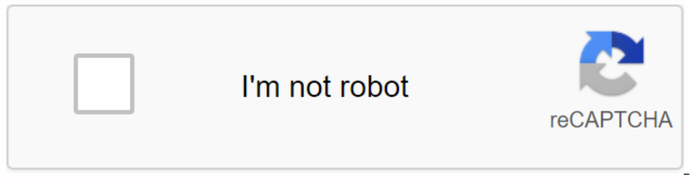

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Scientific method worksheet 9th grade

Break down the definition of science. Part 1 Science is practical. Although science sometimes involves learning from textbooks or professors in lecture halls, its main activity is discovery. The discovery is an active, practical process, not what scientists have done to isolate the world's ivory towers. It is a search and an aspiration for information that explains how information fits together in a meaningful way. And almost always looking for answers to very practical questions: How does human activity affect global warming? Why is bee populations suddenly declining in North America? What allows birds to migrate such long distances? How is black holes shaped? Advertising Science is based on observation. Scientists use all their feelings to gather information about the world around them. Sometimes they collect this information directly, without intervening tools or apparatus. In other cases, they use equipment, such as a telescope or microscope, to indirectly collect information. Either way, scientists will write down what they see, hear and feel. These recorded observations are called data. Part 3 Data can reveal the structure of something. This is quantitative data that describes the object in numbers. Examples of quantitative data are given below: ruby sore

hummingur body temperature is 40.5°C (105°F). The speed of light is 299,792,458 meters per second (670,635,729 mph). Jupiter has a diameter of 142,984 kilometers (88,846 miles). The length of the blue whale is 30.5 meters . Note that the quantitative data consists of the number followed by the unit. A unit is a standardized way to measure a specific dimension or quantity. For example, a foot is a unit of length. Like the counter. Scientific, International System (SI) units, a modern form of metric system, are a global standard. Part 4 Data may also reveal behavior. These are qualitative data, which are written descriptions of the object or organism. John James Audubon, a 19th-century naturalist, ornithologist and painter, is famous for the qualitative observations he made about bird behavior, such as this: In general, scientists collect both quantitative and qualitative data that contribute to knowledge related to a particular topic of the body. In other words, quantitative data are not more important or valuable because they are based on accurate measurements [source: Audubon]. Next we learn about science as a systematic, intellectual pursuit. As more evidence is available that there is no single way to do science, various sources describe the scientific method of action in different ways. Some list three steps, some four and some five. However, they essentially use the same concepts and principles. For our purposes, we are going to say that there are five main steps to the method. Advertising Almost all scientific a sighting that hurts curiosity or raises a question. For example, when Charles Darwin (1809-1882) visited the Galapagos Islands (located in the Pacific Ocean, 950 kilometers west of Ecuador, he noticed several species of scabble, each uniquely adapted to a very specific habitat. First of all, the beaks of fins were quite different and seem to play an important role in how the birds got food. These birds fascinated Darwin. He wanted to understand the forces that allowed so many different varieties of finches to successfully exist in such a small geographical area. His remarks made him wonder, and his amazement led him to ask a question that could be tested. Step 2: The purpose of the question question is to narrow the focus of the study, to identify the problem in specific terms. The question Darwin might have asked after seeing so many different finches was something like this: What caused the diversification of the finches in the Galapagos Islands? Here are some other scientific questions: What causes the roots of the plant to grow down and the stem to grow up? What brand of mouth rinsing kills the most microbes? Which form of the car body most effectively reduces air resistance? What causes coral bleaching? Can green tea reduce the effects of oxidation? What type of building materials absorb the most sound? Approaching scientific questions is not difficult and does not require training as a scientist. If you've ever been wondering anything, if you've ever wanted to know what caused something to happen, then you've probably already asked a question that could start a scientific study. Step 3: Formulate the hypothesis The great thing about the question is that he craves an answer, and the next step in the scientific method is to offer a possible answer in the form of a hypothesis. The hypothesis is often defined as an educated guess, because he is almost always informed about what you already know about the topic. For example, if you want to explore the above problem of air resistance, you can already have an intuitive feeling that a car shaped like a bird would more effectively reduce air resistance than a car shaped like a box. You can use that intuition to help formulate your hypothesis. Usually the hypothesis is indicated as if ... Then. By making such a statement, scientists perform a virtue of the rightful thinking, which is the opposite of induction thinking. The deduction requires the movement of logic from general to specific. Here's an example: If the body profile of a car is related to the amount of air resistance it creates (joint statement), then the car, designed as a bird's body, will be aerodynamic and will reduce air resistance more than the car designed as a box (specific statement). Please note that there are two important features about the hypothesis expressed as if ... Then First, it is tested; an experiment could be established to verify the validity of the application. Secondly, it is falsified; an experiment could be developed that could reveal that such an idea is not true. If these two characteristics are not met, then the question asked cannot be dealt with by a scientific method. Remember that this is an idealized methodology. Scientists do not sit with a five-step checklist that they feel obligated to follow. In fact, the process is quite smooth and open to interpretation and change. One scientist can spend most of his career in the observation phase. Another scientist can never spend much time designing and conducting experiments. Darwin spent nearly 20 years analyzing the data collected while it was working. In fact, much of Darwin's work was an intellectual pursuit, trying to fit puzzle pieces together. And yet no one would argue that his theory of natural selection is less valuable, or less scientific, because he did not strictly follow the five-step process. It would also be appropriate to mention once again that this method is not intended for highly qualified scientists - anyone trying to solve the problem can use it. To illustrate this example, consider this example: You (or a family member) go to the store when the car begins to overheat. In this case, the problem is clear, as is the observation starting the study (temperature warning light). But what causes the car to overheat? One hypothesis may be that the thermostat has stopped working. Another hypothesis may include a radiator. Another may be that the fan belt does not work. Advertising The simplest solution is often a good place to start, and the easiest thing to try in this case is the condition of the fan belt. If you find that the belt does not actually work, then you can feel quite confident that this is the source of the problem. However, you still need to take a test. In this case, the test involves replacing the belt and running the car, or it overheats. If not, you can accept your hypothesis about the fan belt. If the belt has not been broken to begin, or if the car continues to overheat even after changing the belt, you will need to review your hypothesis. You may have noticed that in the example above there were no if ... then hypothesis. You may also have noticed that it does not contain control and experimental groups. This is because daily problem solving does not require such a formality. However, it requires a logical approach and progression of thinking, so that the results test the hypothesis. So if someone can use a scientific method, why has it become so closely related to areas like biology, chemistry and physics? Because pure scientists apply a scientific method with rigor, that nonscientists do not. We will investigate in the next section. ThoughtCo uses cookies you have a great user experience. By using ThoughtCo, you agree to the use of our cookies. The scientific method is a few steps followed by researchers to answer specific questions about the natural world. This includes submitting observations, formulating a hypothesis and conducting scientific experiments. The scientific study begins with a follow-up, followed by a question about what has been observed. The steps of the scientific method are as follows: ObservationQuestionHypothesisExperimentResultsConclusion The first step of the scientific method involves monitoring what interests you. This is very important if you are doing a science project because you want your project to be focused on something that will hold your attention. Your observation may be anything from plant movement to animal behavior, as long as this is something you really want to know more about. This is where you come up with the idea of your science project. After you have made a comment, you need to formulate a question about what you have noticed. Your question should tell you what it is that you are trying to discover or conduct your experiment. When you submit your question, you should be as specific as possible. For example, if you are doing a project for plants, you may want to know how plants interact with microbes. Your question may be: Do plant spices inhibit bacterial growth? The hypothesis is the main component of the scientific process. A hypothesis is an idea that is suggested as an explanation of a natural event, a particular experience or a specific condition that can be tested in defined experiments. It shall specify the purpose of the experiment, the variables used and the expected results of the experiment. It is important to note that the hypothesis must be tested. This means that you should be able to test your hypothesis through experiments. Your hypothesis must be supported or falsified by experiment. An example of a good hypothesis is: If there is a link between listening to music and heart rate, then listening to music will cause a person's resting heart rate to either increase or decrease. After creating a hypothesis, you need to create and conduct an experiment that will test it. You should create a procedure that shows very clearly how you plan to perform the experiment. It is important that you include and identify a controlled variable or dependent variable in the procedure. The controls allow us to test one variable in the experiment because they do not change. Then we can make comments and comparisons between our control and our independent variables (things that change in the experiment) to create an accurate conclusion. The results are where you report what happened in the experiment. This includes detailed information on all observations and during the experiment. Most people find it easier to visualize data in a chart chart or chart information. The final stage of the scientific method is the conclusion. This is where all the results of the experiment are analyzed and the hypothesis is determined. Has the experiment supported or rejected your hypothesis? If your hypothesis has been maintained, great. If not, repeat the experiment or think about how to improve the procedure. Procedure.