Lesson 6 ***Name _____***

Science, Technology, and Engineering

Directions: Use the code hints below to decipher the correct term that belongs in the blank spaces of the passage.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

Simply put, science is the study of the natural __ 15 __ __ __. Everything that scientists study falls into three categories; Earth science (geology), life science (__ 9 __ __ __ __ 25), and physical science (physics). Scientists work hard to collect __ 22 __ 4 __ __ 3 __. Scientists take their findings and develop scientific theories.

Theories are commonly thought of as hunches or opinions, but in science they hold much more credit and merit. A scientific theory is an __ 24 16 __ __ __ __ __ __ __ 14 supported by a large amount of evidence. Scientists also use scientific laws to observe a specific relationship under given conditions in the natural world. Laws hold true anywhere in the 21 __ __ 22 __ __ __ __. Theories and laws are the outcome of testing and collecting data. Scientific ideas would only change if new evidence supported the change.

Scientists collect data by conducting investigations. As scientists conduct experiments, make __ 2 __ __ __ __ __ __ __ __ __ 19, and utilize models, they deepen their understanding of that in which they're investigating. Investigations start with defining a problem, followed by forming a hypothesis and making __ __ __ __ __ __ __ __ __ __ 19. It's important to note that a hypothesis is stated as a testable question, whereas a prediction is an educated guess as to what the 15 __ 20 __ __ 13 __ might be. From there, scientists plan their investigations, identifying what they will deliberately change (the __ __ __ __ __ __ __ __ __ __ __ variable), and what they will observe changing as a result of that (the __ __ __ __ __ __ __ __ __ variable). They then collect and organize data, analyze, and draw conclusions. The more trials that are conducted, the more 22 __ __ __ __ the results become.

It is common for scientists to represent the data they've collected in __ __ __ __ 8 19. Three commonly used graphs include the bar graph, line graph, and circle graph. When a graph is created using an X and Y axis, the __ __ __ __ __ __ __ __ 20 variable is graphed on the __ __ 18 20 __ __ __ __ 12 or Y axis. It is important to always label all parts of a graph, including a title.

When making a bar graph, the bars cannot be touching each other. Making this mistake means that you have made a 8 __ __ __ __ __ __ __ 13. Graphs are an example of a 3 __ 14 3 __ __ __ __ __ 12 model. Other kinds of models include physical models and mathematical models. Scientists often use models in 19 __ 13 21 __ 1 __ __ __ __ 19 to imitate scientific phenomena.

More recently, scientists have worked towards solving everyday problems by inventing new __ __ __ __ __ __ __ __ __ __, and refining new innovations. The application of science combined with mathematics to solve these problems is known as engineering. Engineers work through the design process in order to create __ 18 __ 20 __ 20 __ __ __ 19, as a smaller and cheaper model of what they anticipate their real life solution to be.

Engineers use the design process in a similar way that scientists use the methods of scientific investigation. The difference is that scientists use investigations to answer __ __ __ __ __ 2 12 5 questions, whereas engineers use the design process to design and create solutions to real life problems.

As part of the engineering design process, engineers heavily consider the effects of their technologies. The methods used for analyzing this include, comparison charts, risk benefit analysis, life cycle analysis, and Pugh charts. Comparison charts can show the expected/unexpected and __ __ __ __ __ __ __ __ __/unfavorable outcomes of a technology. A risk benefit analysis shows the pros and cons of a given decision or technology. A life cycle analysis is an evaluation of the 13 __ 20 5 __ 9 __ __ __ and energy required to make, use, and dispose of a product. Lastly, a Pugh chart is a table to compare the 6 __ 1 __ __ __ 5 __ of multiple items.

When it's time to create, engineers use both physical and __ 25 2 __ __ tools to construct and run their creations. Materials used include metals, ceramics, polymer, semiconductors, composites, and exotic materials. Engineers chose the materials needed by considering the 16 __ __ __ __ __ __ 12 and 3 __ __ __ __ __ __ 12 properties of different materials. Some limitations of these materials include availability, cost, and degree of hazard. As new materials are discovered, engineers can enhance previously made technologies, while the opportunity for the creation of new ones is endless!