

Student Name: _____

Form S1: Pre-unit Survey

Please read the following statements. For each item express your level of agreement with the statement by checking the appropriate box. Please pay careful attention to these statements and think carefully before you mark your agreement.

Start each of the following sentences with the words “In this class...”	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1. I focus on technological design					
2. I use mathematics to support my work on the technology design challenge					
3. I do science experiments to support my work on the design challenge					
4. I use web sites to find relevant information					
5. I communicate my ideas through the use of verbal, written or electronic forms					
6. I collect and analyze data					
7. I learn about the cost and benefit of technology					
8. I work with other students collaboratively					
9. I have to draw my models to scale					
10. I'm encouraged to consider the pros and cons of different design alternatives					

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Form S2: Pre-test Safety Light System

1. When solving a design problem, the final design solution is always limited by:
 - (a) constraints and specifications.
 - (b) prescribed approach to the design solution.
 - (c) web-based information and downloading limitations.
 - (d) availability of examples of prior solutions.

2. An informed design cycle is a procedure that:
 - (a) solves all design problems in a single cycle.
 - (b) uses mathematics, science and technology knowledge to enhance the design process.
 - (c) uses a series of mathematical formula to arrive at a single correct solution for the design.
 - (d) is only used by informed experts.

3. An ability to reach consensus in a group about an issue can be achieved by
 - (a) research and investigation using World-Wide-Web search engines.
 - (b) brainstorming and benchmarking.
 - (c) focus grouping and discussing.
 - (d) using prioritizing matrix and problem-solving matrix techniques.

4. Which of the following is NOT a “rule” for brainstorming?
 - (a) The participants call out their ideas freely without any restriction.
 - (b) Being critical and judgmental of ideas.
 - (c) The more ideas the better.
 - (d) Don’t just wait for your own private inspiration.

5. Which of the following is NOT true for power stations based on renewable energy sources?
 - (a) They produce very little air pollution.
 - (b) They do not damage the aquatic environment.
 - (c) They operate without mining precious non-renewable energy sources.
 - (d) They can generate electricity cheaper than power stations based on non-renewable energy sources can.

6. Life cycle assessment is a technique useful for:
 - (a) analyzing the life durability of a product.
 - (b) structural investigation of an industrial product during the cradle-to-grave life cycle.
 - (c) evaluation of environmental/societal costs of industrial products.
 - (d) maximizing the profits of manufacturing companies.

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7. When energy is converted from one form to another, the energy conversion efficiency:
 - (a) can be nearly perfect (i.e., 100%) if the conversion system is properly designed.
 - (b) is never 100% and waste energy is discharged to the environment as waste heat.
 - (c) varies greatly depending on seasonal and local weather conditions.
 - (d) is a sensitive function of the price of heating oil.

8. Light energy can be converted to electrical energy through the use of solar cells (or photovoltaic cells) with an efficiency of about 10%. This means that 90% of solar energy is:
 - (a) converted into chemical potential energy.
 - (b) converted into thermal energy stored in the solar cell.
 - (c) wasted as heat energy discharged into the environment.
 - (d) converted into greenhouse heat energy.

9. When a battery-operated car is in motion, some of the battery energy is wasted or lost in the form of:
 - (a) heat energy.
 - (b) potential energy.
 - (c) internal combustion energy.
 - (d) chemical pollution energy.

10. An electric circuit MUST have:
 - (a) a source of electric energy and a load.
 - (b) integrated circuits and timers.
 - (c) light emitting diodes and photodiodes.
 - (d) transistors.

11. In a simple circuit consisting of a battery, a resistor and a LED, which of the following statement is NOT true?
 - (a) Electrical energy from the battery is converted into light energy in the LED.
 - (b) Electrical energy from the battery is converted into heat energy in the resistor.
 - (c) Chemical energy is converted into electrical energy in the battery.
 - (d) Light energy from LED is partially converted into heat energy in the resistor.

12. There are two 60-watt bulbs in the parallel circuit using a 120 volt source. If we add another 60-watt bulb in parallel:
 - (a) each bulb will produce less light than before.
 - (b) each bulb will produce the same light as before.
 - (c) each bulb will produce 40 watts of light.
 - (d) the third bulb will be dimmer than the other bulbs.

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13. There are two 60 watt bulbs in a series circuit using a 120 volt source. If we add another 60 watt bulb in series:
- (a) each bulb will produce less light than before.
 - (b) each bulb will produce the same light as before.
 - (c) each bulb will produce 60 watts of light.
 - (d) the third bulb will be dimmer than the other bulbs.
14. A wire with a resistance of 24 ohms is connected to a 12 volt battery. According to Ohm's law, the current flow in the wire is 0.5 amps ($12 \text{ volts}/24 \text{ ohms}$). If you replace the 12 volt battery with a 6 volt battery, how many amps are produced within this circuit?
- (a) 1.25 amps.
 - (b) 1 amps.
 - (c) 72 amps.
 - (d) 0.25 amps.

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Form S3: Post-unit Survey

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6. I collect and analyze data					
7. I learn about the cost and benefit of technology					
8. I work with other students collaboratively					
9. I have to draw my models to scale					
10. I'm encouraged to consider the pros and cons of different design alternatives					
Your opinion on the unit:					
11. The module was interesting					
12. I learned how to better use the Internet					
13. The module was difficult for me					
14. The KSBs helped me to better understand the content					
15. I understand the technology design cycle better than when I began this course					
16. I would recommend this unit to other students in school					

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Form S4: Post-test Safety Light System

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S5: Tell Us What You Think

Name: _____

Class: _____

Gender: _____

Current science class: _____

Current math class: _____

Current technology class: _____

Main language spoken at home: _____

What did you like best about this unit?

What was the most difficult activity in this unit?

What would you recommend be done differently next time?
