

Science
History
Institute



Chemistry · Engineering · Life Sciences

Rare Earth Elements And Why They Matter

The Importance of Understanding the Elements of Technology



Introduction

The United Nations General Assembly proclaimed 2019 the International Year of the Periodic Table of Chemical Elements, honoring the 150th anniversary of Dmitri Mendeleev's iconic creation. Yet many of us struggle to recall more than a few of the 118 elements listed on the current table.

Despite familiarity with the periodic table, we don't seem to know much about the individual elements, particularly the group known as the rare earth elements. These elements are vital for the production of all kinds of technology, from cell phones to solar panels.

The good news: those surveyed are eager to round out their understanding of science and its history and want greater access to information about how science is affecting their world. It is the mission of the Science History Institute to explore the intersection of science and society and to provide a scientifically curious public insight into the people, discoveries, and events that have shaped our lives.

How Well Do We Know the Periodic Table?

Despite the periodic table's ubiquitous presence in science classrooms, when asked how many elements they could name on the periodic table, **many people struggled.**

59%
could name no more than 10 elements

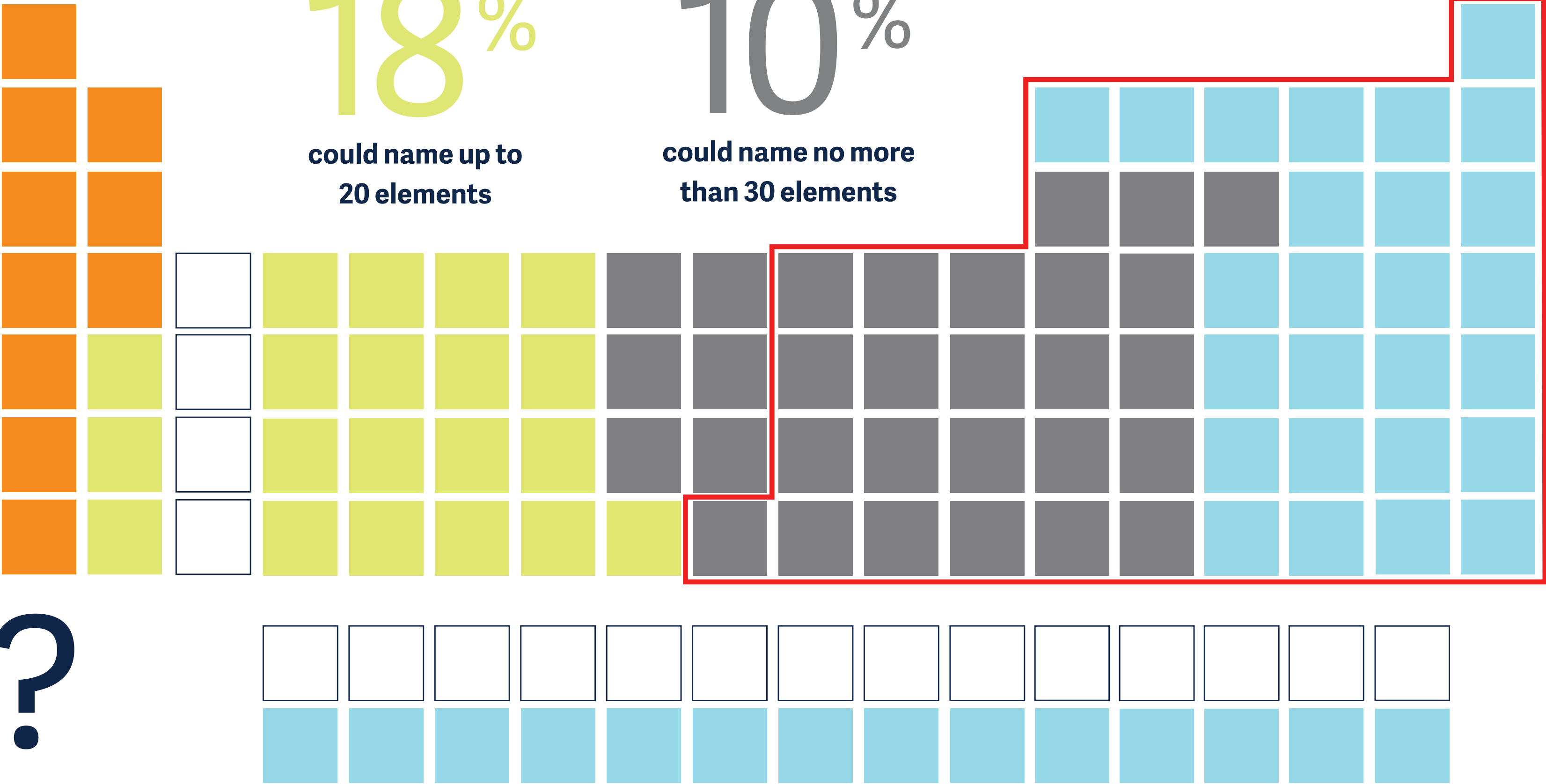
18%
could name up to 20 elements

10%
could name no more than 30 elements

5%
could name no more than 40 elements

22% = ?
could not name a single element

2%
could name up to 50 elements



When It Comes to Rare Earth Elements...



26%

said they have never heard of them

32%

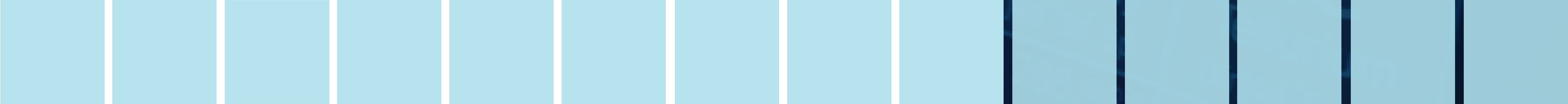
said they were somewhat familiar with rare earth elements

35%

said they had heard of rare earth elements, but were unsure what they are or their significance

6%

said they were very familiar with rare earth elements

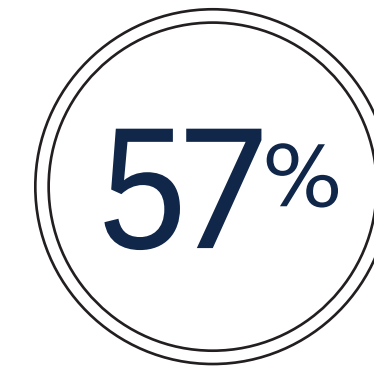


The elements on the periodic table are the building blocks of our world, and the 17 rare earth elements are key to many of the advances in technology we hold most dear. Yet they are almost unknown outside a chemistry lab. Rare earth elements affect global policy and now may even play a role in our nation's politics. They are a part of the consumer products we use now and those we will use in the future.

Without knowing about these crucial elements, are we making uninformed choices about our own future?

An Appetite to Learn about the Role of Science in Daily Life

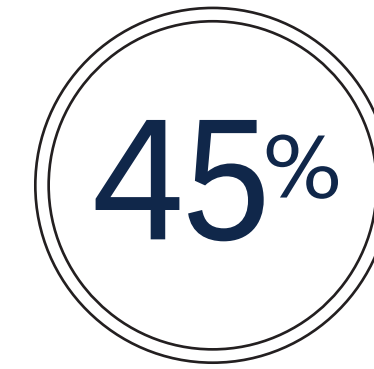
We need to move past acknowledging this lack of awareness and actually address it.



Over half of those surveyed (57%) believe that **science plays a role in their daily lives**



Nearly one in four (24%) said they **wished science information was more accessible** to them



45% feel **it is important to stay up-to-date on scientific developments**



Nearly one in five (17%) said they feel **it is intimidating to stay up-to-date** on the latest science developments



Giving Rare Earth Elements the Attention They Deserve

Rare Earth Elements are not getting the attention they deserve, considering how necessary they are. Many of the technologies that people believe will have the greatest effect on the world over the next five years rely on rare earth elements.

32%
Of people surveyed said that climate change and clean energy tech will have the greatest impact on the world in the next five years.



Nd + **Dy**
Neodymium + Dysprosium
Are key components in the magnets used in electric and hybrid cars.

Additional areas consumers said would change the world, and their rare earth element components, include:

20%

HEALTH TECH

Compounds of the rare earth metal gadolinium (Gd) are commonly used intravenously for MRIs as contrast agents

18%

COMM/MOBILE TECH

The rare earth neodymium (Nd) is used in cell phones for the speakers and vibrations

14%

DEFENSE TECH

Several rare earth metals, terbium (Tb), dysprosium (Dy), samarium (Sm), praseodymium (Pr) and neodymium (Nd), are necessary for high-performance guidance systems

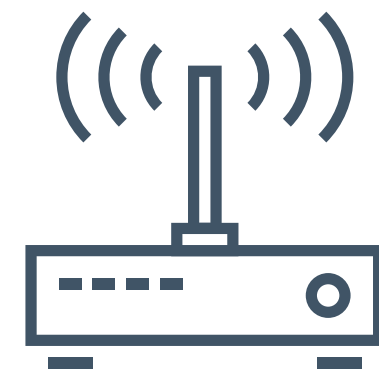
3%

ENTERTAINMENT TECH

Europium (Eu) is used to produce blue, red and white radiance in computer and television screens & erbium (Er) is used in fiber optics that transmit digital information such as internet traffic

Rare Earth Elements and the Technology We Love

Many of those surveyed said they could not live without access to the information and entertainment that defines our lives – all of which rely on rare earth elements.



54% said they could not live without the **internet**



21% said they could not live without **GPS**



42% said they could not live without **computers**



15% said they could not live without **tablets**



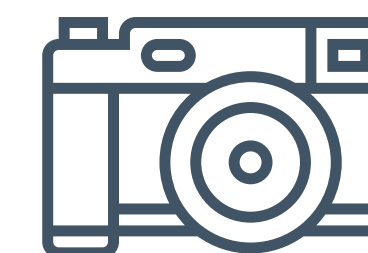
41% said they could not live without **cell phones**



15% said they could not live without **headphones**



37% said they could not live without **TVs**



15% said they could not live without **cameras/video cameras**

About Science History Institute

The Science History Institute collects and shares the stories of innovators and of discoveries that shape our lives. We preserve and interpret the history of chemistry, chemical engineering, and the life sciences. Headquartered in Philadelphia, with offices in California and Europe, the Institute houses an archive and a library for historians and researchers, a fellowship program for visiting scholars from around the globe, a community of researchers who examine historical and contemporary issues, an acclaimed museum that is free and open to the public, and a state-of-the-art conference center.

Methodology

Science History Institute commissioned YouGov — a third-party professional research and consulting organization — to poll the views of 1,263 adults. Fieldwork was undertaken between February 8 and 11, 2019. The survey was carried out online. The figures have been weighted and are representative of all U.S. adults (aged 18+).



For more information:
www.sciencehistory.org

