



## Activity – Using Nature to Inspire

Another way of designing with biomimicry is to find a fascinating process or animal in nature and use its features to inspire a totally new design. Let's practice with two examples!

**Challenge 1:** You sit outside on a nice summer evening and realise hours later that you have dozens of mosquito bites. You wonder why you didn't notice getting bitten at the time, and think about whether this could have any (less itchy!) applications.



**Tip 1:** The tip of a mosquito's mouth is made up of several moving parts that allow the mosquito to push into skin with little pain, so you don't realise you're being bitten... Here is a fascinating video showing it in detail: <https://youtu.be/rD8SmacBUcU>

Can you think of any device that could use these features?

**Inspired design 1:** Research engineers in Japan used sophisticated engineering techniques on the nanometre scale to create an artificial 'mosquito mouth' that uses moving parts and pressure to puncture skin. This produced a needle that penetrates like a mosquito – quickly and painlessly into the skin! – and is very useful for medical applications.





**Challenge 2:** Wasps have a similar feature in their ovipositor, the spike on their rear end, which helps them drill holes into wood where they can lay their eggs. This spike has several moving parts: two toothed parts ratchet the central drill spike into wood to bore the hole. This is a very efficient design that doesn't need a motor and very little force to drill... Can you think of any applications where a small-scale drill like this is useful?



**Inspired design 2:** This multi-part design provides a guided, smooth penetration into material, which is exactly what is required from neurosurgery tools. Brain tissue is very sensitive: developing a neuroprobe using this biomimetic design was a breakthrough for British researchers because it requires minimal force and no motors to operate.



These aren't the only possible designs, of course. Did you come up with something different? Be creative: there are many more innovations and inventions waiting to be developed!