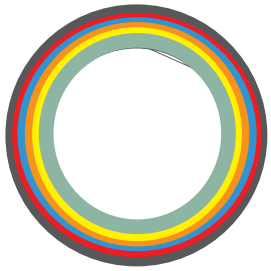
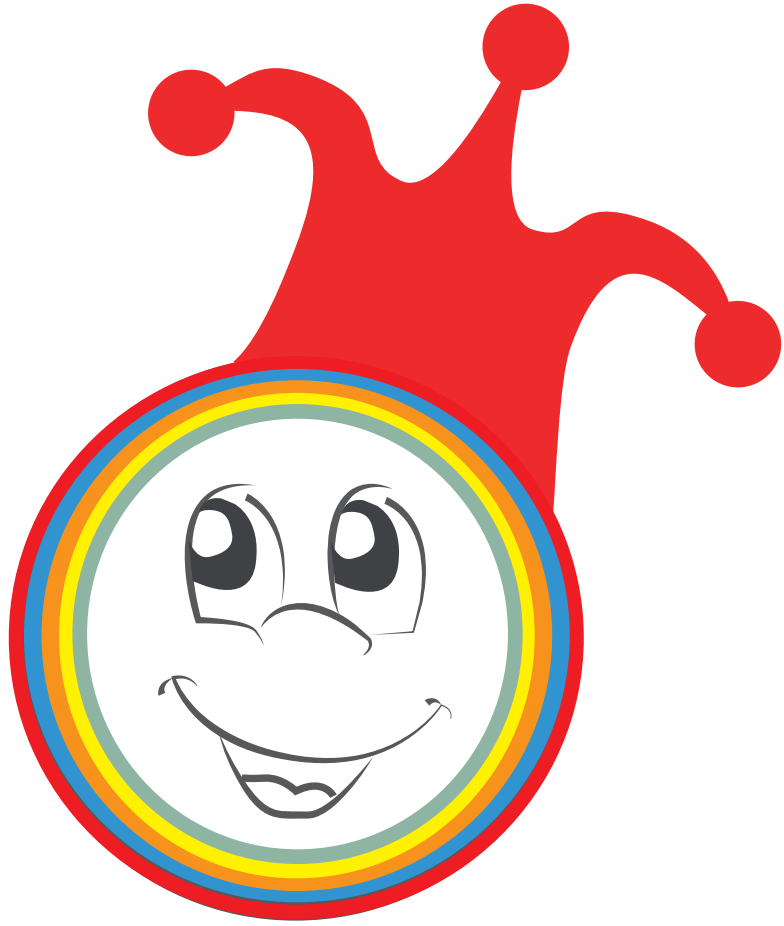


JOKER

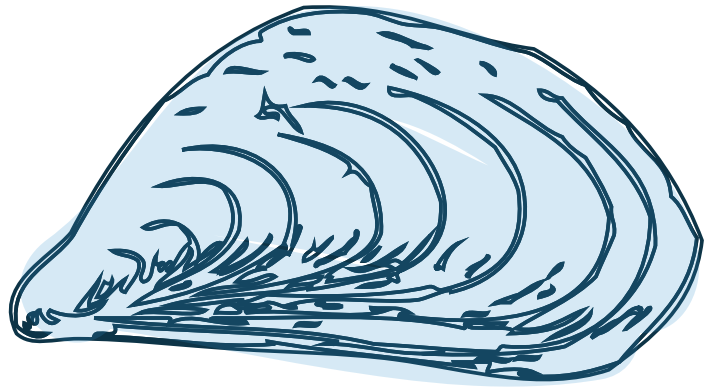


Nature has gone through 3,8 billion years of evolution, which is in effect R&D! The observation of ecosystems allows us to rethink how we design, build and live. There is still so much to discover around us.

BIOMIMICARDS.com

MUSSEL

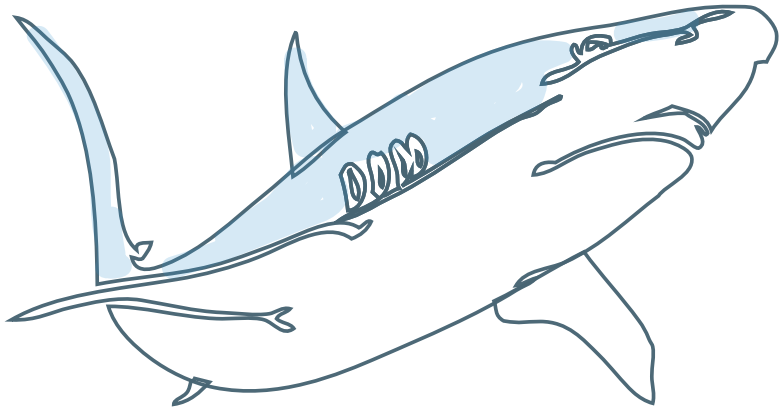
WATER



STICK IN WATER: Mussels are able to synthetize sticky filaments in sea water. This glue sticks firmly to the rocks.

SHARK

WATER



ANTI-ADHERENT: Some shark skins have anti-viral capacities thanks to a substance that makes cells less accessible to viruses. Consequently, it always stays clean and inspired buoy paints, avoiding subsequent maintenance costs.

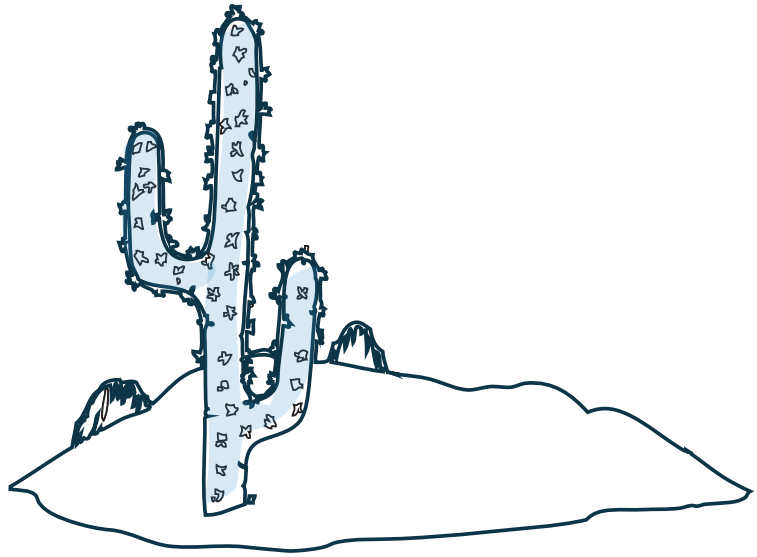
WATER

RIVER

VORTEX: It is by means of a whirlpool that clean. This physical and non chemical cleaning up takes down solid waste, breaks down membranes, and prevents multiplication of toxic bacteria and dilutes pollutants they contain.

WATER

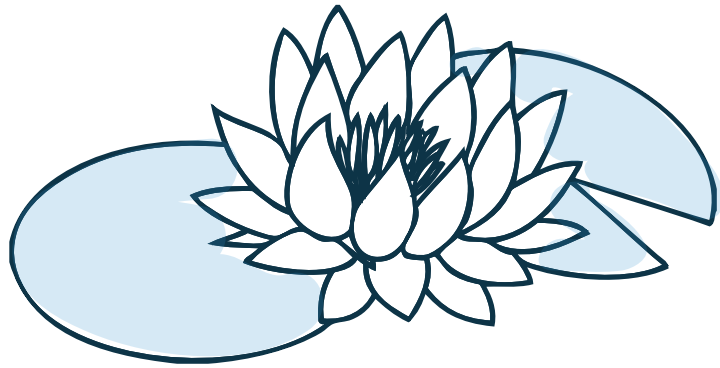
CACTUS



CONDENSATION: Condensation water rain can accumulate and gives the cactus a layer of insulation; as well as a little humid air inside a protective membrane, reducing global water loss.

LOTUS

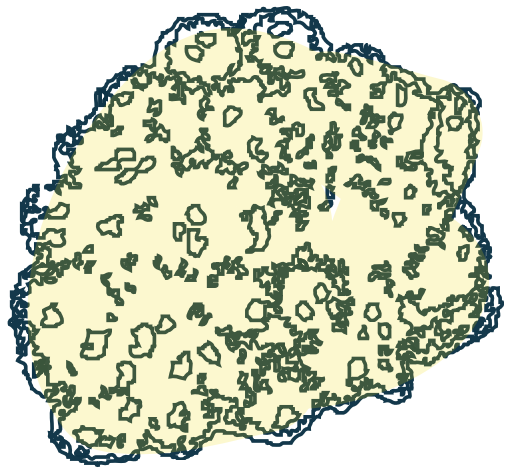
WATER



HYDROPHOBIC: The microscopic structure of the lotus leaf with buds covered with wax reduces the contact surface and water adhesion, allowing self-cleaning without detergent or not energy.

SEA SPONGE

LIGHT



OPTICAL FIBER: Extremely flexible fibres of sea sponge, made at low temperature, transmit light more effectively than current fibre optics that need very high temperatures and very expensive equipment.

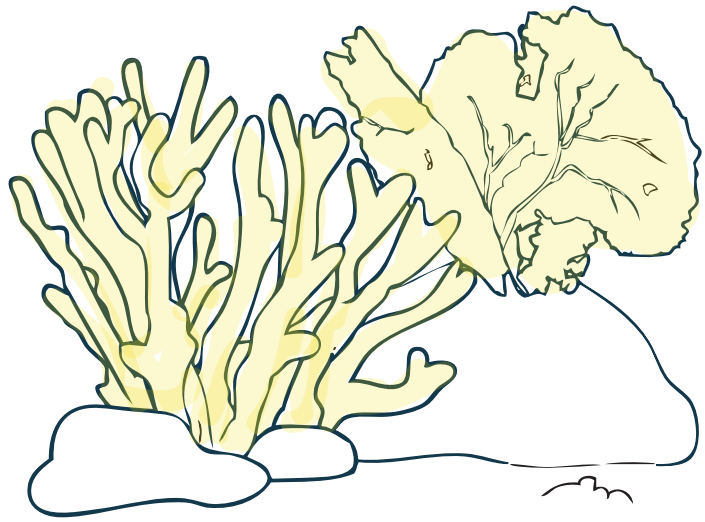
LIGHT

TOMATO

UV PROTECTION: Tomato skin is rich in lycopene, a powerful antioxydant blocking UV, more efficient than the best titanium oxyde.

CORAL

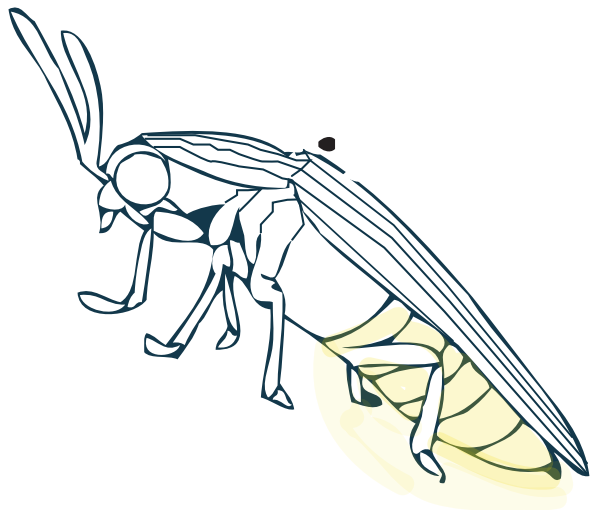
LIGHT



SOLAR FILTER: To protect itself from UV light, coral has developed unique solar protection currently being studied for sun lotions in Australia, which is known for being the country recording the highest skin cancer rate.

LIGHT

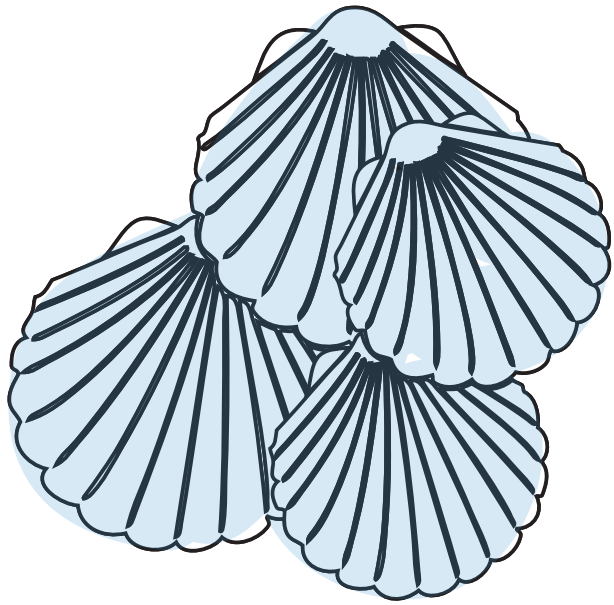
FIREFLY



LED: The firefly's abdomen is covered with saw smooth scales multiplying the emitted light. This structure enables the increased diffusion of light without any extra energy.

WATER

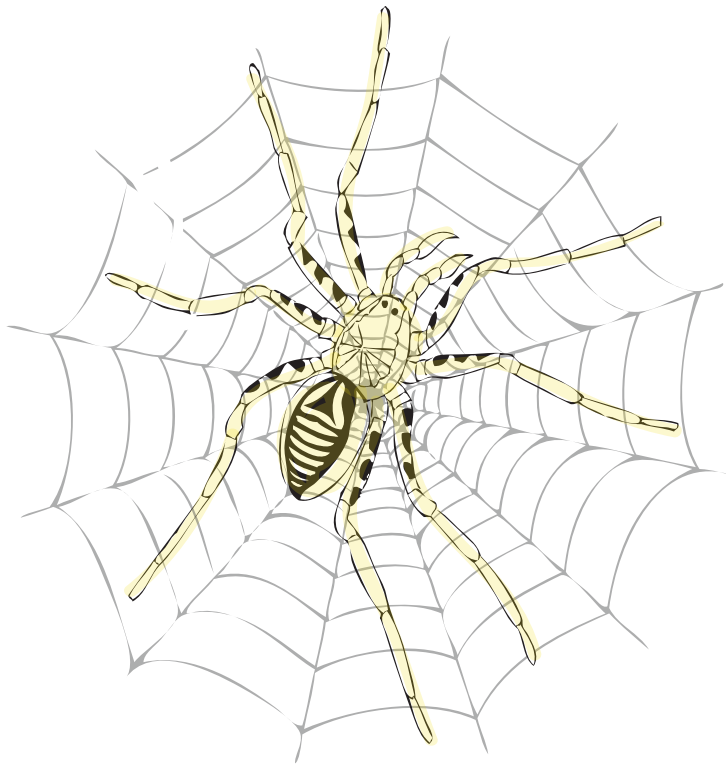
SHELL



SELF-CLEANING: Shell forms itself with the protein of the mollusc and water. Another protein can stop the shell growth: it can be used to avoid obstruction of pipes.

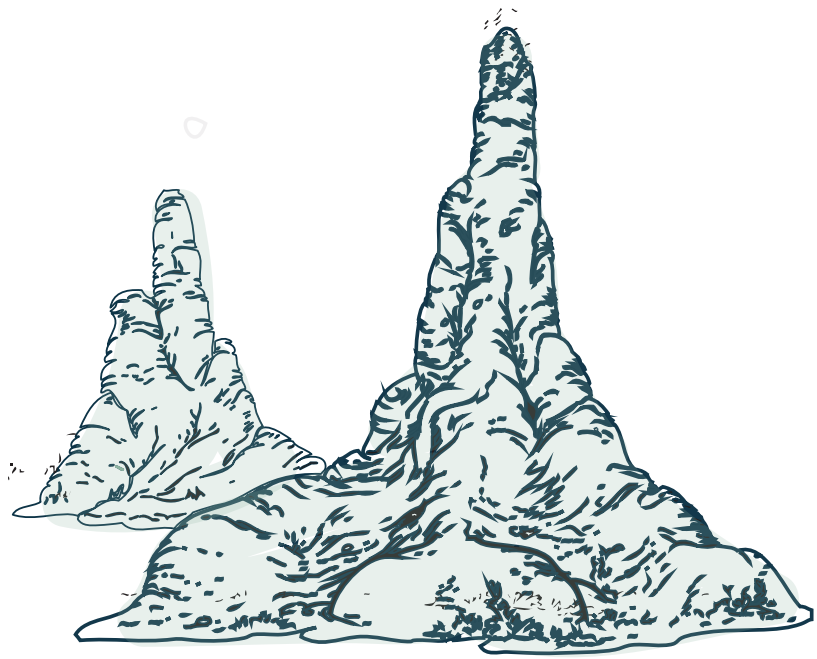
LIGHT

SPIDER



GLASS: Some spider species produce silk thread reflects which UV, attracting some insects while repulsing larger animals such as birds. This thread inspired the development of windows that birds can see.

TERMITE



AIR CONDITIONING: With very high central chimneys that rise above the nest and small holes situated all around it, the air is sucked by these inferior parts evacuating the hot air, creating a natural air conditioning system.

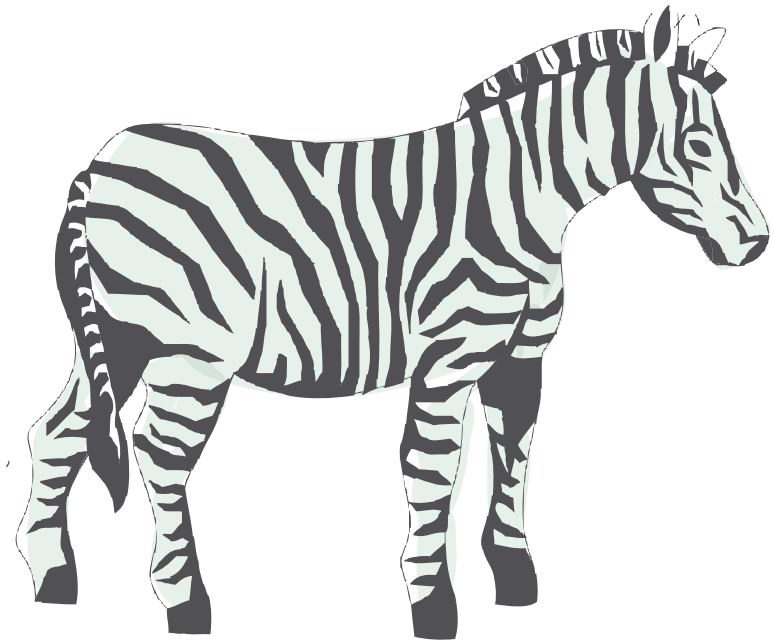
AIR

GECKO

SUCTION: The gecko has gills under its fingers that allow it to climb on any surface, including the smoothest surface, just like suction bads.

AIR

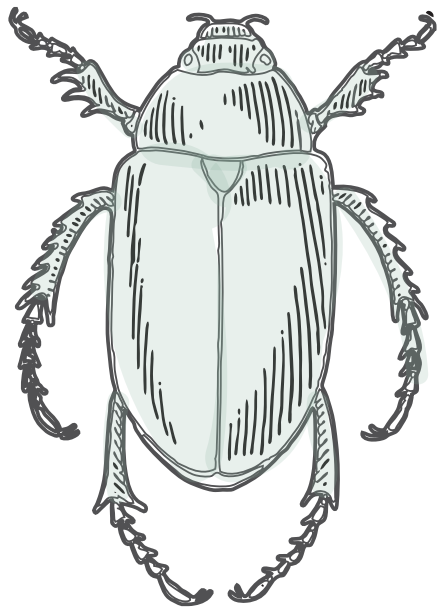
ZEBRA



TEMPERATURE CONTROL: Zebras have black stripes that absorb the light and white stripes that reflect the light. The air circulates between hot and cool parts causing convection currents, refreshing the animal.

AIR

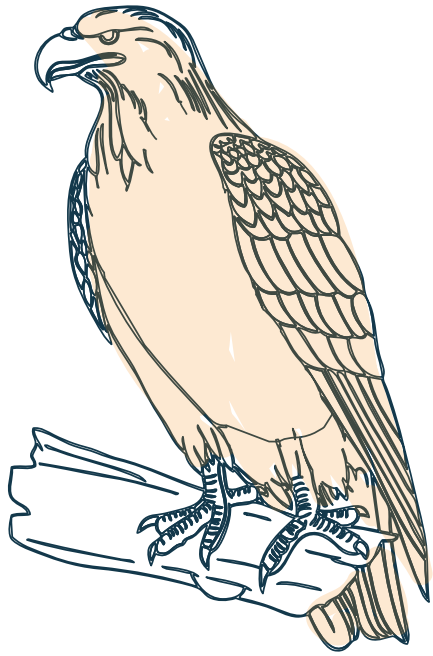
BEETLE



MOISTURIZE: The beetle survives by collecting water from morning dew thanks to its embossed shell. The dew condenses on its bumps and forms droplets that flow down into its mouth.

EAGLE

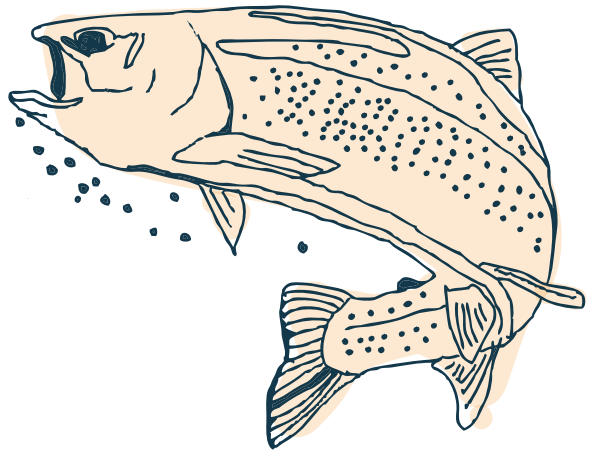
ENERGY



LIFT: The wings of the eagle are made of feathers between which air can flow into multiple whirlpools offering little resistance and lower energy needs.

TROUT

ENERGY



WAVE MOVEMENT: The tail of the trout follows a wave movement where water moves one way along the animal. This movement is better adapted than the propeller in a water environment because it creates less friction and reduces the energy needs.

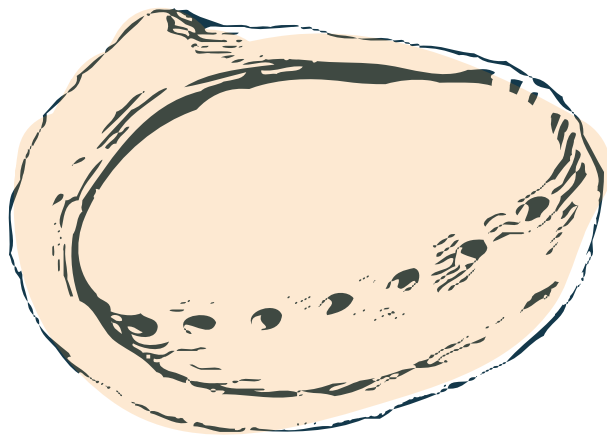
ENERGY

BURDOCK

VELCRO: Burdock was used for the development of velcro. The inventor of this self-sticking tape had the idea while observing burdock stick to his velvet trousers.

ABALONE

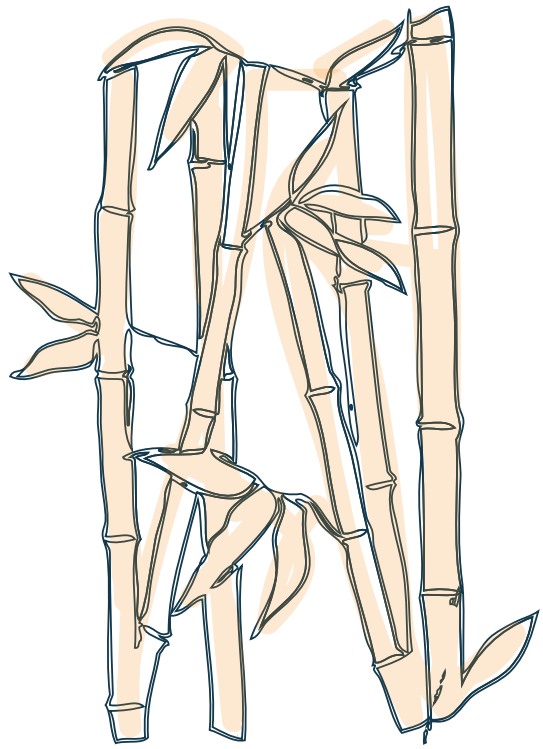
ENERGY



STRONG CERAMIC: This surprising shell makes an ultra strong ceramic from water, at ambient pressure and temperature. Its structure remains flexible thanks to a super protein which makes it very resistant to shocks.

ENERGY

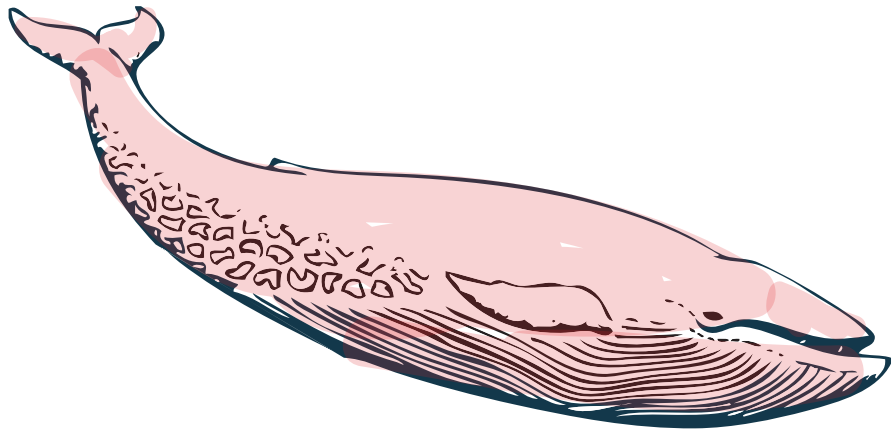
BAMBOO



SUPERSTRUCTURE: Bamboo is one of the fastest growing plants. In Asia, it has long been used to build scaffolding, and more recently to reinforce concrete whilst making it flexible in the face of cyclones and earthquakes.

WHALE

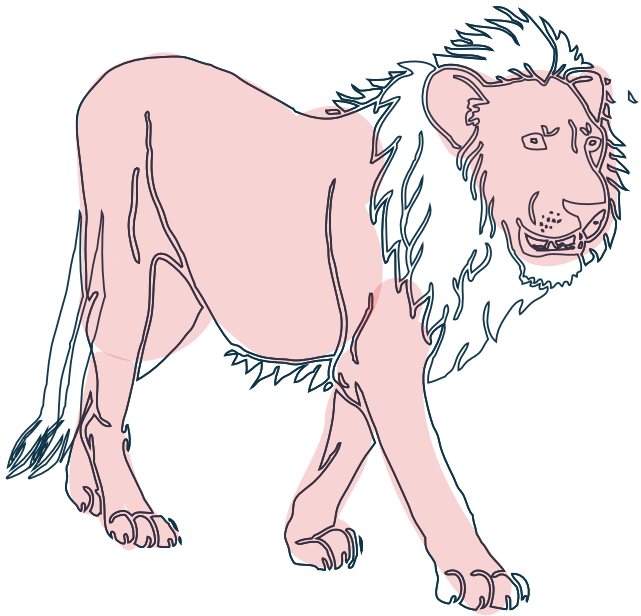
SOUND



SOUND REDUCTION: Stria on the fins of the humpback whale are currently inspiring research for noise reduction of wind turbines and an increase in energy generation.

SOUND

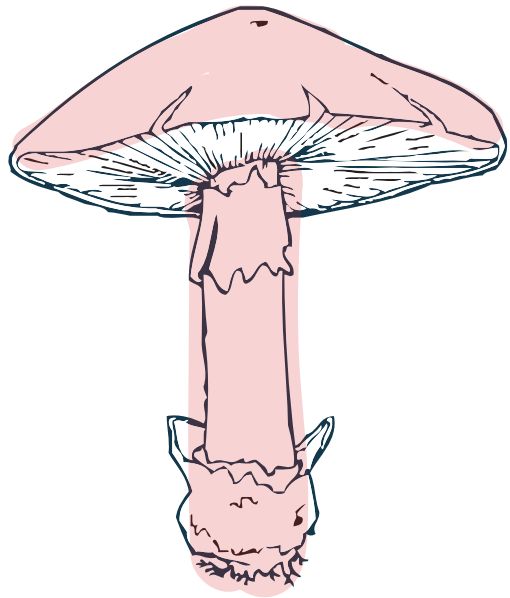
LION



SILENT MOVEMENT: Lions are digitigrades, meaning they walk on their digits or toes. Lion cushions are particularly adapted to make walking and running as silent as possible by diminishing noise and friction on the ground.

MUSHROOM

SOUND



INSULATION: A mushroom is neither a plant, nor an animal. It can grow in the most complete darkness while feeding from almost everything. Once drained of water, it can be used as a building material because it can insulate from sound and is fire-resistant.

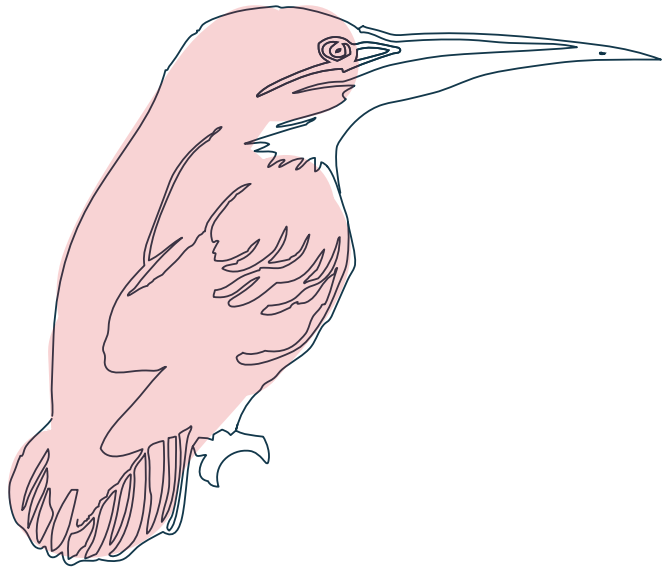
SOUND

BAT

SONAR: Bats never hit an obstacle. They screech and modulate their frequency to differentiate themself from others. This technique has been used to improve sonar and industrial radars.

KINGFISHER

SOUND



LOW IMPACT: Thanks to the ergonomic form of its beak and head, the kingfisher can dive very quickly into the water without losing speed. It has very low turbulences and makes very little noise.

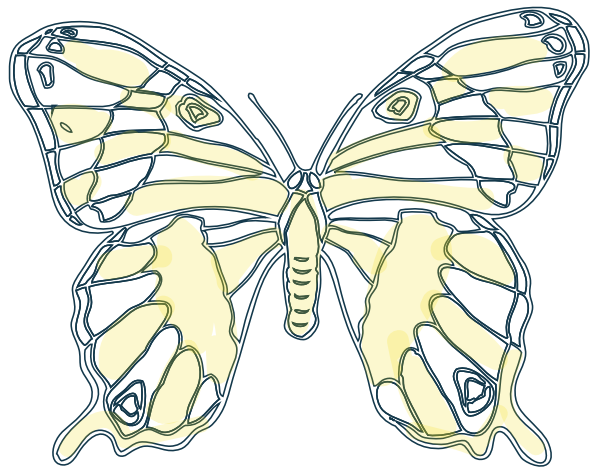
AIR

MAGGOT

HEALING WOUNDS: Some maggots have the special characteristic of being able to consume only infected tissues, to help wounds heal in healthy tissue by stimulating the production of healthy ones. They disinfect wounds without antibiotics.

BUTTERFLY

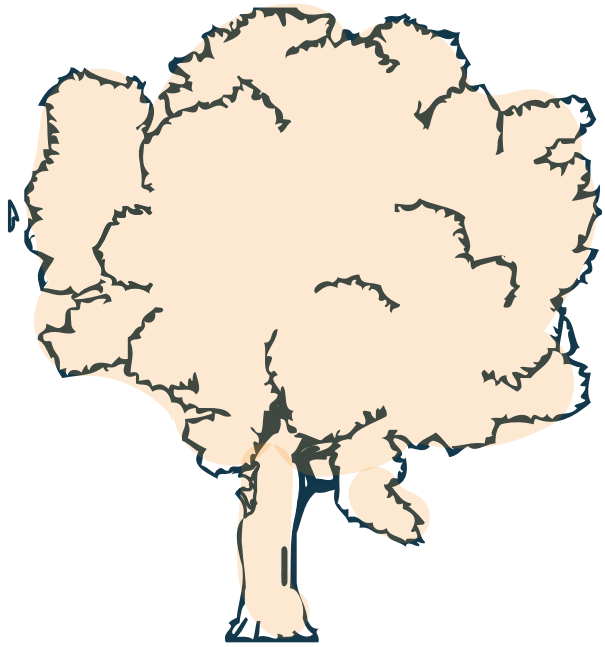
LIGHT



COLOUR WITHOUT PIGMENT: Without ink or pigment, the butterfly wings are coloured. A clever structure plays with the reflection of light to change colour according to the butterfly's needs: protection from predators or seduction.

TREE

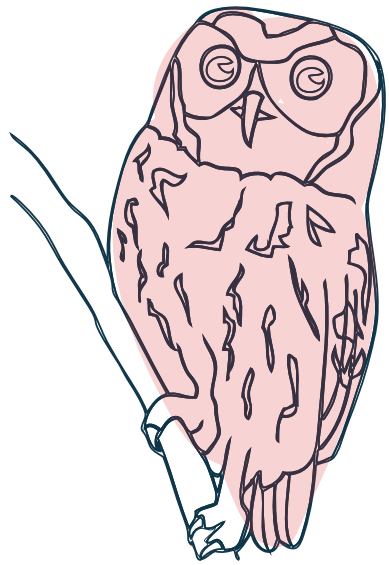
ENERGY



CAPILLARY PUMP: A tree doesn't grow with an inbuilt pump, but it can convey water from roots to leaves. This phenomenon is possible by capillarity and thanks to natural evaporation of the leaves that pump sap from the bottom to the top of the tree. In some tropical forests, trees can even decide to make raining.

SOUND

OWL



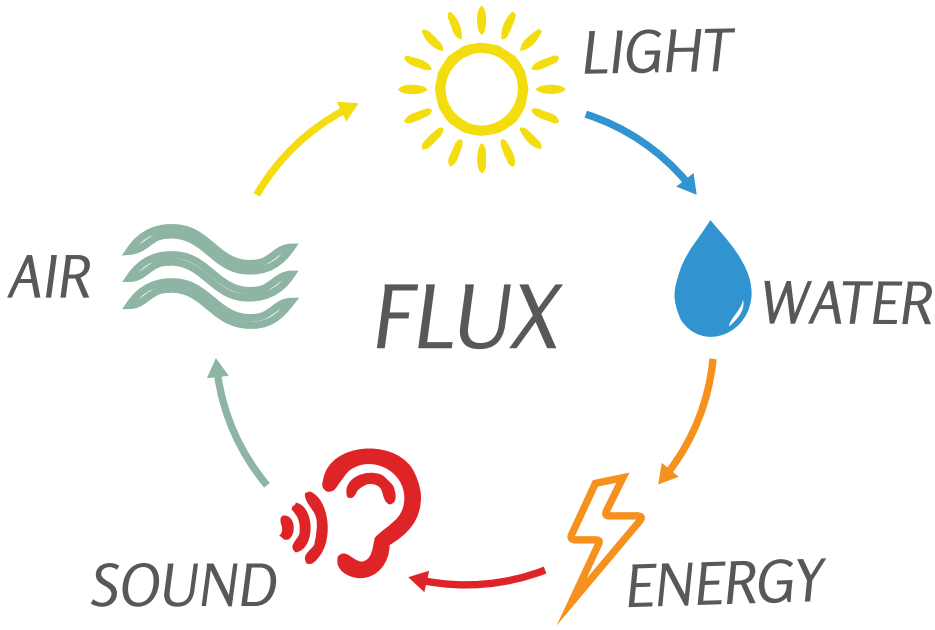
SILENT FLIGHT: The edges of an owl's wings are flexible and porous. It enables totally silent flight to better surprise prey.

AIR

DRAGON FLY

COMPLEX FLIGHT: The insect has two pairs of wings that create micro-draughts between them. This allows energy efficiency and savings, an ultra fast flight or stationary as well as single movements.

BIOMIMICRY



AREAS OF USE

- Architecture
- Electronics
- Transport
- Energy
- Furniture
- Health
- Textiles

BIOMIMICARDS.com

BIOMIMICARDS