

ROUND 4

TOSS-UP

1) PHYSICAL SCIENCE *Short Answer* Which element derives its symbol from the Latin word *Aurum*?

ANSWER: GOLD

BONUS

1) PHYSICAL SCIENCE *Short Answer* What is the term for a chemical species having two ionizable hydrogen atoms?

ANSWER: DIPROTIC

TOSS-UP

2) LIFE SCIENCE *Short Answer* What are animals that eat other animals known as?

ANSWER: CARNIVORES (ACCEPT: PREDATORS)

BONUS

2) LIFE SCIENCE *Multiple Choice* Sea stars, velvet worms and northern shrike birds – all three are examples of:

- W) Omnivores
- X) Detritivores (read as: di-TRI-ti-vohrs)
- Y) Scavengers
- Z) Predators

ANSWER: Z) PREDATORS

TOSS-UP

3) MATH *Short Answer* Simplify completely the fraction $\frac{11}{23}$.

ANSWER: $\frac{11}{23}$

BONUS

3) MATH *Multiple Choice* If you were to graph the inequality $x < -7$ (read as: x is less than negative 7) on a number line, what would it look like?

- W) It would have an open circle at -7 and a ray extending from -7 on the right to negative infinity on the left
- X) It would have a closed circle at -7 and a ray extending from -7 on the right to negative infinity on the left
- Y) It would have an open circle at 7 and a ray extending from 7 on the right to negative infinity on the left
- Z) It would have open circles at -7 and 7 and be shaded in between them

ANSWER: W) IT WOULD HAVE AN OPEN CIRCLE AT -7 AND A RAY EXTENDING FROM -7 ON THE RIGHT TO NEGATIVE INFINITY ON THE LEFT

TOSS-UP

4) ENERGY *Multiple Choice* Which of the following resulted in petroleum?

- W) Meteors that fell from space
- X) Water combined with sediment deposits
- Y) Dead organisms packed together for millions of years
- Z) Saltwater combined with sand

ANSWER: Y) DEAD ORGANISMS PACKED TOGETHER FOR MILLIONS OF YEARS

BONUS

4) ENERGY *Short Answer* Put the following countries in order from least to greatest current annual oil consumption: Brazil, France, India, and China.

ANSWER: FRANCE, BRAZIL, INDIA, AND CHINA

TOSS-UP

5) PHYSICAL SCIENCE *Multiple Choice* Which of the following is NOT characteristic of an atom?

- W) It is positively charged
- X) It has electrons
- Y) It has protons
- Z) It has a nucleus

ANSWER: W) IT IS POSITIVELY CHARGED

BONUS

5) PHYSICAL SCIENCE *Short Answer* What is the smallest non-divisible unit of a covalent compound?

ANSWER: MOLECULE

TOSS-UP

6) MATH *Short Answer* How many 4 inch square tiles will be needed to cover a rectangular surface 8 inches by 24 inches?

ANSWER: 12

BONUS

6) MATH *Short Answer* How many triangular pieces with side lengths of 3 inches, 4 inches, and 5 inches can be cut from a rectangular sheet measuring 8 inches by 6 inches?

ANSWER: 8

TOSS-UP

7) LIFE SCIENCE *Short Answer* What is the general name given to a scientist who studies microorganisms?

ANSWER: MICROBIOLOGIST

BONUS

7) LIFE SCIENCE *Multiple Choice* A plasmid is a circular DNA molecule that is separate from chromosomal DNA, usually occurring in bacteria. Which of the following do plasmids usually contain?

- W) Single-stranded DNA
- X) Cell membrane
- Y) High osmotic pressure
- Z) One or two genes

ANSWER: Z) ONE OR TWO GENES

TOSS-UP

8) ENERGY *Short Answer* Name the form of energy used to transmit and receive signals from radios, cell phones, and televisions.

ANSWER: ELECTROMAGNETIC (ACCEPT: ELECTROMAGNETIC WAVE)

BONUS

8) ENERGY *Short Answer* What is the main difference between the electromagnetic waves used by a radio and those used by a cell phone?

ANSWER: THEIR WAVELENGTH (ALSO ACCEPT: FREQUENCY OR PERIOD)

TOSS-UP

9) EARTH AND SPACE SCIENCE *Short Answer* Lake Vostok, thought to be a good analogue for an under-ice ocean environment on Europa, can be found underneath glacial ice on which continent?

ANSWER: ANTARCTICA

BONUS

9) EARTH AND SPACE SCIENCE *Multiple Choice* Approximately what percent of Earth's water is in the form of ice?

- W) 1.6 %
- X) 6.6 %
- Y) 11.6 %
- Z) 16.6 %

ANSWER: W) 1.6 %

TOSS-UP

10) MATH *Multiple Choice* A spool of ribbon has 500 yards of ribbon. If one fancy bow takes 1.3 yards of continuous ribbon, how many bows can you make from one spool?

- W) 46
- X) 384
- Y) 462
- Z) 650

ANSWER: X) 384

BONUS

10) MATH *Short Answer* If $x + y = 5$ and $3x - 4y = 15$, solve for x and y .

ANSWER: $x = 5$ AND $y = 0$

TOSS-UP

11) LIFE SCIENCE *Multiple Choice* Rabbits eat grass and foxes eat rabbits. What role do foxes play in the food chain?

- W) Primary producer
- X) Primary consumer
- Y) Secondary consumer
- Z) Tertiary consumer

ANSWER: Y) SECONDARY CONSUMER

BONUS

11) LIFE SCIENCE *Short Answer* In a given ecosystem, there are 1 million kilojoules of energy contained in the primary producer biomass. How much energy is available, in kilojoules, to secondary consumers if primary consumers are 10% efficient at converting energy to biomass?

ANSWER: 100,000

TOSS-UP

12) MATH *Short Answer* Mike's bill for texting last month was \$10. This month it was \$15. What was the percentage increase in the bill?

ANSWER: 50%

BONUS

12) MATH *Short Answer* Ira puts 20% of his paycheck in savings. If his check is \$60 per week, how much money will he save in four weeks?

ANSWER: \$48

TOSS-UP

13) EARTH AND SPACE SCIENCE *Short Answer* The Mohorovičić (read as: mōe-HOH-rōe-vi-tsik) discontinuity, commonly referred to as the Moho discontinuity, defines a contrast in seismic velocity that is widely accepted to be the boundary between the mantle and what layer?

ANSWER: CRUST

BONUS

13) EARTH AND SPACE SCIENCE *Short Answer* The Earth's core is believed to be composed primarily of what element?

ANSWER: IRON

TOSS-UP

14) GENERAL SCIENCE *Multiple Choice* Gary and Paul were conducting a science experiment to determine how far an egg could drop before it broke. Gary tested 20 total eggs: 4 cracked at 2 feet, 6 cracked at 3 feet, and the rest did not break after dropping. The data that he collected represents which of the following parts of the scientific method?

- W) Results
- X) Conclusions
- Y) Hypothesis
- Z) Variables

ANSWER: W) RESULTS

BONUS

14) GENERAL SCIENCE *Short Answer* The intersection between the femur and the hipbone can be described as what kind of joint?

ANSWER: BALL AND SOCKET

TOSS-UP

15) EARTH AND SPACE SCIENCE *Short Answer* Due to the construction of the Hoover Dam, the delta of what river has been affected by changes in water flow?

ANSWER: COLORADO RIVER

BONUS

15) EARTH AND SPACE SCIENCE *Short Answer* What are the ecosystems called that are located around rivers and streams, linking water to dry land?

ANSWER: RIPARIAN ZONES (ACCEPT: RIPARIAN AREAS, FLOODPLAIN)

TOSS-UP

16) PHYSICAL SCIENCE *Multiple Choice* Which of the following compounds is most soluble in water of 25° Celsius at 1 atmosphere of pressure?

- W) Aluminum chloride
- X) Zinc oxide
- Y) Magnesium phosphate
- Z) Calcium oxide

ANSWER: W) ALUMINUM CHLORIDE

BONUS

16) PHYSICAL SCIENCE *Short Answer* For solid and liquid solutes, changes in pressure have practically no effect on solubility. For gaseous solutes, what happens to solubility with an increase in pressure?

ANSWER: SOLUBILITY INCREASES

TOSS-UP

17) GENERAL SCIENCE *Short Answer* What body organ destroys and recycles old and damaged red blood cells?

ANSWER: SPLEEN

BONUS

17) GENERAL SCIENCE *Short Answer* Name the enzyme present in saliva that is responsible for breaking down starches into sugars.

ANSWER: AMYLASE (ALSO ACCEPT: PTYALIN)

TOSS-UP

18) LIFE SCIENCE *Multiple Choice* Which of the following is NOT part of a prokaryotic (read as: prōe-kahr-ee-AH-tik) cell?

- W) Cell membrane
- X) Cell wall
- Y) Nucleus
- Z) Cytoplasm

ANSWER: Y) NUCLEUS

BONUS

18) LIFE SCIENCE *Multiple Choice* ATP is commonly called the energy molecule of the cell. Where in the cell would you find ATP made by substrate phosphorylation?

- W) Cell membrane
- X) Cytoplasm
- Y) Mitochondria (read as: my-toh-KOHN-dree-ah)
- Z) Vesicle

ANSWER: X) CYTOPLASM

TOSS-UP

19) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following oceanic currents prevents the climate of Northern Europe from being much colder?

- W) Circumpolar Current
- X) Kuroshio Current
- Y) North Pacific Current
- Z) Gulf Stream

ANSWER: Z) GULF STREAM

BONUS

19) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following statements is NOT true about weather or climate?

- W) The terms weather is used to describe atmospheric conditions over a short period of time in a particular area
- X) Climate is the average weather pattern over many years in a particular area
- Y) Climate causes weather
- Z) Climate variability can be related to periodic changes such as El Niño or La Niña

ANSWER: Y) CLIMATE CAUSES WEATHER

TOSS-UP

20) GENERAL SCIENCE *Short Answer* What is the vertical distance from the undisturbed position of the medium to the top of a crest of a wave called?

ANSWER: AMPLITUDE

BONUS

20) GENERAL SCIENCE *Multiple Choice* Which of the following types of radiation has the shortest wavelength?

- W) Gamma rays
- X) X-rays
- Y) Infrared radiation
- Z) Ultraviolet radiation

ANSWER: W) GAMMA RAYS

TOSS-UP

21) ENERGY *Multiple Choice* What is the approximate minimum temperature difference in degrees Celsius required between deep and shallow waters for an Ocean Thermal Energy Conversion (OTEC) system to be commercially viable?

- W) 5
- X)
- Y)
- Z) 50

ANSWER: Y) 0

BONUS

21) ENERGY *Multiple Choice* About what percentage of efficiency can an OTEC system currently achieve?

- W) 1%
- X) 3%
- Y) 10%
- Z) 20%

ANSWER: X) 3%

TOSS-UP

22) GENERAL SCIENCE *Short Answer* What is the force that determines the shape of planets, stars, and the Solar System?

ANSWER: GRAVITY

BONUS

22) GENERAL SCIENCE *Multiple Choice* Which two features determine the force of gravity between two planets?

- W) Their masses and distance apart
- X) Their atmospheric compositions and masses
- Y) Their rotational motions and shapes
- Z) Their masses and shapes

ANSWER: W) THEIR MASSES AND DISTANCE APART

TOSS-UP

23) PHYSICAL SCIENCE *Short Answer* Although snowflakes can have many forms, generally, snow crystals have what basic shape?

ANSWER: HEXAGONAL (ALSO ACCEPT: SIX-SIDED)

BONUS

23) PHYSICAL SCIENCE *Multiple Choice* Of the following choices, which one best describes the way snowflakes form?

- W) Raindrops freeze
- X) Water vapor freezes onto ice crystals inside clouds
- Y) Ice attaches to dust particles in the air
- Z) Sleet freezes

ANSWER: X) WATER VAPOR FREEZES ONTO ICE CRYSTALS INSIDE CLOUDS

TOSS-UP

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

- W) It crosses our sky along the same path every night
- X) It always rises in the west
- Y) It changes size in our sky as it passes from horizon to zenith to the other horizon
- Z) It gives off no light of its own

ANSWER: Z) IT GIVES OFF NO LIGHT OF ITS OWN

BONUS

24) EARTH AND SPACE SCIENCE *Short Answer* A large portion of the bottom of the Great Salt Lake is covered by smooth, soft and rounded sand, often used in home aquaria. What kind of sand is it?

ANSWER: OOLITIC (ACCEPT: OOLITE)

TOSS-UP

25) MATH *Short Answer* How many modes does the following list of seven numbers have: 1, 4, 4, 7, 8, 14, 14?

ANSWER: 2

BONUS

25) MATH *Short Answer* If you have a data set of the following seven values: 1, 2, 547, 550, 560, 580, 540, what is the name given to values such as 1 and 2?

ANSWER: OUTLIERS