

Energy the Great Chameleon

A.k.a. ENERGY TRANSFORMATIONS /91



NAME _____ HOUR _____

1. List all the **forms** of energy (not **sources** like oil, wind, geothermal) you can think of. Add to this list as you complete this lab. (9pts)

1 _____	4 _____	7 _____
2 _____	5 _____	8 _____
3 _____	6 _____	9 _____

MOTION or MECHANICAL

2. Get a wooden car and push it with your hand. How would you describe the interaction? (tell me about the type of contact: between solids, liquids, or gases and tell me about the direction) (2pts)

Type of contact:
Direction of motion:



3. Now spin the wheels with your hands. How would you describe the interaction? (2pts)

Type of contact:
Direction of motion:

4. Get a small cup with water, put a straw in it and begin to stir it. How would you describe the interaction? (2pts)

Type of contact:
Direction of motion:

5. Using the same cup blow into the straw. How would you describe the interaction? (2pts)

Type of contact:
Direction of motion:

6. Get a small propeller or pinwheel and blow on it. How would you describe the interaction? (2pts)

Type of contact:
Direction of motion:

7. What types of interactions were all of the above, contact interactions or interactions at a distance?

8. Were all the motions visible or invisible?

9. Numbers 1- 6 all demonstrate what form of energy?

10. Is this form of energy potential (stored) or kinetic (in motion)?

11. What type of energy did your **ears** sense in the above activities?



THERMAL

12. Using mechanical energy, rub your hands together firmly and quickly.
What do you feel?

13. Obtain a small cup of sand. Measure its temperature and record the degrees here in Celsius.



14. Obtain another small cup, turn it over and tape the top rims together. Vigorously shake the sand for several minutes. Quickly take another temperature reading of the sand and record here.

15. What was the difference in measurements? (subtract the two temperature numbers from each other)

16. What type of energy does the thermometer measure?

17. What is another name for thermal energy?

USE CAUTION!

18. Light a match at the countertop near the sink. Without putting your fingers IN the flame (just put them near it) what energy form do your *fingers* sense? Be sure to put out the match in the beaker of water. **DO NOT THROW INTO THE WASTE BASKET!**

19. What type of energy did your ears sense when you rubbed your hands, shook the sand, and lit the match?

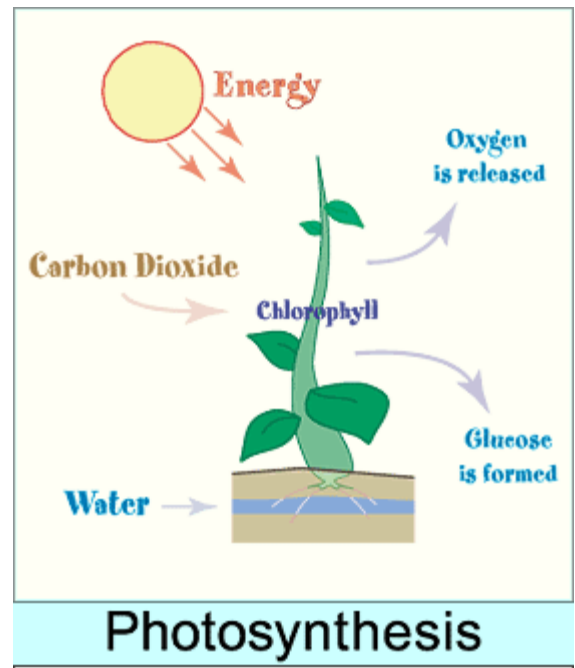
RADIANT

20. What energy form do your *eyes* sense when the match is lit?

21. What is another name for radiant energy?

22. Plants put molecules together, much like a builder puts a house together. What are the building materials for plants? (The bricks, wood, nails, etc.) (2pts)

- 1
- 2



32. What two forms of energy does your food turn into? (2pts)

1] _____ 2] _____

33. What evidence do you have of this?

34. How does a car use chemical energy?

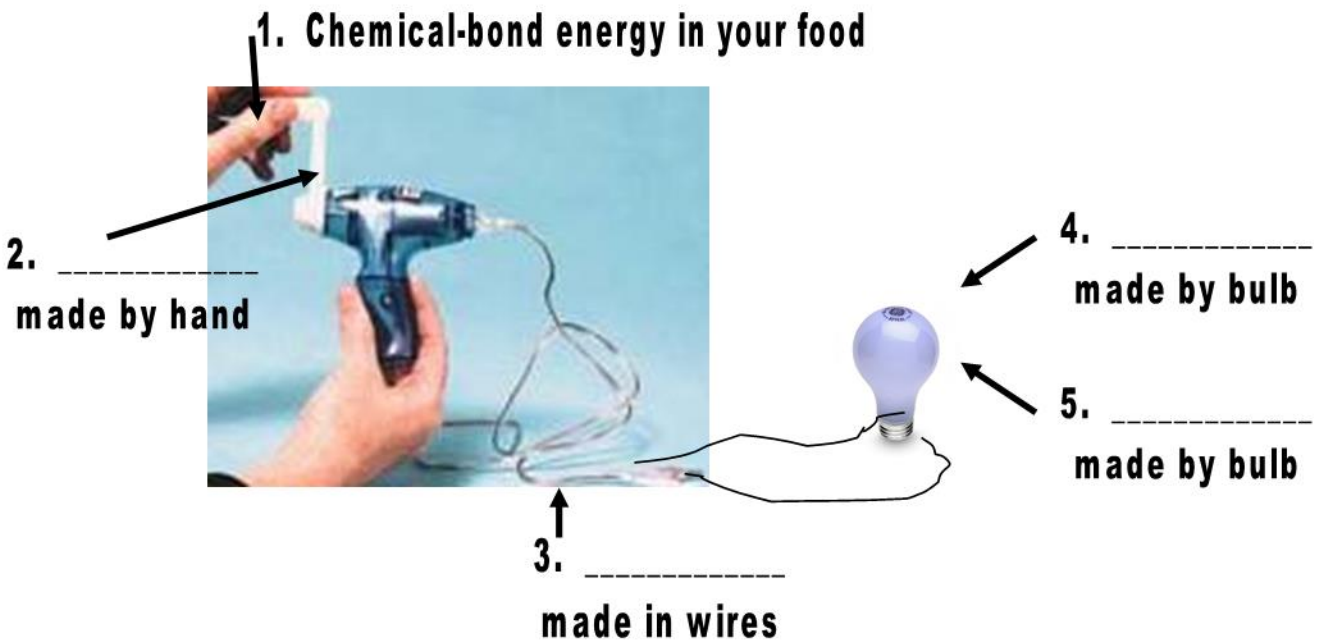
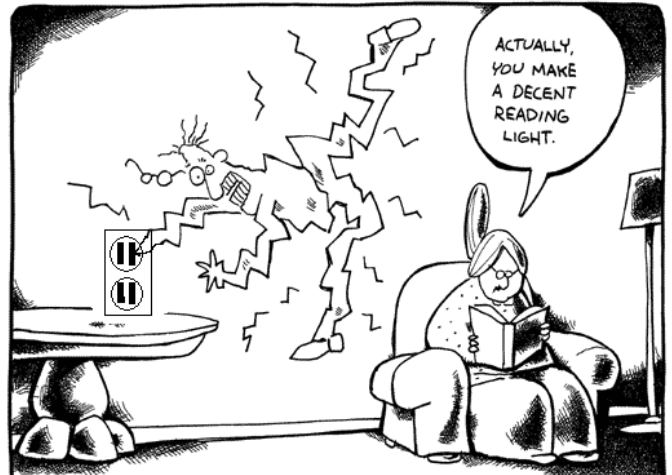
35. How are cars and humans similar?

ELECTRICAL

36. What kind of energy runs through wires?

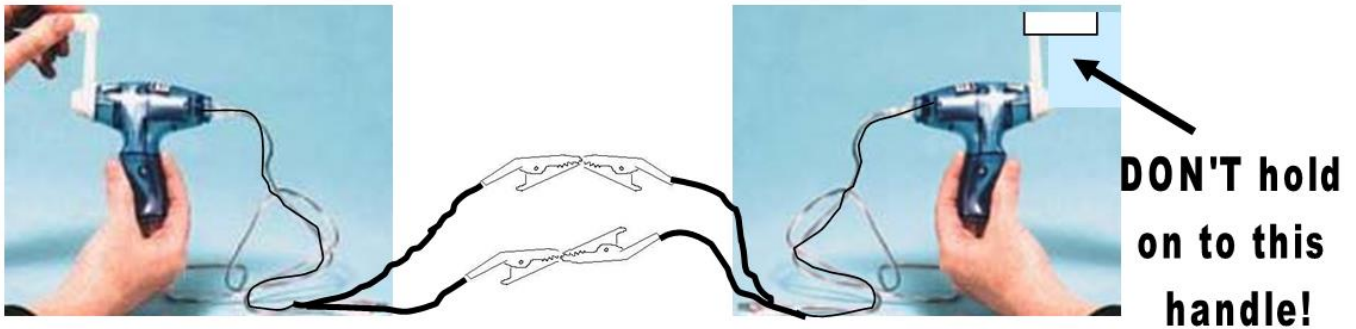
37. What part of an atom is “flowing” or moving through the wires?

38. Get a generator and attach it to a small bulb. Gently turn the generator with your hand, being careful not to go too fast because the bulb can easily burn out. Record the energy transformations. The starting energy is chemical, because you used food (a chemical) to make your hand move. (4pts)



39. Since an electron is moving inside a wire, it is potential or kinetic energy?

40. Now while a partner helps you hold the system, carefully connect a hand generator to another hand generator. Turn ONLY ONE of the handles and record what happens.



41. Does the handle of the second generator spin the same number of times that your hand cranks the other handle?

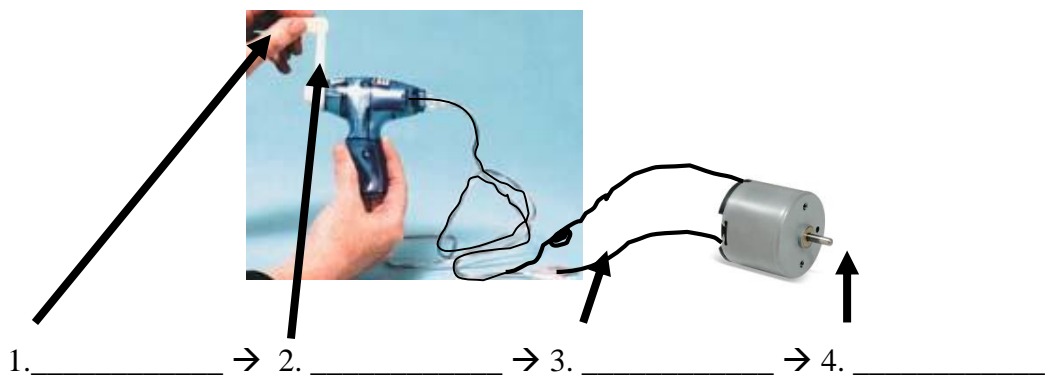
42. This happens because some of the energy gets “wasted.” What two forms of energy were wasted in the two-generator system? (both are caused by friction) (2pts)

- 1.
- 2.

43. What were the four energy transformations in the double generator system? (4pts)

1. _____ → 2. _____ → 3. _____ → 4. _____

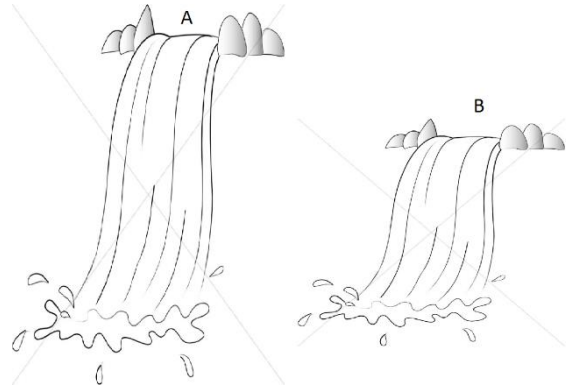
44. Now attach a generator to a small motor. Record the energy transformations. (4pts)



GRAVITATIONAL

45. Make a ramp out of your notebook or a ruler that is 1 cm high. Roll a marble down it. Now, make your ramp about 4 cm high. Describe the difference in the way the 2 marbles rolled down.

46. Where is there more energy-- when gravity pulls it down from a low height or a high height?
47. What is your evidence of this?
48. Before the marble got rolling, what kind of energy was in it? (potential or kinetic?)
49. Once the marble got rolling, what kind of energy was in it? (potential or kinetic?)
50. Finish this statement: When objects are placed at a greater _____, there is more potential _____ energy in the object.
51. Where would there be more gravitational potential energy? Waterfall A or B?
52. Where would you expect to experience the greatest amount of water pressure? Mark it on the picture.



ELASTIC

53. Get a rubber band, stretch it out 10 cm, and shoot it. (Don't aim at people—mess up once and you go to RTC) Measure the distance it goes and record it. Now stretch it out 15 cm and shoot it. Be sure to shoot at the exact same angle. How did the two trials compare?
54. Before you shot it, what kind of energy was there? (potential or kinetic?)
55. When it was flying, what kind of energy was there? (potential or kinetic?)
56. Finish this statement: The more stretched a rubber band is, the greater the _____ energy.
57. Get a bouncy ball. Drop it from 20 cm to the floor. Record how high it bounced back up.
58. What property of matter allowed the ball to store energy for a brief moment and then quickly release it so it could go into the air again?
59. Drop a wadded piece of paper the same size as the bouncy ball from a height of 20 cm. How is this trial different?
60. Did the rubber ball and the paper ball have the same gravitational potential energy?
61. Why didn't the paper ball bounce back up?

NUCLEAR

62. What is the center of an atom called?
63. What happens if you shoot high energy particles into the nucleus of an atom?
64. In the moment that an atom is exploding is that potential or kinetic energy?
65. In the moment just before it explodes is that potential or kinetic energy?

