

# Communicating About Basic Science

Evidence-Based Recommendations for More Effective Communication  
with the Public About Basic Scientific Research

# Introduction

This report is commissioned by SciPEP (**Science Public Engagement Partnership**), a public communication and engagement initiative launched by The Kavli Foundation and the Department of Energy’s Office of Science, to assist scientists, communication professionals, and institutional leaders achieve more productive engagement with the American public(s) on the topic of basic scientific research.

The information presented here is primarily compiled from previously published and unpublished data from ScienceCounts’ national public opinion surveys and research from 2015 to 2022:

NAME	DATE	SOURCE
<b>Benchmark National Survey (#1)</b>	October 2015	ScienceCounts
<b>Scientists’ Attitudes Towards Science Communication (2018)</b>	October 2018	ScienceCounts
<b>Pre-message Trust Banner</b>	September 2019	ScienceCounts
<b>Benchmark National Survey (#2) w/ STEM Professional oversample</b>	November 2019	ScienceCounts
<b>Scientists’ Attitudes Towards Online Science Communication (2020)</b>	October 2020	Newman, Leavy, Copple, and Bennet
<b>Benchmark National Survey (#3) w/ COVID-19 questionnaire</b>	November 2020	ScienceCounts
<b>Assessing How Americans Want to Participate in Science</b>	December 2021	ScienceCounts

Recommendations and interpretations made here are solely those of the author with the intent of providing practical advice.

# Language

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The percentage of Americans having a positive association with each of the following science-related terms:

77%	DISCOVERY
74%	INVENTION
<b>71%</b>	<b>SCIENCE</b>
67%	TECHNOLOGY
67%	INNOVATION
61%	BASIC SCIENTIFIC RESEARCH
57%	APPLIED SCIENTIFIC RESEARCH
49%	RESEARCH GRANTS
37%	PUBLICLY FUNDED SCIENCE
30%	CITIZEN SCIENCE
28%	PUBLIC INVESTMENT

# Language

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Positive association of science-related terms in comparison to the word **science** across population groups segmented by political ideology (conservative, moderate, liberal) and education (HS, college):

**DISCOVERY**

**stronger for all segments**

**INVENTION**

**stronger for conservatives**

**SCIENCE**

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TECHNOLOGY

stronger for college-educated cons and mods

INNOVATION

weaker for HS-educated cons and mods

BASIC SCIENTIFIC  
RESEARCH

weaker or neutral for all segments

APPLIED SCIENTIFIC  
RESEARCH

weaker or neutral for all segments

RESEARCH GRANTS

weaker for all segments

PUBLICLY FUNDED  
SCIENCE

weaker for all segments

CITIZEN SCIENCE

weaker for all segments

PUBLIC INVESTMENT

weaker for all segments

# Language

The most common thoughts that immediately come to mind when Americans hear the phrases **scientific research** and **scientific discoveries and advances** (only five most frequent responses shown):

	SCIENTIFIC RESEARCH	SCIENTIFIC DISCOVERIES AND ADVANCES	IDEOLOGY / EDUCATION SEGMENTATION COMPARISON
<b>BLANK</b>	52%	51%	No difference
<b>MEDICAL AND BIOSCIENCES</b>	26%	18%	Largest difference among conservatives and moderates
<b>WHITE COATS AND LABORATORIES</b>	5%	1%	Largest difference among liberals with college
<b>IMPORTANT PROGRESS</b>	4%	10%	Small difference across all groups
<b>SPACE</b>	2%	6%	Small difference across all groups

**KEY OBSERVATION:**

*The term RESEARCH seems to evoke greater thoughts of medical / bioscience activity in a classic laboratory setting, where DISCOVERIES AND ADVANCES seem to evoke more thoughts of progress and exploration*

# Language

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The phrases often used by Americans to communicate what they believe science **is** and **is not**:

## SCIENCE IS

- A MEANS TO AN END
  - A PATH TO A BETTER TOMORROW
  - A WAY FOR YOUNG PEOPLE TO SERVE THE GREATER GOOD
- 

## SCIENCE IS NOT

- A WAY TO COMPETE
- ABOUT MONEY OR FUNDING
- ABOUT LOOKING BACKWARDS OR THE PAST

### **KEY OBSERVATION:**

*The public describes science as forward-looking, youthful, optimistic, and a way of achieving positive outcomes. They resist talking about science in the context of money, competition, or previous accomplishments.*

# Language Recommendations

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Suggestions to selecting the language to use when communicating about basic scientific research:

1. Use the words **science**, **invention**, and **discovery** often. Nothing is gained by differentiating **basic science** from **applied science** or **science**.
2. Use the word **research** to when associating with the medical / bio-sciences or a conventional laboratory setting. Use the words **discoveries** and **advances** to speak to exploration, adventure, and the acquisition of new knowledge.
3. Present science in the context of forward-motion; it is a vehicle to the future, path to a more optimistic, cooperative tomorrow. Unnecessary talk about money, competition, and past accomplishments kills the dream.

# Mindset

A key goal of ScienceCounts' research was to determine how Americans feel about science. In 2015, a branding study employing both quantitative and qualitative methods determined that the public's principal feeling about science is **hope**. Subsequent polls confirmed this finding by asking the direct question:

Which work best describes what you feel when you hear the word science?

	<u>2017</u>	<u>2019</u>
<b>Hope</b>	<b>63%</b>	<b>56%</b>
Caution	6%	16%
Joy	9%	13%
Fear	3%	1%
Boredom	1%	9%
Other	18%	5%

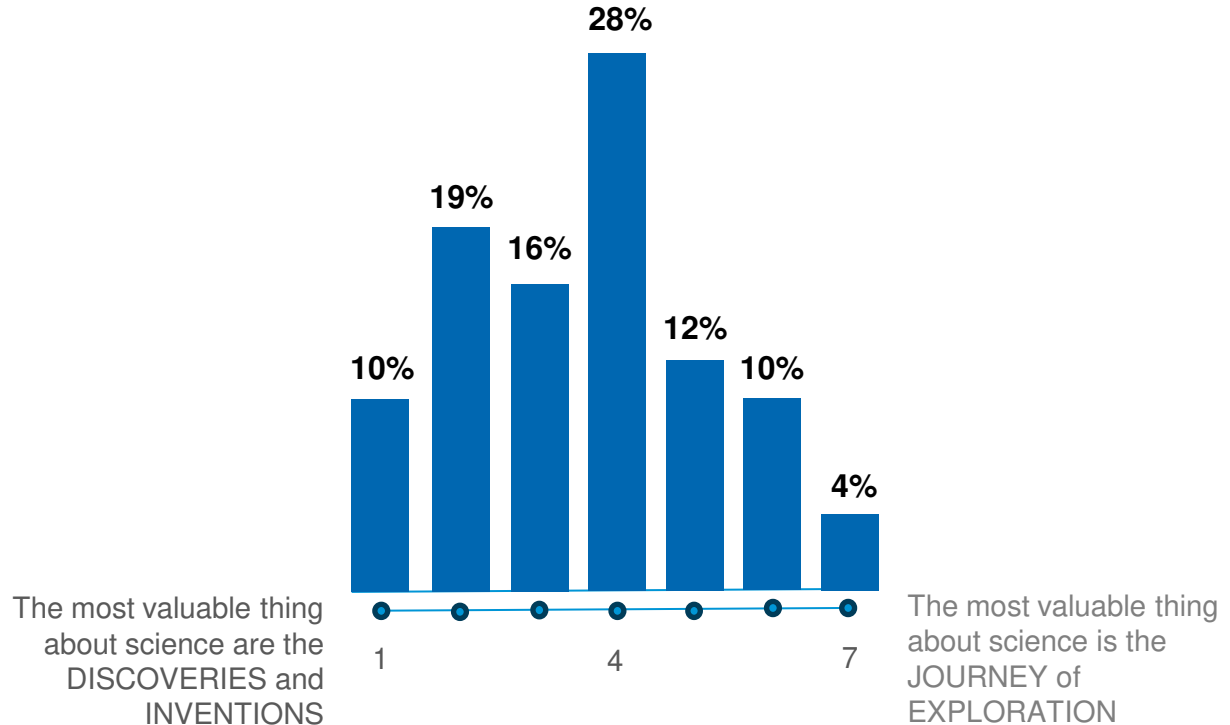
**KEY OBSERVATION:**

*While the strong association of science and hope creates many positive messaging possibilities, it also reveals that Americans' fundamentally have a utilitarian view of science. To the public, science's value lies in its ability to deliver specific outcomes or payoffs, and not in the processes and practices it employs.*



# Mindset

The percentage of Americans' who selected a value on a sliding seven-point sliding scale weighing two different points of view about the where the value of science lies



## KEY OBSERVATION:

*As noted previously, the public's utilitarian view towards science means science's value is more frequently based on payoffs (45% lean to discoveries and inventions) rather than processes (26% lean to journey of exploration).*

# Mindset

In 2019, ScienceCounts (in cooperation with the Alda Center, T. Newman, J. Besley, and A. Dudo) conducted a survey of scientists which asked them to select the word that best describes how they feel. The results were compared to those from ScienceCounts' public opinion poll taken earlier that year:

Which work best describes what you feel when you hear the word science?

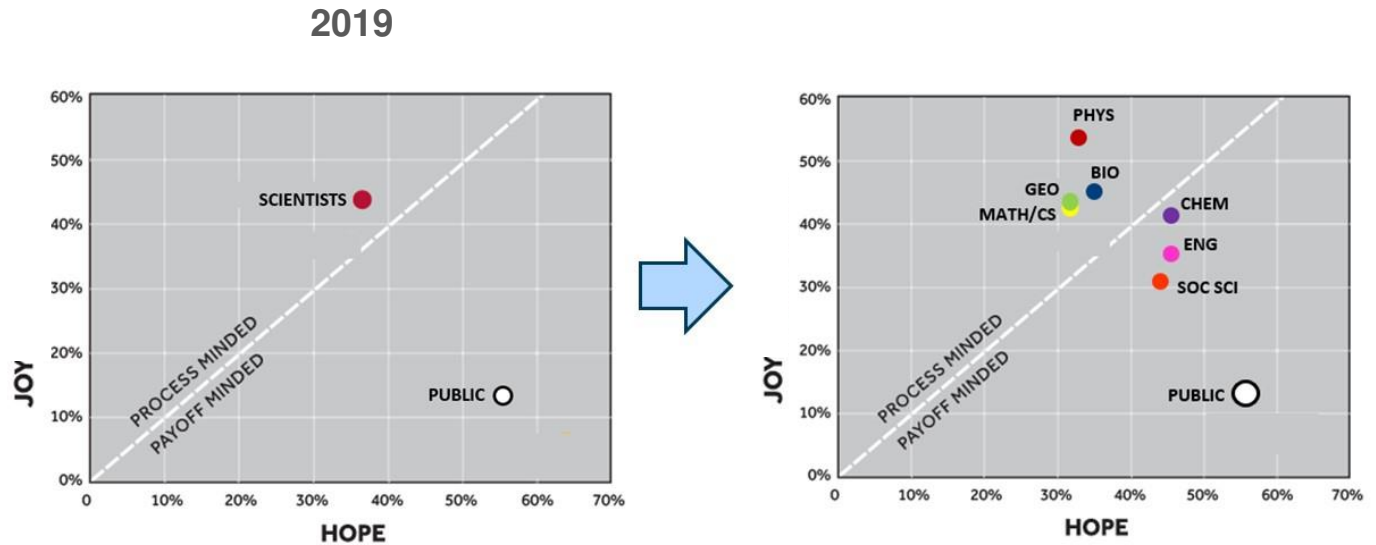
	<b>Public (2019)</b>	<b>Scientists (2019)</b>
<b>Hope</b>	<b>56%</b>	37%
Caution	16%	0%
<b>Joy</b>	13%	<b>43%</b>
Fear	1%	0%
Boredom	9%	1%
Other	5%	19%

**KEY OBSERVATION:**

*In contrast to the public, the prevalent response by scientists was joy. It is hypothesized that the feeling hope, which is the expectation of a future outcome, reflects of a payoff-minded view of science. In contrast, the feeling joy reflects, in which an emotional reward is in the present, reflects a process-minded view of science*

# Mindset

Mapping the public's and scientists' hope / joy responses to the question 'which work best describes what you feel when you hear the word science?'

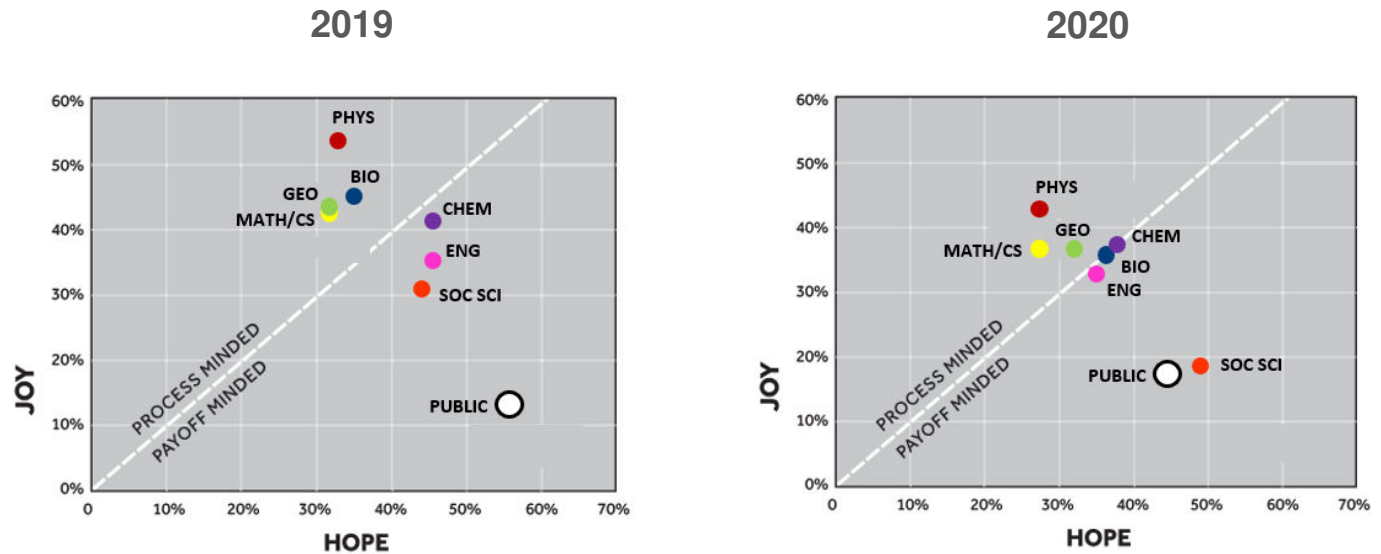


**KEY OBSERVATION:**

*When scientists' responses were broken-out by ideology, career level, employment sector, and gender, there was no significant variations in hope / joy responses. However, when broken-out by scientific discipline, a range mapped out with physicists on one end and social scientists on the other.*

# Mindset

Comparison of the public's and scientists' hope / joy responses in 2019 vs repeated poll and survey in 2020.

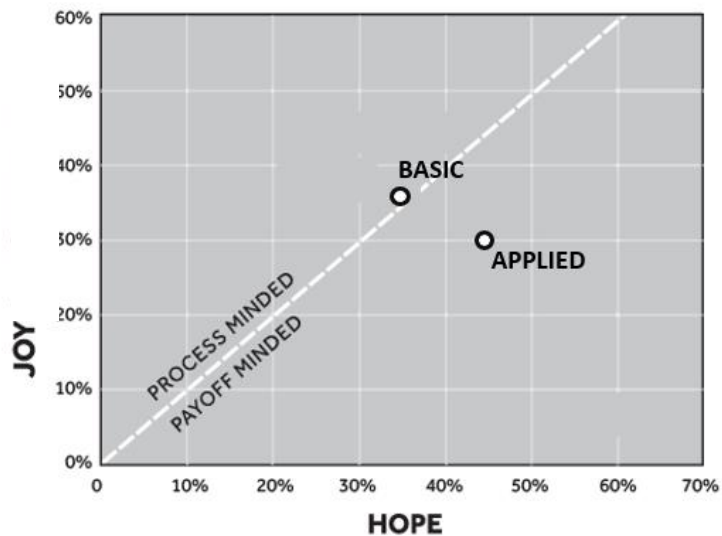


### KEY OBSERVATION:

Data from 2020 reproduced the general pattern where most physicists feel joy and most social scientists feel hope towards science. It is hypothesized, therefore, that more physicists are process-minded and more social scientists are payoff-minded due to the nature of their research.

# Mindset

Dividing scientists' into two groups based upon whether they primarily conduct basic research or applied research ('both' responses are not shown):



**KEY OBSERVATION:**

*Interestingly, a correlation is observed – as hypothesized – between joy, basic scientific research, and process-mindedness and hope, applied scientific research, and payoff-mindedness.*

# Mindset Recommendations

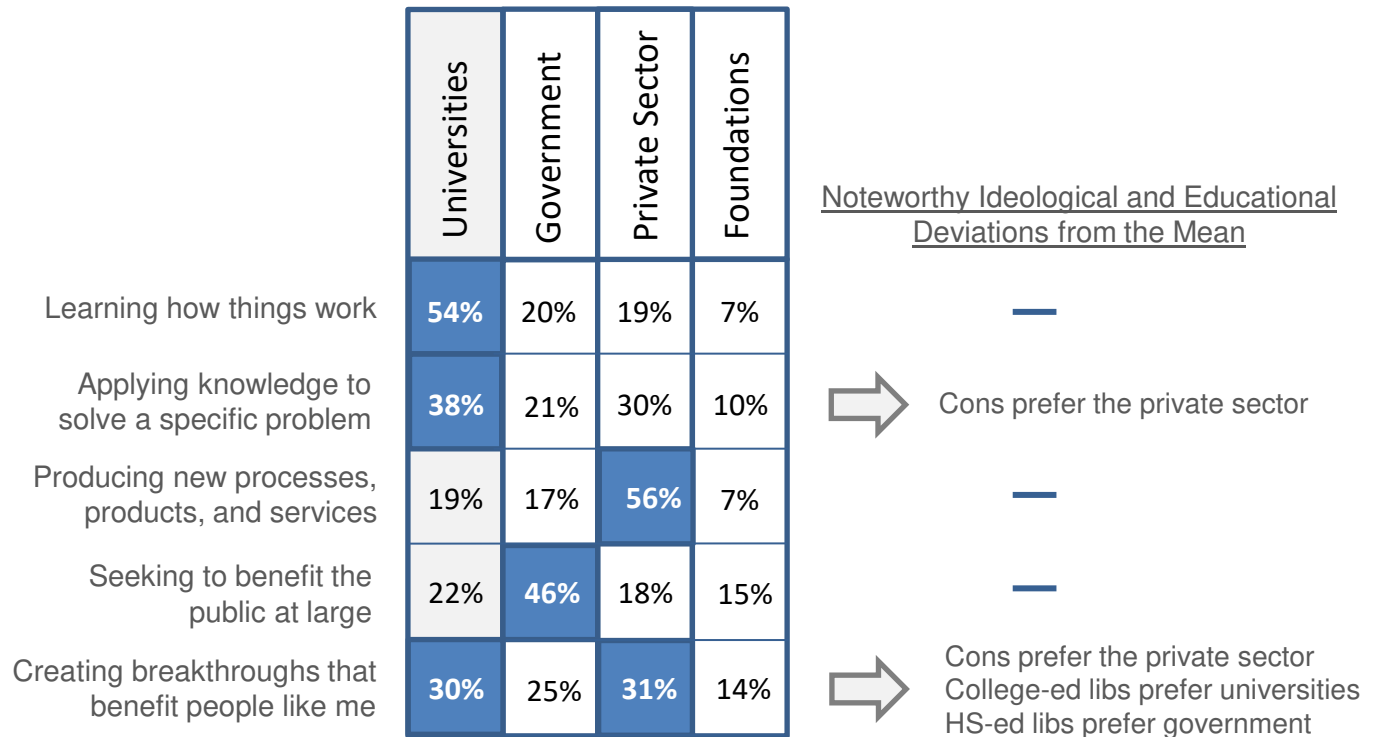
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Suggestions about how to frame narratives and dialogs when communicating about basic scientific research:

1. Build on the fact that most Americans equate science with hope. Recognize, however, that different people hope for different things, which is why several scientific issues are deeply polarizing.
2. Understand that the public's utilitarian view of science means that science will often be judged based on its intended payoff, not by the quality of the methods or credentials of the scientists involved. Therefore, basic scientists should never say that their research is not intended to have a specific payoff. Instead, approach the exploration of the unknown in search of unexpected discoveries as a legitimate payoff.
3. If equating science with hope makes you uneasy, you are probably joy / process-minded person. If so, great, but just be prepared to have to work a bit harder to bridge a cultural communication gap with the public.

# Roles

Percentage of Americans who believe which institutions do the best job at conducting different aspects of science:

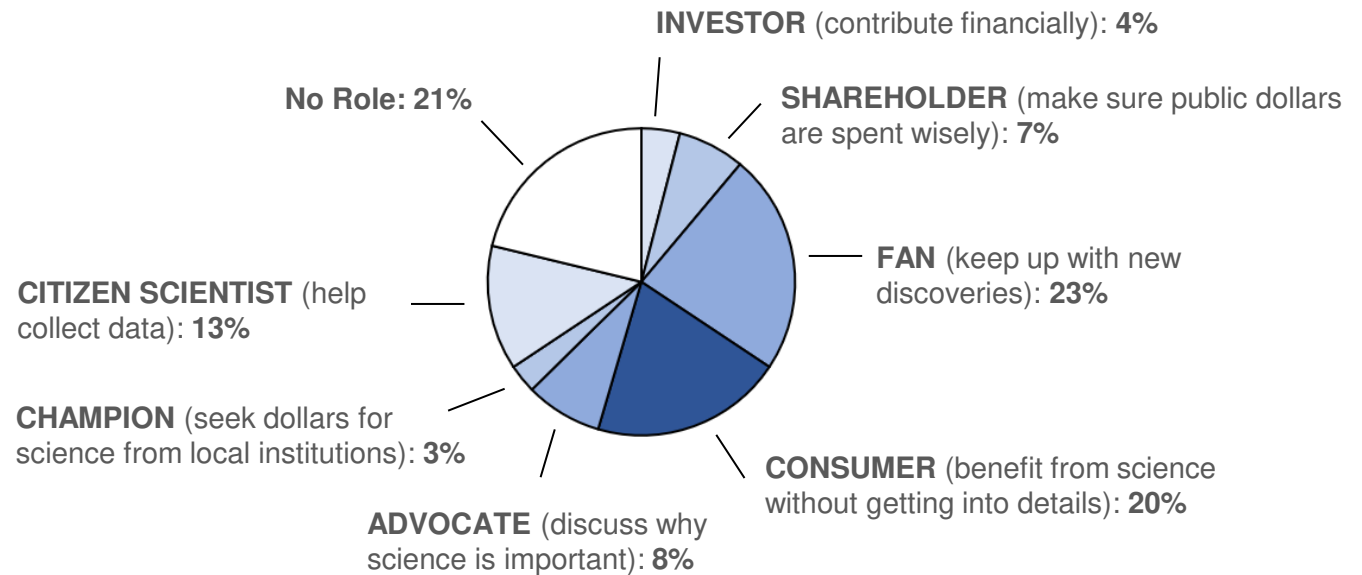


**KEY OBSERVATION:**

*Universities are most associated with basic scientific research (learning how things work) while the private sector is most associated with applied research (producing new processes, products, and services). When it comes to personal benefits, Americans diverge along traditional political institutional lines.*

# Roles

The roles that Americans would most want to play in ensuring the future of scientific research:





# Roles Recommendations

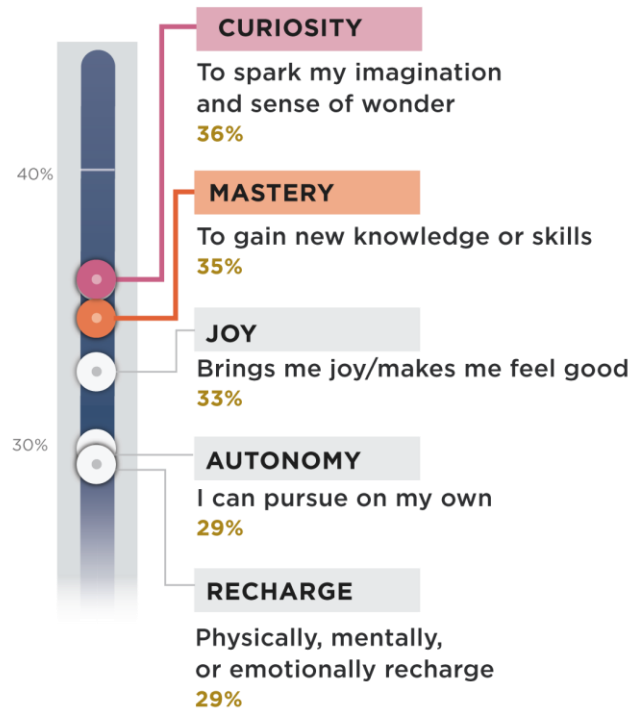
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Thoughts about the relevance of institutions and willingness to personally engage with science:

1. Be aware that the institutions where science is done, and where scientists are employed, heavily influences the public's view and trust along partisan lines. In general, liberals trust academia and government more, and conservatives trust the private sector more.
2. As stated previously, most Americans view science as a tool or commodity that can be used to deliver a specific payoff. This is seen in the roles they principally perceive for themselves, namely as a consumer of information (FAN: 23%), consumer of benefits (CONSUMER: 20%), or a pure spectator (NO ROLE – 21%). However, approximately a third of the public express some willingness to roll-up their sleeves and get involved in supporting science.

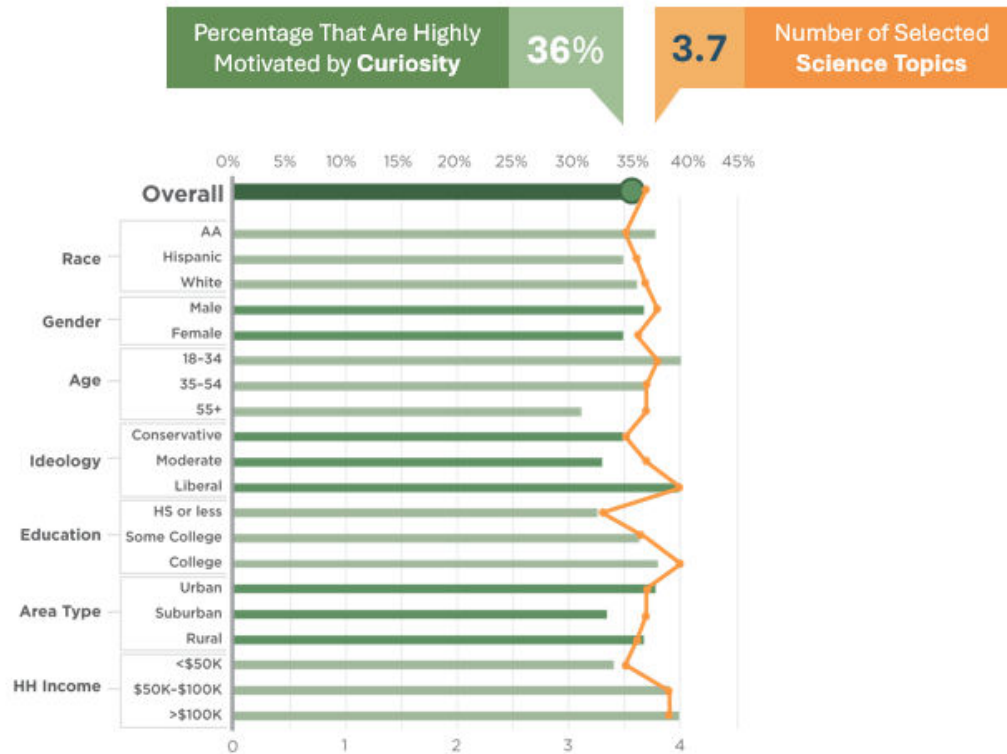
# Science Interest Data

The top five motivations that Americans cite as fueling their interest in science:



# Science Interest Data

The percentage of Americans that are highly curious about science, as well as the number of scientific topics they report to be interested in:



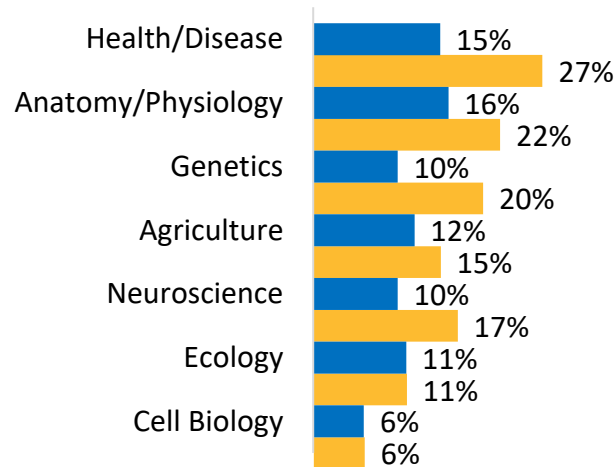
**KEY OBSERVATION:**

*High curiosity in science is relatively uniform (about one-third) across demographic groups, and to the degree that there is some variability, tracks qualitatively well with the number of science topics of interest.*

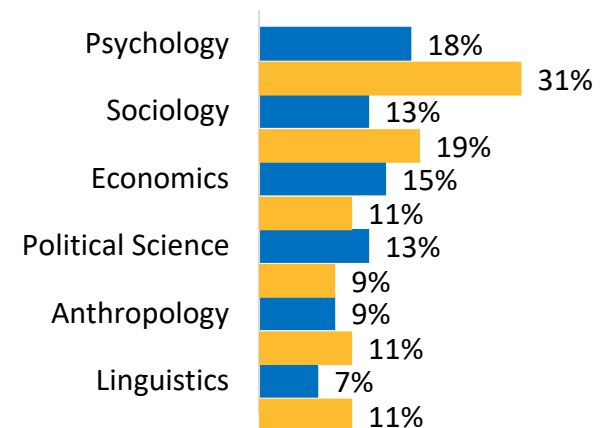
# Science Interest Data

Areas and topics in science that Americans are interested in. Grouped by gender: blue is male, orange is female.

## Life Sciences



## Social Sciences



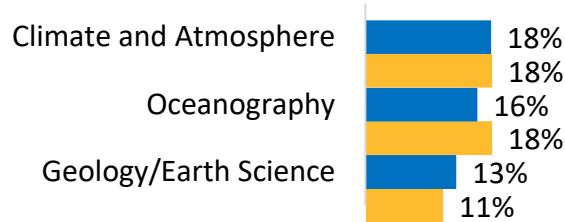
**KEY OBSERVATION:**

*Of all demographic parameters analyzed, topical interest in science varied the most by gender. In general, women express a greater interest in life and social sciences.*

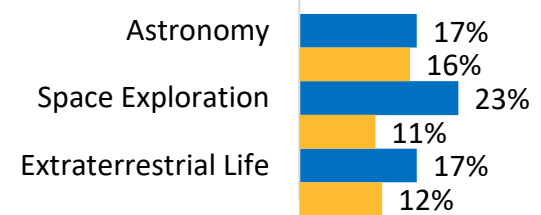
# Science Interest Data

Areas and topics in science that Americans are interested in. Grouped by gender: blue is male, orange is female.

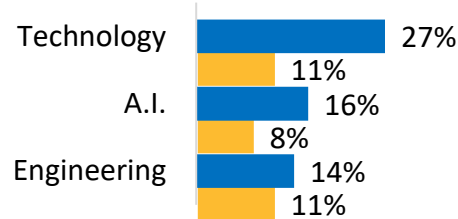
## Earth Sciences



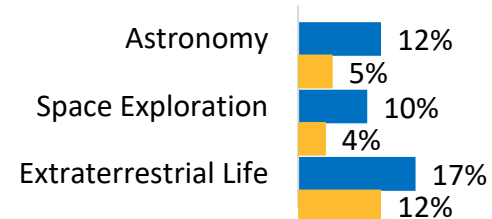
## Space Sciences



## Technology and Engineering



## Physical Sciences



### KEY OBSERVATION:

*Of all demographic parameters analyzed, topical interest in science varied the most by gender. In general, men express a greater interest in technology, engineering, space, and the physical sciences.*

# Science Interest Data

The willingness of the public to give various scientific areas or topics a try, even though they are not presently interested in them:

**MOST  
WILLING**



**LEAST  
WILLING**

- Neuroscience
- Astronomy
- Genetics
- Anatomy
- Psychology
- Oceanography
- Economics
- Technology
- Ecology
- Anthropology
- Linguistics
- Health / Disease
- Agriculture
- Geology
- Political Science
- Engineering
- Space Travel
- Climate
- Sociology
- Electricity
- Physics
- Artificial Intelligence
- Chemistry
- Cell Biology

# Acknowledgements

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CONTACT: [www.ScienceCounts.org](http://www.ScienceCounts.org)

