

What Can Kesler Science Do for You?

4th - 8th grade science teachers love our Life, Earth, and Physical Science materials! With these easy and engaging materials, teachers can save planning time and put their focus back on the teaching that really matters.



5E LESSONS

Two-week lessons with over 100 topics



ESCAPE ROOMS

Engaging activities for review



INQUIRY LABS

Three different levels to fit every student



AMAZING ANCHORS

Anchoring phenomenon to book-end your lessons



SUB PLANS

Never worry about planning for a sub again.



WARM-UPS

Bellringers for the entire year



STATION LABS

Student-led exploration



INTERACTIVE NOTEBOOKS

Bring science journals to life.



WIKI TICKETS

Quick formative assessments



STEM CHALLENGES

Real-world STEM problem-solving



GRAPHING

Table and charts and graphs ... OH MY!



SCIENCE READING COMPREHENSION

Leveled reading passages with mini-activities



SPANGLER COLLABORATION

Exclusive Steve Spangler lessons and videos



WRITING PROMPTS

Writing activities covering 100+ topics

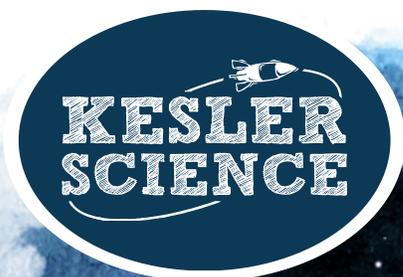


EXPLORIES

Story-driven units with integrated activities



The Kesler Science Professional Learning Network (PLN) group on Facebook has a huge community of engaged and supportive science teachers - come join us!



Electric Bees?

Bees are some of my favorite insects. They have complex social structures, they're critical to pollination, and they dance!

I'm not alone in my bee-positive interest, either - scientists love bees. As a result, bees are one of the most highly researched animals in the world.

This week, though, I learned a new fact about bees, and it's blowing my mind.

But first, some background information. Have you heard of the Atmospheric Potential Gradient (APG)? This is the difference in charge between the ground, which is negative, and the ionosphere, which is positive. The charge increases with each meter of height.

Organisms that are connected to the ground, like trees and flowers, carry a negative charge, even as they rise into the atmosphere. The taller the organism, the greater the difference between their charge and the charge of the air around them. This creates disturbances in the electrical field around the plant.

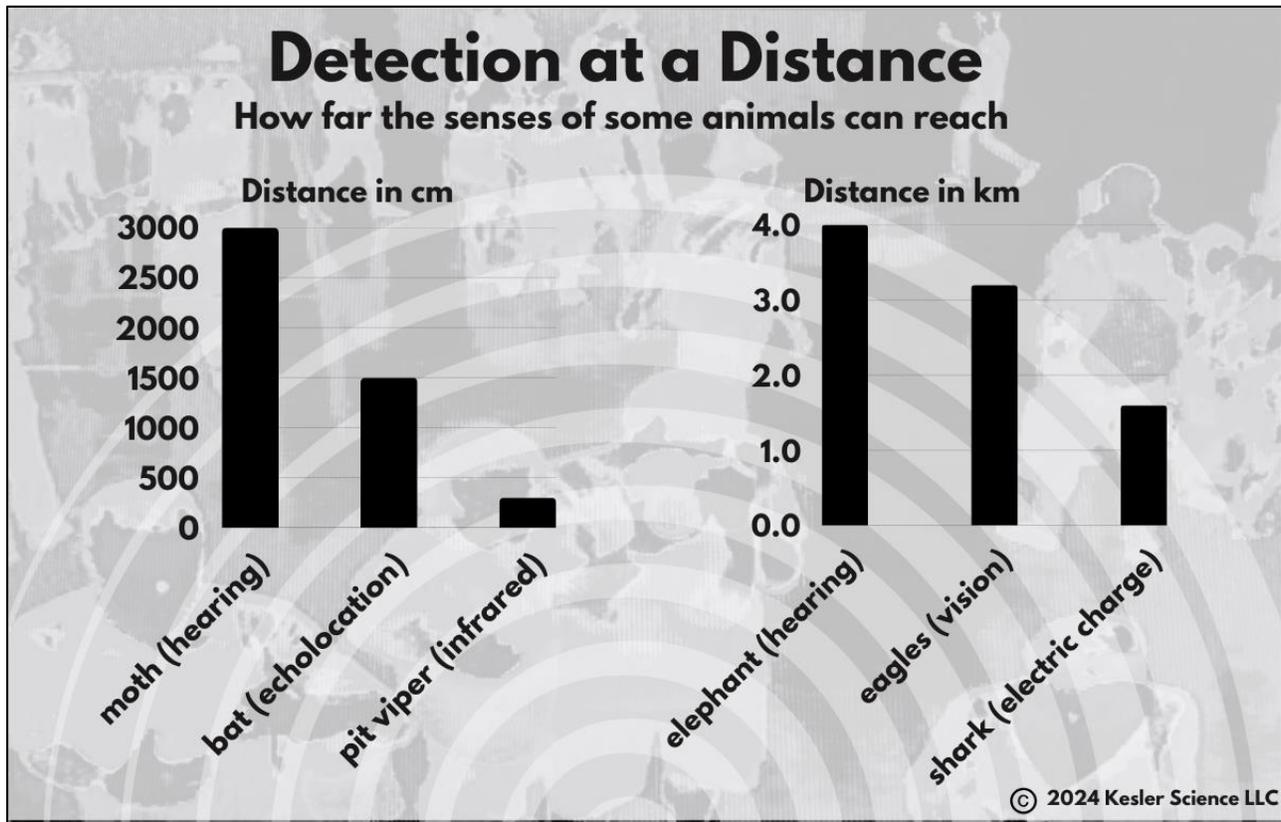
Here's the first mind-blowing fact: bees have special hairs on top of their bodies that can detect this difference in charge from 10 cm away! The hairs bend in response to the negative charge and direct the bees to fly toward negatively charged flowers.

Why does this matter? Because bees, in contrast to plants, pick up a positive charge as they fly through the air. When they visit a flower, all sorts of interesting things happen.

First, the positive charge of the bee attracts the negatively charged pollen toward the bee's body. The pollen will literally jump against gravity! This means the bee picks up much more pollen than if they had to actually touch every grain. It also means that some of the rising pollen gets intercepted by the stigma of the plant, which helps pollination. It ALSO means that pollen that would be pulled to the ground by gravity and lost when the bee shakes the flower gets pulled UP and saved instead.

The other fascinating thing that happens when a bee visits a flower is that the positive charge of the bee neutralizes the negative charge of the flower. It's a temporary effect - the bee gets their positive charge back as they fly - but it lasts long enough that bees can detect the difference between that flower and un-visited flowers. This helps bees not return repeatedly to flowers that have already had their pollen and nectar collected!

Bees aren't the only animals with the ability to detect stimuli at a distance. Check out the graph on the next page to get a "sense" of how weird and wild animal detection systems can be!



1. Moths are prey for bats. How does the hearing of moths give them an advantage over bats?

2. What is the difference between the way the two graphs display data? What would happen if all the information was on the same graph?

3. Bees can detect electric charge at 10 cm. On which graph would you display that information, and what would it look like?

4. Blue whales can hear whale songs from 1,600 km away! On which graph would you display that information, and how would it affect how the graph looks?

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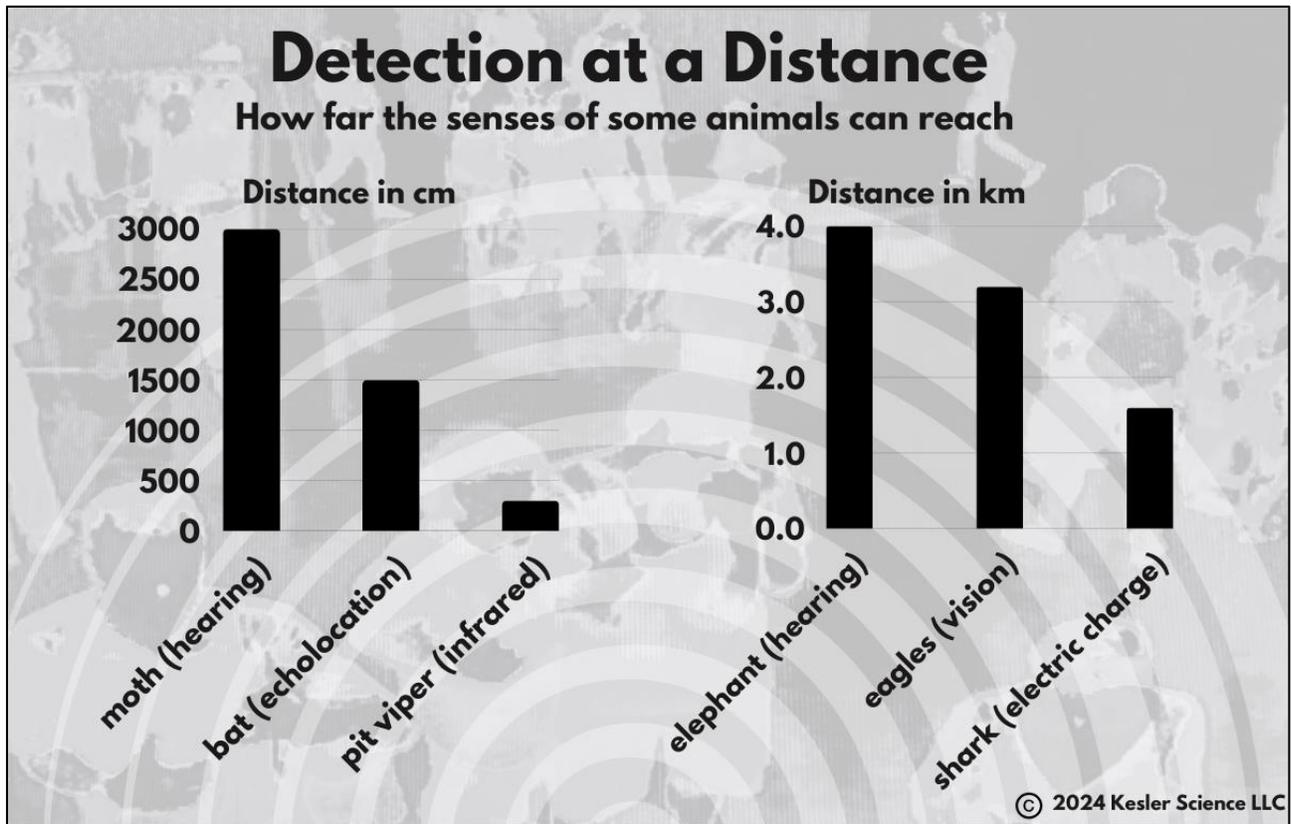
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Moths can hear bats from 30 meters away, but bat echolocation only works at closer than 15 meters. This means moths can try to avoid bats before the bats detect the moths.

2. What is the difference between the way the two graphs display data? What would happen if all the information was on the same graph?

The graph on the left uses centimeters as the scale, while the graph on the right uses kilometers. If all the information was on the same graph, the elephant, eagle, and shark columns would be enormous, while the moth, bat, and pit viper columns would be so short that they would seem invisible.

3. Bees can detect electric charge at 10 cm. On which graph would you display that information, and what would it look like?

The bee information should be on the graph with the centimeter scale, but it would be a tiny column.

4. Blue whales can hear whale songs from 1,600 km away! On which graph would you display that information, and how would it affect how the graph looks?

The shark information should be displayed on the graph with the kilometer scale, but it would make all the other columns look tiny!