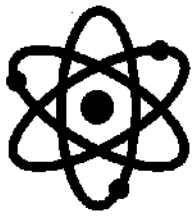
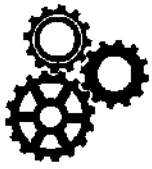
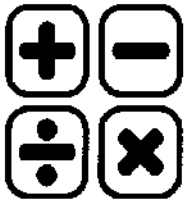
STEM Education

The STEMs of Learning: **Science**, **Technology**, **Engineering**, and **Mathematics** is an initiative designed to get students interested in these career fields. In 2009, the National Academy of Engineering (NAE) and the National Research Council (NRC) reported that there was a lack of focus on the science, technology, engineering, and mathematics (STEM) subjects in K–12 schools. This creates concerns about the competitiveness of the United States in the global market and the development of a workforce with the knowledge and skills needed to address technical and technological issues.

STEM Education	
STEM	**Knowledge and Skills Needed to Address Technical and Technological Issues**
Science 	**Basic science process skills** include the basic skills of classifying, observing, measuring, inferring, communicating, predicting, manipulating materials, replicating, using numbers, developing vocabulary, questioning, and using cues. **Integrated science skills** (more complex skills) include creating models, formulating a hypothesis, generalizing, identifying and controlling variables, defining operationally, recording and interpreting data, making decisions, and experimenting.
Technology 	**Design process** includes identifying and collecting information about everyday problems that can be solved by technology. It also includes generating ideas and requirements for solving the problems.
Engineering 	**Design process** includes identifying a problem or design opportunity; proposing designs and possible solutions; implementing the solution; evaluating the solution and its consequences; and communicating the problem, processes, and solution.
Mathematics 	**Mathematical skills** include the ability to use problem-solving skills, formulate problems, develop and apply a variety of strategies to solve problems, verify and interpret results, and generalize solutions and strategies to new problems. Students also need to be able to communicate with models, orally, in writing, and with pictures and graphs; reflect and clarify their own thinking; use the skills of reading, listening, and observing to interpret and evaluate ideas; and be able to make conjectures and convincing arguments.

Name:_____ Date:_____

What Kind of Science?

Directions: Science is the study of the natural world. There are many different branches of science in which scientists specialize in studying specific parts of the world around us. Write the letter of the correct branch of science on the blank next to the corresponding definition. Use your science textbook, a dictionary, the Internet, or other sources if you need help.

A. geology	**B. botany**	**C. zoology**	**D. paleontology**
E. oncology	**F. meteorology**	**G. astronomy**	**H. seismology**
I. psychology	**J. archaeology**	**K. physics**	**L. genetics**
M. pathology	**N. biology**	**O. chemistry**	**P. logic**
Q. ecology	**R. oceanography**	**S. radiology**	**T. entomology**

This science is the study of...

_____ 1. outer space

_____ 2. the composition, structure, properties, and reactions of matter

_____ 3. life and living organisms

_____ 4. organisms and their environment

_____ 5. the origin, history, and structure of the earth

_____ 6. heredity and inherited traits

_____ 7. the structure, physiology, development, and classification of animals

_____ 8. the development, diagnosis, treatment, and prevention of tumors

_____ 9. prehistoric life through fossils

_____ 10. earthquakes

_____ 11. the mental process and behavior

_____ 12. insects

_____ 13. past human lives by examining remaining material evidence

_____ 14. plants

_____ 15. the principles of reasoning

_____ 16. disease and its causes, processes, development, and consequences

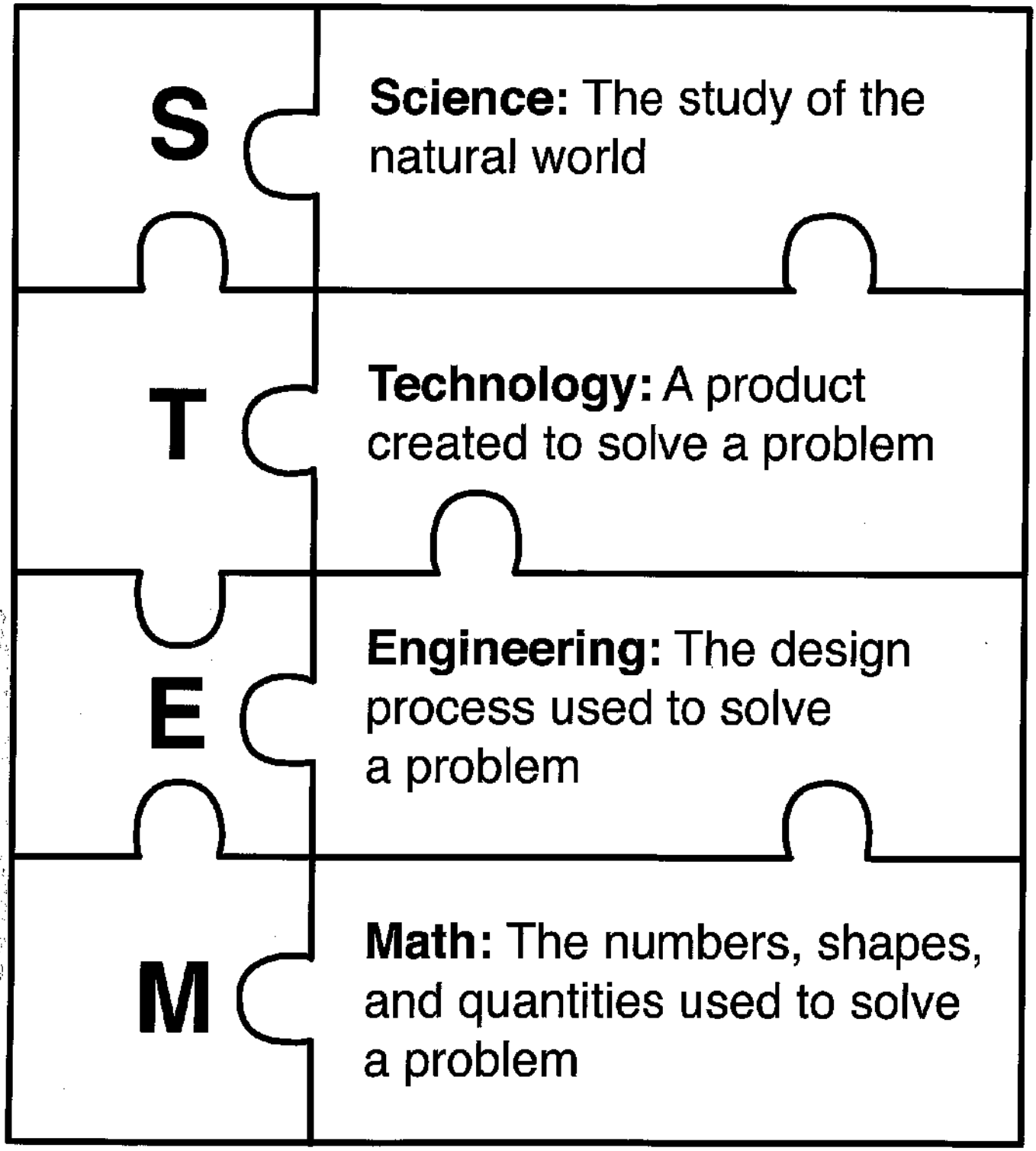
_____ 17. weather and atmospheric conditions

_____ 18. the use of radioactive substances in diagnosis and treatment of disease

_____ 19. the ocean

_____ 20. matter and energy and interactions between the two

The Pieces of STEM



Name:_____ Date:_____

Which Piece of STEM?

Directions: Read each item below and decide which piece of the STEM fields is most involved. Write **science**, **technology**, **engineering**, or **math** on the blank next to each item that most represents that field.

_____ 1. a robot arm is used to grasp objects outside the International Space Station

_____ 2. determining the capacity of a water tank used at the community garden

_____ 3. studying the life span of a giraffe

_____ 4. developing the plans for the new heating system at the middle school

_____ 5. calculating the correct angle for the roof of your neighbor's garage

_____ 6. a paleontologist finds a rare fossil in the local park

_____ 7. an artificial heart is used to keep a patient alive until an organ donor can be found

_____ 8. finding the distance from a satellite in orbit to a receiver on the earth's surface

_____ 9. devising a system for moving water from a reservoir in the mountains to a city on the plains

_____ 10. a bridge spans the Red River, connecting the towns on either side

_____ 11. a doctor studies diabetes in order to find a cure

_____ 12. insulin is used to treat diabetes

_____ 13. the correct dose of insulin is determined by finding the weight of the patient

_____ 14. the plans for an auto-inject pen are developed to allow people to easily inject the correct dosage of insulin when needed

_____ 15. a tablet computer is used by a geologist to record her notes and take pictures of a rock formation.