



This activity represents how a scorpion finds prey by detecting vibrations in sand.

It supports the Eaten Alive exhibit Super Senses—Scorpion

What you need

Each group of students will need:

- Something that vibrates (e.g. cheap electric toothbrush, mobile phone with vibrating function!).
- One rubber exercise mat (e.g. cheap yoga mats cut in half) or a folded beach towel.
- One blindfold.

What to do:

1. Student A must hold the towel or rubber mat vertically in mid air.
Student B must hold the vibrating machine on the underside of the towel/mat.
Student C must be blindfolded and rest eight fingers on top of the towel/mat, similar to the way a scorpion's eight legs touch the ground, but their body (the students palms) do not touch the towel/mat).
Student D must record how successfully Student C can detect the source of vibration.
2. Once Student C is blindfolded and their fingers are in position on top of the towel/mat, Student B needs to leave the vibrating object at different spots under the towel/mat.
3. In less than two seconds, Student C must turn their fingers in the direction of the source of the vibration immediately and 'run' their fingers to where the vibrating machine is located.
4. Student D can record how many times Student C successfully located the vibrating machine in less than two seconds.
5. Students can swap roles to check whether they became more successful as they gained more practice, or if certain conditions made it easier or harder to detect the source of vibrations.

What to notice

How would you do this experiment differently to make it more like a scorpion's environment?

Could you feel vibrations in sand as easily as you feel vibrations through the towel or mat?

Can you detect the vibrations when the vibrating level of the machine has been turned down?

How fast would scorpions react to vibrations?

Experiment number	Successful location of vibrating machine	Unsuccessful location of vibrating machine

What's happening

Touch receptors in human hands detect vibrations. Sand or desert scorpions use the sense of touch on their eight feet to hunt at night.

During the day, desert scorpions burrow under the sand and emerge at night onto the surface to hunt prey. A scorpion's eyesight is rather poor, so it relies on its sense of smell and vibrations in the sand to pick up the location of its next meal.

Whenever an insect walks across sand, it sends out vibrations through the sand.

Sand is fairly absorbent, so vibration waves tend to travel up to 40 centimetres from a source. This means that there is little 'background noise' and the scorpion can pinpoint the source of vibrations fairly easily.

Tiny levers on the scorpion's feet detect vibrations as small as one millionth of a millimetre! Special nerves judge the timing and direction of the vibrations, so the scorpion can pinpoint exactly where the prey is hiding.



Scorpions react to the timing, rather than the strength of vibrations. If one weak, but detectable vibration passes under a scorpion, quickly followed by a second much stronger vibration, the scorpion only reacts to the first, weaker vibration.

After sensing vibrations, the scorpion quickly turns towards the prey and grabs it before inflicting a paralysing sting with its tail.

More information

For more scientific information on how a scorpion finds and captures prey, go to:

http://www.questacon.edu.au/html/assets/pdf/Super%20Sense_scorpion.pdf