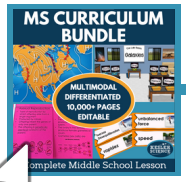
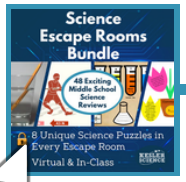
What Can Kesler Science Do for You?

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.



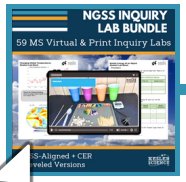
5E LESSONS

Two-week lessons with over 100 topics



ESCAPE ROOMS

Engaging activities for review



INQUIRY LABS

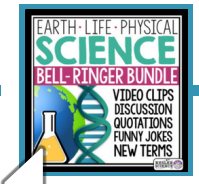
Three different levels to fit every student

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

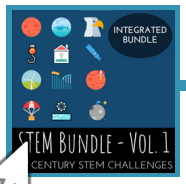
Student-led exploration

INTERACTIVE NOTEBOOKS

Bring science journals to life.

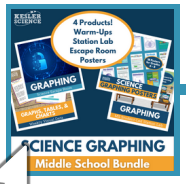
WIKI TICKETS

Quick formative assessments



STEM CHALLENGES

Real-world STEM problem-solving

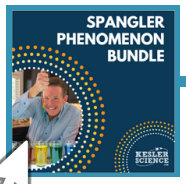


GRAPHING

Table and charts and graphs ... OH MY!

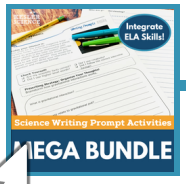
SCIENCE READING COMPREHENSION

Leveled reading passages with mini-activities



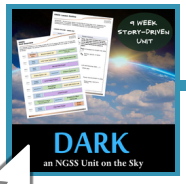
SPANGLER COLLABORATION

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!

KESLER SCIENCE

Name: _____

Date: _____

The Scale of Life

It seems like an impossible question to answer: if you put all the forms of life into groups (sea creatures, bacteria, animals, etc.) and plopped them on a scale, which group would weigh the most? I was shocked to find that scientists have figured out a pretty reliable way to give us an answer - and the results are not at all what I expected!

Let's start with how scientists tackle finding the mass of every living thing on Earth. First, they settled on gigatons of carbon (GtC) as a measurement unit. Carbon can be found floating in the air, mixed with ocean water, or locked away in rocks. It's also stored in anything that's alive!

Scientists will survey a specific type of biome, like a deciduous forest, and calculate the carbon stored in each population. They get a decent count of the living things found in that area and apply that number to every similar biome on the planet! 🌎 It's a rough estimate, for sure, but it reveals some jaw-dropping patterns.

So is the planet straining under the weight of people? Ocean creatures? Bacteria? Nope.

The heavyweight that contributes the most mass in gigatons of carbon is **land plants** - by a LOT. 🌳 The human population has a biomass of 0.06 GtC. Plants have a total biomass of 450 GtC. That's 7,500 times MORE than the mass of every person alive! 😱

Now, things got weird for me when I dug into the biomass data. There are some strange rankings in the smallest-to-largest biomass lineup!

First, let's look deeper at the big picture. At the kingdom level, the world's bacteria biomass is around 70 GtC. Can you imagine the size of the bacteria population it would take to make up that much biomass??

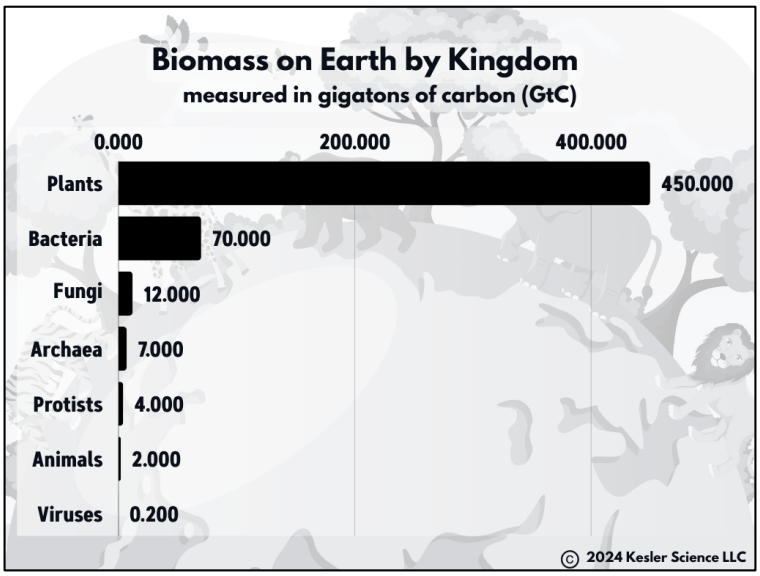
Viruses, though, have the tiniest biomass - just 0.2 GtC. There are an estimated 10 nonillion (10 with 30 zeroes) viruses on Earth! According to the National Human Genome Research Institute, **if you could place all those viruses end to end, you could make a line to the next galaxy--and back!--40 times.** 😱 Can you imagine how lightweight those viruses must be to have so little biomass?

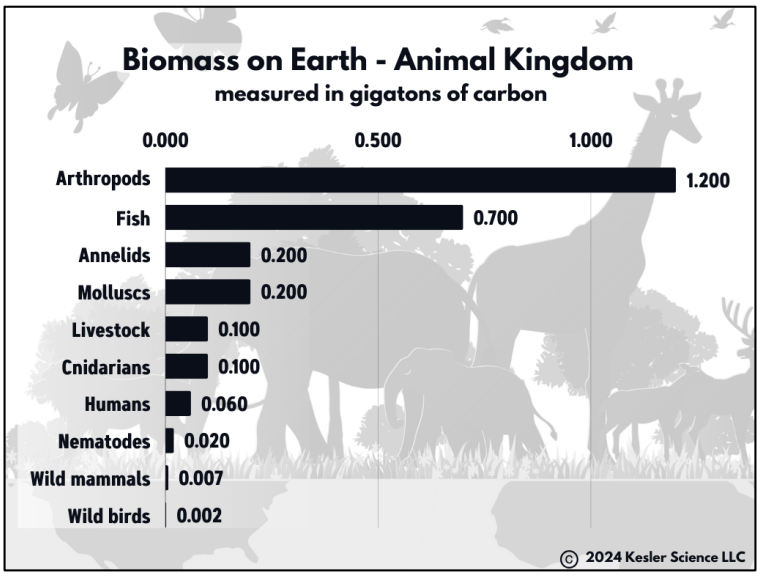
Diving into the 2 GtC of the animal kingdom, leggy arthropods (terrestrial + marine) weigh in at 1.2 GtC - by far the heaviest group.

That makes sense to me, but do you know what I didn't expect? Humans are outweighed by cnidarians! Those are creatures like jellyfish, sea anemones, and corals. I had no idea they would outweigh all of humanity.

Sea anemones

The Scale of Life





1. Terrestrial (land) plants contribute much more to the world's biomass than marine plants. What resources are more easily available on land compared to water?

2. Check out the biomass of wild birds. What do we know about their biology that might contribute to their ranking?

3. Scientists predict that the biomass of the animal kingdom looked a lot different when the human population was smaller. What do you think those differences are?

Weekly Phenomenon Graphing Activity Teacher Key

Blog Link: https://blog.keslerscience.com/phenomenon-and-graphing/scale-of-life

National Human Genome Research Institute: https://www.genome.gov/about-genomics/fact-sheets/Genomics-and-Virology

Graph data source: https://www.pnas.org/doi/10.1073/pnas.1711842115

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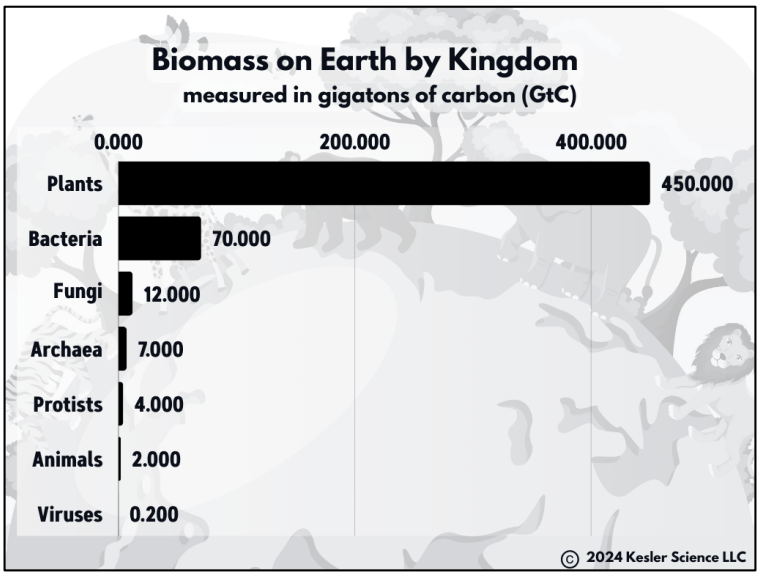
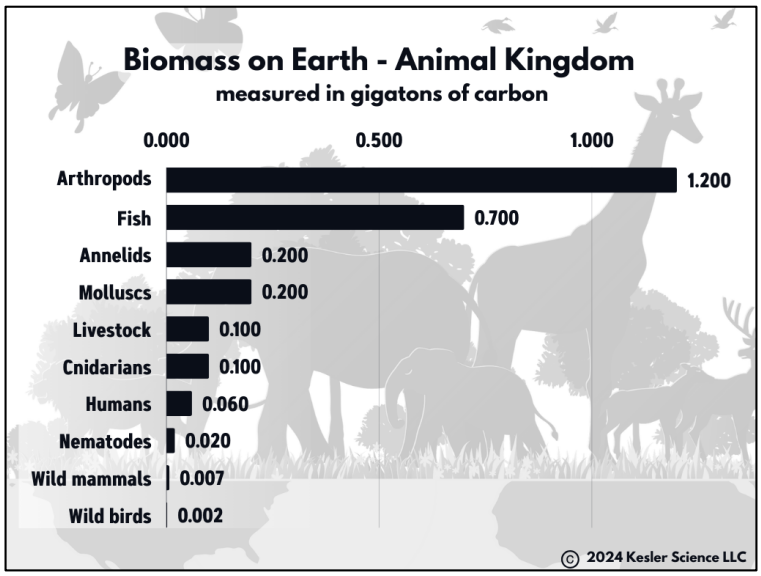
Sea anemones

Weekly Phenomenon
Graphing Activity
Teacher Key

The Scale of Life





1. Terrestrial (land) plants contribute much more to the world's biomass than marine plants. What resources are more easily available on land compared to water?

   This one gets learners thinking about the needs of living things that use photosynthesis. Gas dissolved in the atmosphere, soil, and access to sun (the ocean gets dark pretty quickly as you go down) would all be good answers.

2. Check out the biomass of wild birds. What do we know about their biology that might contribute to their ranking?

   This one gets learners thinking about the adaptations and skeletal systems, like how the pneumatic bones of birds have adapted to have so much space for air.

3. Scientists predict that the biomass of the animal kingdom looked a lot different when the human population was smaller. What do you think those differences are?

   This helps students look at relationships between humans and other members of the biosphere. For example, it's likely that the livestock biomass would be smaller but wild mammal and plant biomass would have been greater.