What Europeans really think (and know) about science and technology

How much do Europeans really know about science and technology? What do they think about it? Do they even care? **Russ Hodge** from the European Molecular Biology Laboratory reports on one of the Eurobarometer surveys.

It's easy to see that science and technology are racing along faster than ever – visit a big electronics store; zoom in on your house with Google Earth[w1]; test one of those talking navigation systems that make you think you could drive with your eyes shut (don't try it). In the face of these developments, you'd think that people's knowledge of science and technology – and their interest in them – would be keeping pace. Unfortunately, that isn't the case. Over the past few years, Europeans' overall interest in science and technology has decreased – just one pattern shown by a series of recent major surveys, the Eurobarometers[w2]. The results of these surveys will surely be of interest to teachers, who are probably our best hope of changing the situation. The complete surveys and a careful analysis of their results can be found online[w2]. This article presents a few highlights.

For more than a decade, the European Union (EU) has carried out regular surveys, called Eurobarometers, to measure public opinion and knowledge on a variety of themes across its member states. One reason is to find common ground as the EU makes policies for countries with diverse cultures; another is to evaluate the effects of past EU programmes. The results are also used to decide what sorts of projects – in education and other areas – the European Commission will support in the future. Two special Eurobarometers carried out in early 2005 should be of particular interest to science teachers: 'Europeans, Science, and Technology' and 'Social values, science and technology'. This article focuses on the first.

The goal of the Eurobarometer on 'Europeans, Science and Technology' was to determine:

- European citizens' interest and level of information
- Their image and knowledge of science and technology
- Their attitudes towards science and technology
- Their ideas about the responsibilities of scientists and policy-makers
- Their perception of scientific research in Europe compared with other parts of the world.

The analysis looks at trends across Europe as a whole, and then breaks down the answers to reveal some fascinating differences between countries, genders, and other types of groups. The results are compared with past surveys to see how Europeans' attitudes to these issues are evolving. Below are some of the questions and a brief analysis of the results.

These are the results for Europe as a whole (1000 people surveyed in each

Question: "Let us talk about those issues in the news which interest you. For each issue I read out please tell me if you are very interested, moderately interested or not at all interested in it."

Themes	Very interested			Moderately interested			Not at all interested		
	2005	1992	Diff.	2005	1992	Diff.	2005	1992	Diff.
Environmental pollution	38%	56%	-18	49%	38%	+11	12%	6%	+6
New medical discoveries	33%	45%	-12	50%	44%	+6	16%	10%	+6
New inventions and technologies	30%	35%	-5	48%	47%	+1	21%	18%	+3
New scientific discoveries	30%	38%	-8	48%	45%	+3	20%	16%	+4
Sports news	26%	29%	-3	42%	38%	+4	32%	33%	-1
Politics	22%	28%	-6	49%	52%	-3	29%	20%	+9

of the 25 EU member/candidate states). On the whole, there is a noticeable drop in the number of people who claimed to be 'very interested' in scientific themes between 1992 and 2005. Additionally, there are interesting differences between individual countries. In an attempt to pin down the reasons behind these trends, interviewers combined the first four themes into a general category ('new inventions and technologies') for a country-by-country analysis. Respondents in Cyprus show the highest interest: 54% said they are 'very interested', far above the European norm. At the other end of the spectrum, only 14% of Lithuanians said they are 'very interested', along with 15% of Romanians, 16% of Italians, 17% of Bulgarians, and 18% of Portuguese.

Breaking the answers down into different groups reveals some other interesting trends:

"Very interested" in new inventions and technologies	
Males	40%
Females	21%
Ages 15-24	38%
Ages 55+	24%
Finished education after the age of 20	41%
Finished education by the age of 15	19%

Those who were very interested or moderately interested were asked to rate the themes they were most interested in. They answered:

Medicine	61%
The environment	47%
Humanities (history, literature, theology, etc.)	30%
The Internet	29%
Economics and social sciences	24%
Astronomy and space	23%
Genetics	23%
Nanotechnologies	8%

There are also some surprising differences in how various groups rate these themes. With medicine, for example, the results are:

People ranking medicine as one theme they are most interested in	
Males	50%
Females	73%
Ages 15-24	40%
Ages 55+	73%
Finished education after the age of 20	73%
Finished education by the age of 15	61%
Still studying	38%

3951 people are 'not at all interested' in new inventions or technologies or new scientific discoveries, and the survey asked them why. The most common answers are:

"I don't understand it"	32%
"I don't care about it'"	31%
"I don't need it"	16%

Why don't people understand? Surveyors asked their subjects, "Do you feel very well informed, moderately informed or poorly informed about these issues in the news?" The results are listed below:

Issues	Very well informed			Moderately well informed			Poorly informed		
	2005	1992	Diff.	2005	1992	Diff.	2005	1992	Diff.
Environmental pollution	15%	25%	-10	61%	60%	+1	23%	14%	+9
New medical discoveries	11%	12%	-1	59%	59%	0	28%	28%	0
New inventions and technologies	11%	9%	+2	53%	53%	0	35%	36%	-1
New scientific discoveries	10%	9%	+1	51%	51%	0	37%	37%	0
Sports news	28%	26%	+2	41%	41%	0	29%	32%	-3
Politics	20%	20%	0	55%	60%	-5	24%	19%	+5

The survey then asked where people get their information about science. The results are the following:

How often do you...	Regularly	Occasionally	Hardly ever	Never
Read articles on science in newspapers, magazines, or on the Internet?	19%	40%	20%	20%
Talk with your friends about science and technology?	10%	37%	26%	27%
Attend public meetings or debates about science or technology?	2%	8%	19%	71%
Sign petitions or join street demonstrations about nuclear power, biotechnology or the environment?	2%	11%	14%	73%

People were then asked about the types of institutes they visited:

Which of the following have you visited in the last 12 months?	
Public library	34%
Zoo or aquarium	27%
Art museum	23%
Science museum, technology museum or science centre	16%
Science exhibition or science week	8%

Interestingly, in Sweden a much higher percentage of the population visits science centres or science and technology museums: 36% of the people interviewed had made such a visit within the past year. Overall in Europe, there is a strong correlation between the level of education a person has attained and such visits: 25% of people who finished their studies after the age of 20 had visited one of these places, compared with just 7% for people who had finished by the age of 15.

CLASSROOM ACTIVITY

Answers from page 23, 'The joy of discovery: a personal experience'

The trail from which Comet West was discovered is indicated by an arrow

Image courtesy of ESO

Another part of the survey concerns people's knowledge of scientific facts. Thirteen statements were made, and the participants were asked to determine whether they were true or false. The chart below shows the overall results.

Quiz statements	True	False	Don't know
1. The Sun goes around the Earth.	29%	**66%**	4%
2. The centre of the Earth is very hot.	**86%**	7%	7%
3. The oxygen we breathe comes from plants.	**82%**	14%	4%
4. Radioactive milk can be made safe by boiling it.	10%	**75%**	15%
5. Electrons are smaller than atoms.	**46%**	29%	25%
6. The continents on which we live have been moving for millions of years and will continue to move in the future.	**87%**	6%	8%
7. It is the mother's genes that decide whether the baby is a boy or a girl.	20%	**64%**	16%
8. The earliest humans lived at the same time as the dinosaurs.	23%	**66%**	11%
9. Antibiotics kill viruses as well as bacteria.	43%	**46%**	11%
10. Lasers work by focusing sound waves.	26%	**47%**	28%
11. All radioactivity is man-made.	27%	**59%**	14%
12. Human beings, as we know them today, developed from earlier species of animals.	**70%**	20%	10%
13. It takes one month for the Earth to go around the Sun.	17%	**66%**	16%

Of the 25 countries tested, Sweden has the highest percentage of correct answers (79%); Cyprus has the lowest (49%). In several countries, the percentage of correct answers has risen appreciably since the same questions were asked in 1992: Belgium (13%), Germany (10%), Ireland (10%), Luxembourg (17%) and the Netherlands (11%). There are large differences between the answers given by various groups:

Group	Average of correct answers
Male	70%
Female	62%
Ages 15-24	70%
Ages 55+	59%
Finished education by the age of 15	53%
Finished education after the age of 20	76%
Attend religious services more than once a week	54%
Never attend religious services	70%

A major part of this Eurobarometer focuses on public attitudes towards science: issues of trust and optimism regarding science's ability to improve society and the world.

To the question, "Among the following categories of people and organisations, which three are best qualified to explain to you the impact of scientific and technological developments on society?", participants responded:

Scientists working at a university or government laboratory	52%
Television journalists	32%
Scientists working in an industrial laboratory	28%
Newspaper journalists	25%
Medical doctors	23%
Environmental protection associations	21%
Consumer organisations	16%
Writers and intellectuals	10%
The industry	6%
The government	6%
Politicians	5%

Respondents were then asked to respond to the following statement: "One day, science will be able to give a complete picture of how nature and the Universe work." The average response across Europe is: 50% agree; 26% disagree, and the rest neither agree nor disagree (or don't know). But here the responses from country are extremely different. In Malta and Greece, more than 70% of the population agree, whereas only 27% of the Swedish people surveyed agree (54% disagree), and results are almost the same in the other Nordic countries and Iceland.

The overall optimism about the potential of science was also measured, by asking for responses to the following statements:

Statement	Agree	Disagree
Scientific and technological progress will help to cure illnesses such as AIDS, cancer, etc.	88%	4%
Science and technology make our lives healthier, easier and more comfortable.	78%	6%
Thanks to science and technology, there will be more opportunities for future generations.	77%	8%
The benefits of science are greater than any harmful effects it may have.	52%	14%
Science and technology will help eliminate poverty and hunger around the world.	39%	37%
Thanks to scientific and technological advances, the Earth's resources will be inexhaustible.	23%	54%
Science and technology can sort out any problem.	21%	58%

The remainder of the respondents answered "neither agree nor disagree" or "don't know". Here, too, there are interesting differences between countries, which would be worth investigating further.

The survey went on to ask about specific technologies and applications. People were asked for their opinion on the following statements:

Statement	Agree	Disagree
Science and technology are responsible for most of the environmental problems we have today.	57%	20%
Food made from genetically modified organisms is dangerous.	54%	14%
Science and technology cannot really play a role in improving the environment.	28%	50%

These questions show some of the widest differences between attitudes across Europe. Cypriots (88%) and Greeks (80%) are most worried about genetically modified foods, whereas there is much less concern in the United Kingdom (33% agree; 23% disagree with the statement that they are dangerous) and the Netherlands (30% agree; 39% disagree).

The survey included a small grade card on science teaching throughout Europe: people were asked to respond to the statement, "Science classes at school are not sufficiently appealing." Here are some of the responses:

Country	Agree	Disagree
25 EU members/associated countries	50%	15%
Turkey	**66%**	**9%**
Sweden	**64%**	**6%**
Slovenia	**63%**	**10%**
Austria	**61%**	**8%**
France	**60%**	**10%**
Portugal	**60%**	**6%**
Malta	39%	21%
Germany	36%	36%
Czech Republic	36%	11%
Cyprus	29%	30%

This is only a small taste of an extensive survey that gives many more insights into the state of knowledge and perceptions of science among the population of Europe. Such numbers are good to have; the real question is what they mean. Answering that question is the challenge that faces the European Commission, national governments, ministries and others as they define policies and decide what types of projects should be supported to improve people's perceptions and knowledge of science. These figures can also be used to reinforce the case for new ideas and initiatives, particularly in applying for educational grants.

Web references

w1 – Google Earth combines satellite imagery, maps and the power of Google to put the world's geographic information at your fingertips: http://earth.google.com

w2 – Eurobarometer survey website: http://ec.europa.eu/public_opinion