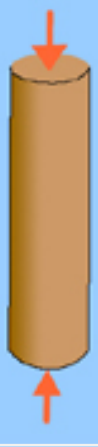
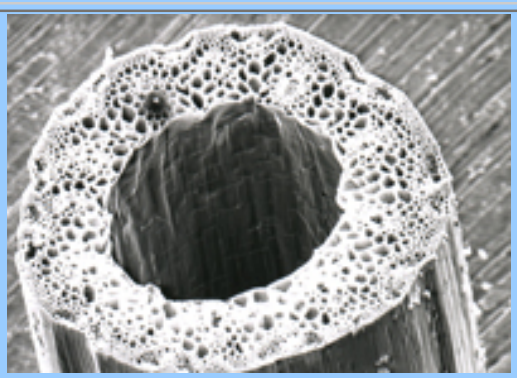
Tubes and Cylindrical Shells with Foam Cores





Plant Stem

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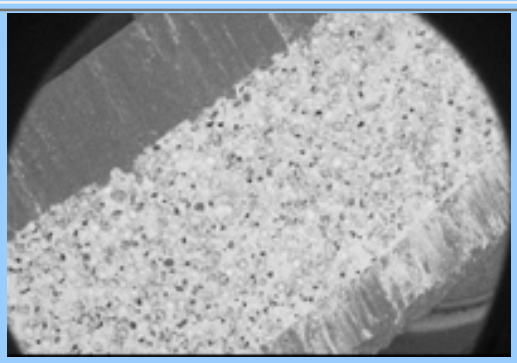
Hedgehog Quill

Many plant stems have a circular cross section with a structure made of a dense outer shell surrounding an inner layer of low density, foam-like cells. This structure is also seen in porcupine quills, hedgehog spines and bird feather quills. Some natural tube structures even have a central hollow core. All of these natural structures need to resist loads with the use of as little material as possible. The inner foam-like structure helps prevent the outer dense shell from kinking and collapsing like a bent drinking straw. Engineering tubes, like the plastic tube and aluminum tube shown on the right, have also been made with a foam core, mimicking the natural structures. To find

out more about how this mechanical system works, see the demonstration and poster on tube structures.

Blue Jay Feather



PVC Pipe