PHSC 1000 – Interdisciplinary Physical Science
Final Exam
Professor David Black
One 8 ½1" x 11" Paper of Notes Allowed

- Which of the following diagrams could represent a solar eclipse?

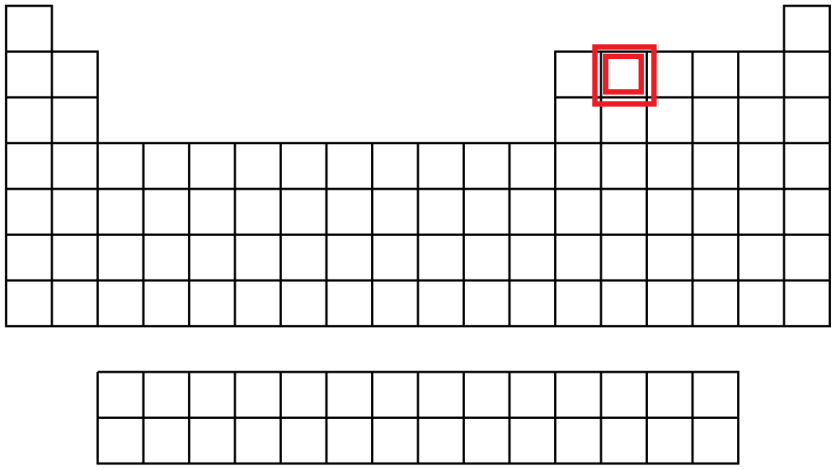
a.

b. B is the answer.

c.

d.

- Below, I show a basic picture of the periodic table with the box for Carbon highlighted. How many protons does Carbon have?



- 8 b. 6 c. 14 d. 5

- How many **valence** electrons does Carbon have?
  - 12 b. 8 c. 21 d. 4

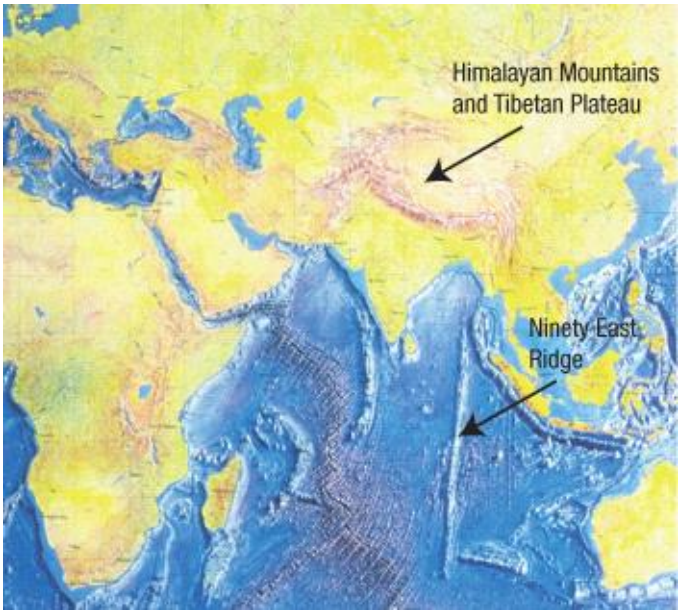
- Which is on the x-axis for the Hertzsprung-Russell Diagram?
  - Luminosity b. Size c. Number of planets d. Temperature

- Which is on the y-axis for the Hertzsprung-Russell Diagram?
  - Luminosity b. Size c. Number of planets d. Temperature

- Which of the following is an evidence of plate tectonics?
  - Similar fossils on either side of the Atlantic Ocean
  - A guy buried under 100 m of ice
  - The tilt of the Earth
  - The tides

- There are two atoms of phosphorous (this isn't a joke.) One has a mass that is almost exactly 31 times the mass of a proton. The other has a mass that's almost exactly 32 times the mass of a proton. What are these two called?
  - Isotopes b. Polymers c. Mixtures d. Sub-shells

- According to plate-tectonic theory, the Himalayan mountains of Asia (see the picture below) formed when



- Asia and Australia separated
- Africa ran into the Middle East
- Southern-central Asia was hit by a large meteorite
- India ran into southern-central Asia

- If a sample of rock we are dating has a radioactive parent-daughter system and there are 20 parents and 60 daughters, how many half-lives have gone by since the formation of the rock?
  - 1 b. 2 c. 3 d. 4 e. 5

- Clayton, this one's for you.
  Which planet has more rings than LeBron (James?)
  - Saturn b. Mercury c. Mars d. Earth

- There are two forces which must be in balance in a star. One is a repulsive force (a force which pushes things apart) which comes when the nuclei of atoms smash together and join to form bigger atomic nuclei. What is the other force called?
  - Gravity b. The Electromagnetic Force c. Kinetic Energy d. Light

- To save on gas, Professor Black gets up to a high speed and then turns his engine off, letting the car coast. Which physics principle is he using?
  - Conservation of momentum b. Heat c. Quantum mechanics
  - d. Action/reaction pair (Newton's third law) e. Inertia

- Which is the biggest?
  - Galaxy b. Planet c. Big Mac d. Star

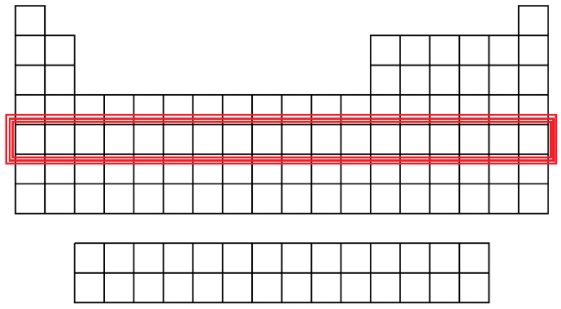
- Which of the following is not testable?
  - Metal can be levitated by putting it in a magnetic field
  - All matter inside a black hole becomes purple

- The Earth is round
- F = ma

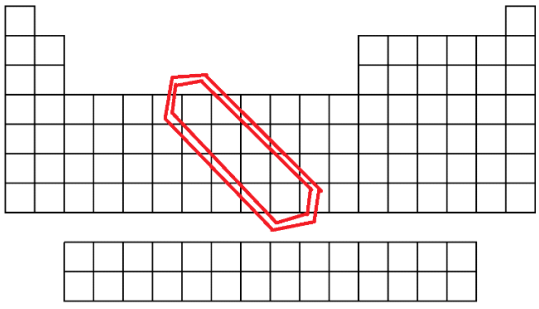
- Professor Black lighting the balloons on fire so you could *see* what happens is an example of which step in the scientific method?
  - Observe b. Question c. Predict d. Test predictions
  e. Draw a conclusion

- Astronomy is
  - The study of planets, stars, galaxy, and the large-scale universe
  - The study of how atoms interact
  - The study of rocks and minerals as well as how our planet is shaped
  - The study of energy, motion, and the mathematical principles that govern events

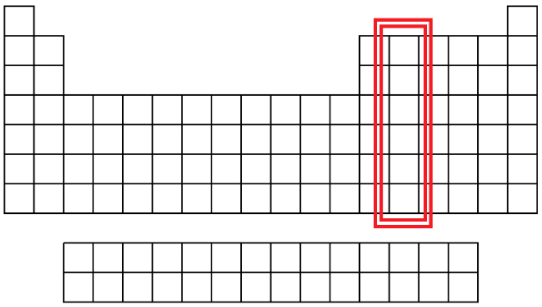
- Elements in the periodic table which are in the same ___column__ often have similar properties. (An example of what each word represents is highlighted, so the elements inside the "highlighted thing" should be similar.)
  - Row



  - Diagonal



  - Column



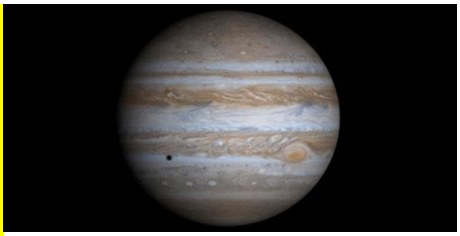
- Spiral pattern

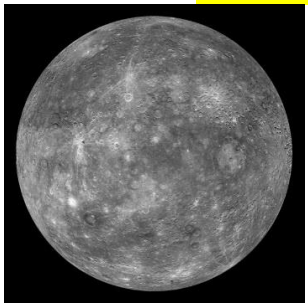
- A rocket being propelled forward because of hot gas escaping out the back is an example of which of the following:
  - Newton's 1st Law b. Newton's 2nd Law c. Newton's 3rd Law
  d. Newton's Law of Cooling

- Protons are
  - Positive b. Negative c. Neutral d. Yellow

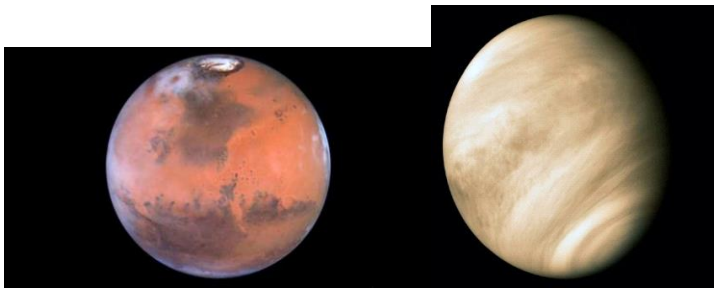
- Which of the following planets is Jupiter?
  - b.

This one >

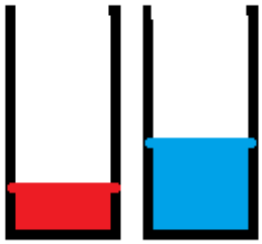




c. d.



- Which of the following molecules could NOT be separated into its elements and give the following result?

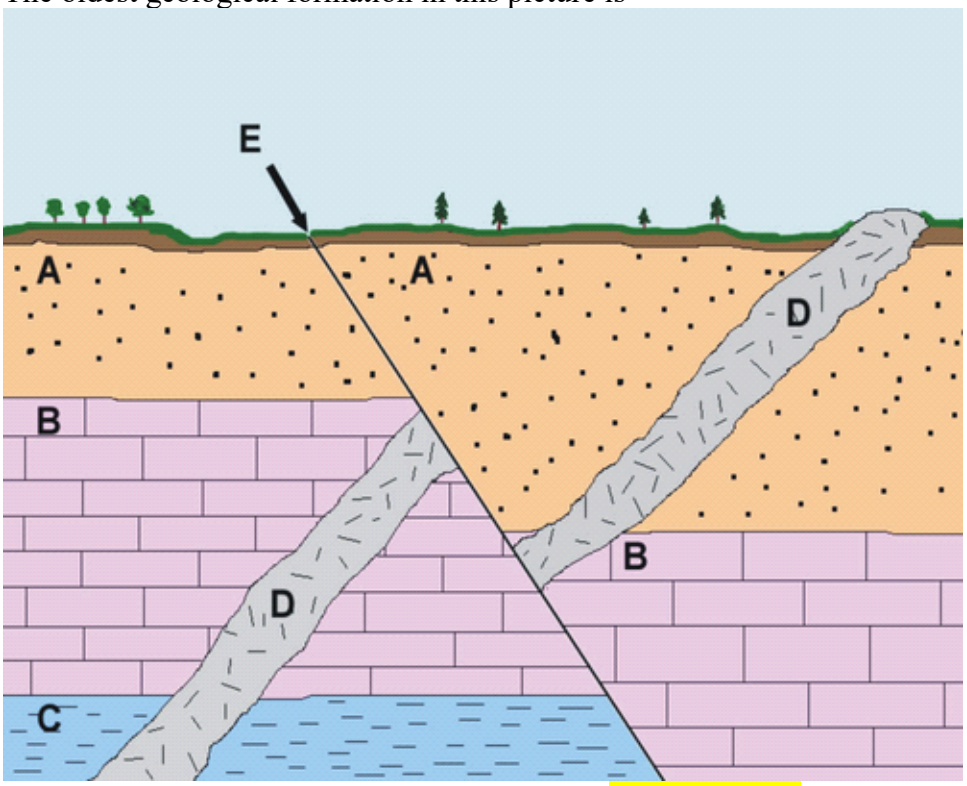


- H_2O b. CO_2 c. NO_2 d. CH_2 e. $C_6H_{12}O_8$

- The main (biggest) object pictured here is a(n)

- Star b. Planet c. Volcano d. Galaxy e. Ion

- The oldest geological formation in this picture is



- A b. B c. C d. D e. E

- The lake pictured below consists of a ring of water about 60 miles across, and it's about 200 million years old. Scientists would tell us that it was probably formed by

- Aliens b. A meteorite c. Canadian nuclear tests d. A volcano

- What is the name of this class?
  - Advanced General Relativity b. Organic Chemistry
  - c. Interdisciplinary Physical Science d. Intro to Painting

- Briefly tell me the difference between a covalent bond and an ionic bond.

  An ionic bond is the *complete transfer* of valence electrons between atoms. A covalent bond is the *sharing* of electrons betwen atoms.

- Give me an example of each of the following (and explain)
    - Something that is testable and that is accepted as true.

      The force of gravity exists.

    - Something that is testable but that is accepted as false.

      If you bury money, a money tree will grow.

    - Something that is not testable.

      "God" exists. (Human deity)

- Name the planets. I'll give you the correct mnemonic this time: My Very Educated Mother Just Served Us Nachos. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

- Draw the basic positions of the Earth, moon, and sun for the following phases of the moon.
    - Waxing gibbous

    - Last Quarter

    - New Moon

- For the next few pictures, give a possible explanation for how these geological features might have formed. You won't be graded on whether or not you give the scientifically-

accepted reason, but you will be graded on whether or not your answer shows a knowledge of things that shape the Earth's surface.

a.

High tides and wind shaped that rock formation.

b.

Plate tectonics shifting and pushing land masses together created this mountain.

c.

Plate tectonics shifted and pushed this land mass up, possible fault lines created the cliff edges.

d.

That river shaped and molded that canyon. Waterfalls can be caused by an excess of water in an area that had no where else to go. Some become permanent.

- Tell me a few things about the class:
    - Two or three things about this class which were the most surprising.
      Concetrated Potassium in water explodes! I didn't know of the Kuiper Belt until this class, atleast, this class was a great refresh of what's around us in the solar system.

    - Something you learned in this class that you had always wanted to know.
      What is at the center of a galaxy, or atleast ours, and it's a black hole. This class gave me a great new perspective on black holes.

    - Two or three questions that you still have.
      Do you personally believe that extra terrestials exist in our milky way galaxy?
      What do you think is a bigger priority? Exploring space, or our oceans?

I had a great time in this class and learned a lot. You made class fun and interesting, and I respect your Bill Nye usage! Haha thank you for a great semester Professor Black, and SCIENCE RULES!!

HAVE A GREAT HOLIDAY BREAK!