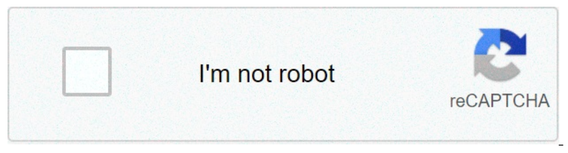

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Sociology is not a science

Everyone’s favorite Mythbuster, Adam Savage, once said: “the difference between screwing around and science is writing it down!” So true, Adam, so true. As long as you record your observations, you’re a scientist. Scientists gather knowledge, make observations, write them down, and test their theories. This process is known as the scientific method.There are three main branches of science: physics, chemistry, and biology. These sciences combine with other fields to make specializations. For example, if you wanted to be a doctor, you would study human biology and organic chemistry. If you wanted to be an astronomer, you would study astronomy and astrophysics.Those that study the sciences will tell you how closely related math, science, and engineering are. The acronym, STEM (Science, Technology, Engineering, and Mathematics), refers to the close relationship between these fields. People in STEM industries help to shape our understanding of the world. Without STEM, our quality of life would be poor. Not only would we be without cell phones and computers, but we also wouldn’t have vaccines and surgery. At this point in history, it is hard to imagine what our lives would look like without it. Take a look at the two water bottles below. The one on the left is pretty much your standard water bottle design: tall, clear, probably crinkly. The one on the right feels a bit less conventional, with its sleek aluminum shell shaped like an Erlenmeyer flask. In a survey of which is cooler, the bottle on the right would win right away, though both bottles serve the very same function. Journal of Consumer ResearchSo what is it, exactly, that makes one design cooler than another? The difference is surprisingly tough to articulate. You might say it’s because the bottle on the right is unconventional. But a water bottle shaped like a kangaroo would be unconventional, too, and you wouldn’t necessarily consider it cool. There’s more to it than just being different. Being cool requires a very delicate balance of doing something that shows that you go your own way, but you do it in a way that is socially acceptable.A lot more, actually. Behavioral scientists have spilled quite a bit of empirical ink on what makes something cool. They’ve basically whittled the phenomenon down to four main traits.First, cool is a social perception, not an inherent quality. So, Pabst Blue Ribbon (PBR) has always been PBR, but it wasn’t cool until Portland hipsters embraced it. Second, coolness is relative. One shirt from Walmart might seem cool compared with another shirt from Walmart, but neither will be as cool as a shirt from H&M (which itself might seem less cool than another H&M shirt). Third, coolness is almost universally positive. And fourth, something that’s cool tends to diverge from the norm. It’s this fourth trait–the unconventionality of cool–that seems to be the key. But in the past that trait been poorly defined. As shown by our example of the kangaroo water bottle, or even a real life product like a Segway, being unconventional alone is not enough to be cool. And, in fact, designs or brands that diverge from the norm too much run the risk of being not just uncool but strongly disliked. Being unconventional alone is not enough to be cool.Recently, marketing scholars Caleb Warren and Margaret C. Campbell tried to understand the connection between conventionality and coolness with a bit more precision. They did so through a series of six experiments comparing consumer products (like the bottles above), coolness ratings (the bottle on the right does rate higher), and participant reactions. In the end, Warren and Campbell concluded that cool designs tend to be “appropriately” unconventional–that is, they challenge unnecessary norms, and aren’t too extreme themselves.“Being cool requires a very delicate balance of doing something that shows that you go your own way and do your own thing, but you do it in a way that is socially desirable or at least acceptable,” Warren tells Co.Design.In their most telling experiment, the researchers introduced test participants to four fictional fashion brands. Each brand was paired with a description that aligned it with a low, moderate, high, or extreme level of unconventionality. A “low” level of unconventionality was essentially the norm–something that followed the market. A “moderate” brand often conformed to convention, while a “high” brand often defied convention. Extreme brands were controversial.Warren and Campbell found the highest coolness ratings among the brands in the middle: not too conventional, not too risky. A moderately unconventional brand was cooler than a typical brand; a highly unconventional brand was cooler than an extreme and controversial brand. This pattern mostly held true whether the raters (i.e., test participants) had countercultural personalities or not. In other words, even people who challenge convention as a lifestyle don’t always think extreme unconventionality is cool. The researchers use the term “autonomy” instead of “unconventional.”Journal of Consumer ResearchThe lesson for designers is they need to know two things about an audience to make a product cool. First, what does that audience consider normal? (The design can fit slightly outside that mold.) Second, what does that audience consider the limits of abnormality. (The design should not cross it.) In the context of our water bottle designs, then, “Erlenmeyer flask-ish” rests beyond “clear and crinkly” but still within “kangaroo-shaped.” (The unconventional water bottle is actually a Heineken design.) Too much coolness can be a bad thing in the long run.“Product designers, the good ones, know a lot of this implicitly,” Warren says. “I think most of them are trying to be different or create things that are different in a way that’s still accessible, or that people can latch onto.”The perpetual concern for consumer designers, in particular, is that too much coolness can be a bad thing in the long run. A design that starts off as cool shifts the lines of conventionality, and then gets imitated so much that it becomes conventional, at which point it can’t be cool by definition. It’s the sort of classic mainstream backlash that keeps one-time consumer iconoclasts, such as Apple or Google, searching for ways to remain outliers.“If you’re really doing something right, the chances are the coolness isn’t going to last,” Warren says. “Because you’re going to shift what is the norm.” A clear, working definition of science can help us understand how it fits into our everyday life. The UK’s Science Council defines Science this way: ‘Science is the pursuit and application of knowledge and understanding of the natural and social world, using a systematic methodology based on evidence.” Knowledge and Understanding Humans have always tried to pursue and apply knowledge and understanding in their everyday lives. Rather than just randomly creating spontaneous experiments, science teaches us to develop and follow clear methods to reaching a conclusion. In a way, science belongs to all humans, not just to professional scientists. You can explore the wonders of science yourself, if can question things, ponder different outcomes and allow evidence to point you to likely conclusions. Science Today Science plays a significant part in our daily lives, and inventions over the years have made our modern lives more sustainable. Consider scientific wonders of the 20th century alone: air travel, automobiles, computers, television, robotics and more. It’s difficult to imagine a world without these, and the ways our lives have been impacted. Medicine Medical doctors and researchers continuously search for new scientific knowledge, drugs and treatments to advance understanding in fields like biotechnology, immunology, microbiology and neuroscience. When new cures are found through science, fatal diseases might be eliminated with a new medical treatment. Communications Scientific research in the past century has brought us communications wonders like radio, television, printing technologies, computers, the Internet, mobile phones, wireless communications and so much more. The way we receive, comprehend and distribute information through these channels has had a massive effect in our everyday lives. Want an example? Listen to how older Americans explain to younger generations how people used to communicate and gain information through earlier innovations. Electricity The scientific wonders of electricity brought light to the world. Electricity changed the fabric of America from a rural, agrarian society working only in daylight hours, to an industrialized nation able to work in lighted areas for 24 hours a day. As a form of energy that results from the motion of charged electrons, electricity is one of mankind’s greatest scientific achievements. It brought power to homes, cities, schools, restaurants and offices everywhere. Electricity allows us to plug in a television set and receive communications. Electricity helps to power air conditioning and heating systems. This has allowed millions of people to move to hot arid climates or cold parts of the world and stay regulated in temperature to enjoy their lives. Transportation The scientific invention of gas and diesel engines provided humans with the ability to transport ourselves in cars, buses, trains and airplanes. Science achievements in the transportation field have allowed us to cut travel times significantly across distances. Science for Simplicity In essence, science has strengthened our understanding about our everyday lives. Science continues to bring forth new growth in understanding human intelligence, computer intelligence and artificial intelligence. Science allows us to experiment with the foods we consume, the drinks we sip and the connections we make. The CK-12 Foundation explains that products are the result of some type of chemical change. Think of a burning candle: The candle is transformed into a different kind of matter — water dioxide and vapor. In this case, the reactants would be the candle (comprised of its wick and wax) and oxygen, which is already present in the air. Products and Chemical ChangesWriting Chemical ReactionsIn science, chemical reactions are typically expressed in the form of an equation. Pressbooks explains that an arrow pointing right (→) signifies the reactants react to yield a product. The items on the left are the reactants, while the items on the right are the products. Plus signs can be found on both sides of the equation and indicate separate product or reactant formulas. Sometimes, these equations must balance, meaning that the number of atoms for each element must be equal on the reactant and product sides of the equation. To balance them, you may be required to change the coefficients in the equation. Examples of Chemical Reactions There are five basic types of chemical reactions, which vary based on how reactants interact to form a new product or products. However, it is worth noting that some reactions can fall into more than one category. The Carolina Biological Supply Company explains them like this: Combination or synthesis reactions: When two or more reactants combine to create one new product (A + B → AB) Decomposition reactions: When a single reactant deteriorates to form two or more products (AB → A +B) Single-replacement reactions: When one element replaces a similar element of another reactant compound (A + BC → AB+ C) Double-replacement or metathesis reactions: When (AB + CD → AD + BC) Combustion reactions: When a substance reacts with oxygen gas, resulting in a release of energy in the form of light and heat; these reactions must have O2 as one of its reactants Chemical Reactions in Everyday LifeChemical reactions, and the products that are formed by them, are present all around us. Some of the most popular types of reactions are covered in biology, which encompasses all living things. A well-known chemical reaction is cellular respiration, which the Khan Academy says is how organisms break down glucose to create energy. The process can occur with (aerobically), or without (anaerobically) without oxygen. Whether or not it involves oxygen, both reactions yield Adenosine triphosphate (ATP). ATP is a form of energy that supports just about every living thing. A second well-known chemical reaction is photosynthesis, which Sciencing describes as what plants do to convert light energy to chemical energy. The process removes carbon dioxide from the atmosphere to create oxygen that we use to breathe. Reactants involved in photosynthesis are light energy, water, carbon dioxide, and chlorophyll. The products are glucose or sugar, oxygen, and water. What Can Volume Consist Of? Volume is the measure of a three-dimensional space, and it can either be a liquid, solid, or gas. You can measure the volume of water in your cup, the volume of a concrete block, or the volume of nitrogen in an enclosed container. These are all measurable units and have a volume. How Is Volume Measured? How volume is expressed in measurement also has to do with what you're measuring, either volume, liquid, or gas. According to the International System of Units (LI), volume is expressed by using cubic meters, which is expressed as m3. However, the metric system measures volume in a different way, in liters and its derivatives, such as milliliter (mL). If you're trying to compare cubic meters to liters, one liter has the same amount of volume as that of a 10-cm cube. How Do You Accurately Measure Volume? Measuring of volume is tricky and depends on if the substance is a solid, liquid, or gas. If you're measuring the volume of a liquid that's in a container, volume is often equal to the shape of the container when filled. Another example is in a measuring cup, where volume is conveniently marked for you, such as when you're cooking or baking. Gases are often sold in containers that are pre-measured in cubic centimeters, which is expressed as cm3. If you're trying to measure the volume of a solid shape, there are common equations you can use to do so. For example, you must first calculate the surface area to determine the volume. To find the volume of a cylinder, you would first find the surface area using surface area = 2πr2 + 2πrh, followed by the volume equation, which is volume = πr2h. What Is Matter? There is often confusion between mass vs. volume. To first understand the difference, knowing what matter is, is important. Practically everything in the universe consists of matter. More specifically, matter is anything that exists that has both mass and volume. The only thing in the universe that does not contain matter is energy, such as with light and sound waves. What Is Mass? Mass is how much matter an object contains. It is different than both weight and volume. Mass measures the amount of matter that an object contains, while weight measures an object's force of gravity. Mass is expressed in kg (kilograms), which is the official measuring unit. Of course, derivatives may be used, such as grams or milligrams. What Is the Difference Between Mass and Volume? Mass measures density, or how much matter that an object contains. Volume measures how much space that an object takes up. For example, if you were measuring the mass and the volume of a gallon of milk, they would be drastically different calculations. Similarly, the outcome of mass vs. weight calculations would also be different.