

ROUND 9

TOSS-UP

1) PHYSICAL SCIENCE *Short Answer* Using two vertically-aligned pulleys to move a load will double the amount of rope you must pull to move the load a given distance, but what will it do to the amount of force you must exert?

ANSWER: HALVE IT

BONUS

1) PHYSICAL SCIENCE *Short Answer* Name three types of friction.

ANSWER: (ACCEPT 3) DRY, STATIC, LIMITING, SLIDING, KINETIC, ROLLING, FLUID, LUBRICATED, SKIN, INTERNAL

TOSS-UP

2) LIFE SCIENCE *Short Answer* Hinge and ball-and-socket are two examples of which kind of body part?

ANSWER: JOINT

BONUS

2) LIFE SCIENCE *Multiple Choice* Muscle, connective, nerve, and epithelial are four basic types of animal:

- W) Cells
- X) Tissues
- Y) Organs
- Z) Organ systems

ANSWER: X) TISSUES

TOSS-UP

3) MATH *Short Answer* What is the measure in degrees of an interior angle of a regular pentagon?

ANSWER: 108

BONUS

3) MATH *Short Answer* What is the sum of the measures of all interior angles of a regular hexagon and a regular octagon?

ANSWER: 1800

TOSS-UP

4) ENERGY *Multiple Choice* Utility companies have adopted a net metering approach with consumers who have renewable sources connected to the electric network. What is net metering?

- W) A program in which people pay for total energy consumption rather than per unit consumption
- X) A program in which people donate a certain amount of funds to those who have trouble paying for their electricity bill
- Y) The power company's method to reduce consumption during peak periods
- Z) An incentive program that credits or pays customers who wish to supplement the utility's electricity with their own sources

ANSWER: Z) AN INCENTIVE PROGRAM THAT CREDITS OR PAYS CUSTOMERS WHO WISH TO SUPPLEMENT THE UTILITY'S ELECTRICITY WITH THEIR OWN SOURCES

BONUS

4) ENERGY *Multiple Choice* A perfectly efficient engine would transform the chemical energy in gasoline into:

- W) Heat
- X) Work
- Y) Motion
- Z) Electricity

ANSWER: X) WORK

TOSS-UP

5) PHYSICAL SCIENCE *Short Answer* Why do most rocks sink in water?

ANSWER: THEY ARE DENSER THAN THE WATER (ACCEPT: THEY WEIGH MORE THAN THE WATER THEY DISPLACE)

BONUS

5) PHYSICAL SCIENCE *Multiple Choice* At a given temperature, the velocity of gases is:

- W) Directly proportional to molecular size
- X) Indirectly proportional to molecular size
- Y) Inversely proportional to molecular mass
- Z) Directly proportional to molecular mass

ANSWER: Y) INVERSELY PROPORTIONAL TO MOLECULAR MASS

TOSS-UP

6) MATH *Short Answer* Evaluate: $3 - |6 - 15|$ (read as: 3 minus the absolute value of the quantity 6 minus 15).

ANSWER: -6

BONUS

6) MATH *Short Answer* Evaluate: $|(-7)(-5)| - 2$ (read as: the absolute value of the product of negative 7 and negative 5 minus 2).

ANSWER: 33

TOSS-UP

7) LIFE SCIENCE *Multiple Choice* Which of the following organisms is not a eukaryote (read as: yuh-KEHR-ee-ōt)?

- W) Protist
- X) Bacteria
- Y) Fungi
- Z) Plant

ANSWER: X) BACTERIA

BONUS

7) LIFE SCIENCE *Short Answer* What are the two most defining features of a eukaryotic (read as: yuh-KEHR-ee-ōetik) cell?

ANSWER: NUCLEUS (DO NOT ACCEPT: NUCLEOID) AND TRUE MEMBRANE-BOUND ORGANELLES

TOSS-UP

8) ENERGY *Multiple Choice* Which of the following items, commonly found in most American households, represents significant energy input if made from its common ore; however, recycling this item saves enough energy to run a TV for 3 hours.

- W) Aluminum can
- X) Glass bottle
- Y) Plastic jug
- Z) Tin can

ANSWER: W) ALUMINUM CAN

BONUS

8) ENERGY *Short Answer* If the average TV consumes 120 watts, and a kilowatt hour costs 10 cents, then how much does it cost in cents to run the TV for 3 hours?

ANSWER: 3.6 (ACCEPT: 4)

TOSS-UP

9) EARTH AND SPACE SCIENCE *Short Answer* What is the name of the tide that has the lowest high tide and highest low tide?

ANSWER: NEAP TIDE

BONUS

9) EARTH AND SPACE SCIENCE *Short Answer* The San Andreas Fault, which runs along most of the coast of California, is an example of what type of fault: normal, thrust, or strike-slip?

ANSWER: STRIKE-SLIP

TOSS-UP

10) MATH *Short Answer* Which of the following values is greater: $\frac{42}{45}$, $\frac{2}{3}$, or $\frac{8}{9}$?

ANSWER: $\frac{42}{45}$

BONUS

10) MATH *Short Answer* Giving your answer as a fraction in simplest form, what is the difference between $\frac{13}{15}$ and $\frac{19}{21}$?

ANSWER: $-\frac{4}{105}$

TOSS-UP

11) LIFE SCIENCE *Multiple Choice* Most scientists believe that protists evolved from which of the following?

- W) Prokaryotes (read as: prōe-KAHR-ee-ōets)
- X) Fungi
- Y) Plants
- Z) Euglenoids (read as: yuh-GLEE-nohids)

ANSWER: W) PROKARYOTES

BONUS

11) LIFE SCIENCE *Multiple Choice* Protist habitats are often characterized by the presence of which of the following?

- W) Soil
- X) Moisture
- Y) Algae
- Z) High altitude

ANSWER: X) MOISTURE

TOSS-UP

12) GENERAL SCIENCE *Short Answer* If an atom of neutral nitrogen has 7 neutrons, what is its weight in atomic mass units?

ANSWER: 14 ATOMIC MASS UNITS

BONUS

12) GENERAL SCIENCE *Multiple Choice* What substance most commonly makes soil black?

- W) Minerals
- X) Burned wood
- Y) Clay
- Z) Organic matter

ANSWER: Z) ORGANIC MATTER

TOSS-UP

13) MATH *Multiple Choice* On a number line, the coordinate of S is -6 and the coordinate of R is 3 . Which statement is true?

- W) S divided by R is greater than 0
- X) R minus S is less than 0
- Y) S times R is less than 0
- Z) S plus R is greater than 0

ANSWER: Y) S TIMES R IS LESS THAN 0

BONUS

13) MATH *Short Answer* On a coordinate grid, a line segment has endpoints $(-1, 2)$ and $(3, -4)$. What are the coordinates of the midpoint of the segment?

ANSWER: $(1, -1)$

TOSS-UP

14) ENERGY *Short Answer* What is the term for a type of organism that recycles dead matter back into nutrients primary producers can use?

ANSWER: DECOMPOSER (ACCEPT: DETRITIVORE)

BONUS

14) ENERGY *Short Answer* If a food chain has four trophic levels, apex predators would belong to which trophic level?

ANSWER: FOURTH

TOSS-UP

15) EARTH AND SPACE SCIENCE *Multiple Choice* Most of the mass of Earth's atmosphere is located in which of the following layers?

- W) Troposphere
- X) Mesosphere
- Y) Thermosphere
- Z) Stratosphere

ANSWER: W) TROPOSPHERE

BONUS

15) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is true about air over the north and south poles?

- W) It evaporates at a much faster rate than air found elsewhere
- X) It rises, creating a region of high snowfall
- Y) It freezes and falls to earth as ice, forming the ice sheets
- Z) It sinks, creating a high pressure system near the surface

ANSWER: Z) IT SINKS, CREATING A HIGH PRESSURE SYSTEM NEAR THE SURFACE

TOSS-UP

16) PHYSICAL SCIENCE *Multiple Choice* Which of the following explains why white light entering a prism exits and projects a rainbow?

- W) The prism's crystal lattice colors the white light, like stained glass
- X) Different parts of the prism absorb different colors of light
- Y) The prism separates the white light into its component parts
- Z) The prism acts as a polarizing filter

ANSWER: Y) THE PRISM SEPARATES THE WHITE LIGHT INTO ITS COMPONENT PARTS

BONUS

16) PHYSICAL SCIENCE *Short Answer* By name or number, identify the following materials which are NOT associated with the ceramics industry: 1) brick, 2) uranium oxide, 3) porcelain, or 4) foam?

ANSWER: FOAM (ACCEPT: 4)

TOSS-UP

17) GENERAL SCIENCE *Short Answer* What inorganic nutrient, often found in detergent, is implicated in algal blooms?

ANSWER: PHOSPHORUS (ACCEPT: PHOSPHATES)

BONUS

17) GENERAL SCIENCE *Multiple Choice* Which of the following substances does not react with either vinegar or iodine?

- W) Baking soda
- X) Baking powder
- Y) Cornstarch
- Z) Powdered sugar

ANSWER: Z) POWDERED SUGAR

TOSS-UP

18) LIFE SCIENCE *Multiple Choice* Which of the following processes is NOT classified as passive transport?

- W) Endocytosis (read as: EHN-doh-sy-TŌE-sis)
- X) Facilitated diffusion
- Y) Filtration
- Z) Osmosis

ANSWER: W) ENDOCYTOSIS

BONUS

18) LIFE SCIENCE *Short Answer* Which element is needed by ocean animals to build protein, is found in about half of the dissolved oceanic gases, and is quite harmful to humans who ascend too quickly while diving?

ANSWER: NITROGEN

TOSS-UP

19) EARTH AND SPACE SCIENCE *Short Answer* Limestone is largely composed of which two minerals?

ANSWER: CALCITE AND ARAGONITE

BONUS

19) EARTH AND SPACE SCIENCE *Short Answer* Diamonds are formed when carbon-based material is exposed to high pressures and comparatively low temperatures. Where are these two types of environments found on Earth?

ANSWER: LITHOSPHERIC MANTLE (ACCEPT: BELOW CONTINENTAL PLATES), SITE OF A METEORITE IMPACT

TOSS-UP

20) GENERAL SCIENCE *Multiple Choice* Which of the following sets of equipment could be used to measure the boiling point of a liquid?

- W) Beaker, hot plate, and thermometer
- X) Balance, thermometer, and test tube
- Y) Stopwatch, test tube, and microscope
- Z) Test tube, hot plate, and balance

ANSWER: W) BEAKER, HOT PLATE, AND THERMOMETER

BONUS

20) GENERAL SCIENCE *Multiple Choice* Which of the following processes releases energy?

- W) Evaporation
- X) Melting
- Y) Boiling
- Z) Condensation

ANSWER: Z) CONDENSATION

TOSS-UP

21) MATH *Multiple Choice* Considering a number set {1,2,4,7,50}, which of the following values is the largest?

- W) Mean
- X) Median
- Y) Range
- Z) Third quartile

ANSWER: Y) RANGE

BONUS

21) MATH *Short Answer* A bag of lawn fertilizer covers 2500 square feet. How many bags of fertilizer would you need to share with your neighbor if your lawn was 175 feet by 200 feet and your neighbor's yard was 150 feet by 150 feet?

ANSWER: 23

TOSS-UP

22) GENERAL SCIENCE *Multiple Choice* In which of the following locations would you expect a scientist who was studying tundra to collect his or her samples?

- W) The Pacific Ocean
- X) Coastal Greenland
- Y) The tropics
- Z) The Sahara

ANSWER: X) COASTAL GREENLAND

BONUS

22) GENERAL SCIENCE *Short Answer* Name the two living monotremes.

ANSWER: DUCKBILLED PLATYPUS AND ECHIDNA

TOSS-UP

23) PHYSICAL SCIENCE *Multiple Choice* When you bombard uranium-235 with a slow-moving neutron, the resulting atomic change is called:

- W) Nuclear fusion
- X) Nuclear fission
- Y) Electron addition
- Z) Nuclear degradation

ANSWER: X) NUCLEAR FISSION

BONUS

23) PHYSICAL SCIENCE *Multiple Choice* In nuclear chemistry, a mass defect exists due to:

- W) The high energy of electrons
- X) Unsymmetrical configurations
- Y) Nuclear binding energy
- Z) Weak nuclear forces

ANSWER: Y) NUCLEAR BINDING ENERGY

TOSS-UP

24) EARTH AND SPACE SCIENCE *Short Answer* What is the name for the two times of year when the nighttime and daylight portions of a day are of approximately equal lengths?

ANSWER: EQUINOX

BONUS

24) EARTH AND SPACE SCIENCE *Multiple Choice* What is the approximate air pressure at the surface of the Earth in pascals?

- W) 5,000
- X) 10,000
- Y) 100,000
- Z) 500,000

ANSWER: Y) 100,000

TOSS-UP

25) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following depicts an accurate relationship between river water and groundwater within one watershed area?

- W) River water may be polluted but groundwater lacks pollutants
- X) They are the same, though the water may pick up slightly different chemicals and minerals as it moves through the ground
- Y) Groundwater can be contaminated by septic tanks but rivers cannot
- Z) Rivers flow into the ocean but groundwater cannot

ANSWER: X) THEY ARE THE SAME, THOUGH THE WATER MAY PICK UP SLIGHTLY DIFFERENT CHEMICALS AND MINERALS AS IT MOVES THROUGH THE GROUND

BONUS

25) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is a major concern for oceanfront homes using well water and septic tanks?

- W) Using too much well water in a short time can over-pump the fresh groundwater, drawing seawater into the well
- X) Water systems of coastal homes are particularly susceptible to pollution due to excessive toilet flushing
- Y) Washing food into the sink drain will attract crabs and fish into the septic tank and lead to infestations
- Z) Dishwashers must only be run with the incoming tide so the food from the plates can be washed out with the outgoing tide

ANSWER: W) USING TOO MUCH WELL WATER IN A SHORT TIME CAN OVER-PUMP THE FRESH GROUNDWATER, DRAWING SEAWATER INTO THE WELL