Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Energy Test Study Guide -- Testing Monday 12/14

Directions: On your own please answer the following questions to help you study for your test. These questions have been taken directly from topics for the test. It would benefit you immensely if you filled this out accurately and took it home to study!

1. Define Potential Energy.
   1. The energy of position or possible movement
2. Define Kinetic Energy.
   1. The energy of motion
3. Michael Phelps is on the starting block. Here he has energy of position or \_\_\_\_\_\_\_\_\_\_\_\_\_\_. When he jumps off the block his energy is changed into what?
   1. From gravitational potential → motion energy
4. A stretched rubber band is an example of what kind of energy?
   1. Stored mechanical energy
5. Is the energy produced by water running a turbine in a dam kinetic or potential?
   1. Kinetic because the dam water is moving and turning a turbine to produce electricity. The water behind the dam would have gravitational potential energy before it falls.
6. Define Thermal Energy.
   1. Internal energy of substances--- HEAT energy
   2. The more vibration of the molecules or atoms of a substance, the more heat energy
   3. The cooler something is, the less its molecules or atoms vibrate.
7. Define Stored Mechanical Energy.
   1. Energy stored in substances by application of a force…examples are rubber bands and compressed springs (stretching, twisting, bending)
8. Suppose you are doing jumping jacks, what kind of energy do you have at the top of your jump when you are above the ground?
   1. At the top you would be above the ground and would have gravitational potential energy
9. How does height affect gravitational potential energy?
   1. The higher the object the greater the potential energy it has.GEP=massx9.81Xheight
10. Define an exothermic reaction.
    1. The reaction will GIVE OFF heat you will feel it get hot
11. Give an example of an exothermic reaction.
    1. Calcium Chloride and water – temperature increases
    2. Iron filings and oxygen- temperature increases
12. Define endothermic reaction.
    1. This reaction absorbs heat and gives a cooling effect.
13. Give an example of an endothermic reaction.
    1. Baking soda and vinegar (lab experiment) temperature decreases
14. What are the 11 main forms of energy?
    1. Potential, chemical, nuclear, stored mechanical, gravitational, kinetic, radiant, thermal, motion, sound, electrical
15. What kind of energy would make something feel warm?
    1. Thermal
16. The energy of moving electrons is known as what?
    1. Electrical
17. What happens if you wear dark clothes on a sunny day?
    1. They absorb the radiant energy and produce thermal energy
18. What happens if you wear white clothes on a sunny day?
    1. The reflect radiant energy and stay cool
19. Tell me what the Law of Conservation of Energy says.
    1. Energy cannot be created or destroyed, it can only change forms

20. What is energy conversion?

**Energy conversion** is the process of transforming **energy** from one form into another.

21.Solve this equation for the question mark:

Electrical energy for light bulb = 250 J (joules) Light Energy out = 120 J (joules) + Heat Energy out \_\_\_\_\_?\_\_\_\_ J (joules)

(basically 250 = 120 + x) x=130 J

22.Based on the above answer, how much energy was being wasted?

* 1. 130 J

**You just need to know the equation for energy efficiency %E=(out/in) X100**

**23.** What is the % efficiency of a ball that has 110 J of potential energy before a bounce (input) and 83J of energy after the bounce (output) ?

Remember equation is (total work or Energy output/input) x 100

(83J/110J)X100 = 75.45 %

24.What energy transfer happens in photosynthesis?

* 1. Light/radiant to chemical energy

25.If two of anything collide together what types of energy will they produce? (There should be 3)

* 1. Motion, sound, thermal

26.What factors impact the amount of kinetic energy something has when it falls?

* 1. How fast it falls (velocity) and mass of the object

27.True or false? An object’s mass and its height determine the amount of GPE the object has.

answer- True

28. How did the happy sad ball part I and II relate to our energy unit? *(give overview or lab and conclusions/ reflection/ observations/ findings.)*

answer many vary- With happy sad part I we saw energy transfer from GPE to kinetic motion. In happy ball part II we saw the amount of energy transferred to heat, sound, bounce change with a change in the ball’s temp. Both we good example of energy conversion and reviewed energy efficiency.

29. True or false- Heat travels from higher temperature ares to cooler areas. *(What is this known as?)*

True- Part of the Second law of thermodynamics

30.What is the difference between heat and temperature?

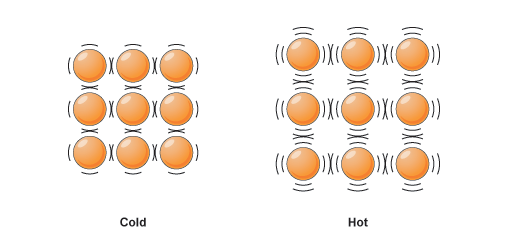
Thus, the **heat** of an object is the total energy of all the molecular motion inside that object. (movement of molecule and amount of substance) **Temperature**, on the other hand, is a measure of the average **heat** or thermal energy of the molecules in a substance (how fast particles are moving).

31. True or false- If a ball is dropped from 1 meter and bounces 97 cm it is more efficient than a ball that is dropped from 1 meter and only bounces 10 cm. Why?

(Since GPE = mgh, you can use h to compare these as long as m and g remain the same.)

True- because the second ball transfers energy to less useful forms and does not bounce as high.

or (97cm/100cm ) X 100 = 97 % (10/100)X 100= 10%

32. What do the particles of water look like in a bucket with lots of heat/thermal energy vs a bucket with a low amount of heat/ thermal energy? Draw it below. 

33. How is heat transferred? (*3 main ways and know their definitions-in Science Matters p34*)

Convection, conduction, radiation - link to help explain. <http://www.physicsclassroom.com/class/thermalP/Lesson-1/Methods-of-Heat-Transfer>

34. What are four energy sources that we talked about in class? How are they used (how do they make electricity) Pros and cons. *(look over notes)*

*Coal, Petroleum, Uranium, natural gas.*

*Uranium results in radioactive waste, but a positive is that is releases no carbon emissions.*

*Coal is the dirtiest of the fossil fuels, but the US has vast amounts of coal within its borders.*

*Natural gas is cleaner than coal and oil, but like coal and oil also releases carbon dioxide.*

*-review atoms, review what a non-renewable is, review how much of our oil is shipped in.*

35. If you double the height you lift a wrecking ball, what happens to the amount of PE it has? Explain.

It would double the amount of PE. Potential energy depends on mass, gravity, and height. If you increase the high it will increase the amount of PE

36. If you throw a rock twice as fast, what happens to the amount of KE it has?

It would have double the amount of KE. Kinetic energy depends on the velocity (speed) of an object and mass. If you increase the Velocity you will increase the KE. ( it will quadruple)

37. Explain. If you double the mass of a Yeti on a sled, what happens to the KE at the bottom of the hill? (assume they start at the same height)

The Ke would double, The Yeti would crash into the snowmen with more energy, requiring more energy to slow him down.

38. Compare and contrast Nuclear and Chemical energy. What are the similarities and differences between them?

**Nuclear**

Protons and Neutrons react inside the nucleus.

Elements transmute into other elements.

happen in the sun (fusion) and how we make nuclear energy (fission)

**Chemical**

Elections react outside the nucleus (electrons)

This **energy** is released during digestion.

As the bonds between these atoms loosen or break, a **chemical** reaction will occur, and new compounds are created

batteries are good examples

39. List something that operates by transforming chemical energy to light energy.

Flashlight (chemical) battery- Radiant/light

40. What are the energy transformations from the sun to you running a marathon?

Radiant - chemical (plant grows)- motion (you pick and eat plant)-Chemical ( digestion )- Thermal (keep body warm)- motion (running)