**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per:\_\_\_\_\_\_\_\_\_\_\_**

**Scientific Method and Energy Study Guide**

**Scientific Method:** In each experiment, write a problem statement, a hypothesis, and identify the independent variable, dependent variable, and control variable.

A comprehension test was given to students after they had studied textbook material either in silence or with the television turned on.

Problem Statement:

Hypothesis:

Independent:

Dependent:

Control:

Workers at a company were assigned to one of two conditions: One group completed a stress management training program; another group of workers did not participate in the training. The number of sick days taken by these workers was examined for the next 2 months.

Problem Statement:

Hypothesis:

Independent:

Dependent:

Control:

Students at a University were split into two groups and each received a different text for a philosophy course. Once one group received a traditional textbook, while the other received an interactive textbook on a tablet computer. After the course, the final exam grades between the two groups of students were compared.

Problem Statement:

Hypothesis:

Independent:

Dependent:

Control:

**Graphing Skills:** Graph the data using all 7 graphing skills. You need to include a **title, labels, a scale, plot the points, write the correlation), and draw a best fit line. SHOW ALL WORK.**

Problem statement: How does Height affect weight?

|  |  |
| --- | --- |
| **Height (in)** | **Weight(lb)** |
| 60 | 120 |
| 68 | 154 |
| 57 | 115 |
| 62 | 123 |
| 73 | 178 |
| 65 | 135 |
| 58 | 117 |
| 72 | 165 |
| 74 | 170 |
| 78 | 182 |

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**Problem Statement: How does the time exercised affect the calories burned?**

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|  |  |
| --- | --- |
| **Time(min)** | **Calories** |
| 60 | 120 |
| 68 | 154 |
| 57 | 115 |
| 62 | 123 |
| 73 | 178 |
| 65 | 135 |
| 58 | 117 |
| 72 | 165 |
| 74 | 170 |
| 78 | 182 |

 **The two basic types of energy:** Determine the best match between basic types of energy and the description provided. Put the correct letter in the blank.

\_\_\_\_\_\_1. A skier at the top of the mountain (a) Kinetic Energy

\_\_\_\_\_\_2. Gasoline in a storage tank (b) Potential Energy

\_\_\_\_\_\_3. A race-car traveling at its maximum speed

\_\_\_\_\_\_4. Water flowing from a waterfall before it hits the pond below

\_\_\_\_\_\_5. A spring in a pinball machine before it is released

\_\_\_\_\_\_6. Burning a match

\_\_\_\_\_\_7. A running refrigerator motor

**Definitions of Energy:** Write down the definition for each of the following terms after reading the article.

ENERGY:

KINETIC ENERGY:

POTENTIAL ENERGY:

**Forms of Energy. Directions**: Determine the type of energy for each form (Kinetic, Potential, or Both) and give an example.

|  |  |  |  |
| --- | --- | --- | --- |
| **Form** | **Definition** | **Type (KE, PE, or Both)** | **Example**  |
| Mechanical energy |  |  |  |
| Thermal energy |  |  |  |
| Chemical energy |   |  |  |
| Nuclear energy |  |  |  |
| Elastic energy |  |  |  |
| Electromagnetic energy |  |  |  |
| Gravitational potential energy |  |  |  |

**Forms of Energy:** Match the energy form(s) to the description provided. A few questions may have more than one answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_1. Falling rocks from the top of a mountain (a) Mechanical

\_\_\_\_\_\_\_\_\_\_\_\_\_2. Release of energy from the Sun (b) Electrical

\_\_\_\_\_\_\_\_\_\_\_\_\_3. Energy released from food after it is eaten (c) Heat

\_\_\_\_\_\_\_\_\_\_\_\_\_4. Batteries (d) Radiant

\_\_\_\_\_\_\_\_\_\_\_\_\_5. The energy that runs a refrigerator (e) Chemical

\_\_\_\_\_\_\_\_\_\_\_\_\_6. Nuclear fission reactors (f) Nuclear

\_\_\_\_\_\_\_\_\_\_\_\_\_7. The rumble of thunder from a storm (g) Sound

\_\_\_\_\_\_\_\_\_\_\_\_\_8. Rubbing your hands together

\_\_\_\_\_\_\_\_\_\_\_\_\_9. Gasoline

\_\_\_\_\_\_\_\_\_\_\_\_\_10. Food before it is eaten

\_\_\_\_\_\_\_\_\_\_\_\_\_11. Lightening

**Energy Formulas:** Write the formula for potential, kinetic, and mechanical energy.

Potential Energy Formula:

Kinetic Energy Formula:

Mechanical Energy Formula:

**Energy Calculations:** Calculate the potential, kinetic, and mechanical energy for each situation.

1. A rock weighing 650kg was raised to 4.0m. What is the potential energy?
2. A Hammer was raised 10m and weighed 40kg. What is the potential energy?
3. A nail weighing .08kg is nailed in a wall 9m high. What is the potential energy?
4. A man running at 6m/s weighs 65kg. What is his kinetic energy?
5. A truck has a mass of 3400kg and is moving at a speed of 47m/s. What is the kinetic energy?
6. A bike has a mass of 12kg and is moving at a speed of 23m/s. What is the kinetic energy?
7. A football player throws a football weighing .64kg at a speed of 5m/s at a height of 19 m. What is the football’s mechanical energy?
8. A crane carries a metal tube weighing 85kg that is 11m above the ground at the speed of 3m/s. What is the metal tube’s mechanical energy?

