Teacher Guidance on Challenges and Functions

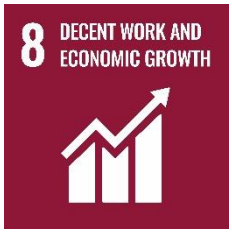
These notes are to support teachers. Some Teams might need additional support in deciding on the best Functions relevant to their selected Challenge. Below are some suggested Functions for each Challenge which you can share with Teams as appropriate. All the Functions and organisms listed can be searched via the www.asknature.org website.

Providing Teams with one or two Functions will ensure they start their Challenge more confidently. Additionally, you might like to offer one or two organisms to help, again ensuring Teams develop confidence in their investigations.

It can be helpful for Teams to test out some of their Functions using the Ask Nature website, and then refine their final list of Functions.

Challenge	Suggested Function	Organisms to Explore (from Ask Nature)
How to grow food in cities	Breakdown waste Cooperate between species Collect water Optimize space	Fungi Forest canopies Namib beetle Bees

Challenge	Suggested Function	Organisms to Explore (from Ask Nature)
How can we design a building that keeps people healthy whilst minimizing the ecological impact of the building?	Maintain stable temperature Send/sense signals Protect from microbes Distribute (fresh) air	Ants Water strider Cicada wings Black-tailed prairie dog
How to make glue that doesn't kill you?	Attach permanently Attach temporarily Make polymers	Mussels Slug adhesive Black coral



Challenge	Suggested Function	Organisms to Explore (from Ask Nature)
How does my business get noticed?	Create colour Modify light/colour Send light [signals] Send sound [signals]	Butterflies Fireflies Plantain Mole cricket
How does nature relax?	This is a harder Challenge than it sounds. It's important to consider the specific building you want to change and what creates stress e.g. excess noise, over-crowding, heat, etc. Once you have more details, then specific Functions can be considered.	

Challenge	Suggested Function	Organisms to Explore (from Ask Nature)
What if buildings cooled themselves without energy from fossil fuels?	Maintain stable temperature Distribute gases (air) Protect from (high) temperature Sense temperature cues	Termites Sycamore seedpods Dromedary camel Common vampire bat
How do I find like-minded people to cooperate with?	Coordinate by self-organisation Cooperate within the same species Adapt behaviours Coordinate activities	Insect colonies Mycorrhizal fungi Chestnut-mantled oropendola Birds

Challenge	Suggested Function	Organisms to Explore (from Ask Nature)
How do we stop buildings over-heating on a hot day?	Protect from temperature Transform thermal energy Reflect light Maintain homeostasis	Numbat Saharan silver ant Emperor penguin Yellow bumblebee
How can we create more efficient ways to travel where we need to go?	Cooperate between (eco)systems Coordinate activities Move in/on liquids (reduce drag) Move in/on gases (reduce drag)	Red harvester ants Starlings Fish Common swift
Can we create building materials which reduce carbon emissions?	Optimize shape/materials Manage tension Manage compression Store chemical entities (carbon) Physically assemble structure	Birds (nest building) Fish-pole bamboo Sea urchin Coral polyp Coral
How can buildings adapt to changing sea levels and increased flooding?	Modify buoyancy Move on liquids Sense motion [water level changes] Protect from excess liquids	Brown algae Fish Shrimp [Euchaeta rimana] Beaked sedge

Challenge	Suggested Function	Organisms to Explore (from Ask Nature)
Can we create clothing which does not harm the planet?	Manage tension Chemically assemble polymers Physically assemble structure	Cherry leaf roller Bacteria Spider silk
How to keep kitchen surfaces clean?	Protect from excess liquids Protect from dirt/solids Breakdown compounds	Nasturtium Cicada Long-finned pilot whale
How to sleep warm and waste free?	Protect from temperature Physically assemble structure	Emperor penguin Spider silk
How to make better choices quickly?	Cooperate within the same species Learn Coordinate by self-organisation	Bees Bottlenose dolphin Tonkean macaque