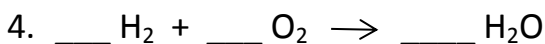
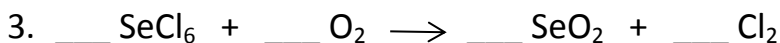
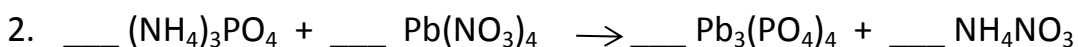
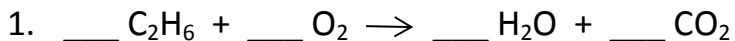


Chemistry and Energy Test Review

Name: _____

SPS2e. Apply the Law of Conservation of Matter by balancing the following types of chemical equation – synthesis, decomposition, single replacement, double replacement.



SPS7. Students will relate transformations and flow of energy within a system.

S8P2a. Explain energy transformation in terms of the Law of Conservation of Energy.

6. A rolling ball eventually comes to a stop. Where did the energy in the ball go?
 - a. It was destroyed.
 - b. It was transformed into thermal energy through friction.
 - c. It was transferred to the grass.
 - d. It disappeared like magic.

7. What energy transformation occurs in a burning match?
 - a. Chemical to thermal and electromagnetic
 - b. Thermal to chemical and smell
 - c. Electromagnetic to thermal and magnetic
 - d. Chemical to electrical and nuclear

8. What type of energy conversion happens when you draw a picture on the floor?
- Chemical to thermal to electrical
 - Thermal to mechanical to chemical
 - Mechanical to chemical to thermal
 - Chemical to mechanical to thermal
9. Which of the following would be the BEST example for an energy transformation from chemical energy to thermal energy?
- A pot of boiling water.
 - A campfire.
 - A Flashlight.
 - A nuclear bomb.

S8P2b. Explain the relationship between potential and kinetic energy.

10. Wiley Coyote was chasing the Roadrunner and ran off a cliff. Where does he have the most potential energy?
- When he holds up the sign saying "Yikes!" before he falls.
 - Right after he starts to fall.
 - Halfway to the ground as he falls.
 - Just before he hits the ground at the bottom.
11. Which has the most kinetic energy?
- Ice cream
 - Sweet tea
 - Helium in a balloon
 - Raindrops falling on my head

12. Where does a rollercoaster have the most potential energy?

- a. At the top of the highest hill.
- b. At the bottom of the highest hill.
- c. At the entrance to a loop.
- d. At the location of the nearest exit.

13. Which has the least potential energy?

- a. A 150 pound man standing still.
- b. A 150 pound man walking at 2 miles per hour.
- c. A 150 pound man jogging at 10 miles per hour.
- d. A 150 pound man running at 18 miles per hour.

14. Which of the following has the most potential energy?

- a. A car driving on the highway.
- b. A man on the top of a ladder.
- c. An orange sitting on top of a table.
- d. A ball in the air as it sails over the back fence.

S8P2c. Compare and contrast the different forms of energy and their characteristics.

15. Which of the following best represents chemical energy?

- a. Fireworks!
- b. The nuclear power plant where Homer Simpson works.
- c. A compact fluorescent light bulb.
- d. Asimo, the Honda Robot.

16. A source of electromagnetic energy is

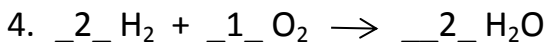
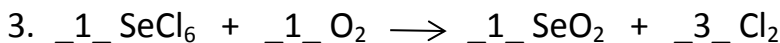
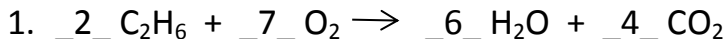
- a. A pound of prime Wisconsin Cheddar cheese.
- b. A light emitting diode otherwise called an LED light.
- c. A refrigerator magnet advertising dog grooming services.
- d. A group of 200 guys slamming into one another in a mosh pit

17. Thermal energy is best represented by
- A flannel shirt because flannel is awesome.
 - Two atoms being smashed together to make one bigger atom.
 - The energy stored in the bonds between two atoms.
 - The energy of particles in the different states of matter.
18. The energy you get due to an object's attraction to another object is called
- Electrical energy
 - Magnetic energy
 - Thermal energy
 - Gravitational energy
19. The energy stored in the bonds between two atoms is
- Nuclear energy
 - Chemical energy
 - Thermal energy
 - Electromagnetic energy
20. Light waves are representative of this form of energy:
- Sound energy
 - Electromagnetic energy
 - Mechanical energy
 - Thermal energy
21. This kind of nuclear energy is obtained by combining 2 smaller atoms into one large atom.
- Fusion
 - Fission
 - Fructis
 - Fussy Onion
22. All stars, including The Sun, use this kind of nuclear energy:
- Fusion
 - Fission
 - Factual
 - Fraggle

Answers and Explanations

The first 5 problems are all balancing chemical equations problems. We did 40 practice problems in class both as guided practice and in small groups. Students needing help should see me individually or watch the video from Khan Academy to try and get a handle on things

<https://www.khanacademy.org/science/chemistry/chemical-reactions-stoichiometry/v/balancing-chemical-equations>



6. The Law of Conservation of Energy states that energy cannot be created or destroyed. It can only be transformed. So the correct answer is B.
7. A match is wood with paraffin and phosphorous. These are chemicals and so the starting energy is chemical. When the match burns a chemical reaction takes place releasing light (electromagnetic energy) and what we'd call in everyday life "heat" which in scientific terms is thermal energy. Choice A.
8. Drawing a picture on the floor starts with the person. In a person's cells chemical energy is converted so that we can move our body parts (mechanical energy). The pencil is in contact with the floor as it moves and encounters friction. With friction you get thermal energy. Choice D.
9. Choice B, the campfire is correct. A campfire is the chemical energy of the wood being transformed into electromagnetic and thermal energy.

10. Potential energy is energy that is stored or of position (usually above the Earth). The place where Wiley Coyote is at the highest and not moving is right before he begins to fall which means that is where he has the most potential (least kinetic) energy. Right before he hits the ground is where he'd have the most kinetic (least potential) energy. Halfway down, he would have 50% potential and 50% kinetic energy. Choice A.
11. These type questions take a little "putting two and two together" type thinking. You have to know what state of matter the different choices are, remember the particle motion of each state of matter and then apply the definitions of potential and kinetic energy to sort out the answer. Solids, whose particles move the least, have the most potential energy (least kinetic). Gases and plasmas have particles that are far apart and moving rapidly so they have the most kinetic (least potential). Choice C is the correct answer.
12. Roller coasters have the most potential where they are the highest (top of hills and loops) and the most kinetic where the coaster "cars" are moving the fastest (bottom of hills and entrance/exits of loops). Choice A is correct.
13. The least potential is also the most kinetic. So in this case, you're looking for where the man is moving the fastest. Choice D is correct. Choice A is where the man would have the most potential/least kinetic.
14. Potential is stored energy or energy of position. Choices A & D have motion which means some (if not all) of the potential has been converted to kinetic energy. The man is both heavier than and higher than the orange so choice B would be the correct answer.
15. Chemical energy is the energy stored in the bonds between atoms. Choice A is the correct answer as fireworks are chemicals and the explosion is a release of energy as those bonds are broken and energy is released.

16. Light is a kind of electromagnetic energy along with all parts of the electromagnetic spectrum (radio, microwave, infrared, visible light, ultraviolet, x-ray & gamma). The correct answer would therefore be the LED from Choice B.

#17-23 are recall type questions as they have been given definitions and examples of each form of energy and related information. Students should study those notes to prepare for this section. These questions simply ask the student to recall the correct answer.

17. Thermal energy is what we usually call “heat” and is measured using a thermometer so the answer would be choice D.

18. Choice D is the correct answer.

19. Choice B.

20. Choice B.

21. Choice A.

22. Choice A.

23. Choice D.

24. There are two types of solar energy. The first is the one most people think of when they hear “solar energy” which is the **photovoltaic cells**. Photons of light strike the solar cell. The solar cell absorbs the photon which excites the atoms causing them to eject electrons and then tiny wires in the cell collect those electrons. The second type of solar energy is **solar thermal** where giant mirrors are used to focus sunlight on one spot (usually the top of a tower) which is full of water or some substance that is heated up and then used to heat water. The water turns to steam. The steam is used to turn a turbine which spins a magnet in a coil of wire and generates electricity.

