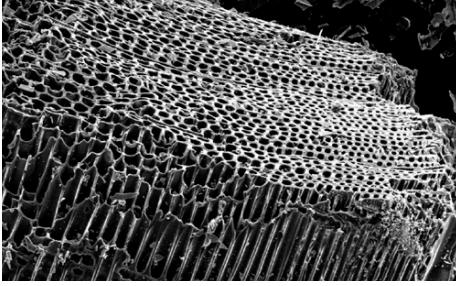
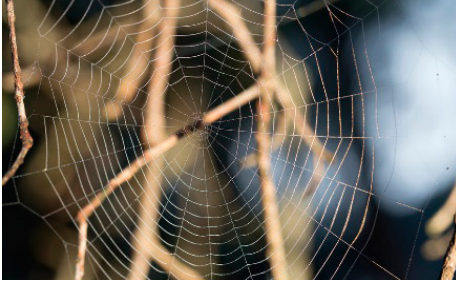






W4.2 PLANNING AND DESIGNING

Maintain strength and form (support human activities; resist strong winds)

	<p>WOOD STRUCTURE</p> <p>The structure of the growth rings creates a structure which is dense (strength) and flexible at the same time.</p> <p>Wood is composed primarily of two materials: cellulose and lignin. Cellulose is like rope, very strong when pulled, not when compressed. Lignin is like cement, strong in compression but not in tension.</p>
	<p>SPIDER WEB</p> <p>Most spider web silks have exceptional mechanical properties. They exhibit a unique combination of high tensile strength and extensibility (ductility). This enables the silk fibre to absorb a large amount of energy before breaking. Comparing silk to other materials, weight for weight, spider silk is stronger than steel, but not as strong as Kevlar.</p>
	<p>CORAL REEF</p> <p>Corals make their building materials (mainly limestone) without mining by using carbon-dioxide (CO₂) and sea water. Limestone is the main component of cement; corals offer a less energy intensive way to make cement.</p>
	<p>SEA CUCUMBER</p> <p>Sea cucumbers' skin is usually supple, allowing them to slide through narrow spaces between rocks and corals. But when touched a defensive reaction makes their skin go rigid in seconds, thanks to enzymes that bind protein fibres together. A second set of enzymes can break those bonds to make the skin soft again.</p>
	<p>BONE STRUCTURE</p> <p>The structure of bones is designed for holding weight whilst minimising material. Also, bones can adapt to increased or reduced stress and loads. The Eiffel tower in Paris was designed by studying the trabecular and macro structure in a femur bone.</p>
	<p>BEE HONEYCOMBS</p> <p>"A hexagonal honeycomb is the way to fit the most area with the least perimeter." (Thomas Hales mathematician). Space-efficiency is not the only benefit of building with hexagons. Stacked together, hexagons fill spans in an offset arrangement with six short walls around each 'tube' giving structures a high compression strength.</p>

Some more inspiring shapes and structures in nature; examples for biomimicry purposes can be found by searching online.



Snail shell



Hornet nest



Nidus (nest) of Oak Leaf-rolling Weevil



Physalis fruit



Pine cone



Tinder agaric