→ Level: First P2 – P4

Growing Up

MACDUFF MARINE AQUARIUM

Background Information

Teachers may find it useful to refer to the information provided in the 'Sorting Living Things' activity.

In order for a species to be successful and continue generation after generation it needs to be able to reproduce. Plants and animals adopt strategies to increase their chances of success as a species. The main goal of reproducing is to ensure the next generation goes on to become adults themselves. Some animals such as snails or fish generally produce many young, provide little parental care and chance that some will grow to be adults. Other species such as whales and humans normally produce only one young every few years but invest longer nurturing their offspring to ensure they reach adulthood.

There are two different types of reproduction, asexual and sexual. In asexual reproduction, one parent produces an exact copy of itself; or a clone. This is a common form of reproduction in bacteria, some plants and fungi where the parent simply splits and becomes two separate life forms. This type of reproduction can also occur in some animals including anemones and jellyfish. Sexual reproduction requires two parents, a male and a female, which produce young that have genetic traits from both parents. This is typical of most animals and plants. Some animals can even produce by both asexual and sexual reproduction.

Life in the Moray Firth comprises of a great diversity of living things, from bacteria to large mammals, all competing for their chance to grow and reproduce. Exactly how individual species reproduce will vary slightly from species to species as they compete against each other to secure the survival of their offspring to adulthood and so pass their genes to the next generation. Although there are variations between how individual species reproduce, many plant and animal groups have similar traits, the examples given in the next pages demonstrate six life cycles of different Moray Firth marine animals.

Objective

To explore the differences and similarities between adult animals and their young.

Experiences and Outcomes

HWB 0-50a/
HWB 1-50a
I am learning about where living things come from and about how they grow, develop and are nurtured.

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Life Cycles of Invertebrates

Animals that lack a backbone have different stages of growth, with each stage having a different body form from the final adult stage. After hatching from eggs the animal undergoes larval stages. The number of larval stages varies with species. Sea snails have a 3 phase life cycle, jellyfish have 5 phases and lobsters have several phases in their life cycle. Insects are one of the most well known invertebrate groups, however there are no marine insects and so they are not included in this activity worksheet.

Jellyfish
Jellyfish reproduce by both asexual and sexual reproduction. Males release sperm into the water which fertilise the female's eggs which she keeps under her umbrella shaped body. This stage of reproduction is sexual and once the eggs have been fertilised the female releases them into the water where they hatch into larvae and float on the ocean currents before attaching themselves onto rocks; at this stage they are called polyps. The polyps trap plankton and can live for 20 years before they 'bud' into ephyrae, baby jellyfish. This budding stage is asexual reproduction and each polyp can produce many clones of the original jellyfish. The jelly babies feed on small plankton and grow to adult size. They only live as adults for 3 – 6 months, long enough to reproduce and create the next generation.

Periwinkles
The male periwinkle seeks the female by tracing chemicals produced in her mucus trail, after finding his mate, he mounts her, and fertilises her eggs. Periwinkles live in large colonies and females will mate 20 times a day with different males and produce up to 10,0000 eggs every year. She keeps the fertilised eggs inside her body until a spring tide and then releases them into the water. The eggs hatch into a larval form which is free swimming in the plankton and when big enough they attach onto rocks and graze on algae. The periwinkle's shell grows as the snail gets bigger.

Lobsters
Crustaceans, including crabs, lobsters and barnacles need to moult their hard outer shells for their bodies to grow and develop and therefore these animals have many stages in their life cycle. The female lobster carries the eggs, known as berries, for 9 months. The eggs hatch at night and float to the surface of the water, living in a planktonic state. During this time the larva moults its shell and upon the fourth moult the larva metamorphoses into to a juvenile lobster and moves to the sea floor where it burrows under the mud or sand. After several years the adult lobster is large enough to fend off predators and it can roam the ocean floor. The larvae and juvenile lobsters are prey to many animals and, of 20,000 lobster eggs produced, less than one lobster will reach adulthood, but can live over 50 years.

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Life Cycles of Vertebrates

Animals with backbones reproduce by sexual reproduction and they all have well developed reproductive organs. The five groups of vertebrates, fish, amphibians, reptiles, birds and mammals all use different methods of reproduction.

Cod
Most bony fish, such as cod, plaice and mackerel produce vast quantities of eggs and sperm into the water, the fertilised eggs hatch into a larval fish before they grow and develop into their adult form. The male and female cod spiral upwards in a courtship dance, releasing their eggs and sperm into the water. A female cod can produce over 9 million eggs during the spawning season. The fertilised eggs take 10 – 14 days to develop before a larval fish hatches. At about 4 – 6 weeks the larval fish will be able to swim against the current and descend to the bottom of the sea floor where they hunt for worms and crustaceans in the sand and mud. The young fish are called codlings and shelter in kelp reefs until they are mature enough to survive in the open seas. It takes 4 years for the codlings to become adults and they live for almost 20 years.

Gannets
Sea birds spend virtually all their life at sea, but must come to land to lay their eggs. Woodland birds lay their eggs in trees and bushes but seabirds favour rocky cliff edges that are inaccessible to predators such as foxes or stoats. Gannets pair up in spring and lay a single egg in a nest. Both male and female birds nurture the egg for 6 weeks until it hatches into a chick covered with downy feathers. The parents spend 8 weeks travelling back and forth from sea, catching fish for the youngster. During this time the chick loses its down feathers and grows flight feathers. The chick spends time flapping its wings and preparing for a life at sea before it finally launches itself out of the nest and into the air.

Dolphins
Marine mammals such as seals, dolphins and whales, reproduce in the same way as humans. The female carries the young inside her body for several months and the foetus gains nutrients from the mother's placenta. The female then gives birth and provides milk for the youngster until it is able to find food itself. Dolphins mate, give birth and suckle their young under water. They are social animals and live in a 'pod'. The pod will help protect other family members from predators and they work together to hunt and catch food. A female dolphin only has one calf every two years but its chances of survival to adulthood are greatly increased from the care that it is given during the early stages of its life.

Amphibians, including frogs, toads and salamanders, all live part of their lives in rivers or fresh water lochs; but not in sea water. The eggs are laid and hatch in water where the juveniles have gills to obtain oxygen. As adults they lose their gills and move onto land, and breathe through lungs.

Turtles, sea snakes and marine lizards are all reptiles that can be found living in the sea. Turtles are the only rare visitor during the summer months to the water of the Moray Firth when they visit following their favourite food source, jellyfish. Although turtles spend almost all their life at sea, they come ashore to lay their soft-shelled eggs on tropical sandy beaches. After hatching the young make their way back to sea to mature into adults.

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Activity

Use the worksheet and draw a line to match the young to its parent.

Discussion Points and Follow-on Activities

Follow on with 'Looking at Life Cycles' in second level resources.

Teacher's answer key:

A6/ B4/ C1/ D3/ E2/ F5

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