

## Nature's Engineers further information for Pocket Garden Design Competition 2024

There is so much to wonder at in the natural world. Here's some information you can share with pupils to help inspire their Pocket Garden Designs for 2024. ENJOY!

### Nests and other homes

Animals construct clever structures that transform natural materials into shelters that have built in air-conditioning, temperature control and defensive measures.

- **Swallows** build their nests on vertical surfaces. <https://academy.allaboutbirds.org/cliff-swallows-build-nests-from-mud/>
- How a **Woodpecker** makes a hole in a tree <https://www.youtube.com/watch?v=LiFzfDLco9s>
- The **Pie-billed Grebe** builds a floating nest with rotting plant material that gives off a little bit of heat as it rots and helps to incubate the egg. <https://www.audubon.org/news/how-grebes-build-floating-nests-keep-their-eggs-high-and-dry>
- **Weaver birds** weave their nests from long strips of grass. Watch them weaving in the clip on this webpage <https://www.discoverwildlife.com/animal-facts/birds/bird-nests-guide>
- **Social weaver birds** create nests together that help to regulate the temperature inside both day and night <https://www.youtube.com/watch?v=jPibkNv7IM>
- Antarctic **Gentoo penguins** nest building with pebbles <https://www.bbcearth.com/news/the-gift-to-win-a-penguins-heart>
- **Caddis fly larvae** use tiny stones to build a shell for camouflage and protection, some will spin a net to catch food. Watch both here <https://www.facebook.com/BBCSpringwatch/videos/the-curious-case-of-the-caddisfly-%EF%B8%8F/355391982780610/>
- **Honey bees** across the world build their hives from hexagon shapes. Here's why: <https://www.youtube.com/watch?v=F5rWmGe0HBI>
- **Orangutans** build a nest in the tree canopy. These orphan orangutans are learning how to build a nest. <https://www.youtube.com/watch?v=q5ic4j7s7j4>
- **Weaver ants** build a nest for the colony by sticking leaves together with silk. <https://www.youtube.com/watch?v=o5X82nu5cgk>
- **Spiders** weave amazing webs and this one uses its silk to hoist an empty shell it want to live in, into a bush. <https://thekidshouldseethis.com/post/this-snail-shell-spider-uses-its-web-to-hoist-objects-up-high>
- Find out about the **Social weaver bird, Great Bower bird, Pufferfish, Oriental hornet, and Prairie dogs** in this 8 minute clip <https://nerdfighteria.info/v/wYPQLsS3ST8/>

## Ecosystem engineers

Some animals, sometimes called 'keystone' species, create conditions that allow lots of other species to thrive and they are seen as ecosystem engineers.

- **Purple sea star** is an apex predator of North American tide pools and was one of the first species to be identified as a keystone species. A 'Green World' clip here explains the influence of levels in a food pyramid. <https://media.hhmi.org/biointeractive/click/keystone/sea-star.html>
- **Beavers** build a dam to make a pond. <https://www.youtube.com/watch?v=iyNA62FrKCE> The dams slow the flow of water, recharge aquifers and let sediment settle, improving water quality and availability downstream. The pond and wetland area created by the dam support other wildlife too <https://www.oneearth.org/the-benefits-of-beavers/>
- **Wildebeest** A herbivore whose diet of grass is the key element in the health of the whole Serengeti ecosystem. <https://www.youtube.com/watch?v=4HxUnl1Kij8>
- **Earthworms** can transform a soil. They improve soil fertility and structure as well as being food for lots of other creatures. <https://www.earthwormsoc.org.uk/earthworm-function> You can see why Darwin called them 'nature's ploughs in the clip on this page: <https://www.forbes.com/sites/davidbressan/2016/05/24/earthworms-as-landscape-engineers/>
- **Wolves** We know that predators control the number of their prey species. The reintroduction of wolves to Yellowstone Park in America shows their impact on the whole ecosystem and even the physical geography. <https://www.youtube.com/watch?v=W88Sact1kws>
- **Mussels** are filter feeders. They draw in water to ingest the tiny particles of food that are suspended in the water. They effectively clean the water, so more light can penetrate, which supports more life. <https://www.youtube.com/watch?v=vrEyHo3SuZI>

## Human technology and biomimicry

There are modern technologies that imitate natural forms and benefit from improved efficiency and functionality.

- **Velcro** was inspired by the seeds of the burdock plant. <https://www.velcro.co.uk/original-thinking/our-story/>
- The **bullet train** in Japan mimics the shape of a Kingfisher's beak and features inspired by owls and penguins to increase speed and efficiency <https://asknature.org/innovation/high-speed-train-inspired-by-the-kingfisher/>
- **Air conditioning for buildings** is being inspired by the way that some creatures design their homes such as termites. The first 2 minutes of this clip explain how termites create air conditioning for their home. <https://www.bbcearth.com/news/what-termites-can-teach-architects&ocid=twert>