject Science - Year 9 Medium Term Plan/SOW** | **The Academy of St Francis of Assisi** |
|  | **Title :**  **B16 Organising an ecosystem** | **Number of lessons in sequence** | **5 lessons** |
| **Overarching Curricular Goals (Aims)**  | **By the end of this unit students will:** In this chapter students have studied how feeding relationships are represented in food chains. They should understand the importance of photosynthesis in feeding relationships, linking with work in B8 *Photosynthesis*. They should recall the main feeding relationships within a community and understand how the numbers of predators and prey are inter-related, including interpreting predator–prey population graphs. Students have looked at mineral cycling and the microbes involved. They should understand how materials are recycled through the abiotic and biotic components of an ecosystem, and the importance of decay. They should link this with the main chemicals that make up cells in B1.2 *Animal and plant cells*, respiration in B9 *Respiration*, and transpiration in B4.8 *Evaporation and transpiration*. Students have studied the water cycle and should recall the main stages of condensation, precipitation, evaporation, transpiration, and respiration. They should understand what the carbon cycle is and recall the processes that remove carbon dioxide from the atmosphere and return it again. They should understand the role of microbes in the carbon cycle as carrying out respiration to release carbon dioxide. | **Links to National Curriculum****Links to & building upon prior learningIncluding KS2 if Yr7** | **KS3 NC Links**The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops and the importance of plant reproduction through insect pollination in human food security. How organisms affect, and are affected by, their environment, including the accumulation of toxic materials. **NC KS4 Links**The need for transport systems in multicellular organisms, including plants. Photosynthesis as the key process for food production and therefore biomass for life. The process of photosynthesis. Levels of organisation within an ecosystem. Some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community. How materials cycle through abiotic and biotic components of ecosystems. The role of microorganisms (decomposers) in the cycling of materials through an ecosystem. Organisms are interdependent and are adapted to their environment. The importance of biodiversity. Methods of identifying species and measuring distribution, frequency and abundance of species within a habitat. Positive and negative human interactions with ecosystems.  |
| **Outcomes/****Success Criteria** | **Knowledge Learners will:** Photosynthetic organisms are the producers of biomass for life on Earth. Feeding relationships within a community can be represented by food chains. All food chains begin with a producer which synthesises molecules. This is usually a green plant which makes glucose by photosynthesis. Producers are eaten by primary consumers, which in turn may be eaten by secondary consumers and then tertiary consumers. Consumers that eat other animals are predators, and those eaten are prey. In a stable community the numbers of predators and prey rise and fall in cycles. Many different materials cycles through the abiotic and biotic components of an ecosystem. All materials in the living world are recycled to provide the building blocks for future organisms. The water cycle provides fresh water for plants and animals on land before draining into the seas. Water is continuously evaporated and precipitated. Microorganisms cycle materials through an ecosystem. Decay of dead plants and animals by microorganisms returns carbon to the atmosphere as carbon dioxide and mineral ions to the soil. The carbon cycle returns carbon from organisms to the atmosphere as carbon dioxide to be used by plants in photosynthesis.\* See individual lessons for skills  |
| **2/3 tier vocabulary.** | **Differentiation/Scaffolding/Support.** | **Stretch and challenge opportunities in class, enrichment and home learning.** | **Opportunities for wider reading/Listening/watching.** |
| Keywords Food webFood chainEcosystemPopulationProducerConsumerDecomposerBiomass Carbon cycleDecomposers Primary consumer Producers Secondary consumer  | **Knowledge Support:** * Key facts.
* Knowledge organisers.

**Reading support**:* Explicit vocabulary delivery
* Glossary of terms
* Visualizer to support whole class reading.
* Keyword discussion and annotation.

**Skills support:** * Support sheets
* Practical guidance sheets.
* Practical scaffolding.
* Demonstrations and discussions.
* Writing frames.
 | Lesson assessment task differentiated to support and challenge.Seneca Learning KS3 ScienceOak academyBBC Bitesize**Scholarship:**National geographic<https://www.nationalgeographic.org/encyclopedia/ecosystem/>British ecological society <https://besjournals.onlinelibrary.wiley.com/>British ecological society <https://www.britishecologicalsociety.org/>Conservation.org<https://www.conservation.org/> | National geographic [www.nationalgeographic.org](http://www.nationalgeographic.org)CommunitiesThis lesson introduces the topic of ecology and looks at communities and how organisms interact.<https://classroom.thenational.academy/lessons/communities-64vkcc>CyclesThis lesson looks at the importance of cycles for living organisms with a particular focus on the water and carbon cycles.<https://classroom.thenational.academy/lessons/cycles-c8rkat>Case Study: Dr Beth PenroseIn this lesson we will learn about Dr Beth Penrose who is a plant scientist investigating how we can reduce the human intake of contaminated crops.<https://classroom.thenational.academy/lessons/case-study-dr-beth-penrose-cgw68c> |

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| **Unit Title** | **Sequence of learning Lesson title, theme, big question.** |  **Key concepts/outcomes/knowledge and skills.**  | **Assessment/ including specific content/ knowledge/skills tested.**  | **HWK. To be in books clearly marked** | **Furthering Cultural Capital.****&** | **Recall of prior or future topics –**  | **Lesson resources including or hyperlink to supporting websites/resources/books/texts & individual lessons.**  |
| B16 Organising an ecosystem | B16.1 Feeding relationshipsThe feeding relationships in communities.After this topic, you should know:the importance of photosynthesis in feeding relationshipsthe main feeding relationships within a communityhow the numbers of predators and prey in a community are related. | Aiming for 4* state the meaning of producer, consumer, predator, prey and give examples of each.
* identify producers, consumers, predators and prey in a food chain.
* describe what a graph shows about how the numbers of predator and prey change over time.

Aiming for 6* identify producers, primary consumers, secondary consumers, tertiary consumers, predators and prey in a food web.
* describe what happens to a population in a food web when another changes.
* plot data as a line graph and explain the pattern of predator and prey populations.

Aiming for 8* explain in detail why all living things depend on producers.
* evaluate in detail food chains/webs as models to show feeding relationships.
* make predictions based on data of a predator prey relationship.
 | Key questionsWhat is a producer? What is a food chain? What is a consumer? What is a herbivore? What is a predator? What is a prey organism? What is an apex predator? | Feeding relationships – homework 1Student Book end of spread answers |  | KS3 Ecosystems Quiz  | B16.1 Feeding relationshipsB16.1 Calculation teacher: Predator–prey relationship numbersB16.1 Calculation: Predator–prey relationship numbersB16.1 Working scientifically teacher: Predator/prey relationshipsB16.1 Working scientifically: Predator/prey relationshipsB16.1 Feeding relationships assessment.B16.1 Feeding relationships exit quiz.  |
| B16.2 Materials cyclingHow materials are cycled in a community.After this topic, you should know:How materials are recycled in a stable communitythe importance of decay. | Aiming for 4* state what a decomposer is and give examples.
* I can name some substances that are recycled in the living world.
* describe the events in the water cycle.

Aiming for 4* explain why decomposers are important to a stable ecosystem.
* explain the importance of recycling substances.
* describe the events in the decay cycle.

Aiming for 4* explain how detritivores increase the rate if decay using ideas about surface area.
* explain how substances change as they decay.
* comment on the limitations of a simple model of decay.
 | Key questionsWhat is the water cycle?What is decay?what is a stable ecosystem? | B16.2 Materials cycling – homework 2Student Book end of spread answers |  | Feeding relationships exit quiz | B16.2 Materials cycling PPTB16.2 Activity: The decay cycleActivity where students describe the decay cycle and explain the importance of recycling.B16.2 Activity teacher: The decay cycleTeacher notes for B16.2 Activity: The decay cycle, including answers for the questions.B16.2 The water cycleB16.2 Materials cycling assessment taskB16.2 Materials cycling exit quiz  |
| B16.3 The carbon cycleHow carbon is cycled in the environment. After this topic, you should know:what the carbon cycle isthe processes that remove carbon dioxide from the atmosphere and return it again. | Aiming for 4* state that carbon atoms are moved around the Earth (recycled).
* give one reason why we need to recycle carbon.
* use a diagram of the carbon cycle to describe the main processes involved.

Aiming for 6* describe the events in the carbon cycle.
* explain why the carbon cycle is vital to life on Earth.
* write word equations for photosynthesis, respiration and combustion.

Aiming for 8* explain in detail why the concentration of carbon dioxide I the atmosphere is rising and why this is an issue.
* explain the links between photosynthesis, respiration and combustion in the carbon cycle.
* write balanced symbol equations for photosynthesis, respiration and combustion.
 | What is the carbon cycle?What is respiration?What is decomposition?What is combustion?What is photosynthesis?  | B16.3 The carbon cycle – homework 3Student Book end of spread answers |  | Materials cycling and feeding relationships exit quiz  | B16.3 The carbon cycle PPTB16.3 Activity teacher: Processes in the carbon cycleTeacher notes for B16.3 Activity: Processes in the carbon cycle, including answers for the questions.B16.3 Activity: Processes in the carbon cycleActivity where students describe the carbon cycle and write word equations for the different processes.B16.3 Bump up your grade teacher: Pass the carbonTeacher notes for B16.3 Bump up your grade: Pass the carbon, including answers for the questions.B16.3 Carbon cycle sortStudents put the stages of the carbon cycle in the correct order.B16.3 Carbon cycle sortStudents put the stages of the carbon cycle in the correct order.B16.3 The carbon cycle assessment taskB16.3 The carbon cycle exit quiz |
| B16 : checkpoint lesson  |  |  | B16 Organising an ecosystem summary answers and practice questions – homework 4B16 Organising an ecosystem: Student Book summary answers |  | The carbon cycle, materials cyclingand feeding relationships exit quiz  | B16 Checkpoint quiz: Organising an ecosystemB16 Checkpoint follow-up: Aiming for Grade 4B16 Checkpoint follow-up: Aiming for Grade 6B16 Checkpoint follow-up: Aiming for Grade 8B16 Checkpoint follow-up: Teaching notesB16 downloadable podcast: Organising an ecosystem (Foundation)B16 downloadable podcast: Organising an ecosystem (Higher)B16 Organising an ecosystem: Student Book end of spread answersB16 Organising an ecosystem: Student Book summary answersB16 Self-assessment checklist: Organising an ecosystem |
|  | B16 EOTT |  |  |  |  |  | B16 Organising an ecosystem: Exam-style questions (Foundation).B16 Organising an ecosystem: Exam-style questions answers (Foundation)B16 Organising an ecosystem: Exam-style questions (Higher)B16 Organising an ecosystem: Exam-style questions answers (Higher) |