

4: EATING BIG, UGLY, SCARY WORDS FOR LUNCH

Today's Subject:

As suggested by the title, students will learn not to fear large, technical words, but to rather pause to understand them and add them to their vocabulary.

Purpose:

Scientific words can be intimidating because of the compounding of Greek and Latin combining forms. This lesson will help students learn to break down scientific words into their components to understand them and to increase their comfort level with them.

Vocabulary Builders:

Many new words were introduced in today's lesson, not so much for the student to memorize these words or their meanings, but to introduce the student to the idea of analyzing unusual words.

Activity Book Answers:

Crack these scary-sounding sentences to reveal some common expressions and famous sayings. Have a dictionary close at hand or use an online dictionary when you need help with a word. (You will probably need help with several words to complete this exercise.) If you get stuck on one of these, pass it up and come back to it at the end. If you still can't get it, even after you have

defined all the words then you may ask a parent, teacher or another student for help. Perhaps you are unfamiliar with the saying.

1. Present precipitation comprises felines and canines. *It's raining cats and dogs.*
2. The proto-avian acquires the oligochaete. *The early bird gets the worm.*
3. A minted disk of elemental copper alloy preserved is the same procured. *A penny saved is a penny earned.*
4. Every agglomeration of atmospheric condensate has an apparent aura of *argentum*. *Every cloud has a silver lining.*
5. Do not enumerate your barnyard fowl before they emerge from their ova. *Do not count your chickens before they hatch.*
6. That is an equine reflecting a dissimilar wavelength of visible electromagnetic radiation. *That's a horse of a different color.*
7. Do not lacrimate due to a capsized vessel of bovine lactic fluid. *Don't cry over spilt milk.*

5: THE SPACE-TRAVELING WEIGHT-LOSS PROGRAM

Today's Subject:

The relationship between mass and weight
Introduction to simple abstraction

Vocabulary Builders:

| | | |
|-----------|---------|--------|
| pounds | weight | x axis |
| kilograms | gravity | y axis |
| force | mass | |
| density | grams | |

Purpose:

Much of science (and of life in general) involves measurements on different related scales. The gasoline at the pump shows a relationship between the gasoline price and the number of gallons you pump. This lesson is designed to begin helping students analyze such simple relationships so they can better understand them. It also introduces the concepts of mass and weight and tells how they differ.

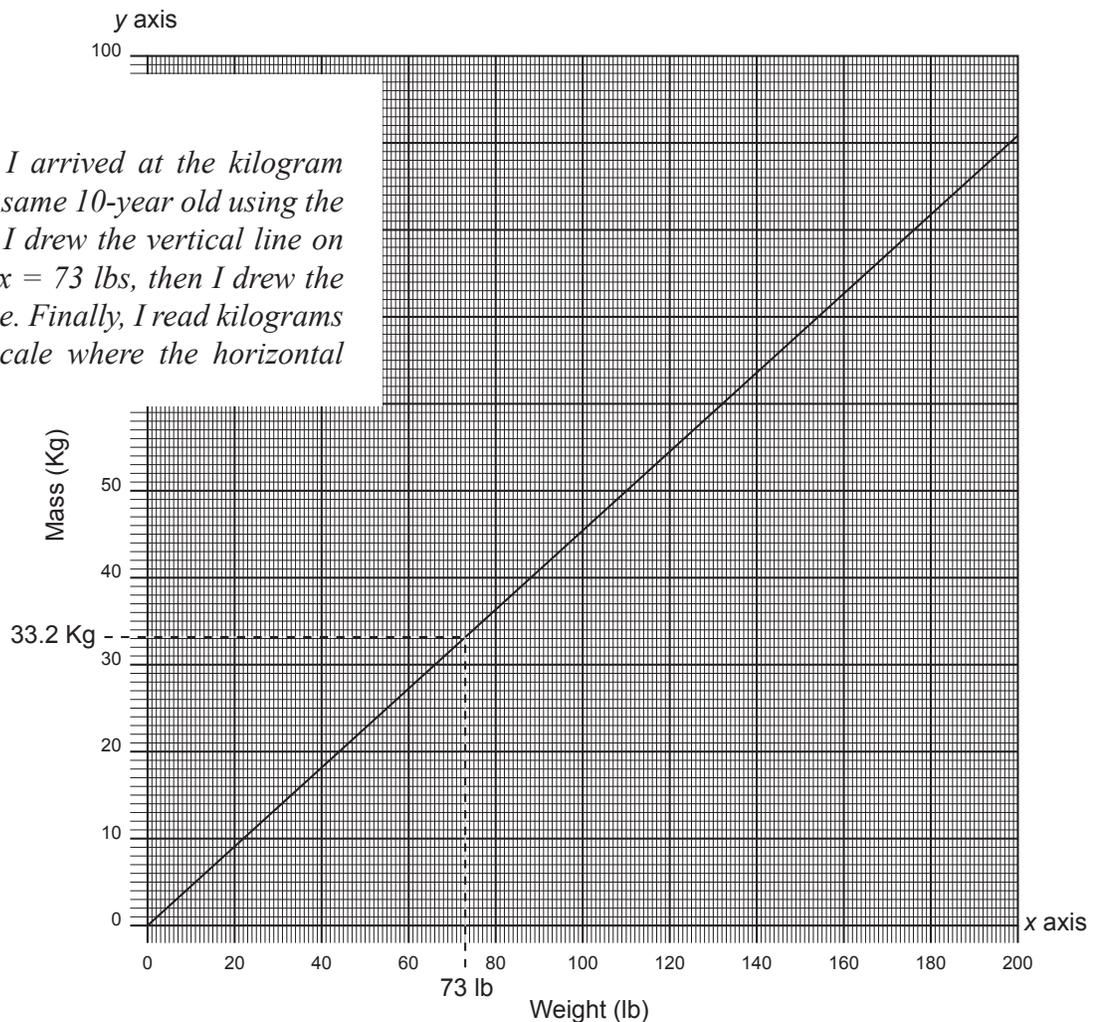
Activity Book Answers:

Here is a sample of the data we asked the students to provide and how we arrived at these answers:

Write the weight you read from your bathroom scale here. If you don't have a bathroom scale, give your best estimate: 73 lbs

This is the value from the bathroom scale of an average 10-year old.

Here is how I arrived at the kilogram mass for that same 10-year old using the graph. First, I drew the vertical line on the graph at $x = 73$ lbs, then I drew the horizontal one. Finally, I read kilograms off the left scale where the horizontal



line crossed the y axis.

Write your mass in kilograms that you got from the graph here: *My value (corresponding to 72 lbs) is 33.2 kg*

Write your calculated mass in kilograms (pounds \div 2.2) here: *My calculated value is exactly the same as my measured value 33.2 kg.*

I calculated it out to one place to the right of

the decimal point. Don't count off if the student didn't record this extra digit. My calculator actually read 33.1818... I rounded to the first decimal place. If the student does a really good job of estimating his mass from the graph the two estimates (graphical and calculated) should agree to within a kilogram. The graph is very precise, so your student could get the same answer (within a tenth of a kg) from the two methods if he used great care.

7: ATOM PARTS

Today's Subject:

A brief introduction to the most important particles that make up the universe.

Purpose:

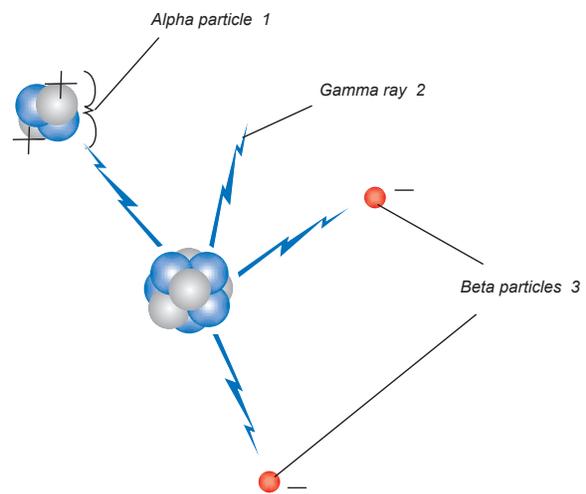
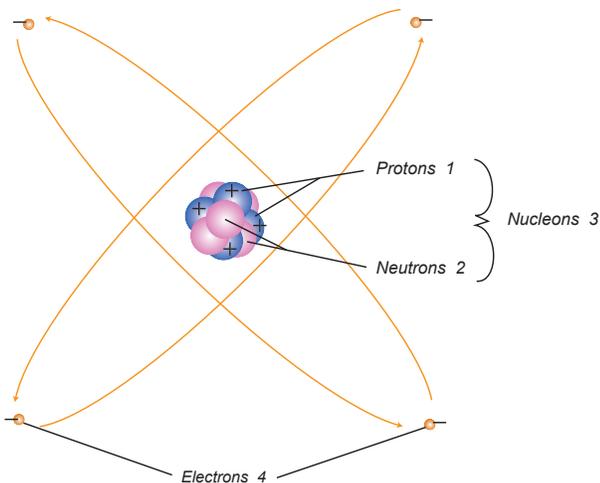
Any science lesson will require a brief background in particles. This lesson will be the foundation for many lessons to come. Please be sure the student gets it well.

Vocabulary Builders:

| | | | |
|-----------------|-----------------|---------------|-----------------------------------|
| Atom | Repel | Isotope | Groups |
| Neutron | Negative charge | Anion | Decay |
| Proton | Positive charge | Cation | Alpha particle |
| Electron | Nucleus | Atomic symbol | Beta particle |
| Electric charge | Nucleon | Plasma | Gamma ray |
| Electricity | Radioactive | Element | Periodic table of the elements |
| Attract | Atomic number | Periods | |

Activity Book Answers:

Here are the diagrams your student labeled in the Activity Book:



Unscramble the letters to reveal a list of words from your lesson. Clues are given to help you. Write the unscrambled words in the boxes beside the scrambled letters.

- cairodivaet r a d i o a c t i v e having an unstable nucleus
- pugor g r o u p column in the periodic table
- adcye d e c a y the undoing of a nucleus
- peelr r e p e l push away
- ebat b e t a decay particles having the same mass and charge as electrons
- conlune n u c l e o n proton or neutron; any particle in an atom's nucleus
- noian a n i o n atom with a negative charge from too many electrons
- eidrop p e r i o d row in the periodic table
- teenmel e l e m e n t substance made from only one kind of atom
- niatoc c a t i o n atom with a positive charge from too few electrons
- criticteley e l e c t r i c i t y electrons moving through a conductor
- gheacr c h a r g e force of attraction between electrons and protons
- samlap p l a s m a hot, dense matter that may lose its atomic structure

Now unscramble the circled letters to find the answer to this riddle and enter them in their correct order in the spaces below the riddle:

I contain gold, silver and platinum but I am very inexpensive. I have all the ingredients for making anything in the universe. Some of my contents could kill you, yet I am in your lab kit and I'm perfectly harmless! What am I?

p e r i o d i c t a b l e

27: HERE'S LOOKING AT YOU, KID

Today's Subject:

The anatomy of the human eye.

Purpose:

To develop in the student the ability to understand the structure of the human body in well-defined organ. To develop an interest in the study of anatomy and to begin to understand how anatomical structure relates to biological function.

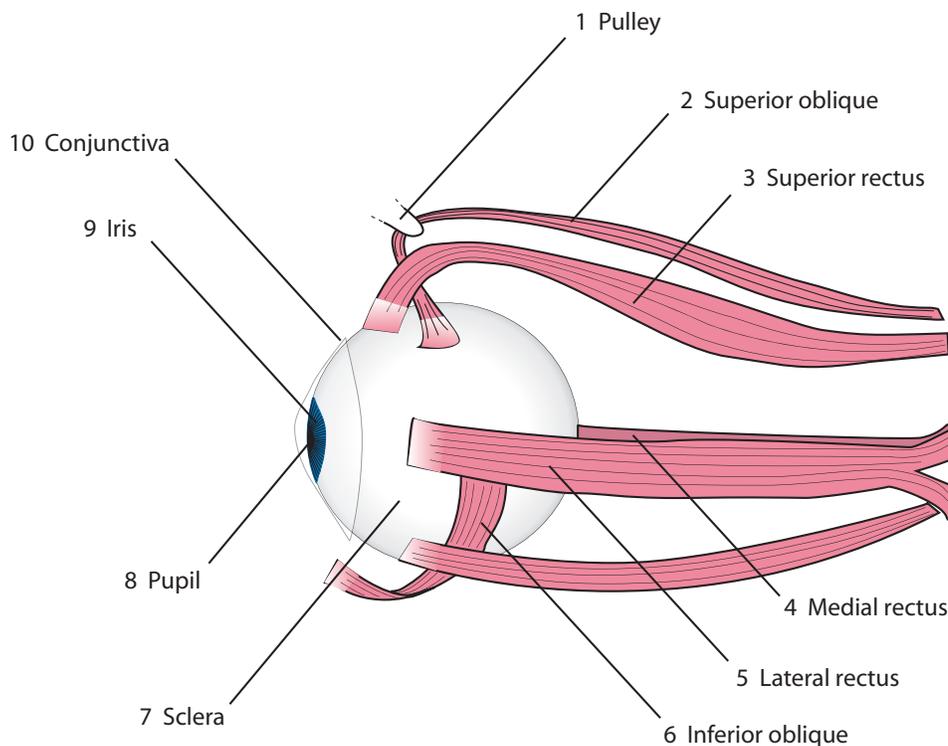
Vocabulary Builders

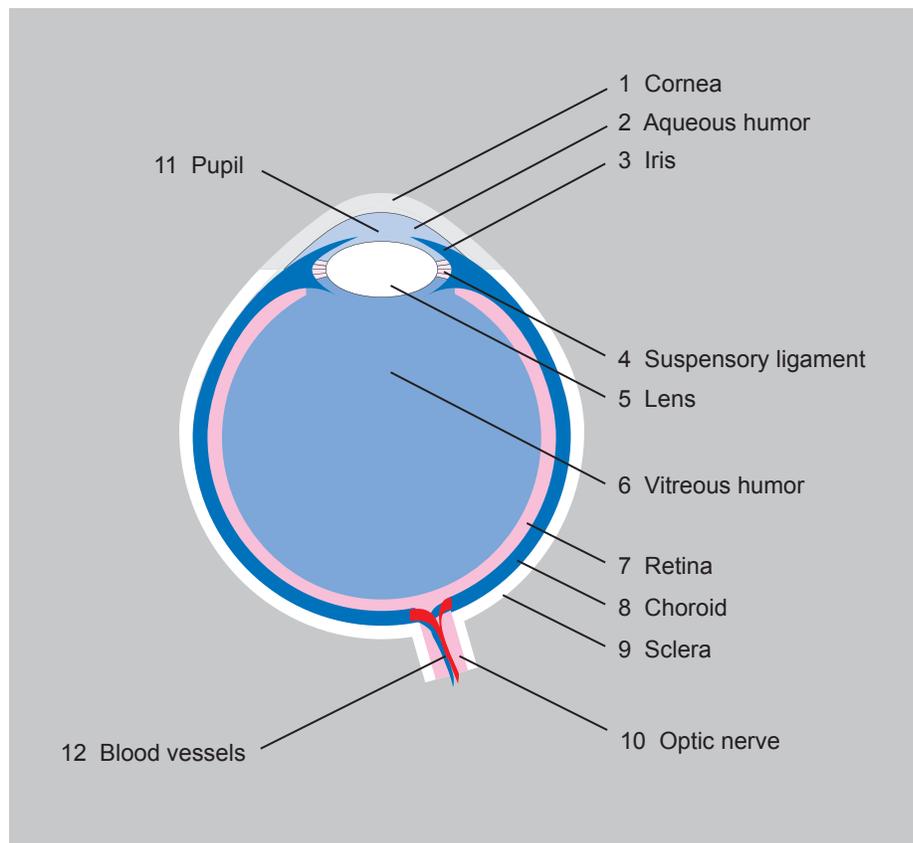
| | | |
|--------|--------------|------------------|
| Retina | Contract | Fovea centralis |
| Rod | Choroid | Aqueous humor |
| Cone | Ciliary body | Vitreous humor |
| Lens | Anatomy | Medial rectus |
| Iris | Oblique | Lateral rectus |
| Pupil | Midline | Inferior rectus |
| Sclera | Sphincter | Superior rectus |
| Cornea | Spectrum | Superior oblique |
| Dilate | Macula | Inferior oblique |

Activity Book Answers:

Here are the diagrams your student labeled in the Activity Book:

Please label all the features of the eye that were shown in the diagrams in your book.





What part am I?

1. I am part of the outer covering of the eye, like the sclera, but I am as clear as can be so light can pass through me. *cornea*
2. I am a disk that bulges in the middle. Although I am made of living cells, light can pass right through me. Because I'm flexible I can bend the light to focus it on the back of the eye. *lens*
3. I am the "projector screen" of the eye. I'm the innermost layer that receives the light from the part described in number 2, above. I have cells called rods and cones that capture the light so that you can see. *retina*
4. I am the middle layer of eye tissue. The lens, the suspensory ligament and the iris are all attached to me. I have lots of blood vessels for carrying blood to the retina cells. *coroid*
5. I am the watery liquid found in the eye in front of the lens. *aqueous humor*
6. I am the gel-like fluid behind the lens that keeps pressure on the inside of the eye and gives it its shape. *vitreous humor*

7. I am the tough, outer coat of the eye. Because I am white, nobody can see through me. *sclera*
8. I'm not really a part, just a hole in the iris that lets light pass through. I appear black because the inside of the eye is dark, and I let people see into the inner parts of the eye. *pupil*
9. I am the nerve that carries electrical signals from the eye to the brain. *optic nerve*
10. I am the cell type that is responsible for color and detailed vision. *cones*
11. I am the cell type that is responsible for vision in low light. *rods*

8: SIR ISAAC NEWTON

1. When did Sir Isaac Newton live?
 - c. *Late 1600's and early 1700's (Isaac Newton lived from 1642 to 1727).*
2. He lived at about the same time:
 - c. *the bubonic plague was in England*
3. He is most famous for his studies on:
 - b. *natural philosophy (physics) and mathematics*
4. Among his most famous discoveries was that:
 - d. *gravity is the force that holds the moon close to the Earth*
5. Circle all the following that were spoken of in the lesson among Newtons achievements:
 - a. *progress on the mathematics called calculus*
 - b. *writing three laws of motion*
 - c. *discoveries about gravity*
 - d. *studies on light and optics*
 - e. *use of prisms to divide light into different colors*
 - f. *inventing first reflecting telescope*
 - g. *building mechanical toys and kites*
6. Of which of the following written works was Newton the author?
 - a. *Opticks and Principia*
7. Who were some other scientists with whom Newton was acquainted?
 - a. *Edmond Halley*
 - e. *Isaac Barrow*
8. Which of the following were among Newton's distinctions?
 - a. *Master of the Mint*
 - b. *British Royal Knight*
 - d. *President, British Royal Society*
 - e. *Burial in Westminster Abbey*
9. Which of the following likenesses is that of Newton?
 - c. 

All the correct answers are shown. All except h are correct.