

ROUND 8

TOSS-UP

1) ENERGY *Multiple Choice* A swing converts energy between which two forms?

- W) Kinetic and radiant energy
- X) Mechanical and electrical energy
- Y) Radiant and sound energy
- Z) Kinetic and potential energy

ANSWER: Z) KINETIC AND POTENTIAL ENERGY

BONUS

1) ENERGY *Short Answer* If you drop a tennis ball from the first story window of a building, it has less and less of which form of energy as it falls?

ANSWER: GRAVITATIONAL POTENTIAL ENERGY (ACCEPT: POTENTIAL ENERGY)

TOSS-UP

2) GENERAL SCIENCE *Multiple Choice* Why are fruits and vegetables essential in a healthy mammalian diet?

- W) They have a high water content
- X) They are the best source of protein
- Y) They are rich in minerals and vitamins
- Z) They are the best source of carbohydrates

ANSWER: Y) THEY ARE RICH IN MINERALS AND VITAMINS

BONUS

2) GENERAL SCIENCE *Multiple Choice* Which of the following meals would give humans most of the nutrients needed in a day?

- W) Vegetables, fruit, and water
- X) Meat, milk, and a piece of chocolate
- Y) Bread, vegetables, and fish
- Z) Meat, fish, and bread

ANSWER: Y) BREAD, VEGETABLES, AND FISH

TOSS-UP

3 PHYSICAL SCIENCE *Multiple Choice* In order to figure out what is in a sealed box, you perform some tests. The box seems heavy for its size and is harder to remove from a steel table than when placed on a concrete floor. What kind of object could be inside the box?

- W) Magnet
- X) Another steel table
- Y) Battery
- Z) Computer

ANSWER: W) MAGNET

BONUS

3) PHYSICAL SCIENCE *Multiple Choice* Which of the following characteristics best describes metals?

- W) Brittle, highly reactive, and have low melting points
- X) Lustrous, malleable, and are good conductors
- Y) Dense, form salts, and are highly reactive
- Z) Hard, form negatively charged ions, and are good resistors

ANSWER: X) LUSTROUS, MALLEABLE, AND ARE GOOD CONDUCTORS

TOSS-UP

4) PHYSICAL SCIENCE *Short Answer* What is the name given to the superposition of two or more waves resulting in a new wave pattern?

ANSWER: INTERFERENCE

BONUS

4) PHYSICAL SCIENCE *Short Answer* Which type of wave interference will give you a flat line?

ANSWER: DESTRUCTIVE INTERFERENCE

TOSS-UP

5) MATH *Short Answer* The Sun is approximately 93 million miles from the Earth. What is this distance written in scientific notation?

ANSWER: 9.3×10^7

BONUS

5) MATH *Short Answer* What is 909,888,000,000 written in scientific notation with three significant digits?

ANSWER: 9.10×10^{11}

TOSS-UP

6) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is true about divergent plate boundaries where the lithosphere is being pushed and pulled apart?

- W) They only occur along the seafloor
- X) They are sites of the most explosive volcanism known on earth
- Y) They are no longer active but there is evidence of volcanism from millions of years ago
- Z) Magma from the mantle is exposed at the surface and cools to form new lithospheric (read as: li-thoh-SFIR-ik) crust

ANSWER: Z) MAGMA FROM THE MANTLE IS EXPOSED AT THE SURFACE AND COOLS TO FORM NEW LITHOSPHERIC CRUST

BONUS

6) EARTH AND SPACE SCIENCE *Multiple Choice* Why are there no deep-sea trenches off the east coast of the United States?

- W) There are no trenches in the Atlantic Ocean; trenches exist only in the Pacific Ocean
- X) The Appalachian Mountains are volcanic mountains and trenches are not associated with volcanism
- Y) The eastern coast of the United States is in the middle of the North American Plate, not at a plate margin where trenches can occur
- Z) The deep ocean trenches have been filled with sediments from the many rivers that drain the U.S.

ANSWER: Y) THE EASTERN COAST OF THE UNITED STATES IS IN THE MIDDLE OF THE NORTH AMERICAN PLATE, NOT AT A PLATE MARGIN WHERE TRENCHES CAN OCCUR

TOSS-UP

7) LIFE SCIENCE *Short Answer* What is a tool used to identify organisms that consists of a series of paired statements or questions that describes alternative possible characteristics of the organism and the presence or absence of certain visible structures or characteristics?

ANSWER: DICHOTOMOUS KEY

BONUS

7) LIFE SCIENCE *Multiple Choice* You are using a dichotomous key to identify a leaf you have picked up. You observe that you have a leaf with several main veins of about equal size, all of which extend from a common point at the base of the blade. Your leaf could be from which of the following trees?

- W) Maple
- X) Beech
- Y) Birch
- Z) Elm

ANSWER: W) MAPLE

TOSS-UP

8) MATH *Short Answer* Mark has two pairs of gym shorts and three gym shirts. If he wears one of each, how many different outfits are possible?

ANSWER: 6

BONUS

8) MATH *Short Answer* How many different ways can four people stand in a line?

ANSWER: 24

TOSS-UP

9) ENERGY *Multiple Choice* If you drop a tennis ball from the first-story window of a building, as it falls it has increasingly less of which of the following forms of energy?

- W) Electrical
- X) Gravitational
- Y) Kinetic
- Z) Thermal

ANSWER: X) GRAVITATIONAL

BONUS

9) ENERGY *Short Answer* Which of the following is NOT a reason people are deciding to change incandescent bulbs to fluorescent bulbs?

- W) Fluorescent bulbs consume less power than incandescent bulbs
- X) Fluorescent bulbs last longer than incandescent bulbs
- Y) Fluorescent bulbs produce warmer light than incandescent bulbs
- Z) Fluorescent bulbs have a lower lifetime cost than incandescent bulbs

ANSWER: Y) FLUORESCENT BULBS PRODUCE WARMER LIGHT THAN INCANDESCENT BULBS*

* [NOTE: INCANDESCENT LIGHTS PRODUCE WARMER LIGHT. SEE EERE.ENERGY.GOV]

TOSS-UP

10) PHYSICAL SCIENCE *Short Answer* What is the term used for a liquid's resistance to changing form?

ANSWER: VISCOSITY

BONUS

10) PHYSICAL SCIENCE *Short Answer* What ion has 17 protons and 18 electrons?

ANSWER: CHLORIDE (ACCEPT: CL⁻)

TOSS-UP

11) MATH *Short Answer* There is a men's basketball team with 5 players. Their weights in pounds are: {165, 200, 220, 238, and 310}. What is the median weight of the players?

ANSWER: 220

BONUS

11) MATH *Short Answer* What is the shape of $\frac{x^2}{3} + \frac{y^2}{5} = 1$?

ANSWER: ELLIPSE

TOSS-UP

12) LIFE SCIENCE *Multiple Choice* Name the tiny air sacs involved in the exchange of oxygen and carbon dioxide in the lungs.

- W) Alveoli (read as: ahl-VEE-oh-ly)
- X) Trachea
- Y) Marrow
- Z) Ventricles

ANSWER: W) ALVEOLI

BONUS

12) LIFE SCIENCE *Multiple Choice* After a forest fire, what specific type of succession rebuilds the ecosystem?

- W) Pioneer
- X) Secondary
- Y) Ecological
- Z) Primary

ANSWER: X) SECONDARY

TOSS-UP

13) ENERGY *Short Answer* What force, commonly associated with heat energy, resists the motion of moving objects?

ANSWER: FRICTION

BONUS

13) ENERGY *Short Answer* What is friction called when dealing with solids moving through a fluid?

ANSWER: DRAG

TOSS-UP

14) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following processes increases salinity in surface waters of the ocean?

- W) High levels of evaporation
- X) Melting sea ice
- Y) High levels of precipitation
- Z) Abundance of ocean life

ANSWER: W) HIGH LEVELS OF EVAPORATION

BONUS

14) EARTH AND SPACE SCIENCE *Multiple Choice* In which of the following regions of the world will you likely find surface ocean water that is high in salinity and temperature but low in productivity?

- W) Middle of the Atlantic, north of the equatorial waters
- X) North Pacific Ocean, near the shoreline
- Y) Indian Ocean, between India and Africa (Arabian Sea)
- Z) Coral reefs, off the northeast coast of Australia

ANSWER: W) MIDDLE OF THE ATLANTIC, NORTH OF THE EQUATORIAL WATERS

TOSS-UP

15) MATH *Short Answer* In degrees, what is the measure of one interior angle of a regular triangle with a side length of 3?

ANSWER: 60°

BONUS

15) MATH *Short Answer* A rhombus has side lengths of 15 centimeters, a diagonal of 24 centimeters, and another diagonal of 18 centimeters. What is its area in square centimeters?

ANSWER: 216

TOSS-UP

16) LIFE SCIENCE *Multiple Choice* Which of the following would be considered an autotroph (read as: AW-toh-trōef)?

- W) Oak tree
- X) Tiger
- Y) Mushroom
- Z) Human

ANSWER: W) OAK TREE

BONUS

16) LIFE SCIENCE *Multiple Choice* The oxygen released by plants and other autotrophs (read as: AW-toh-trōefs) comes from which compound?

- W) Carbon dioxide
- X) Water
- Y) Hydrogen peroxide
- Z) Carbon monoxide

ANSWER: X) WATER

TOSS-UP

17) GENERAL SCIENCE *Short Answer* One of the first steps in the scientific method is hypothesis formulation. What is the hypothesis?

ANSWER: A PREDICTION OF THE OUTCOME (ACCEPT: EDUCATED GUESS)

BONUS

17) GENERAL SCIENCE *Short Answer* As part of the scientific method, scientists frequently repeat other scientists' experiments. By name or number, which of the following factors would never be a reason to repeat another scientist's experiment: 1) to collect more data to prove the hypothesis was true, 2) to validate the initial results, 3) to gain a deeper understanding of the problem, and/or 4) to satisfy one's curiosity.

ANSWER: TO COLLECT MORE DATA TO PROVE THE HYPOTHESIS WAS TRUE
(ACCEPT: 1)

TOSS-UP

18) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is true about a full lunar eclipse?

W) They occur every month

X) They tend to occur in the same months as solar eclipses

Y) They only occur when the Moon is at perigee (read as: PEHR-i-jee), closest to Earth

Z) Everyone on the night side of Earth with a clear sky can see the lunar eclipse

ANSWER: Z) EVERYONE ON THE NIGHT SIDE OF EARTH WITH A CLEAR SKY CAN SEE THE LUNAR ECLIPSE

BONUS

18) EARTH AND SPACE SCIENCE *Short Answer* What is primarily responsible for the blue clouds of Neptune?

ANSWER: METHANE

TOSS-UP

19) MATH *Multiple Choice* Which of the following correctly describes a triangle with side lengths of 2 inches, 3 inches, and 4 inches?

- W) Equilateral
- X) Isosceles
- Y) Scalene
- Z) Right

ANSWER: Y) SCALENE

BONUS

19) MATH *Multiple Choice* Suppose you have an equilateral triangle with a base of 2 inches. Which of the following is true?

- W) The other sides of the triangle are 1 inch
- X) The triangle could be similar to a right triangle
- Y) The triangle is a right triangle
- Z) The triangle is similar to all equilateral triangles

ANSWER: Z) THE TRIANGLE IS SIMILAR TO ALL EQUILATERAL TRIANGLES

TOSS-UP

20) PHYSICAL SCIENCE *Multiple Choice* Which of the following intermolecular forces is strongest?

- W) Hydrogen bonding
- X) London dispersion force
- Y) Dipole-dipole interaction
- Z) Hydrophobic interaction

ANSWER: W) HYDROGEN BONDING

BONUS

20) PHYSICAL SCIENCE *Short Answer* Which property of water refers to its ability to stick to other substances?

ANSWER: ADHESION

TOSS-UP

21) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is true about constellations?

- W) They are made up of stars that not only appear close together but that are actually physically close together in space
- X) They are all visible throughout the year from all points on Earth's surface
- Y) They may serve as reference points in the night sky
- Z) The locations of the stars in the constellations have changed significantly since the times of ancient Greeks

ANSWER: Y) THEY MAY SERVE AS REFERENCE POINTS IN THE NIGHT SKY

BONUS

21) EARTH AND SPACE SCIENCE *Multiple Choice* Our Solar System orbits the center of our Milky Way Galaxy. One full revolution takes about 200-250 million years. The last time our solar system was where it is now, what was occurring here on Earth?

- W) Humans were trying to survive with dinosaurs
- X) Pangaea (read as: pahn-JEE-ah) was just breaking up into the continents we know today
- Y) There were no living organisms on Earth yet
- Z) There were no animals living on land but the seas were full of life

ANSWER: X) PANGAEA WAS JUST BREAKING UP INTO THE CONTINENTS WE KNOW TODAY

TOSS-UP

22) GENERAL SCIENCE *Short Answer* The mole is the SI (read as: S-eye) base unit used to measure:

ANSWER: THE AMOUNT OF A SUBSTANCE

BONUS

22) GENERAL SCIENCE *Multiple Choice* Which of the following is the SI (read as: S-eye) unit prefix that represents the largest power of 10?

- W) Giga
- X) Mega
- Y) Peta
- Z) Tera

ANSWER: Y) PETA

TOSS-UP

23) LIFE SCIENCE *Multiple Choice* Which of the following molecules is most commonly used for the transport of energy in cells?

- W) GTP
- X) GDP
- Y) ADP
- Z) ATP

ANSWER: Z) ATP

BONUS

23) LIFE SCIENCE *Short Answer* What do the letters TP stand for in the acronym ATP?

ANSWER: TRIPHOSPHATE

TOSS-UP

24) GENERAL SCIENCE *Short Answer* If an atom of neutral nitrogen has 7 protons, how many electrons will it have?

ANSWER: 7

BONUS

24) GENERAL SCIENCE *Multiple Choice* Which of the following describes molecules in solid phase?

- W) Molecules are not in contact with each other and move freely, rapidly, and randomly
- X) Molecular forces are not strong and molecules can rotate and roll over each other
- Y) The molecules may move and assume the shape of the container
- Z) Molecular motion is highly restricted; they can only vibrate in place

ANSWER: Z) MOLECULAR MOTION IS HIGHLY RESTRICTED; THEY CAN ONLY VIBRATE IN PLACE

TOSS-UP

25) EARTH AND SPACE SCIENCE *Multiple Choice* What happens to the wastewater in a septic tank?

- W) It is removed weekly by solid waste management companies along with curbside trash pickup
- X) It is piped into the town's sewer system
- Y) It stays in the septic tank until it is full and it then pumped out about every 50 years
- Z) It is released into a pond or leach field where it can either evaporate or join groundwater

ANSWER: Z) IT IS RELEASED INTO A POND OR LEACH FIELD WHERE IT CAN EITHER EVAPORATE OR JOIN GROUNDWATER

BONUS

25) EARTH AND SPACE SCIENCE *Multiple Choice* Imagine that you are an engineer designing a new neighborhood in a mountainous region. To reduce the likelihood of polluted groundwater, which of the following is the most important factor when considering the placement of drinking water wells, septic tanks, and landfills for the community?

- W) The landfill must be located very close to the neighborhood or else people will not use it
- X) The drinking water wells must have enough protective covering to prevent groundwater from entering the well before pollutants have been removed
- Y) The septic tanks must be located at the top of the hill to receive the most rainwater, which is vital for the chemical processes that occur inside
- Z) There must be a septic tank and landfill located at each home to provide enough waste management for the community

ANSWER: X) THE DRINKING WATER WELLS MUST HAVE ENOUGH PROTECTIVE COVERING TO PREVENT GROUNDWATER FROM ENTERING THE WELL BEFORE POLLUTANTS HAVE BEEN REMOVED