

Science Forward—The Science Senses

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Flora Lichtman: [0:00] Hi, I'm Flora Lichtman. I'm a science journalist and the host of "Science Forward," a video series that's part of a new approach to teaching basic science. We're hoping to recast science, not as a bunch of facts and figures to memorize or equations to keep in your head, but to help students see science as a lens on the world. We're going to emphasize critical thinking and what we're calling science senses, number sense, data sense, knowledge sense. Stay tuned, and welcome to Science Forward.

[0:30] [music]

Mary Pearl: [0:36] What makes a question a scientific question is that it's about the observable natural and physical world.

Male Participant: [0:44] Science really is trying to make sense of nature, in my view. We try to understand. We're trying to understand our world.

Mary Pearl: [0:52] Number sense is important, because math is the language of science. If you don't have number sense, you can't do the kinds of measurements that are necessary to answer scientific questions.

Suzanne Tamang: [1:04] When we think about size, computer scientists will start talking about bytes. One byte is equal to eight bits. 1,000 bytes is a kilobyte. A million is a megabyte.

Elodie Ghedin: [1:19] If we do a back of the envelope calculation, all of a sudden you have 10 to the 10. That's 10 with 9 zeros behind it. That gives you sort of a scale.

Mary Pearl: [1:40] Data sense refers to all the way you take raw measurement and transfer it into results. A compelling argument explains what the data collection you accomplish actually shows us about how the world works.

Bon Sy: [1:57] Pattern recognition starts with how we perceive the world, how we collect data, and from the data how we capture patterns and subsequently to identify, though the pattern, some additional meaning of that.

Regina Alvarez: [2:11] How many trees are there? How big are the trees? What species of trees are there? What condition are they in?

Mary Pearl: [2:18] Knowledge sense refers to the big picture, and it has many parts to it. Knowledge sense is understanding what constitutes a question of science, for example. It also refers to the practice of science, how one designs a research question and then

fashions a method to answer that question. Another important aspect of knowledge sense is the application and ethics of science.

David Gruber: [2:47] You have to go into science with an open mind. You have to have an open mind about what you're looking at. When your results come out different than you expected, you can't just try to do the experiment again until you finally force your results to what you thought it would be. You drive yourself on what you find.

Charles Liu: [3:04] Scientific knowledge based on number sense and data sense and then building knowledge. Science sense lets you predict the future.

Flora Lichtman: [3:14] We're going to talk to all kinds of scientists in this series, astronomers, robotocists, paleoclimatologists, people asking questions like, "What happens when two galaxies collide," "What was the planet like hundreds of thousands of years ago," or "How do you make a machine that thinks?"

[3:32] What we're going to find when talking to these scientists is that there are some consistencies in the way that they approach information. That's where the science senses come in. They are basically ways to think about scientific thinking, little digestible bites.

[3:46] We also think that they are tools for navigating the world. I admit that that's our hope with this series, that these science senses have some relevance in your daily life. Let us know. Join the conversation at our website.