ROUND 1

TOSS-UP

1) LIFE SCIENCE  Multiple Choice  Which of the following is NOT part of the human respiratory system?

W) Pharynx [FAR-ingks]
X) Larynx [LAR-ingks]
Y) Esophagus [i-SOF-uh-guhs]
Z) Trachea [TRAY-kee-uh]

ANSWER: Y) ESOPHAGUS

BONUS

1) LIFE SCIENCE  Multiple Choice  Plasma is the part of human blood that consists mostly of which of the following?

W) Red blood cells
X) White blood cells
Y) Water
Z) Hemoglobin [HEE-muh-gloh-bin]

ANSWER: Y) WATER

TOSS-UP

2) MATH  Short Answer  The thickness of a plastic sheet manufactured by Perky Plastics must satisfy: \( |t - 2| \leq 0.001 \) [the absolute value of the quantity t minus 2 is less than or equal to 0.001]. Providing your answer to the nearest thousandth, what is the maximum thickness \( t \), in centimeters, this plastic sheet may have?

ANSWER: 2.001

BONUS

2) MATH  Short Answer  The perimeter of a rectangle is equal to 280 meters. The ratio of its length to its width is 5:2. What is the area of the rectangle in square meters?

ANSWER: 4000
TOSS-UP

3) PHYSICAL SCIENCE  Short Answer  What is the potential difference in volts between two points, located 2 meters apart, in a constant electric field of 1 volt per meter?

ANSWER: 2

BONUS

3) PHYSICAL SCIENCE  Multiple Choice  Which of the following cannot be classified within the classical three states of matter?

W) Gasoline
X) Liquid nitrogen
Y) Bleach
Z) Liquid crystal

ANSWER: Z) LIQUID CRYSTAL

TOSS-UP

4) MATH  Multiple Choice  Which of the following would be the approximate measure of the length of a soccer field?

W) 1 decameter
X) 10 kilometers
Y) 100 meters
Z) 1000 centimeters

ANSWER: Y) 100 METERS

BONUS

4) MATH  Short Answer  The volume of cube C is 8 cubic centimeters. Cube D has an edge 3 times the edge of cube C. What is the volume of cube D in cubic centimeters?

ANSWER: 216
TOSS-UP

5) GENERAL SCIENCE  *Multiple Choice*  Leaves with an undivided blade are called which of the following?

W) Tendrils
X) Spines
Y) Compound
Z) Simple

ANSWER: Z) SIMPLE

BONUS

5) GENERAL SCIENCE  *Multiple Choice*  Which of the following will allow measurement of a liquid’s volume with the greatest precision?

W) 50 milliliter cylinder graduated in 1 milliliter increments
X) 100 milliliter cylinder graduated in 0.5 milliliter increments
Y) 100 milliliter cylinder graduated in 1 milliliter increments
Z) 200 milliliter cylinder graduated in 5 milliliter increments

ANSWER: X) 100 MILLILITER CYLINDER GRADUATED IN 0.5 MILLILITER INCREMENTS

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TOSS-UP

6) ENERGY  *Short Answer*  A house built in the United States with passive solar capabilities needs to have its large windows facing which compass direction?

ANSWER: SOUTH

BONUS

6) ENERGY  *Multiple Choice*  Which of the following units is most commonly used in the U.S. to compare the energy content of two different fuel sources?

W) BTU
X) Barrel
Y) Kilowatt
Z) Gallon

ANSWER: W) BTU
TOSS-UP

7) LIFE SCIENCE  Multiple Choice  Which of the following annelids has a sucker at each end of its body?

W) Earthworm  
X) Leech  
Y) Bristleworm  
Z) Polychaete [POL-i-keet]

ANSWER: X) LEECH

BONUS

7) LIFE SCIENCE  Short Answer  Put the following four stages of development in order from earliest to latest: 1) larvae [LAHR-vee], 2) adult, 3) egg, 4) pupa.

ANSWER: 3, 1, 4, 2 (ACCEPT: EGG, LARVAE, PUPA, ADULT)

TOSS-UP

8) EARTH AND SPACE  Multiple Choice  Which of the following types of maps would show the most accurate representation of the entire surface of the Earth?

W) Mercator projection  
X) Equal-area projection  
Y) Globe  
Z) Contour projection

ANSWER: Y) GLOBE

BONUS

8) EARTH AND SPACE  Multiple Choice  Which of the following is the best explanation of how rift valleys are formed?

W) The scouring of bedrock as glaciers retreat  
X) Tectonic divergence  
Y) The accumulation of glacial deposits deposited as glaciers retreat  
Z) A wide river scours out the land then shifts direction

ANSWER: X) TECTONIC DIVERGENCE
TOSS-UP

9) PHYSICAL SCIENCE  Short Answer  What is the kinetic energy in joules of a 10-kilogram object moving at a velocity of 2 meters per second?

ANSWER: 20

BONUS

9) PHYSICAL SCIENCE  Short Answer  A glass of water with ice cubes in it has a mass of 300 grams. What will the mass in grams be immediately after the ice has melted?

ANSWER: 300

TOSS-UP

10) MATH  Short Answer  If both coordinates of a point are negative, in which quadrant in the Cartesian coordinate system would it be located?

ANSWER: III (ACCEPT: THIRD)

BONUS

10) MATH  Short Answer  If \(ab = 12\), \(a + b = 8\), and \(a\) is greater than \(b\), what is the value of \(a - b\)?

ANSWER: 4
TOSS-UP

11) GENERAL SCIENCE  Short Answer  Identify all of the following four choices that all living things must do to survive: 1) excrete wastes, 2) maintain homeostasis [hoh-mee-uh-STAY-sis], 3) ingest food, 4) metabolize.

ANSWER: 1, 2, 4 (ACCEPT: EXCRETE WASTES, MAINTAIN HOMEOSTASIS, METABOLIZE)

BONUS

11) GENERAL SCIENCE  Multiple Choice  Which of the following statements is NOT true?

W) Some species of Archeabacteria [ahr-ke-bak-TEER-ee-uh] are the oldest organisms on Earth
X) Some species of Archeabacteria are extremophiles
Y) Some species of Eubacteria have a membrane-bound nucleus
Z) Some species of Eubacteria are found in your mouth

ANSWER: Y) SOME SPECIES OF EUBACTERIA HAVE A MEMBRANE-BOUND NUCLEUS

TOSS-UP

12) ENERGY  Multiple Choice  Emma puts a thermometer into a glass filled with hot water. Why does the mercury inside the thermometer rise?

W) Air bubbles are released
X) Heat from the water makes it expand
Y) Heat from the water makes it contract
Z) Air pressure above the water pulls it up

ANSWER: X) HEAT FROM THE WATER MAKES IT EXPAND

BONUS

12) ENERGY  Multiple Choice  Which of the following is, to date, the most promising method of disposing of nuclear waste?

W) Combining it with carbon dioxide
X) Storing it underground in a geologic formation
Y) Storing it in a low-level disposal vault
Z) Diluting it before pouring it into the ocean

ANSWER: X) STORING IT UNDERGROUND IN A GEOLOGIC FORMATION
TOSS-UP

13) LIFE SCIENCE  *Multiple Choice*  Which of the following types of feather helps birds maintain a constant body temperature?

W) Contour  
X) Down  
Y) Barbed  
Z) Ribbed  

ANSWER: X) DOWN

BONUS

13) LIFE SCIENCE  *Multiple Choice*  Which of the following is an adaptation in birds that facilitates flight?

W) Hollow bones  
X) Sharp claws  
Y) Smooth feathers  
Z) Small beaks  

ANSWER: W) HOLLOW BONES

TOSS-UP

14) EARTH AND SPACE  *Short Answer*  In approximately 5.5 billion years, our Sun will move to which next phase in its life cycle?

ANSWER: RED GIANT

BONUS

14) EARTH AND SPACE  *Multiple Choice*  Which of the following cosmic phenomena gave rise to most of the iron found on Earth?

W) Red giants  
X) Supernovae  *soo-per-NOH-vee*  
Y) Quasars  *KWAY-zahrs*  
Z) Pulsars  

ANSWER: X) SUPERNOVAE
TOSS-UP

15) PHYSICAL SCIENCE  Short Answer  A metal spoon, a wooden spoon and a plastic spoon are all placed in hot water. After 15 seconds, which spoon will feel the hottest?

ANSWER: METAL

BONUS

15) PHYSICAL SCIENCE  Short Answer  What form of electromagnetic radiation causes sunburns?

ANSWER: ULTRAVIOLET (ACCEPT: UVA AND UVB; DO NOT ACCEPT: UVC)

TOSS-UP

16) MATH  Short Answer  Providing your answer as a fraction in lowest terms, what is the slope of a line that is perpendicular to a line with the equation \( y = 5x - \frac{2}{3} \) ?

ANSWER: \(-1/5\)

BONUS

16) MATH  Short Answer  What is the greatest integer less than or equal to \(\sqrt{888}\)?

ANSWER: 29
TOSS-UP

17) GENERAL SCIENCE  *Multiple Choice*  Which of the following statements is true?

W) Lightning never strikes the same location twice  
X) A car’s rubber tires will protect its occupants from lightning  
Y) If outside during a lightning storm, it is best to take a low, crouching position with feet together  
Z) Lightning strike victims retain an electrical charge and will shock someone who touches them  

ANSWER: Y) IF OUTSIDE DURING A LIGHTNING STORM, IT IS BEST TO TAKE A LOW, CROUCHING POSITION WITH FEET TOGETHER

BONUS

17) GENERAL SCIENCE  *Short Answer*  If you see a flash of lightning and ten seconds pass before you hear a clap of thunder, about how far away to the nearest mile is the thunderstorm?

ANSWER: 2

TOSS-UP

18) ENERGY  *Short Answer*  Electric energy is used to power an incandescent lamp. Is the amount of light energy produced more than, less than, or equal to the electrical energy used?

ANSWER: LESS THAN

BONUS

18) ENERGY  *Short Answer*  In 1800, Alessandro Volta made the first electric battery by alternating discs of copper and zinc with cloth dampened with a solution of water and salt. What was the name of his invention?

ANSWER: VOLTAIC PILE (ACCEPT: ELECTRIC ORGAN)
TOSS-UP

19) LIFE SCIENCE  Multiple Choice  Which of the following kinds of mammal teeth are used to bite and cut?

W) Incisors  
X) Premolars  
Y) Molars  
Z) Grinders

ANSWER: W) INCISORS

BONUS

19) LIFE SCIENCE  Short Answer  What is the term for the non-living physical and chemical components of an ecosystem?

ANSWER: ABIOTIC

TOSS-UP

20) EARTH AND SPACE  Short Answer  What is the name of the artificial satellite, launched in 1957, that was a partial cause for the formation of the National Aeronautics and Space Administration?

ANSWER: SPUTNIK

BONUS

20) EARTH AND SPACE  Multiple Choice  The size of a wind-generated wave formed in open ocean depends on which of the following pairs of characteristics of wind?

W) Strength and duration  
X) Strength and direction  
Y) Fetch and direction  
Z) Fetch and temperature

ANSWER: W) STRENGTH AND DURATION
TOSS-UP

21) PHYSICAL SCIENCE  Multiple Choice  Which of the following is an example of a compound?

W) O₂  
X) O₃  
Y) HCl  
Z) Cl₂

ANSWER: Y) HCl

BONUS

21) PHYSICAL SCIENCE  Multiple Choice  Which of the following properties is NOT a property of a covalent molecular compound?

W) Low melting point  
X) Low boiling point  
Y) Good electrical conductivity  
Z) Poor thermal conductivity

ANSWER: Y) GOOD ELECTRICAL CONDUCTIVITY

TOSS-UP

22) MATH  Short Answer  If an angle measures 34°, what is the measure in degrees of its supplement?

ANSWER: 146°

BONUS

22) MATH  Short Answer  Given a triangle ABC in which side AB = 10 centimeters, side AC = 10 centimeters, and angle A = 72°, what is the measure in degrees of angle B?

ANSWER: 54°
23) GENERAL SCIENCE  *Multiple Choice*  In the chemical formula for ammonia, NH₃, which of the following does the subscript 3 represent?

W) The number of hydrogen atoms in each molecule of ammonia  
X) The number of nitrogen atoms in each molecule of ammonia  
Y) The number of nitrogen and hydrogen atoms in each molecule of ammonia  
Z) The number of ammonia molecules that will bond together  

**ANSWER: W) THE NUMBER OF HYDROGEN ATOMS IN EACH MOLECULE OF AMMONIA**

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**BONUS**

23) GENERAL SCIENCE  *Short Answer*  Providing your answer in scientific notation with the correct number of significant digits, what is the sum of 1.2 × 10⁻³ and 2.7 × 10⁻⁴?

**ANSWER: 1.5 × 10⁻³**

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**TOSS-UP**

24) EARTH AND SPACE  *Short Answer*  In Earth's interior, where temperature and pressures are high, what is the term for molten rock?

**ANSWER: MAGMA**

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**BONUS**

24) EARTH AND SPACE  *Multiple Choice*  Extremely coarse grained igneous rocks, with minerals larger than 1 inch, are evidence of which of the following?

W) Volcanic rocks with previously formed crystals  
X) Volcanic rocks cooled rapidly along ocean floor fissures  
Y) Magma cooling with high volatile content  
Z) Magma cooling quickly to form aplite  

**ANSWER: Y) MAGMA COOLING WITH HIGH VOLATILE CONTENT**
TOSS-UP

25) LIFE SCIENCE  *Multiple Choice*  Which of the following biomes, on average, receives the lowest amount of annual precipitation?

W) Temperate deciduous forest  *

X) Tundra

Y) Taiga

Z) Grasslands

ANSWER: X) TUNDRA

BONUS

25) LIFE SCIENCE  *Short Answer*  Name all of the following five animals which can be found in a wetlands environment: 1) pronghorn antelope 2) beaver, 3) muskrat, 4) salamander, 5) hedgehog.

ANSWER: 2, 3, 4 (ACCEPT: BEAVER, MUSKRAT, SALAMANDER)