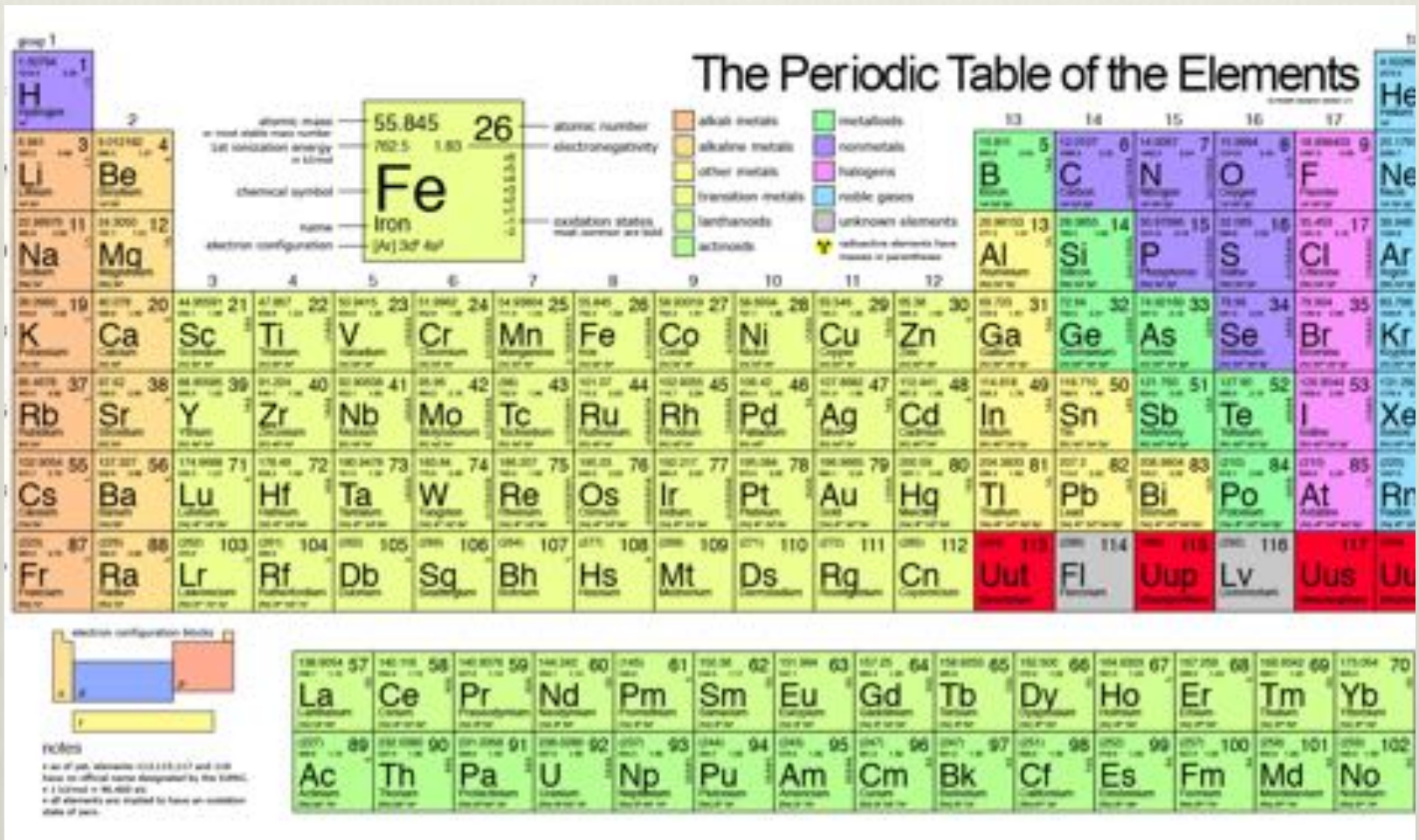


Periodical Table



*How much science does an
ordinary citizen need to function
in modern society?*

The Stability of the Bicycle David E.H. Jones



Three parts

- ❖ 1. How much science?
- ❖ 2. What science?
- ❖ 3. Survey results

Carl Sagan

We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology. This is a clear prescription for disaster. It's dangerous and stupid for us to remain ignorant about global warming, say, or ozone depletion, toxic and radioactive wastes, acid rain. Jobs and wages depend on science and technology.

Ian Chubb

We live in a world utterly reliant on science to fuel its industries and provide for its people. In the future, science will only become a bigger part of our lives, and the impacts will touch us all... We need therefore to equip as many of our future citizens as possible to understand how science works, its methods and its ethics; and to be able to make better informed judgements.

George DeBoer

People with extremely limited understanding of science function very well in society, many of them at the very top levels of their professions.

George DeBoer

“The rhetoric notwithstanding, there is no reason to believe that the national security, economy, democratic way of life, and science prominence are threatened by the low level of scientific and mathematical literacy in the general population” Audrey Champagne

Part 2: what science should people know?

Facts?

- ❖ Like does the sun go round the earth? :
Yes/No
- ❖ Do antibiotics cure viruses? : Yes/No
- ❖ The first humans lived among dinosaurs:
Yes/No

Science literacy

- ❖ First used Rockefeller study 1958
- ❖ Definitions have been contentious
- ❖ Tests and surveys
- ❖ Chart changes through longitudinal studies

Other views: Susannah Priest

No list of scientific facts quite captures what we hope citizens will bring to the disentanglement of legitimate but messy science from other sorts of arguments and claims. Citizens often need skills that will serve them well when the facts are not yet clear, even to scientists.

Priet's question?

What knowledge about science is of most central value to citizens in a contemporary democracy, in which many personal and policy decisions have some relationship to science or technology and most of the facts, observations, and conclusions of science (and also pseudoscience) are available to us on our computer screens?

Effective navigational skills

Priest's answer

- ❖ Heuristic clues, to sort out the wheat from the chaff
- ❖ The skills to distinguish credible science from the less-credible

Other views 2: UC Santa Barbera *Scienceline*

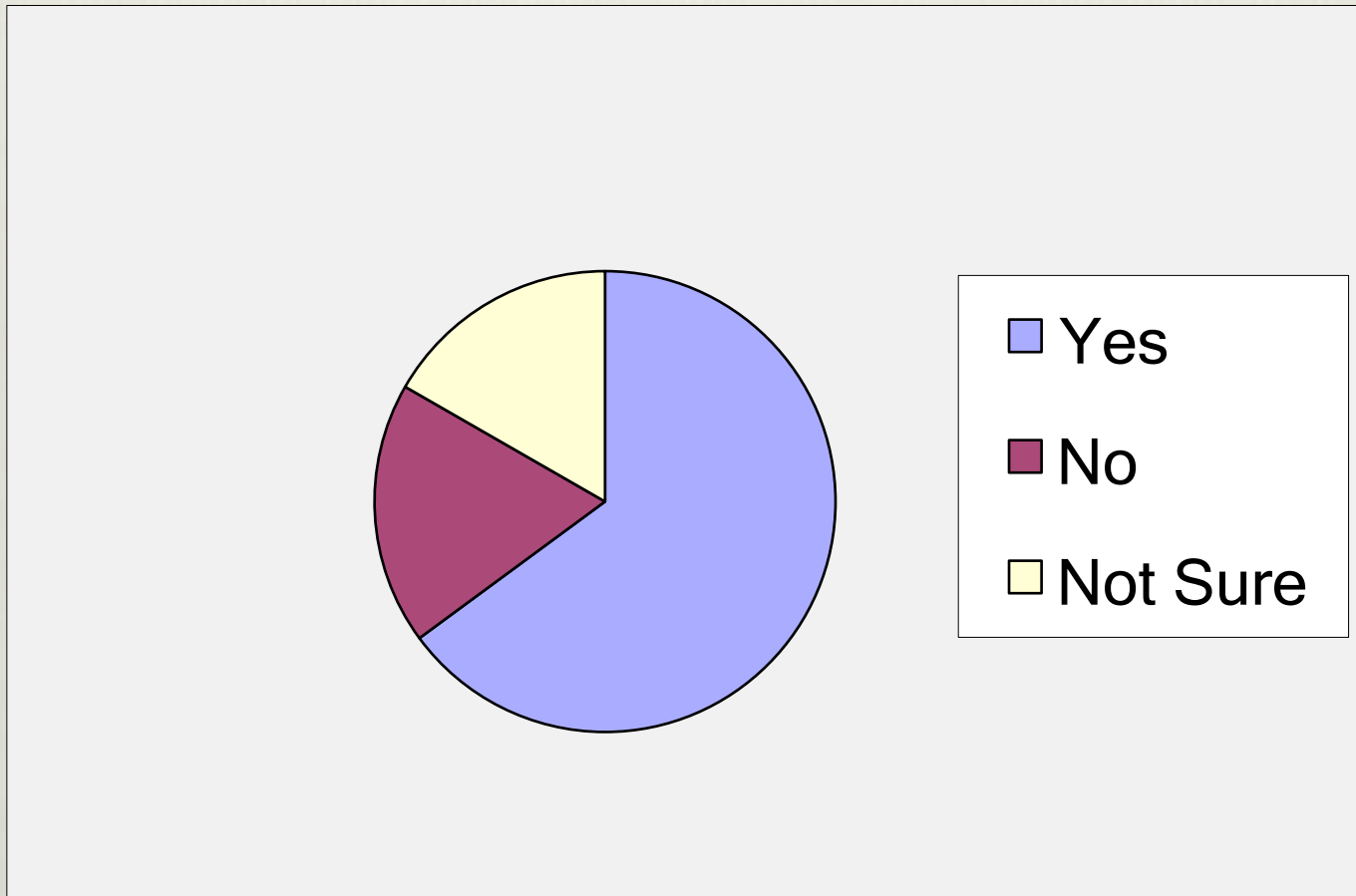
To even ask the question of what 'facts' in science should people know puts science in the corner where it does not belong, that of being perceived as just a collection of facts.

Other views 3: Chris Bryant CPAS

What I would like [people] to know is how to access the science that they may need from time to time.

People are very good at educating themselves when the need arises.

“Do you think there is a set of basic scientific facts people should know?”



Q2: So what are those basic facts?

Most common - a broad understanding of science (and often using the word 'basic')

Theory of evolution, basic genetics, basic Newtonian mechanics, basic principles of thermodynamics (heat, conduction), constitution of atmosphere, basic functions of central organs in the body, basics of nutrition and health, basic math - numerical literacy, basic technological literacy.

Basic facts 2

Facts plus process

On the side of facts: minimum basic knowledge of chemistry, physics and biology of ordinary daily things; on the side of "dealing with facts": a basic knowledge of the way science works; reasonable knowledge about what [sic] is a valid scientific claim and what seems bogus (even some scientists don't); capability of distinguish what can be important or not (also).

Basic facts 3

Core knowledge + curiosity

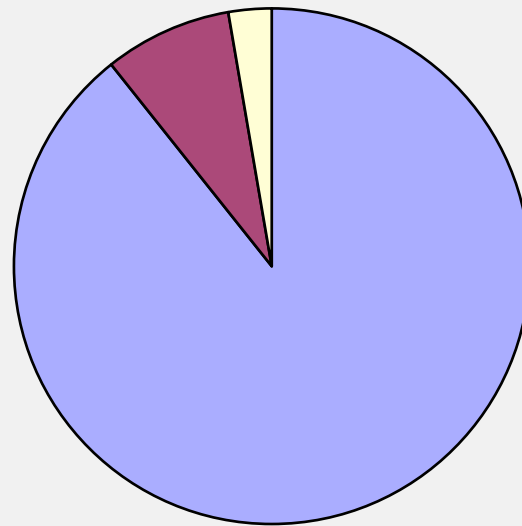
I don't like the idea of "basic scientific facts" but some core knowledges and attitudes to the physical world are needed in each society. It helps people to have some basic level of physics - gravity, inertia. Understanding forces and geometry for building things. Basic biology for food safety and personal hygiene - bacteria, viruses and toxins.

Basic facts 4

Practical knowledge

People should know that expired food can be eaten a few days after expiration dates because the preservatives are still there in the food, and there is lack of oxygen to grow bacteria or germs quick enough to make the food go bad. ... People should learn about how dementia can affect different old people in different ways, to look out for parents, e.g. some elderly may have problems distinguish an apple and a christmas tree decorations.

“Do you think it is important for people to understand the way scientists work, the ‘scientific method’?”



■ Yes
■ No
■ Not Sure

What aspects of the ‘scientific method’?

- ❖ ‘Science is constantly being revised to reflect the best available evidence’ (49%)
- ❖ ‘What we know is not based on 100% fact but as best we can know it. Knowledge is contestable and testable’ (36%)
- ❖ ‘The scientific way is the way of producing/creating more reliable, and more accurate scientific knowledge than other ways. It is not the answer to all questions and there are other knowledges that answer other questions much better.’ (33%)

Further comments

Double-blind, placebo-controlled randomised trials can be a very powerful way of generating reliable knowledge. Anecdotal evidence or evidence derived from personal experience can be very unreliable and the scientific method can be used to avoid that unreliability.

I would prefer them to know how they can apply the scientific method in their own life. Eg. if they have an idea or opinion, how can they check it? What evidence can they gather and how can they test it?

Sources

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