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Science Bowl Questions 12/2/10

Grade 9

**Toss-Up**

1) ENERGY *Multiple Choice* The energy of an object or system is

W) how much work it can do on another object or system

X) how much work it cannot do on another object or system

Y) the amount of time it can do work on another object or system

Z) the amount of time it cannot do work on another object or system

ANSWER: W) how much work it can do on another object or system

**Bonus**

1) ENERGY *Short Answer* Energy is the ability to perform

ANSWER: work

**Toss-Up**

2) ENERGY *Multiple Choice* Energy can be measured in

W) force

X) light

Y) work

Z) time

ANSWER: Y) work

**Bonus**

2) ENERGY *Short Answer* What is the formula for work?

ANSWER: Work = Force x Distance

**Toss-Up**

3) ENERGY *Multiple Choice* What are the two most basic forms of energy?

W) potential energy and unpotential energy

X) kinetic energy and unkinetic energy

Y) potential energy and kinetic energy

Z) real energy and fake energy

ANSWER: Y) potential energy and kinetic energy

**Bonus**

3) ENERGY *Short Answer* As an object starts to move, potential energy is converted into

ANSWER: kinetic energy

**Toss-Up**

4) ENERGY *Multiple Choice* Which of the following is a form of energy?

W) real energy

X) star energy

Y) fake energy

Z) thermal energy

ANSWER: Z) thermal energy

**Bonus**

4) ENERGY *Short Answer* What is another name for thermal energy?

ANSWER: heat energy

**Toss-Up**

5) ENERGY *Multiple Choice* What is the speed of light in m/s to one significant figure?

W) 3 X 103 m/s

X) 3 X 107 m/s

Y) 3 X 108 m/s

Z) 3 X 1012 m/s

ANSWER: Y) 3 X 108 m/s

**Bonus**

5) ENERGY *Short Answer* In the equation E = mc2, what symbol represents the speed of light?

ANSWER: c

**Toss-Up**

6) ENERGY *Multiple Choice* Sound and light energy travel in

W) rays

X) waves

Y) vacuums

Z) black holes

ANSWER: X) waves

**Bonus**

6) ENERGY *Short Answer* Can both sound and light waves travel in vacuums?

ANSWER: No

**Toss-Up**

7) ENERGY *Multiple Choice* What is the part of the light spectrum that we can be seen by the naked eye called?

W) x-rays

X) radio waves

Y) visible light

Z) sound waves

ANSWER: Y) visible light

**Bonus**

7) ENERGY *Short Answer* Which color of visible light has the lowest frequency?

ANSWER: red

**Toss-Up**

8) ENERGY *Multiple Choice* Which type of light wave has the longest wavelength?

W) gamma-rays

X) x-rays

Y) infrared waves

Z) radio waves

ANSWER: Z) radio waves

**Bonus**

8) ENERGY *Short Answer* Do FM or AM radio waves have longer wavelengths?

ANSWER: AM radio waves

**Toss-Up**

9) ENERGY *Multiple Choice* Which type of light has the highest frequency?

W) gamma-rays

X) x-rays

Y) ultraviolet waves

Z) infrared waves

ANSWER: W) gamma-rays

**Bonus**

9) ENERGY *Short Answer* How many meters long is one wave of a gamma-ray?

ANSWER: 10-12 meters

**Toss-Up**

10) ENERGY *Multiple Choice* What are three types of fossil fules?

W) gasoline, heat, and energy

X) coal, petroleum, and heat

Y) petroleum, natural gas, and unnatural gas

Z) coal, petroleum, and natural gas

ANSWER: Z) coal, petroleum, and natural gas

**Bonus**

10) ENERGY *Short Answer* Burning fossil fuels generates

ANSWER: electricity

**Toss-Up**

11) ENERGY *Multiple Choice* What type of energy heats the Earth?

W) electromagnetic energy

X) nuclear energy

Y) potential energy

Z) chemical energy

ANSWER: X) nuclear energy

**Bonus**

11) ENERGY *Short Answer* What happens to an atom in order to create nuclear energy?

ANSWER: the nucleus is split into 2 smaller nuclei

**Toss-Up**

12) ENERGY *Multiple Choice* What percentage of oil is used in automobiles?

W) 22 %

X) 35 %

Y) 55 %

Z) 75 %

ANSWER: Y) 55 %

**Bonus**

12) ENERGY *Short Answer* Automobiles account for what fraction of greenhouse emissions?

ANSWER: 1/3

**Toss-Up**

13) ENERGY *Multiple Choice* One joule is

W) 1 N X 1 cm

X) 1 N X 1 m

Y) 1 kN X 1 m

Z) 1 kN X 1 km

ANSWER: X) 1 N X 1 m

**Bonus**

13) ENERGY *Short Answer* In scientific notation, how many joules are in 1 kN X 1 km?

ANSWER: 1 X 106 J

**Toss-Up**

14) ENERGY *Multiple Choice* What is the unit for power?

W) watt

X) joule

Y) newton

Z) kilometer

ANSWER: W) watt

**Bonus**

14) ENERGY *Short Answer* What is the formula for power?

ANSWER: Power = work done / time interval

**Toss-Up**

15) ENERGY *Multiple Choice* What is the formula for kinetic energy?

W) Kinetic Energy = 1/2 X mass X speed

X) Kinetic Energy = mass X speed

Y) Kinetic Energy = 1/2 X mass X speed2

Z) Kinetic Energy = mass X speed2

ANSWER: Y) Kinetic Energy = 1/2 X mass X speed2

**Bonus**

15) ENERGY *Short Answer* Which has more kinetic energy: heavier objects or lighter objects?

ANSWER: heavier objects

**Toss-Up**

16) ENERGY *Multiple Choice* How much work is done on a 12,000 newton object when it is lifted a height of 1.5 meters?

ANSWER: 18,000 joules

**Bonus**

16) ENERGY *Short Answer* To seven significant figures, how much work is done on a 97,634.00 newton object when it pushed a distance of 0.5000000 meters?

ANSWER: 48,871.00 joules

**Toss-Up**

17) ENERGY *Multiple Choice* Through what equation can mass be turned into energy?

ANSWER: E = mc2

**Bonus**

17) ENERGY *Short Answer* The formula E = mc2 is used in what type of reactions?

ANSWER: nuclear reactions

**Toss-Up**

18) ENERGY *Multiple Choice* Heat flows from

W) low to high

X) high to low

Y) fast to slow

Z) weak to strong

ANSWER: X) high to low

**Bonus**

18) ENERGY *Short Answer* If a hot piece of lead is put in water at room temperature, where will the heat flow?

ANSWER: the heat will flow out of the lead, into the water

**Toss-Up**

19) ENERGY *Multiple Choice* Renewable resources are types of energy that

W) can be replaced in nature in a short period of time

X) cannot be replaced in nature in a short period of time

Y) can be replaced in factories in a short period of time

Z) are usually useless

ANSWER: W) can be replaced in nature in a short period of time

**Bonus**

19) ENERGY *Short Answer* What are the 6 types of renewable energy

ANSWER: solar energy, hydropower, wind power, biomass, biofuel, and geothermal energy

**Toss-Up**

20) ENERGY *Multiple Choice* Most living organisms feed on molecules called

W) carboxides

X) hydroxites

Y) sulfates

Z) hydrocarbons

ANSWER: Z) hydrocarbons

**Bonus**

20) ENERGY *Short Answer* Hydrocarbons release energy when combined with

ANSWER: Oxygen

**Toss-Up**

21) ENERGY *Multiple Choice* What is gravitational potential energy

ANSWER: potential energy due to elevated position

**Bonus**

21) ENERGY *Short Answer* What is the formula for gravitational potential energy?

ANSWER: GPE = Weight X Height

**Toss-Up**

22) ENERGY *Multiple Choice* In the formula for gravitational potential energy, what unit is used for weight?

W) grams

X) centigrams

Y) kilograms

Z) megagrams

ANSWER: Y) kilograms

**Bonus**

22) ENERGY *Short Answer* If an object weighs 20 kg and is 20 meters above the ground, what is its gravitational potential energy?

ANSWER: 400 J

**Toss-Up**

23) ENERGY *Multiple Choice* In the formula for gravitational potential energy, what unit is used for height?

ANSWER: meters

**Bonus**

23) ENERGY *Short Answer* If an object weighs 10 kg and has a gravitational potential energy of 65 joules, how high is it from the ground?

ANSWER: 6.5 meters

**Toss-Up**

24) ENERGY *Multiple Choice* One paper clip has about the energy of

W) a campfire

X) a bonfire

Y) a conventional bomb

Z) an atomic bomb

ANSWER: Z) an atomic bomb

**Bonus**

24) ENERGY *Short Answer* The energy of a paper clip can be found by using what equation?

ANSWER: E = mc2

**Toss-Up**

25) ENERGY *Multiple Choice* Which type of light has the lowest frequency?

W) radio waves

X) x-rays

Y) ultraviolet waves

Z) gamma-rays

ANSWER: W) radio waves

**Bonus**

25) ENERGY *Short Answer* How many meters long is one wave of a radio wave?

ANSWER: 103 meters