

ROUND 10

TOSS-UP

1) MATH *Short Answer* A number is obtained by doubling an original value a total of 5 times. What is the final result if the original number is 1?

ANSWER: 32

BONUS

1) MATH *Short Answer* A number is obtained by doubling an original value, then doubling that result, and repeating that doubling process 6 times. If the final value is 320, how large was the original number?

ANSWER: 5

TOSS-UP

2) LIFE SCIENCE *Short Answer* There is a corn field with two varieties of corn, Corn A and Corn B, planted in alternating rows. The tassels are removed from Corn A, ensuring that the only pollen released in the field comes from Corn B. Not considering pollen that could be carried in from outside of the field, how can we characterize the ears of corn that will grow on Corn A?

ANSWER: HYBRID

BONUS

2) LIFE SCIENCE *Multiple Choice* When plant scientists began crossing different pure lines, they noticed that the hybrid plants that resulted were:

- W) Less vigorous than their parents
- X) Equally as vigorous as their parents
- Y) Unable to sustain life
- Z) More vigorous than their parents

ANSWER: Z) MORE VIGOROUS THAN THEIR PARENTS

TOSS-UP

3) ENERGY *Multiple Choice* Which of the following statements about sound energy is true?

- W) Sound energy is produced by vibrations, not by discrete particles
- X) Sound energy can easily be used for production of electrical power
- Y) Sound energy is a form of thermal energy
- Z) Sound energy is related to chemical changes

ANSWER: W) SOUND ENERGY IS PRODUCED BY VIBRATIONS, NOT BY DISCRETE PARTICLES

BONUS

3) ENERGY *Multiple Choice* Ultrasound is acoustic energy in the form of waves with a frequency above the human hearing range. Which of the following statements does NOT reflect a use of ultrasonic energy?

- W) To observe the condition of a fetus before birth
- X) To detect motion in the immediate vicinity of a vehicle
- Y) To make iPod sound quality better
- Z) To find schools of fish

ANSWER: Y) TO MAKE IPOD SOUND QUALITY BETTER

TOSS-UP

4) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following characteristics is the least reliable when identifying minerals?

- W) Color
- X) Streak
- Y) Cleavage
- Z) Hardness

ANSWER: W) COLOR

BONUS

4) EARTH AND SPACE SCIENCE *Short Answer* What mineral characteristic is defined as a mineral's ability to break along preexisting planes of weakness?

ANSWER: CLEAVAGE

TOSS-UP

5) MATH *Multiple Choice* Considering a circle of radius 1, which of the following has the largest numerical value?

- W) Circumference
- X) Diameter
- Y) Area
- Z) Radius

ANSWER: W) CIRCUMFERENCE

BONUS

5) MATH *Short Answer* What is the surface area, in terms of π , of a cylinder with a radius of π and height of π ?

ANSWER: $4\pi^3$

TOSS-UP

6) LIFE SCIENCE *Multiple Choice* Which of these constitutes a correct DNA base pairing?

- W) A-C
- X) G-T
- Y) A-T
- Z) C-C

ANSWER: Y) A-T

BONUS

6) LIFE SCIENCE *Short Answer* Name the 4 nucleic acids found in DNA.

ANSWER: ADENINE, GUANINE, THYMINE, CYTOSINE

TOSS-UP

7) GENERAL SCIENCE *Short Answer* What physical quantity does a wattmeter measure?

ANSWER: SUPPLY RATE OF ELECTRIC POWER (ACCEPT: ELECTRIC POWER)

BONUS

7) GENERAL SCIENCE *Short Answer* A 25 watt lamp has a resistance of 4 ohms. What is the voltage applied across the lamp?

ANSWER: 10

TOSS-UP

8) EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is NOT true about groundwater?

W) It never freezes

X) It ultimately flows to the ocean

Y) It is replenished by surface water from streams, precipitation and rivers

Z) It can be depleted by humans in a particular region

ANSWER: W) IT NEVER FREEZES

BONUS

8) EARTH AND SPACE SCIENCE *Short Answer* In some regions of the U.S., sinkholes form in the bedrock when rocks are naturally dissolved by circulating ground water. Name a rock type which can dissolve, collapsing to form spaces and caverns deep underground.

ANSWER: EVAPORITE OR CARBONATE

TOSS-UP

9) MATH *Short Answer* What is $4(z + 3) - 2$ (read as: 4 times the quantity z plus 3) when $z = 6$?

ANSWER: 34

BONUS

9) MATH *Multiple Choice* If Jen ran $t + 3$ kilometers and Susan ran half as much as Jen and biked twice as much as Jen ran, which expression represents their total kilometers of exercise?

W) $2.5(t + 3)$ (read as: 2.5 times the quantity t plus 3)

X) $3.5t + 3$

Y) $3.5(t + 3)$ (read as: 3.5 times the quantity t plus 3)

Z) $1.5t + 4.5$

ANSWER: Y) $3.5(t + 3)$

TOSS-UP

10) EARTH AND SPACE SCIENCE *Multiple Choice* What is the term used to describe someone who draws maps?

W) Graphic designer

X) Meteorologist

Y) Geoscientist

Z) Cartographer

ANSWER: Z) CARTOGRAPHER

BONUS

10) EARTH AND SPACE SCIENCE *Short Answer* What type of igneous rock forms underground, cools slowly, and can be identified by its large grain sizes and phaneritic texture?

ANSWER: PLUTONIC

TOSS-UP

11) PHYSICAL SCIENCE *Short Answer* You have a yellow banana with no spots. You cut it into chunks to put it into a fruit salad, and it starts to turn brown. What process is causing the banana to turn brown?

ANSWER: OXIDATION

BONUS

11) PHYSICAL SCIENCE *Multiple Choice* The secret to the prevention of oxidation is to provide a layer of protection between the exposed material and the air. Which of the following is NOT an example of a process used to prevent oxidation?

- W) Anodizing aluminum
- X) Waxing a car
- Y) Putting lemon juice on exposed fruit
- Z) Spraying paint on metal objects

ANSWER: W) ANODIZING ALUMINUM

TOSS-UP

12) GENERAL SCIENCE *Short Answer* What is the name for all the molten rock that is hidden underground?

ANSWER: MAGMA

BONUS

12) GENERAL SCIENCE *Multiple Choice* What is the main component of volcanic gas?

- W) Sulfur Dioxide
- X) Steam
- Y) Carbon Dioxide
- Z) Nitrogen Dioxide

ANSWER: X) STEAM

TOSS-UP

13) LIFE SCIENCE *Multiple Choice* Cheese, yogurt, apple cider, olives, and sauerkraut are all made with:

- W) Dehydration
- X) Bacteria
- Y) Yeast
- Z) *Paramecium* (read as: pah-rah-MEE-shee-uhm)

ANSWER: X) BACTERIA

BONUS

13) LIFE SCIENCE *Multiple Choice* You go to the doctor because you have a sore throat. She looks at your throat and sympathizes, then says, "Go home and rest, you'll beat that virus in no time!" She does NOT write a prescription for antibiotics, however, because:

- W) Antibiotics kill bacteria and you have a viral infection
- X) Antibiotics are being overused
- Y) Antibiotics are relatively inexpensive
- Z) Antibiotics only work if you have a cold

ANSWER: W) ANTIBIOTICS KILL BACTERIA AND YOU HAVE A VIRAL INFECTION

TOSS-UP

14) EARTH AND SPACE SCIENCE *Multiple Choice* Meteorology is the study of:

- W) Meteors
- X) Weather
- Y) Space
- Z) Rocks

ANSWER: X) WEATHER

BONUS

14) EARTH AND SPACE SCIENCE *Multiple Choice* Along with tectonic forces, weathering and erosion, which of the following process also helped to shape landforms on Earth today?

- W) Condensation
- X) Upwelling
- Y) Deposition
- Z) Transpiration

ANSWER: Y) DEPOSITION

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* Which of the following geologic periods is the most recent?

- W) Permian
- X) Silurian
- Y) Devonian
- Z) Jurassic

ANSWER: Z) JURASSIC

BONUS

15) GENERAL SCIENCE *Multiple Choice* Purple martins are the largest member of the swallow family in North America. Which of the following is NOT true about purple martins?

- W) They are monogamous
- X) They eat only flying insects
- Y) The male croak song is always sung in the presence of a female
- Z) Only the female feeds their young

ANSWER: Z) ONLY THE FEMALE FEEDS THEIR YOUNG

TOSS-UP

16) ENERGY *Multiple Choice* What phenomenon is responsible for the shimmer that rises from cement on a hot day?

- W) Evaporation
- X) Refraction of light off dust particles
- Y) Changing light refraction from mixing cool air with warm air
- Z) An optical illusion

ANSWER: Y) CHANGING LIGHT REFRACTION FROM MIXING COOL AIR WITH WARM AIR

BONUS

16) ENERGY *Short Answer* Name the phenomenon that occurs when light is refracted by layers of air which have different temperatures and produce a distorted image.

ANSWER: A MIRAGE

TOSS-UP

17) GENERAL SCIENCE *Short Answer* The dinosaur known as a Brontosaurus since 1879 is correctly referred to by what name?

ANSWER: APATOSAURUS

BONUS

17) GENERAL SCIENCE *Multiple Choice* Which of the following statements is NOT true about the *Apatosaurus*?

- W) It was an omnivore
- X) It could crack its tail like a whip to ward off would-be attackers
- Y) It had a small jaw
- Z) An adult weighed as much as 20 elephants

ANSWER: W) IT WAS AN OMNIVORE

TOSS-UP

18) PHYSICAL SCIENCE *Short Answer* What is the chemical name for the compound NaCl?

ANSWER: SODIUM CHLORIDE

BONUS

18) PHYSICAL SCIENCE *Short Answer* What is the chemical name for the compound $\text{Cd}(\text{MnO}_4)_2$?

ANSWER: CADMIUM PERMANGANATE

TOSS-UP

19) EARTH AND SPACE SCIENCE *Short Answer* What is the name given to the supercontinent believed to have existed around 250 million years ago, before the continents split apart and drifted to where they are today?

ANSWER: PANGAEA

BONUS

19) EARTH AND SPACE SCIENCE *Short Answer* Rank the seven continents in order from largest to smallest area.

ANSWER: ASIA, AFRICA, NORTH AMERICA, SOUTH AMERICA, ANTARCTICA, EUROPE, AUSTRALIA

TOSS-UP

20) MATH *Multiple Choice* You are the manager of a video game store who is trying to decide what type of games to order and re-stock for next month. In looking at past and current sales, which of the following data descriptions would be of most interest to you?

- W) Mean
- X) Median
- Y) Mode
- Z) Range

ANSWER: Y) MODE

BONUS

20) MATH *Short Answer* If you had a stem-and-leaf plot in which the first stem 1 had leaves of 2, 2, and 4; the second stem 2 had leaves of 1, 4, and 5; and the third stem 3 had leaves of 0, 0, and 1; what is the median?

ANSWER: 24

TOSS-UP

21) PHYSICAL SCIENCE *Short Answer* Name the environmental phenomenon most closely associated with air movement and measured using millimeters of mercury.

ANSWER: ATMOSPHERIC PRESSURE (ACCEPT: AIR PRESSURE, BAROMETRIC PRESSURE)

BONUS

21) PHYSICAL SCIENCE *Short Answer* In millimeters of mercury, what is the standard atmospheric pressure at sea level?

ANSWER: 760

TOSS-UP

22) LIFE SCIENCE *Short Answer* What is the phenomenon of water moving across a semi-permeable membrane from an area of higher concentration to an area of lower concentration?

ANSWER: OSMOSIS

BONUS

22) LIFE SCIENCE *Short Answer* What are pinocytosis (read as: py-noh-si-TŌE-sis), phagocytosis (read as: fah-goh-sy-TŌE-sis), and exocytosis (read as: ehk-sōe -sy-TŌE-sis) types of?

ANSWER: ACTIVE TRANSPORT

TOSS-UP

23) MATH *Short Answer* Triangle CAT (read as: C-A-T) is a triangle with right angle A. Angle T is twice the measure of angle C. What is the measure of angle T in degrees?

ANSWER: 60

BONUS

23) MATH *Short Answer* Point D with coordinates (-1, -3) is reflected over the y -axis. The result is then reflected through the line $y = x$. What are the coordinates of the first image of the point D?

ANSWER: (-3, 1)

TOSS-UP

24) ENERGY *Multiple Choice* Touching hot objects with oven mitts relies on insulation that slows heat movement from the hot pan to your hand. However, the air in the oven mitt is only a good insulator if convection is not able to happen. That means that the air must be:

- W) Warm
- X) Slow
- Y) Moving
- Z) Stagnant

ANSWER: Z) STAGNANT

BONUS

24) ENERGY *Multiple Choice* Fiberglass insulation is one option for home insulation. It can be placed in attics, within outside walls, under floors, over unheated garages, and in other locations. Which of the following is NOT an advantage of fiberglass insulation?

- W) It reduces heat flow in and out of the home, so less energy is used for heating and cooling
- X) It can reduce transmission of sound from one room to another or from the outside
- Y) It is entirely made from recycled materials
- Z) It is non-combustible

ANSWER: Y) IT IS ENTIRELY MADE FROM RECYCLED MATERIALS

TOSS-UP

25) PHYSICAL SCIENCE *Short Answer* What state of matter is responsible for the production of light in fluorescent and neon lights?

ANSWER: PLASMA (ACCEPT: IONIZED GAS) (DO NOT ACCEPT: GAS)

BONUS

25) PHYSICAL SCIENCE *Multiple Choice* In a closed system, exergonic reactions may NOT increase the available:

- W) Heat
- X) Pressure
- Y) Entropy
- Z) Energy

ANSWER: X) PRESSURE