TOPIC PLANNER: ECOLOGY

[Version 1.4 – 2024]

NZ Curriculum: Key competencies

Thinking; Managing Self; Using language, symbols and texts; Relating to others

Science

Level 3 & Level 4: *The Nature of Science: Participating and contributing:* Use their growing science knowledge when considering issues of concern to them.

Living World: Ecology: Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.

Living World: Life processes: Recognise that there are life processes common to all living things and these occur in different ways.

Level 5:*The Nature of Science: Participating and contributing:* Develop an understanding of socio-scientific issues by gathering relevant scientific information in order to draw evidence based conclusions and take action where appropriate.

Living World: Ecology: Investigate the interdependence of living things (including humans) in an ecosystem.

Living World: Life processes: Identify the key structural features and functions involved in the life processes of plants and animals.

Level 6:*The Nature of Science: Participating and contributing:* Develop an understanding of socio-scientific issues by gathering relevant scientific information in order to draw evidence-based conclusions to take action where appropriate.

Living World: Ecology: Investigate the impact of natural events and human actions on a New Zealand ecosystem.

Living World: Life processes: Relate key structural features and functions to the life processes of plants, animals, and micro-organisms and investigate environmental factors that affect these processes.

Te Marautanga o Aotearoa:

Pūtaiao Level 4+ *The Natural World: The Organism:* Recognise that there are biological processes common to all organisms, which occur in different ways in different species. *The Biological Environment*: Recognise and explain the changes undergone by species (especially those of Aotearoa) over long periods of time.

LEARNING OBJECTIVES:

LO1 Identify ways we as people are connected with fish
LO2 Describe key features of fishes including those certified by the Marine Stewardship Council
LO3 Observe a fish and record evidence
LO4 Experience and identify local marine species
LO5 Identify key adaptations of fishes to suit their habitat and use a scientific key
LO6 Describe patterns in body shapes of fish that live in the same habitat
LO7 Describe the concept of 'habitat' and identify differences amongst three marine habitats
LO8 Describe the concept of food web and the effect unsustainable fishing has on food webs
LO9 Describe a characteristic of orange roughy that makes it susceptible to overfishing
LO10 Use scientific and fishery related vocabulary

NZ Curriculum:

This resource can also be used to support the teaching of Achievement Objectives in:

- Te Reo Māori
- English
- Maths

POSSIBLE WONDERINGS:

- What makes a fish a fish?
- Why are fish different shapes?
- What is it like in the deep ocean?
- How does overfishing impact on habitats and food chains?
- Would it matter if lots of sharks disappeared?
- If one type of fish is overfished, how does this affect other marine life?

POSSIBLE ACTIONS:

- LOOK for the Marine Stewardship Council blue fish tick when you buy fish
- INVESTIGATE the shape and features of a fish when next you see one!
- FIND pictures taken underwater in the ocean and see if you can identify what kind of habitat they show?
- DRAW a diagram of a fish and label as many parts as you can
- MAKE a poster highlighting the effects of overfishing on other marine creatures

LEARNING EXPERIENCES OVERVIEW

LESSONS 1 & 2: FIELD TRIP: FISHY CONNECTIONS [FOCUS QUESTION: How am I connected with fishes?] AND WHAT IS A FISH? [FOCUS QUESTION: How am I connected with fishes?]

- WATCH film [1:55] & experience being underwater in Aotearoa New Zealand [view using Chrome] [slide 10]
- CONSIDER your connection with fish (tūpuna, kai moana & current actions)
- WRITE a story called 'a creature of the sea & me' [slide 10]
- Explore connections with fishes through te ao Māori & whakapapa [slide 11]
- DISCUSS 'what is a fish? [slide 13]
- BRAINSTORM prior knowledge about fish (prior knowledge chart) [slide 14]
- DEVELOP & TEST knowledge of NZ fish species Māori and English common names using Ngā Ika Moana o Aotearoa CARDS and Kahoot quiz [slide 14]
- INVESTIGATE fish features using slide 15 & the Fishy Worksheet [slide 15]
- IDENTIFY & LABEL features of a fish [slide 16 & 17] [Answers on slide 17]
- Take a real or virtual lesson with the National Aquarium of New Zealand to discover more fishy features [slide 17] or explore more with this NIWA guide
- READ, RESEARCH & ANSWER questions about local fish (homework?) Local Fish Spotty Worksheet and / or Local Fish Worksheet [slide 18]
- BRAINSTORM what we know about fish & sea near us [slide 18]
- VISIT a local wharf & catch local fish using bait catchers [slide 19] see Field Trip and Worksheet [slide 19] OR take a virtual field trip with the team from National Aquarium of New Zealand

LESSON 3: BODY SHAPES OF FISHES [FOCUS QUESTION: What patterns can we see in the body shapes of fish from similar habitats?]

- DISCUSS how fish adapt to their environment (Adaptation) [slide 20]
- INVESTIGATE how body shapes of fishes can give clues to where & how a fish lives [slide 21] (see also Scientific Keys Fish Adaptations)
- Reinforce learning and WATCH short film clips while identifying the body shape of each fish [slide 22]
- USE Scientific Keys Fish Adaptations to figure out key information about how & where different species of fish like to live [slides 23 & 24]
- RESEARCH to confirm your findings [slide 25]
- WATCH short film clips of deep water species & pelagic (open ocean) species
- CONSIDER adaptations needed to live in these habitats [slides 26 & 27]
- INVESTIGATE adaptations of deep water fish such as the Viperfish or Anglerfish
- Find ten cool facts to CREATE a set of true false cards [see Teacher Outline]
- TEST knowledge of fish body shape adaptations [slide 28]
- & EXPLORE adaptions in one of the MSC certified fish [slide 29]

LESSON 4: MARINE HABITAT [FOCUS QUESTION: How do marine habitats differ from one another?]

- INVESTIGATE 'habitat' & BRAINSTORM existing knowledge of habitat using prior knowledge chart [slide 30]
- DISCUSS different habitat types [slides 31 & 32]
- EXPLORE the deep ocean via the National Aquarium of New Zealand [1:30] & go for a deep dive to see animals of The Deep Sea [slide 33]
- Use Habitat cards to PLAY a true false card game and match marine species to their correct habitat [slide 33] [see also Teacher Outline]
- INVESTIGATE Deep Sea Exploration via the National Aquarium of New Zealand [slide 33]
- EXPLORE the impact of overfishing on habitats and how these impacts are being addressed [slide 33 & 34]
- WATCH short VR underwater films to practice OBSERVATION [see slide 33 & 34]
- RESEARCH habitat & community of creatures & CREATE a set of habitat cards habitat [see Teacher Outline]
- CREATE & WRITE about a creature with features adapted to an imaginary habitat!! [See Teacher Outline]

LESSON 5: MARINE FOOD WEBS [FOCUS QUESTION: *What is a food web and how can overfishing affect food webs?*]

- DISCUSS food chains, predator / prey relationships and the idea that marine creatures are linked [slide 35]
- INVESTIGATE marine food webs [slide 36]
- WATCH a film on food webs [2:06] [simpler] or Antarctic food web [4:53] [more complex] [slide 37]
- PLAY String game NZ and Food web game & PLAY the online food web game [slide 37] [see Teacher Outline]
- WATCH Pew film [1:35] about loss of sharks [slide 38] and CONSIDER the impact of one animal being removed from a food web?
- GO on a virtual or real-life lesson with National Aquarium on New Zealand

LESSON 6: SUSTAINABLE FISHING: ORANGE ROUGHY [FOCUS QUESTION: *What characteristics of orange roughy make them susceptible to overfishing?*] and REVIEWING KEY CONCEPTS [FOCUS QUESTION: *What have we learnt?*]

- DISCUSS Orange Roughy & their susceptibility to overfishing [slide 40 & 41]
- CONSIDER impacts of climate change on fish distribution and oceans
- PLAY a Kahoot Quiz to review the marine ecology topic [slide 42]
- REVIEW key terms – define terms and act them out [slide 42]

KEY WORDS AND CONCEPTS (FOR TEACHERS)

Fish	A fish is a scaly skinned vertebrate [animal with back bone] that breathes using gills and lives in water.
Bony fish	A fish belonging to a large class of fishes distinguished by a skeleton of bone. Most modern fishes are bony fishes.
Cartilaginous fish	A fish belonging to a class of fishes with a skeleton of cartilage rather than bone, including the sharks, rays, and chimaeras.
Vertebrate	A large group of animals that all have a backbone or spinal column, including mammals, birds, reptiles, amphibians, and fishes.
Invertebrate	A large group of animals that have no backbone or spinal column, including shellfish (mollusca) and crabs (crustacea).
Gills	The paired respiratory organs used by fish (and some amphibians) to extract oxygen from water.
Community	A naturally occurring group of plants, animals and other organisms that are interacting in a unique habitat.
Predator	An animal that naturally preys on others.
Prey	An animal that is hunted and killed by another for food.
Habitat	The natural home or environment of an animal, plant, or other organism
Food chain	A simple linear series of organisms each dependent on the next as a source of food.
Food web	A system of interlocking and interdependent food chains.
Pelagic	Relating to or living in the open sea.
Adaptations	The action or process of adapting or changing to become more suited to an environment. Also refers to the trait as a result of this process.
Sustainable fishing	Sustainable fishing means looking after the environment where fish live and not overfishing. Sustainable fishing means leaving enough fish in the ocean, respecting habitats and ensuring people who depend on fishing can maintain their livelihoods.

TE KAWA O TANGAROA
OCEAN CENTRED LEARNING