

The Internet as a Resource for News and Information about Science

**The convenience of getting scientific
material on the web opens doors to better
attitudes and understanding of science**

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John B. Horrigan, Associate Director

Summary of Findings

40 million Americans rely on the internet as their primary source for news and information about science.

- When asked where they get most of their news and information about science, 20% of all Americans say they turn to the internet for most of their science news. That translates to 40 million adults.
- This is second only to television, which is cited by 41% of Americans as the place where they get most of their science news and information.
- Newspapers and magazines are each cited by 14% as their main sources for news and information about science.

For home broadband users, the internet and television are equally popular as sources for science news and information – and the internet leads the way for young broadband users.

Internet users with high-speed internet connections at home are equally as likely to cite the internet as TV as the media from which they get most of their science news.

- One third (33%) of home broadband users say they get most of their science news and information from TV, while 34% say the internet.
- Among adult home broadband users under the age of 30, the internet is the most popular source for science news and information. Some 44% of those between the ages of 18 and 29 say they get most of their science news from the internet and 32% in this group say that television is their main source for science news.

The internet is the source to which people would turn first if they need information on a specific scientific topic.

Each respondent to this survey received questions on one of three specific scientific topics: stem cell research, climate change, and origins of life on Earth. When asked what source they would use first if they needed to learn more about the topic, here is what they said:

- 67% of those receiving questions about stem cell research said they would turn to the internet first for information on this topic; 11% said the library.

This Pew Internet & American Life Project report is based on the findings of a daily tracking survey on Americans' use of the Internet. All numerical data were gathered through telephone interviews conducted by Princeton Survey Research Associates between January 9 and February 6, 2006, among a sample of 2,000 adults, aged 18 and older. For results based on the total sample, one can say with 95% confidence that the error attributable to sampling and other random effects is +/- 3%. For results based Internet users (n=1,447), the margin of sampling error is also +/- 3%.

Pew Internet & American Life Project, 1615 L St., NW, Suite 700, Washington, DC 20036
202-419-4500 <http://www.pewinternet.org>

Summary of Findings

- 59% of respondents receiving questions about climate change said they would turn to the internet first for information on this topic; 12% said the library.
- 42% of those answering questions about the origins of life on Earth said they would turn to the internet first for information on this topic; 19% said the library, and 11% said the Bible or church.

The internet is a research tool for 87% of online users. That translates to 128 million adults.

- 70% of internet users have used the internet to look up the meaning of a scientific concept or term.
- 68% have gone online to look for an answer to a question about a scientific concept or theory.
- 65% have used the internet to learn more about a science story or discovery first heard of offline.
- 55% have used the internet to complete a science assignment for school (for either oneself or a child).
- 52% have used the internet to check the accuracy of a scientific fact or statistic.
- 43% have downloaded scientific data, graphs, or charts from the internet.
- 37% have used the internet to compare different or opposing scientific theories.

This adds up to 87% of online users who have done at least one of these activities. Translated to the full adult population in America, that amounts to 128 million people who have used the internet to get some kind of scientific information.

Consumers of online science information often try to check the accuracy of scientific claims. Sometimes they use the internet for this purpose; other times they use offline sources.

- 62% of those who get science information online use other online information to check the reliability of scientific information.
- 54% of online science consumers use offline resources, like a journal or encyclopedia, to assess the reliability of science information.
- 54% of online science consumers go to the original source of the information or the original study it is based upon.

Fully 80% of those who have gotten science news and information online have engaged in at least one of these “fact-checking” activities. Although a majority of those who get science information online feel the internet is a reliable source for checking on science information, fully half of those who use an online source for fact-checking also use both of the other means to look further into a science fact.

Convenience plays a large role in drawing people to the internet for science information.

When asked what comes closest to describing why they get science news and information on the internet, here is what internet users who have ever gotten such information online said:

- 71% say they turn to the internet for science information because it is convenient.
- 13% say they turn to the internet because they believe information there is more accurate than other sources.
- 12% say they turn to the internet because information is available online that is not available elsewhere.

Happenstance also plays a role in users' experience with online science resources. Two-thirds of internet users say they have come upon news and information about science when they went online for another reason.

- Fully 65% of internet users say they have come across science news and information when they had gone online with another purpose in mind.
- Younger internet users, those with high-speed connections, and those with a lot of online experience are more likely to have encountered science information online:
 - 70% of those with broadband at home have encountered science information when they went online for another reason.
 - 71% of those under 30 have come upon science information when they went online for another reason.
 - 74% of those who have been online for ten years or more have encountered science information when they went online for another reason.

Those who seek out science news or information on the internet are more likely than others to believe that scientific pursuits have a positive impact on society.

Among internet users who have gotten science news and information online:

- 48% strongly agree that to be a strong society, the United States needs to be competitive in science; 33% of remaining online users strongly agree with this.
- 43% strongly agree that scientific research is essential to improving the quality of human lives; 27% of remaining online users say this.
- 38% strongly agree that developments in science make society better; 27% of remaining online users strongly agree with this.

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- 22% strongly agree that people need a good understanding of scientific concepts and principles to lead their daily lives; 15% of remaining online users say this.

Non-internet users were less likely to strongly agree with each of these propositions, and this is due mainly to the fact that non-internet users have lower levels of educational attainment than online users. Higher levels of education are linked to getting science news and information online as well as the likelihood that a respondent strongly agreed with the above statements. Still, even among well-educated respondents, those who used the internet to get science information were more likely to agree with the above propositions than well-educated respondents who did not use the internet for science information.

Internet users who have sought science information online are more likely to report that they have higher levels of understanding of science.

- 81% of those who have gotten science information online say they have a good idea of what it means to study something scientifically; 60% of remaining internet users say this.
- 78% of those who have gotten science information online describe themselves as “very” or “somewhat” informed about new scientific discoveries; 58% of remaining internet users says this.
- 69% of those who have gotten science information online say they have a “very good” or “good” understanding of science; 49% of remaining online users say this.

To be sure, other things are associated with whether someone says he or she has a good understanding of science. A college or graduate degree – especially for those who have taken some science courses – is correlated with higher self-reported levels of interest in and knowledge of science. At the same time, interest in science is also associated with people’s sense of what they know about science. Nonetheless, getting science information online is an independent factor in this dynamic: A college-educated person who gets science information online is more likely than a similar college graduate who doesn’t get science information online to report higher levels of interest in science in the three measures listed above.

Between 40% and 50% of internet users say they get information about a specific topic using the internet or through email.

Respondents in each topic area were asked whether, at some point, they had use the internet or email for news and information about the issue at hand. Here’s what they said:

- 38% of internet users who received questions about stem cell research said they had gotten information on the topic from the internet or through email.
- 49% of internet users who received questions about climate change said they had gotten information through the web or via email on climate change.

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- 42% of internet users who answered questions about the origins of life said they had gotten information on the topic from the internet or through email.

Search engines are far and away the most popular source for beginning science research among users who say they would turn first to the internet to get more information about a specific topic.

Focusing only on respondents in each of the three topical modules who said the internet would be their *first* option if they needed to find out more about their topic, about 90% in each topic said they would use a search engine. Specifically:

- 87% of stem cell respondents who cited the internet as their first choice for finding out more about their topic said they would use a search engine.
- 93% of climate change respondents who cited the internet as their first choice for finding out more about their topic said they would use a search engine.
- 91% of origin of life respondents who cited the internet as their first choice for finding out more about their topic said they would use a search engine.

Half of all internet users have been to a website which specializes in scientific content.

When asked whether they had ever gone to websites where the content is predominantly about science, half (49%) of internet users said they had been to at least one of the following sites.

- 23% of internet users have been to NationalGeographic.com.
- 23% have been to USGS.gov, the main website of the U.S. Geological Survey, which is the main U.S. government site for Earth-science information.
- 19% have been to NASA.gov.
- 14% have been to the Smithsonian Institution website.
- 10% have been to Science.com.
- 9% have been to Nature.com.

Fully 59% of Americans have been to some sort of science museum in the past year.

- Nearly half (48%) of all Americans have been to a zoo or aquarium in the past year.
- 26% have been to a natural history museum.
- 23% have been to a science or technology museum.
- 14% have been to a planetarium.

When looking across all of these science-oriented entities, 59% of Americans have been to at least one of them in the past year. Excluding zoos or aquariums from this count,

40% of Americans in the past year went to a natural history museum, science or technology museum, or planetarium.

Science websites and science museums may serve effectively as portals to one another.

- Fully 79% of those who have gone to a website that specializes in science content have gone to a science museum in the past year; 59% of the general population have made such visits.
- For the internet users who have been to a science museum in the past year, 57% have been to a science website – 8 points above the average for all internet users.

The correlation between people going to science museums and science websites was the strongest across all the sources asked about, i.e., including TV shows and magazine. In other words, there was a much stronger link between visiting a science museum and a science website than between visiting a science website and watching science television programming. This suggests that online and offline science resources may play off of each other in a distinctive way that draws at least some users more deeply to resources that promote science knowledge.

Summary of Findings

The Internet as a Resource for News and Information about Science: Summary of Findings at a Glance
40 million Americans rely on the internet as their primary source for news and information about science.
For home broadband users, the internet and television are equally popular as sources for science news and information – and the internet leads the way for young broadband users.
The internet is the source to which people would turn first if they need information on a specific scientific topic.
The internet is a research tool for 87% of online users. That translates to 128 million adults.
Consumers of online science information are fact-checkers of scientific claims. Sometimes they use the internet for this, other times they use offline sources.
Convenience plays a large role in drawing people to the internet for science information.
Happenstance also plays a role in users' experience with online science resources. Two-thirds of internet users say they have come upon news and information about science when they went online for another reason.
Those who seek out science news or information on the internet are more likely than others to believe that scientific pursuits have a positive impact on society.
Internet users who have sought science information online are more likely to report that they have higher levels of understanding of science.
Between 40% and 50% of internet users say they get information about a specific topic using the internet or through email.
Search engines are far and away the most popular source for beginning science research among users who say they would turn first to the internet to get more information about a specific topic.
Half of all internet users have been to a website which specializes in scientific content.
Fully 59% of Americans have been to a science museum in the past year
Science websites and science museums may serve effectively as portals to one another.
Source: John B. Horrigan. <i>The Internet as a Resource for News and Information about Science</i> . Washington, DC: Pew Internet & American Life Project, September 2006.

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Acknowledgements

About the Pew Internet/Exploratorium partnership: This survey was developed by the Pew Internet & American Life Project and the Exploratorium, a science museum and science-education center in San Francisco, California.

With the support of a grant from the National Science Foundation (NSF)¹, the Exploratorium has undertaken a project designed to improve the public's understanding of how scientists gather and interpret scientific evidence. As part of this effort, the Exploratorium commissioned the Pew Internet Project to develop and implement a national survey to determine how Americans get their science news and information. Funds for the survey reported in this document came from the Exploratorium through this NSF grant.

About the Pew Internet & American Life Project: The Pew Internet Project is a nonprofit, non-partisan think tank that explores the impact of the Internet on children, families, communities, the work place, schools, health care, and civic/political life. The Project aims to be an authoritative source for timely information on the Internet's growth and societal impact. Support for the project is provided by The Pew Charitable Trusts. The project's Web site: www.pewinternet.org.

The Exploratorium: Housed within the walls of San Francisco's landmark Palace of Fine Arts, the Exploratorium is a museum of science, art, and human perception filled with hundreds of interactive, hands-on exhibits. In addition to serving more than half a million people who visit the museum each year, the Exploratorium is also a leader in the movement to promote museums as informal education centers, providing professional development for science teachers and teacher-educators, and operating as a research and development center for the science museum field at large. The Exploratorium's award-winning Web site, online since 1993, currently receives more than 20 million unique visits a year. Through its many innovative exhibits and programs, the museum encourages people of all ages to explore the world around them. The Exploratorium's Web site: www.exploratorium.edu.

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Part 1.

The Internet and Science News and Information

People's attitudes about science, their level of scientific knowledge, and the attention they pay to scientific developments have long been a topic of interest in the scientific community and among policymakers. The National Science Foundation (NSF) has since the early 1980s tracked people's attitudes toward and understanding of science in its bi-annual "Science & Engineering Indicators" series. The NSF's most recent report on the topic – released in 2006 and based on a 2004 survey – finds that Americans are generally supportive of science, but often not well informed about scientific topics.²

The dominant media source for getting news and information about science has been – and remains – television. However, as the NSF pointed out in its 2004 survey, the internet makes a difference in how people get information about science. In 2004, respondents to the NSF survey said the internet was their preferred source of information when trying to find out about specific scientific issues – eclipsing encyclopedias or other research tools.

Even since 2004, there has been change in the world of cyberspace. In early 2004, 63% of Americans had access to the internet, a figure that grew to 73% in the beginning of 2006. The means of online access have changed more noticeably since 2004. Only 24% of Americans had "always on" high-speed internet connections at home in the early part of 2004. By March 2006, 42% of Americans had high-speed (or broadband) connections at home, a 75% increase.

This report seeks to sort through the mix of resources people use to get information about science, explore where the internet fits, and how it matters. The survey was commissioned as a component of *Evidence: How Do We Know What We Know*, an NSF-funded, Web-based project being designed by the Exploratorium to help users investigate the nature of scientific understanding. By providing examples and experiences based on current scientific investigations about topics of interest to a broad public, this online resource gives users the opportunity to explore their own processes of knowledge construction and compare it with the kinds of processes used by scientists.

As one of the first museums to bring resources to the public through the World Wide Web, the Exploratorium is interested in learning how people use the internet to engage with science. The Pew Internet Project's extensive experience in understanding the role of the internet as an important informational and cultural resource in the United States makes it possible for this survey to address the issue.

² National Science Foundation, *Science & Engineering Indicators 2006*. Chapter 7. Available online at: <http://www.nsf.gov/statistics/seind06/c7/c7h.htm>.

Among the questions this report explores are:

- Where does the internet fit in how people learn about scientific issues relative to other resources people may use?
- Is there any connection between getting science information online and attitudes about science and scientific research?
- Does the internet play an evidentiary role for users, letting them check scientific facts, verify claims about science, or dig deeper into scientific controversies?

In the landscape of how people get science news and information, the television dominates, but the internet is the next most popular source.

All respondents to the Pew Internet/Exploratorium survey were asked where they have ever gotten news and information about science, and where they get most of their science news and information. As the table shows below, the internet is half as likely as television to be cited as a main source of science news, but it is the second most cited source across the range of media.

How Americans get science news and information		
	Where people get MOST of their science news & information	Where people have EVER gotten science news & information
Television	41%	88%
Internet	20	54
Magazines	14	63
Newspapers	14	69
Radio	4	46
Other	7	*
Source: <i>Pew Internet & American Life Project Survey, January 2006.</i>		

The figures above are consistent with those from the NSF's 2004 survey which asked about people's primary source of news about science and technology. In that survey, 41% cited TV, 18% the internet, 14% a magazine, 14% the newspaper, and 2% the radio.³

In the table above, the 54% of all Americans who have gotten science news and information on the internet translates into 74% of internet users having done this (because not everyone is an internet user). For the 20% of all Americans who get most of their science information from the internet, this translates into 27% of all online users.

³ See Figure 7-1 in the 2006 *Science and Engineering Indicators*. The two surveys are not fully comparable – the Pew Internet survey asked only about science while NSF inquired about science and technology.

Science news and information

The table below contrasts the demographic profiles of those who get most of their news and information about science from television and those who say the internet is their main source for this kind of information. People who turn to the internet most for science news and information are more likely to be young, well educated, and able and willing to make the monthly outlay for a high-speed internet connection. Those who rely on television tend to be older, less educated, and less likely to have a child under the age of 18.

Demographic profile of those who rely on TV and those who rely on the internet for most of their science news and information		
% in each demographic group who use specific means for science information	Rely on TV for most science news	Rely on the internet for most science news
Gender		
Male	45%	55%
Female	55	45
Parental status		
Parent of child under 18	36	42
Age		
18-29	19	36
30-49	40	43
50-64	23	17
65+	18	4
Race/ethnicity		
White (not Hispanic)	68	73
Black (not Hispanic)	15	10
Hispanic (English speaking)	13	10
Education		
Less than high school	20	5
High school grad	43	26
Some college	21	32
College +	16	37
Student (full or part-time)	9	26
Income		
Under \$30K	33	22
\$30K-50K	20	19
\$50K-\$75K	13	15
Over \$75K	17	32
Internet use		
Has internet access	62	100
Has broadband at home	32	68
Number of cases	791	364
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>		

People under age 30 are equally as likely to say they rely on the internet as television for most of their news about science.

Although TV the main source for science in the general population, the picture changes when focusing only on respondents under the age of 30. For that group, 36% say they get most of their science news and information from television, which is basically the same

Science news and information

percentage – 34% – who say they rely on the internet for most of their science information. Here is how media use for science information sorts out when comparing age groups.

How Americans get science news and information by age				
	Ages 18-29	Ages 30-49	Ages 50-64	Age 65+
Television	36%	42%	42%	43%
Internet	34	22	15	5
Magazines	9	14	15	19
Newspapers	10	10	18	21
Radio	2	5	4	3
Other	7	6	5	4
Number of cases	253	693	555	477
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>				

People use the internet extensively to learn about science – for research, homework, satisfying curiosity, and looking for evidence about scientific propositions.

Although about one quarter of all internet users say they get most of their science news and information from the internet, the vast majority – 87 % – of internet users have at one time turned to the internet to get some piece of information about science. Note the contrast between 87% and the 74% figure cited above as the share of internet users who ever have gotten online information. The difference arises this way: When respondents are prompted about specific online science activities, they remember things they have done with respect to science that they don't when simply asked if they have ever gotten science information online. As the table below shows, online users are likely to use the internet almost like an encyclopedia – looking for meanings of specific scientific terms or looking for an answer to a specific question about science.

3 out of 5 (59%) internet users have used the internet for online queries connected to scientific evidence.

People also use the internet to search for evidence to help them sort out issues regarding science. Half (52%) have used the internet to check the accuracy of a scientific fact or statistic and 37% have used the internet to compare opposing or different scientific theories. This adds up to 59% of internet users who have done at least one of these two activities.

Science news and information

Types of science-oriented research online	
	All internet users
Look up the meaning of a scientific term or concept	70%
Look for an answer to a question you have about a scientific concept or theory	68
Learn more about a science story or discovery first heard of offline	65
Complete a science assignment for school (either self or child)	55
Check the accuracy of a scientific fact or statistic	52
Download scientific data, graphs, or charts	43
Compare different or opposing scientific theories	37

Source: Pew Internet & American Life Project Survey, January 2006.

For those with high-speed internet connections at home, 91% have done at least one of these activities online.

As to specific online sites which provide science content, the table below shows the share of internet users who have ever been to the listed sites.

Where internet users go online for science information	
Website	% of all internet users
Discovery.com	31%
PBS.org	28
NationalGeographic.com	23
USGS.gov	23
NASA.gov	19
Website of the Smithsonian Institution	14
Science.com	10
Nature.com	9

Source: Pew Internet & American Life Project Survey, January 2006.

Close to two-thirds (62%) of internet users have been to at least one of those eight sites. Of the six sites that specialize mainly in science content (i.e., excluding PBS and Discovery), 49% of internet users have been to at least one of those sites. And a sizable

share of the internet population – 27 % – has been to three or more of these eight sites at one point.

Part 3 of this report will analyze in greater detail the usage patterns for these sites and compare use of online science resources to offline ones, such as going to science museums, reading science magazines, and watching science TV programming.

Consumers of online science information are into fact-checking – sometimes using online resources but also using offline ones.

Those who have gotten science news or information online sometimes dig deeper into a piece of scientific information. Specifically:

- 62% say they look for other information online to check the reliability of information they have found to ensure it is correct.
- 54% say they check with an *offline* source, like a journal or encyclopedia, to assess reliability.
- 54% look up the original source of the information or the original study the information is based upon.

Fully 80% of those who have consulted science information online have done at least one of these three activities. Those who use the internet to check the reliability of information they have found online are also likely to use offline sources to further check the fact. Fully two-thirds (68%) of internet users who have checked into a science fact online also have checked with an offline source to assess its reliability.

For those in the 18-29 age group with high-speed connections at home, the reliance on the internet for fact-checking is pronounced. Fully 71% of those who have gotten science information online have turned to the internet to find out more about the reliability of scientific information; they are only slightly more likely than average to have checked with an offline source (57% have) or looked up the original source of information (56% have).

Convenience is a big driver of people to the internet for science information.

Respondents were asked what comes *closest* to describing why they use the internet for science news and information. Among online users who have gotten some news or information about science on the internet, 71% say they do so because getting science information online is easy and convenient. Just 13% say they turn to the internet because they believe online science information is more accurate than elsewhere and another 12% say it is because they can get science information online that they can't get elsewhere. For home broadband users, 77% cite convenience as the reason they use the internet for science information and news.

Science news and information

When probed further about where they turn first when looking for science news and information, 61% of people who have gotten science information online identify the internet as their starting point; 69% of home broadband users say this.

Online users, by happenstance, run into science news and information when they log on for another purpose.

When asked if they come upon science news and information when they have gone online with another purpose in mind, 65% of internet users say they have encountered science information when they are online for something else. This phenomenon is more prevalent among the younger pool of internet users in the sample.

Encountering science information online when user is online for another reason	
Ages 18-29	71%
Ages 30-49	70
Ages 50-64	60
Age 65+	43
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>	

It is also the case that people who have more internet experience are more likely to run into science information online than others. Three quarters (74%) of internet users who have been online 10 or more years have come upon online information while online for another reasons compared to 61% of other online users.⁴ This is because online experience is associated with more extensive internet surfing habits.

A somewhat greater share of home broadband users (70%) says they have encountered science information when online for another reason. Online experience and connection speed tend to amplify one another a bit; 76% of those with broadband at home and ten or more years of online experience have come across science information in the course of an online session intended to do something else.

For Americans with high-speed internet connections at home, the internet plays a central role in how they get news and information about science.

With convenience cited as a reason for getting science news and information online, it is not surprising that the most convenient means of online access – the “always on” home broadband connection – alters the patterns of consumption of science information. As the table below shows, having a high-speed connection makes a difference in how people get news generally about science. This comes partly at the expense of newspapers. Given that

⁴ Just over one-third (37%) of online users say they had been online for 10 years or more in the Pew Internet and American Life Project January 2006 survey.

Science news and information

TV remains the media source that people generally turn to most often for news and information of any sort, it is notable that for science, the internet is basically at parity as a general source for news and information for home high-speed users.⁵

Internet access and where Americans say they get <u>most</u> of their science news and information			
	Home broadband users	Home dial-up users	Non-internet users
Television	33%	35%	61%
Internet	34	22	*
Magazines	15	16	12
Newspapers	11	17	17
Radio	4	5	4
Other	3	6	6
Number of cases	773	514	553

Source: Pew Internet & American Life Project Survey, January 2006.

As was the case for general patterns of media use for science information, focusing on different age groups is illuminating when considering connection speed. For the “under 30” group, the internet is the clearly preferred means for getting news and information about science. (The 50-64 and over 65 age cohorts were combined due to the small number of cases of survey respondents with broadband at home over the age of 65).

Where Americans get <u>most</u> of their science news and information			
Home broadband internet users			
	Ages 18-29	Ages 30-49	Age 50+
Television	32%	33%	29%
Internet	44	32	25
Magazines	9	14	19
Newspapers	3	10	18
Radio	1	5	3
Other	9	5	5
Number of cases	125	347	291

Source: Pew Internet & American Life Project Survey, January 2006.

⁵ See Pew Research Center for the People and the Press, *Online Papers Modestly Boost Newspaper Readership: Maturing Internet News Audience Broader Than Deep*, July 2006. for data on patterns of media use for general news. Available online at: <http://people-press.org/reports/display.php3?ReportID=282>.

Once people turn to the internet for science news and information, they learn to rely on it as a source. That is especially true for young people.

For the 87% of internet users who have gotten science news and information online, we asked them where they usually turn to first when they need a bit of scientific information or want the latest science news. Among this group, fully 61% say they first go online when this need strikes. Roughly one-third (34%) cite another source, with those sources being fairly evenly spread among magazines, books, the library, TV, encyclopedias, and newspapers (all cited by anywhere from 3% to 5% of respondents).

Again, the numbers change for those with high-speed connections at home. Fully 69% of home broadband users say they turn first to the internet for news and information about science, with 27% turning first to other sources. Honing in on young high-speed at-home users – those in the 18-29 age range – shows that three-quarters of this group (76%) turn to the internet first for news and information about science, with only 17% turning first to other sources.

A mix of forces seems to prompt users' online encounters with science information, including unplanned encounters with science information online, the convenience of the internet, attitudes toward science, and home broadband connections. This shows that the internet is a doorway to science information for many Americans.

As noted, some 20% of Americans say the internet is their main source for news and information about science. Analysis of the data shows there are several reasons for this, including respondents' access to broadband at home, the internet's convenience as tool for accessing science information, and the likelihood that respondents have unplanned encounters with science information. Which factors have the greatest relative influence?

Statistical analysis of these effects shows that happenstance is the largest factor underlying people's tendency to say the internet is the source for most of their science news. That is, encountering science information online when using the internet for another purpose correlates most strongly with people saying the internet is a main source for science news and information. Convenience matters a good deal too, but its effect is half that of happenstance. Specifically, when thinking about what accounts for the share of Americans who rely mainly on the internet for science news, about a quarter of it (27%) is attributable to the phenomenon of people encountering science news online when they logged on for a different reason and 14% is due to people viewing the internet as a convenient source for this information.

Other factors are important as well. A person's outlook toward science, i.e., the extent to which someone sees himself as well-informed about science and overall interest in learning about scientific discoveries, explains 16% and 9%, respectively, of the share of

Science news and information

people using science as a main source of news. Having a home broadband connection (14%), being under the age of 30 (8%), and being male (7%) each explain a portion of the frequency with which people use the internet as their main source of science information.⁶

This analysis points to a confluence of forces that, for some users at least, opens doors to science resources online. Certainly what people bring to the internet, such as their interest in science and how closely they follow scientific discoveries, shapes their online science habits. Generational differences and, to a modest extent, gender also come into play.

But characteristics of the web enter into the picture as well. The convenience and availability of online information draw some users to the internet for science information. Although it may seem surprising that unintended encounters with science information online are strongly correlated with use of the internet as a main source for science information, this finding is consistent with other Pew Internet research. After the 2004 general election, half of internet users reported having unplanned encounters with news about the campaign and politics when they had gone online for another reason.⁷

Moreover, people are increasingly turning to the internet for general news. About twice as many Americans got news online on the typical day in 2005 than four years earlier, a phenomenon in part driven by the growth in home broadband adoption.⁸ This trend increases the chance of unplanned encounters with science information online. Whether it is convenience, happenstance, or an “always on” high-speed connection at home, for many (mostly young) Americans, the internet holds prominent position as an information resource for science.

⁶ This analysis uses logistic regression to model the factors that predict the chances someone says they use the internet as their main source of science news and information. The relative contribution of the factors discussed is derived by comparing the predicted probability when the factor is not present (e.g., the respondent does not believe the internet is a convenient science tool or the respondent does not have a home broadband connection) to the model’s average predicted probability.

⁷ Lee Rainie, Cornfield, Michael, and Horrigan, John. *The Internet and Campaign 2004*. Pew Internet & American Life Project, March 2005. Available online at: http://www.pewinternet.org/PPF/r/150/report_display.asp.

⁸ John Horrigan, *Online News: For many home broadband users, the internet is a primary news source*. Pew Internet & American Life Project, March 2006. Available online at: http://www.pewinternet.org/PPF/r/178/report_display.asp.

Part 2.

Science Knowledge, Attitudes, and the Internet

The Pew Internet/Exploratorium science and the internet survey asked respondents a series of questions on their attitudes about science, how well they view their understanding science, and how closely they follow developments in science.

Well-educated Americans and those who say they are interested in scientific discoveries are confident about their understanding and knowledge of science.

Most Americans (58%) report they have at least a good understanding of science and two-thirds (69%) see themselves as at least somewhat informed about science. Still, about 40% of Americans say their understanding of science is fair or poor.

If you had to rate your own understanding of science would you say it is ...	
Very good	20%
Good	38
Just fair	32
Poor	9
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>	

As to following scientific discoveries, most Americans consider themselves at least somewhat informed, but about one-third do not see themselves as well-informed about scientific discoveries.

How well informed would you say you are about new scientific discoveries?	
Very informed	11%
Somewhat informed	58
Not too informed	23
Not at all informed	8
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>	

Finally, two-thirds of Americans (66%) said they have a good idea of what it means to study something scientifically (33% were not really sure). When pressed to describe what it means to study something scientifically, nearly all (93%) of those who said they understood this concept were able to give an answer.

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Looking more closely at the data, several factors come into play in explaining the responses to these questions. Foremost are levels of education, whether respondents like to read about a variety of different things, or whether respondents say they enjoy learning about science.

Self-Assessment of Science Knowledge (% in each group that who say "yes")				
	College degree	Non-college graduate	Like to read about many different things	Enjoy learning about science and new discoveries
My basic understanding of science is "very good" or "good"	75%	51%	65%	77%
I am "very" or "somewhat" informed about new scientific discoveries.	83	63	78	86
I have a good idea of what it means to study something scientifically	90	57	73	80

Source: Pew Internet & American Life Project Survey, January 2006.

Online users who have gotten science news and information online report higher levels of understanding of science, follow science more closely, and are more likely to say they understand the scientific method.

As noted, 74% of internet users say they have gotten some kind of news or information about science online. This group of online science surfers shows very distinct differences from online users who have *not* gotten science information online when it comes to assessing their interest and understanding of science.

Self-Assessment of Science Knowledge & Internet Use		
Science topics	Percent of those who have <u>ever</u> gotten science information online	Percent of online users who have <u>not</u> gotten science information online
My basic understanding of science is "very good" or "good"	69%	49%
I am "very" or "somewhat" informed about new scientific discoveries.	78	58
I have a good idea of what it means to study something scientifically	81	60
Number of cases	1042	405

Source: Pew Internet & American Life Project Survey, January 2006

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On the one hand, these are not surprising results. People who, for whatever reason, seek out science news and information online would be expected to say that they have a good understanding of science or know a lot about the latest in scientific studies.

Yet these differences are important because they are independent of a variety of demographic, behavioral, and other attitudinal factors that one would expect to drive people to extensive surfing to science sites. The survey asked respondents about their interest in science, curiosity about learning new things, educational levels, whether they have attended a science museum in the past 12 months, regularly watch TV channels that specialize in science content, or subscribe to magazines that have science content. The survey also included standard demographic questions on gender, age, race, and income. The presence of these other questions permits statistical analysis that disentangles many of the various effects of all these variables – including use of the internet to get science news and information – on people’s perceptions of what they know about science.

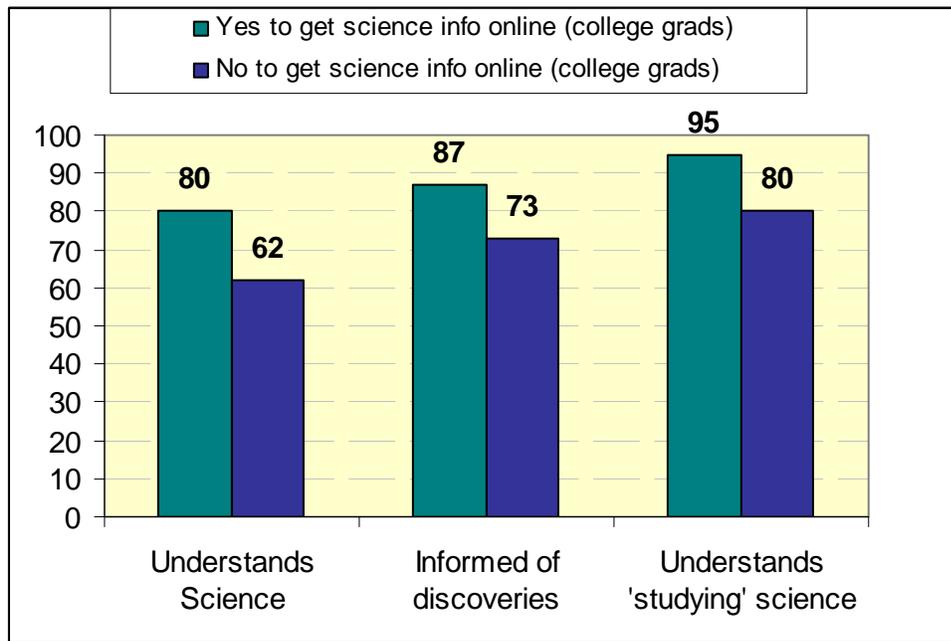
People who have ever sought science news and information online report higher levels of knowledge and understanding of science.

When controlling for all the factors listed above, there is a positive and statistically significant relationship between being a user of online science resources and people’s self-reported levels of understanding of science, being informed of new scientific discoveries, and understanding what it means to study something scientifically.⁹ If having a college degree is associated with a high likelihood that respondents say they have a “good” or “very good” understanding of science, then a respondent who is a college graduate *and* goes online for science news and information has a higher likelihood of rating his understanding of science as “good” or “very good” than the same respondent who isn’t a science web surfer (see following chart). The same thing is true when focusing on how respondents rate how well-informed they are about new scientific discoveries or their understanding of the scientific process.

⁹ Other factors of possible interest that were statistically significant were gender and age. Men were more likely than women to rate their understanding of and interest in science highly. Younger adults were more likely than older ones to rate their understanding of and interest in science highly. Factors such as race, income, marital status, and where a respondent lives (e.g. urban areas) were not statistically significant.

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Understanding of science – comparing college graduates who get science information online to college graduates who don't



This statistical correlation does not fully explain the underlying causal relationships between use of the internet for science information and attitudes about science. People with a lot of education or interest in science may have a strong technological orientation – so their existing predilection to turn to the internet for information may map very directly to positive attitudes about science. In that case, the science content they find online is not a cause of their better attitudes about science they express. At the same time, since many internet users (65%) say they encounter science news and information when they go online for a different reason, some of those surfers may come across science content online that has an influence on their attitudes about science.

The statistical analysis points to a clear correlation between people's online science surfing and their sense of their knowledge and understanding of science: *those who say they have ever sought science news and information online report higher levels of knowledge and understanding of science, even when taking into account educational levels, expressed interest in science, and a host of other demographic factors.*

Self-reported understanding of the scientific process does not track with other measures of understanding of the scientific process.

All respondents in the Pew Internet/Exploratorium survey were asked “In general, would you say you have a good idea of what it means to study something scientifically, or are you not really sure what that means?” Some 66% responded that they “have a good idea of what it means” with 33% saying they weren't really sure. Those who responded

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affirmatively to the question were then probed to describe in their own words what it means to study something scientifically. Fully 93% gave a response and 7% either said they did not really know what it means or refused to answer. This suggests that, as an upper bound, 60% of Americans can be thought of as having a good understanding of the scientific method – at least when asked to do a self-assessment on the topic.

These findings do not match those in the NSF's 2004 survey on science, which used a different approach to arrive at the finding that “many Americans appear not to have a firm grasp on the nature of the scientific process.” In that survey, 46% of respondents successfully answered a question that tested their understanding of how an experiment is conducted. The difference in results is due to the different questions – one a self-reported assessment of understanding the scientific process and the other a measure of understanding of a specific dimension of the scientific process.¹⁰ The differences in how the issues are framed are likely the reason in the gap in measures of respondents' understanding of the scientific process.

Those who go online for science news and information are more likely to strongly agree with propositions about science's positive role in improving society, the quality of human lives, and the nation's well-being.

All respondents were presented a series of statements to assess their attitudes about science, and several of the propositions extolled the virtues of science in helping society, people, and the country. As the table below shows, adult Americans were generally in agreement about the importance of science and its benefits to society. These findings are consistent with other surveys on the public's attitudes about science; the Virginia Commonwealth University Life Sciences Survey of 2005 found that 87% of Americans “strongly” or “somewhat” agree that scientific research is essential for improving the quality of people's lives and 85% “strongly” or “somewhat” agree that developments in science help make society better.¹¹

¹⁰ See p. 7-19 in *Science and Engineering Indicators 2006*.

¹¹ 2005 VCU Life Sciences Survey: Support for Stem Cell Research Grows; Opposition to Cloning Continues; Pluralism in Views about Origins of Biological Life. Available online at: <http://www.vcu.edu/uns/Releases/2005/oct/102405a.html>.

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Attitudes about science: all respondents				
	Strongly agree	Agree	Disagree	Strongly disagree
To be a strong society, the United States needs to be competitive in science	39%	50%	8%	1%
Scientific research is essential to improving the quality of human lives	35	56	7	1
Developments in science help make society better	31	58	8	1
In order to live their daily lives, people need a good understanding of basic scientific concepts and principles	19	58	18	2
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>				

Among those who have ever gotten science information online, this activity also has a statistically significant association with higher rates of agreeing with positive statements about society. Thus, even when controlling for interest in science, education, willingness to learn new things, and other demographic factors, having gotten science information online is correlated with a higher level of a respondent's perception of the virtues of science in society.¹² The table below shows how those who have gotten science news or information online differ from other internet users when it comes to attitudes about science in society.

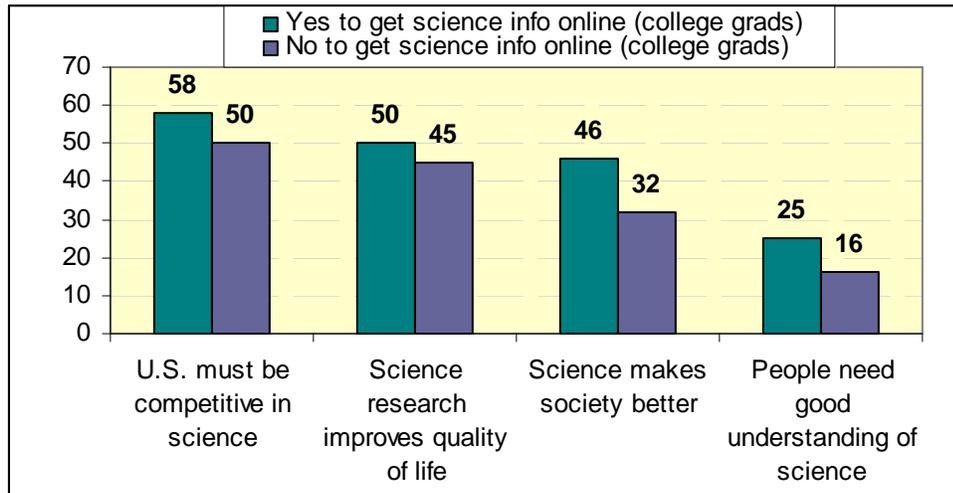
Science attitudes and use of the internet for science information		
% "strongly agree"	Those who have <u>ever</u> gotten science information online	Online users who have <u>not</u> gotten science information online
To be a strong society, the United States needs to be competitive in science	48%	33%
Scientific research is essential to improving the quality of human lives	43	27
Developments in science help make society better	38	27
In order to live their daily lives, people need a good understanding of basic scientific concepts and principles	22	15
Number of cases	1042	405
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>		

¹² As might be expected, interest in science, having a college degree, and willingness to learn new things are significantly correlated with the statements agreeing that science is helpful to society. Men were more likely than women to agree that developments in science improve society and that the U.S. must be competitive in science. Other factors, such as race or marital status, did not have any significant association with the chances of agreeing with these statements.

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The following chart helps to demonstrate the statistically independent correlation between online science information and attitudes about science. The chart compares responses to the above attitudinal questions among those with college degrees who have gotten science information online with college graduates who have not gotten science information online. The percentages reflect those who “strongly agree” with the specific statement.

Attitudes about science – comparing college graduates who get science information online to college graduates who don’t



When presented with statements that cast doubt on the scientific enterprise, respondents who are politically conservative are most likely to agree with them.

Very few Americans have strongly held beliefs when it comes to worries about whether science creates problems or pays too little attention to moral issues. Yet, particularly regarding the notion that science doesn’t pay enough attention to moral values, substantial numbers of Americans agree with the concerns raised in the proposition presented to them.¹³

¹³ The 49% of Americans who “strongly” or simply “agree” with the statement “science doesn’t pay enough attention to values” compares with 56% who “strongly” or “somewhat” strongly agree with this in the 2005 VCU Life Sciences Survey.

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Worries about science: all respondents				
	Strongly agree	Agree	Disagree	Strongly disagree
Scientific research today doesn't pay enough attention to the moral values of society	11%	38%	36%	7%
Science creates more problems than solutions for us and our planet	3	19	52	19
Source: <i>Pew Internet & American Life Project Survey, January 2006.</i>				

When scrutinizing which subgroups may be more or less inclined to agree with these statements, respondents who describe their political beliefs as conservative are more likely to strongly or somewhat agree with the statements in the table above. This is especially true regarding worries about science and moral values.

Respondents were asked to classify their political views as somewhat or very liberal, somewhat or very conservative, or moderate. In the table below, “liberal” denotes the 29% of respondents who said they are somewhat or very liberal, “conservative” represents 35% of respondents who said they are somewhat or very conservative, and “moderate” are the 27% of those who labeled themselves “moderate” politically.

Worries about science: political ideology			
	Conservative	Liberal	Moderate
Science creates more problems than solutions for us and our planet	28%	20%	20%
Scientific research today doesn't pay enough attention to the moral values of society	60	39	45
Source: <i>Pew Internet & American Life Project Survey, January 2006.</i>			

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Those who go online for news or information about science, have a college education, or describe themselves as politically liberal or moderate are generally less likely to agree with these statements. Among those with college degrees or who have gotten science news online, there are generally lower levels of worry.

Worries about science: education and online science surfing		
% “strongly agree” or “agree”	College degree	Have gotten science news & information online
Science creates more problems than solutions for us and our planet	16%	13%
Scientific research today doesn't pay enough attention to the moral values of society	35	37

Source: Pew Internet & American Life Project Survey, January 2006.

The findings show that culture and ideology are certainly at play in shaping attitudes about science. These differences come most sharply into focus when looking at the moral dimensions of scientific research.

Part 3.

The Dynamics of Getting Science Information: Specific Issues

The Pew Internet/Exploratorium survey on science asked respondents to rate their level of interest in a number of different scientific topics. The table below displays the results for all 2,000 adults surveyed.

Science issues of interest to the public			
	Very interested	Somewhat interested	Not at all interested
Changes in the Earth's climate	42%	39%	18%
The human genome and DNA	36	41	22
The origins of life on this planet	35	40	24
Space and space exploration	31	41	28
Stem cell research	31	40	26
The origins of the universe	29	37	33

Source: *Pew Internet & American Life Project Survey, January 2006. N= 2,000 Margin of error is ±3%.*

The rationale for doing this was to guide respondents to question modules on three specific topics probing the dynamics of how people get information on these issues. The three topics explored were: stem cell research, the origin of life on Earth, and climate change. Overall, 26% of respondents answered questions on stem cells, 38% on global climate change, and 29% on the origins of life on Earth. Each respondent answered questions on only one of those three topics.

The internet is a primary research tool for Americans interested in specific scientific topics.

When asked about specific scientific topics, respondents generally rely on TV for most of their information, although school was cited by a plurality of those in the origins of life module. It is worth noting that newspapers fare better on questions on scientific specific topics than when people are asked without topical reference where they get most of their science news and information. As noted in Part 1, the broad question about main news sources for science placed the internet ahead of newspapers; the pattern reverses (with the exception of origins of life) when respondents are queried about a topic in which they have expressed an interest.

The Dynamics of Getting Science Knowledge

Where people have gotten MOST of their information about...			
	Stem Cell Research	Climate Change	Origins of Life
Television	42%	51%	31%
Newspapers	25	23	10
Internet and email	20	19	13
Magazines	17	9	11
Radio	7	5	8
School	5	8	34
Bible/church	*	*	8
Other	5	5	3
Number of cases	539	741	571
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>			

When asked where they would turn first if they needed to get more information about a specific topic, the internet is most frequently cited by respondents – and by a majority for two of the three modules.

If you wanted to learn more about a specific science topic, where would you go FIRST for more information?			
	Stem Cell Research	Climate Change	Origins of Life
The internet	67%	59%	42%
Library	11	12	19
Bible/Church	*	*	11
Books	*	1	6
Science magazines	4	3	3
Scientific journals	3	3	4
Television	2	7	3
Newspapers	2	5	1
Doctor	2	*	*
Number of cases	539	741	571
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>			

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With the exception of “origins of life,” most people would turn to the internet to find out more about the specific topics explored, and a plurality of those in the “origins of life” module chose the internet. With the library coming in second for each of the three topics, and traditional media registering very low ratings, it appears that respondents took this question to be about doing research on the topic. In that context, the internet seems clearly to be a preferred research tool.

Among those who would turn first to the internet to get more science information, a large majority of users would begin with a search engine.

For the subset of respondents in each module who said they would choose the internet first as their source for more information, about 90% said they would use a search engine. Specifically:

- 87% of those who answered questions about stem cells and who would turn first to the internet to find out more on the topic said they would use a search engine. The remaining 13% said they’d rely on a specific website.
- 93% of those who answered questions about climate change and who would turn first to the internet to find out more on the topic said they would use a search engine. The remaining 7% said they’d rely on a specific website.
- 91% of those who answered questions about the origins of life and who would turn first to the internet to find out more on the topic said they would use a search engine. The remaining 9% said they’d rely on a specific website.

Ease of getting science information online no doubt plays a role in people’s preference to turn to the internet first for additional information about the specific topic about which they were asked. In each case, a majority of respondents said they would find it easy to find information about a specific topic; people with high-speed internet connections at home were more likely to say this.

Between 40% and 50% of internet users say they get information about a specific topic using the internet or through email.

Respondents in each topic area were asked whether, at some point, they had use the internet or email for news and information about the issue at hand. Here’s what they said:

- 38% of internet users who received questions about stem cell research said they had gotten information on the topic from the internet or through email.
 - Of these, 43% said they had gotten such information at least several times a month.
 - About half of this group (49%) said they could recall an actual website from which they had gotten information on stem cells.

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- 49% of internet users who received questions about climate change said they had gotten information through the web or via email on climate change.
 - Of these, 46% said they had gotten such information at least several times a month.
 - 42% of this group said they could recall a website from which they had gotten information about climate change.
- 42% of internet users who answered questions about the origins of life said they had gotten information on the topic from the internet or through email.
 - Of these, 49% said they had gotten such information at least several times per month.
 - Just 23% of this group said they could recall a website from which they had gotten information on the origins of life.

Those who follow an issue most closely tend to be more reliant on the internet as a primary source of information on the topic.

The survey asked respondents in each question module how closely they followed the particular topic. For stem cell respondents, two-thirds (66%) said they follow the issue “very” or “fairly” closely, a similar number said this for climate change (68%), and 60% said this for the origins of life.

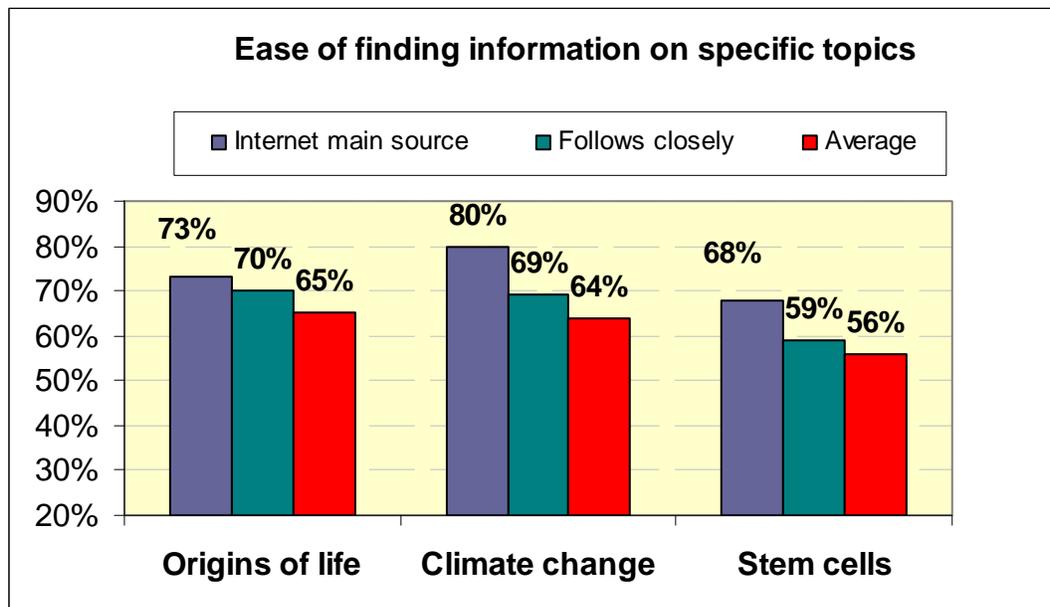
- For stem cell respondents, 24% of those who follow the topic very or fairly closely said they turn to the internet for most of their information on the issue, compared to 11% of those who said they don’t follow the issue closely.
- For climate change respondents, 23% of those who follow the topic very or fairly closely said they use the internet for most of their news and information on the topic, compared to 10% of everyone else who received climate change questions.
- For those answering questions about the origins of life, 17% who follow the topic fairly or very closely say they use the internet for most of their information on the topic; 7% of everyone else says they rely on the internet mainly for information on origins of life.

The greater-than-average tendency for those most interested to turn to the internet for science information may be another dimension of the convenience motive for getting science information online. That is, those with a lot of interest in the topic may value convenience as a way to keep up with it – and the internet certainly offers that. In fact, those who follow these issues closely are more likely to view the internet as an easy and convenient tool for getting news and information about science; collectively 71% of respondents across the three topics say this, compared to the 65% average.

Those who most closely follow specific scientific issues or use the internet primarily for information on the topics say it is easy to find scientific information.

Respondents in each of the three modules were asked whether it is easy or difficult to for them to find science information – by whatever means. On average, most respondents in the three topics said it was easy to find scientific information on the issue on which they were questioned.

Those who follow the issues very or fairly closely say it is easy to get information of any sort about the specific topics asked about; their interest in the topic has perhaps led them in the past to information sources on it. Those who say the internet is their primary source for news and information on the topic are most likely to say it is easy to find information on a topic.



Online science resources, while not usually the starting point, are often part of the informational journey for the interested consumer of science information.

The data discussed above help paint a stylized portrait of how an interested science consumer might go about gathering information on a specific topic. Although it is impossible to determine the precise impetus for looking for science information, there is a good chance that something seen on TV or in the newspaper sets things in motion. For those who follow a particular topic very closely, there is a greater chance the internet might get things going. However, as the “origins of life” questions suggest, school may also be a motivator for exploring something about science.

After that, the internet is probably the next stop. Respondents, most of the time, said they would turn first to the internet for additional information on a specific topic. If they do go online, they will start at a search engine. There is, however, a small chance that an online science consumer will go to a specific website on the topic of interest.¹⁴

Even if someone uses the internet extensively for science information, it is not likely that the internet will be used exclusively for learning about science.
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Most often – particularly among those who say the internet is their main source for science news and information – the science searcher will have an easy time finding what he or she needs. But even if the search process uses the internet extensively, it is not likely that the internet will be used exclusively. There is a four in five chance that, if the search involves finding a specific fact, that the science consumer will try to verify it. For an internet user who has used cyberspace for science, offline resources will be part of the verification process two-thirds of the time. Although the survey did not ask what offline sources people would use, the library seems a likely candidate, as that was the second most frequently cited place to which people would turn first for more science information.

¹⁴ Roughly 10% of those who said they would turn first to the internet for a science informational need said they would go to a specific website. Moreover, in the climate change questions, 49% of respondents got information online on the topic, and 42% of them said they could remember a specific site they visited; this translates into about 20% of all internet users in that module being able to recall a specific website pertaining to climate change. One can imagine some users going directly to a remembered website, or using a search engine to get quickly back to that website.

Part 4.

Media Mix: The Different Means People Use to Get Science Information

The Pew Internet/Exploratorium survey on science information asked specific questions about the resources people may use to learn about science – museums, TV, magazines, and the internet. The tables below display the results for the resources asked about, with comparisons of the average responses with responses of those in selected subgroups whose behavior was notably different.

Half (49%) of internet users have been to at least one website whose main focus is on science.

Sites with diversified content and multiple platforms such as cable television (e.g., Discovery.com) get the most traffic and it is quite likely that people go to these sites for information unrelated to science. When including sites with diversified content that includes science, such as PBS.org and Discovery.com, 62% of Americans have been to at least one science site. Unsurprisingly, people who are interested in science are most likely to go to these sites. And respondents with a high-speed internet connection at home are more likely to have gone to at least one of these eight sites – by a 68% to 56% margin in comparison with dialup home internet users.¹⁵

	Science websites		
	All internet users	Interested in science	Home broadband connection
Discovery.com	31%	40%	35%
PBS.org	28	32	32
NationalGeographic.com	23	33	26
USGS.gov	23	28	26
NASA.gov	19	29	21
Website of the Smithsonian Institution	14	19	16
Science.com	10	15	10
Nature.com	9	12	9

Source: Pew Internet & American Life Project Survey, January 2006.

Focusing only on websites whose content is predominantly devoted to science – NationalGeographic.com, USGS.gov, NASA.gov, the Smithsonian’s website, Science.com, and Nature.com – yields different patterns. As noted, half (49%) of online users have been to one of these six sites. Home connection speed makes a difference here

¹⁵ This difference is statistically different when holding constant other attitudinal and demographic factors.

– 56% percent of home broadband users have been to one of the six science-oriented sites, although it is not the largest factor behind this behavior.

Interest in science and education play larger roles in this behavior. Fully 63% of those who are very interested in science and 63% who have had college science courses have been to one of the six sites that specialize mainly in science content (compared with the 49% average). The users of scientific websites come to them because of their education, preferences, and interest in science. Connection speed, though a facilitating factor, is not a primary driver of people to websites that specialize in science content.

Fully 59% of the public has been to some sort of science museum in the past year.

Respondents were asked whether they had, in the past year, paid a visit to a variety of institutions that have exhibitions relating to science. When considering each of the four types of institutions listed below, 59% of adult Americans say they had visited at least one of them. When excluding zoos or aquariums, 40% of American adults visited either a natural history museum, science or technology museum, or planetarium in the past year.

Science museum visits		
	All respondents	College graduates
A zoo or aquarium	48%	63%
A natural history museum	26	38
A science or technology museum	23	37
A planetarium	14	18

Source: Pew Internet & American Life Project Survey, January 2006.

Fully 76% of college graduates have been to a science museum in the past year and 68% of internet users have done this; the higher figure for internet users is due to the fact that online users are more likely to have college degrees than others.

Three in five (61%) of Americans say they regularly watch specific channels or TV shows that will often or sometimes touch on scientific topics.

Science on television		
	All respondents	College graduates
Discovery	43%	42%
The History Channel	35	35
National Geographic	24	25
The Learning Channel	23	26
Arts & Entertainment	22	24
Nova	11	16

Source: Pew Internet & American Life Project Survey, January 2006.

Given the breadth of offerings of these channels and shows, there is little variation in the frequency of people watching them across demographic category. Some small, but significant, differences show up in looking at specific TV content categories. Older people are more likely to watch National Geographic, the History Channel, or Nova, while people under age 65 are more likely to watch the Learning Channel.

28% of Americans subscribe to at least one of six magazines whose content specializes in science.

Science magazines are clearly niche publications, and the numbers in the table below reflect that. Interestingly, the more likely subscribers are both young and old, as seen in the data for students and senior citizens. However, factors such as income (because these products quite likely are mainly seen as discretionary purchases) and overall interest in science also influence the choice to subscribe to these publications.

Science magazines			
	All respondents	Students	Over age 65
National Geographic	18%	25%	23%
Popular Science	7	6	7
Discover	6	11	6
Science	4	6	5
Nature	4	7	3
Scientific American	4	10	3
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>			

Those who go to websites with scientific content tend to be younger and better educated than people who use other means to get science information.

The table below offers a demographic comparison of users of various means of getting information about science. The groups are not mutually exclusive, but there are some clear differences when examining the demographic portraits. Not only are users of science websites younger and better educated than other groups, the table also suggests that some science website users are probably helping their kids on school science projects; science website users are most likely to have school age children in the house.

Demographics profiles of those who pursue science knowledge					
	Websites whose main content is science	Subscribe to science magazine	Regularly watch science TV	Visited science museum in past year	All Americans
Gender					
Male	53%	52%	53%	47%	48%
Female	47	48	47	53	52
Parental status					
Parent of child under 18	43	33	36	41	36
Age					
18-29	24	23	22	22	21
30-49	47	35	40	45	39
50-64	23	23	23	21	23
65+	6	19	14	11	17
Race/ethnicity					
White (not Hispanic)	70	70	71	74	71
Black (not Hispanic)	9	12	13	9	11
Hispanic (English speaking)	15	13	12	12	11
Education					
Less than high school	6	10	10	6	13
High school grad	24	29	37	33	36
Some college	29	25	24	26	24
College +	42	37	29	36	28
Student (full or part-time)	22	20	15	17	14
Income					
Under \$30K	17	20	25	19	26
\$30K-50K	21	18	21	20	19
\$50K-\$75K	14	14	14	15	13
Over \$75K	33	30	24	30	23
Don't know/refused	15	18	16	16	18
Number of cases	720	543	1,209	1,181	2,000
<i>Source: Pew Internet & American Life Project Survey, January 2006.</i>					

Science websites and science museum may effectively serve as portals to one another.

The table above shows a similarity in profiles between science website users and those who have visited a science museum of some sort in the past year. Going to a science museum may prompt someone to check out its website, and vice versa. In fact, when looking at the correlations among these different ways of finding out about science, the strongest relationship is between use of science websites and going to science museums.

Looking at this phenomenon more closely shows that going to a science website or a science museum is linked to higher levels of engagement with other science information sources.

Frequency of ever having used a specific means for science information <u>if</u> respondent has visited science museum in past year		
	% who did this	Percentage points above average
Visited at least one of six science sites (% of internet users)	57%	8
Regularly watch science TV programming (% of all respondents)	66	5
Subscribe to science magazine (% of all respondents)	31	3
Source: Pew Internet & American Life Project Survey, January 2006.		

Frequency of ever having used a specific means for science information <u>if</u> respondent has visited at least one of six science-oriented websites		
	% of all respondents	Percentage points above average
Visited science museum in past year	79%	20
Regularly watch science TV programming	72	11
Subscribe to science magazine	36	8
Source: Pew Internet & American Life Project Survey, January 2006.		

Having visited one of the six science websites asked about clearly is associated with a big boost in having paid a visit to a science museum, and having been to a science museum gives boost, albeit smaller, to the chances of having visited a science website.

The strong correlation between visits to science websites and museums makes providers of these services members of a common community in a distinctive way. Visitors to a Smithsonian museum may go to the Smithsonian website to learn more about something they saw during their in-person visit. But that same visitor may also visit – or even *instead* visit – the website of another entity that provides information on the topic at hand. The internet’s “many-to-many” character drives this phenomenon and the growth of high-speed networks accentuates it.

Part 5.

Implications

This report has shown that those who use science websites generally have more positive views about science and its place in society, as well as higher self-reported levels of knowledge about science. A person's level of education partly explains these phenomena, and the convenience of online information undoubtedly draws people to these sites. However, that is not the whole story. Users of science websites report higher levels of satisfaction about science, a phenomenon independent of other factors.

These and the report's other findings have several implications for those interested in using the internet to promote public interest in and knowledge of science:

- Marketing initiatives to draw people to science resources online can have real payoffs. People who use science resources online are more likely to have positive attitudes about science – irrespective of education and other demographic characteristics.
- Online science resources complement – and are complementary to – other sources for science information. As seen in the way science websites and museums may serve as portals to one another, science on the internet will work best when it connects to content from other sources – and the reverse is true.
- Young people in particular find the convenience of science information online to be a reason to use these electronic resources. Unplanned encounters with science information online when doing other things on the internet also play an important role. This means that there are opportunities in developing online resources tailored to young people.
- Cultural outlook – such as political ideology – comes into play in shaping people's perspectives on science. Science websites or education programs may not be able to address these phenomena, but designers of such programs should be aware of these realities.

Methodology

This Pew Internet & American Life Project report is based on the findings of a daily tracking survey on Americans' use of the internet.

Telephone interviews were conducted by Princeton Survey Research Associates between January 9 and February 6, 2006, among a sample of 2,000 adults, 18 and older. For results based on the total sample, one can say with 95% confidence that the error attributable to sampling and other random effects is plus or minus 3 percentage points. For results based internet users (n=1,447) the margin of sampling error is plus or minus 3 percentage points. In addition to sampling error, question wording and practical difficulties in conducting telephone surveys may introduce some error or bias into the findings of opinion polls.

The sample for this survey is a random digit sample of telephone numbers selected from telephone exchanges in the continental United States. The random digit aspect of the sample is used to avoid “listing” bias and provides representation of both listed and unlisted numbers (including not-yet-listed numbers). The design of the sample achieves this representation by random generation of the last two digits of telephone numbers selected on the basis of their area code, telephone exchange, and bank number.

The response rate for this survey was 30%.