

# **VIEWS ON SCIENCE-TECHNOLOGY SOCIETY ©**

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## WHAT'S IT ALL ABOUT?

We want to understand the viewpoints that high school students hold on the complex topic “science, technology and Canadian society.” Thousands of grade 12 students from across Canada wrote paragraphs about various issues on this topic. We analyzed all their paragraphs closely and found some common viewpoints. We called these common viewpoints “student positions.” More recently, we interviewed over 100 students and discovered that most students were able to express their true beliefs BETTER by choosing one of the “student positions” THAN by writing a paragraph. We made a questionnaire out of these “student positions.”

We call our questionnaire *Views on Science-Technology-Society* (VOSTS). It is an inventory of student viewpoints about science, and about how science is related to technology and society. VOSTS is unique because Canadian high school students had a major hand in developing it. It's essentially their ideas catalogued in a logical way.

## **INSTRUCTIONS TO STUDENTS:**

Each question of the VOSTS inventory begins with a statement about a science-technology-society topic. Most of these statements express an extreme view on the topic. You may happen to agree strongly with this view; you may happen to disagree vigorously; or your own position may be in between the two.

Next, there is a list of positions (or viewpoints) on the issue. These usually go from one extreme to the other. You are asked to choose one of these positions, **BUT ONLY ONE** – the one that comes closest to your personal view or belief.

To summarize:- Read the statement carefully.

- Think to yourself whether you agree or disagree with the statement, or can't make up your mind.
- Then read the list of different positions on the topic.
- Pick the one that comes closest to your own position.

Every page ends with the same three positions. Here is how you can use them if you wish:

- X. “I don't understand.” This choice is included in case there is a key word or phrase that you just don't understand.
- Y. “I don't know enough about this subject to make a choice.
- Z. “None of these choices fit my basic viewpoint.” This choice can be used when none of the other positions comes close to your own belief, or when you want to combine two or more choices into one position.

There are no “right” answers; this is not a test. We simply want to understand what your position is on a number of issues about science and about how it relates to technology and society.

**PLEASE DO NOT MAKE ANY MARKS IN THE QUESTION BOOKLET.**

**10111 Defining science is difficult because science is complex and does many things. But MAINLY science is:**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. a study of fields such as biology, chemistry and physics.
- B. a body of knowledge, such as principles, laws and theories, which explain the world around us (matter, energy and life).
- C. exploring the unknown and discovering new things about our world and universe and how they work.
- D. carrying out experiments to solve problems of interest about the world around us.
- E. inventing or designing things (for example, artificial hearts, computers, space vehicles).
- F. finding and using knowledge to make this world a better place to live in (for example, curing diseases, solving pollution and improving agriculture).
- G. an organization of people(called scientists) who have ideas and techniques for discovering new knowledge.
- H. No one can define science
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**10112 Defining science is difficult because science is complex and does many things. But MAINLY science is:**

**Your position, basically:** (Please read from A to J, and then choose one.)

- A. a study of fields such as biology, chemistry and physics.
- B. a body of knowledge, such as principles, laws and theories, which explain the world around us (matter, energy and life).
- C. exploring the unknown and discovering new things about our world and universe and how they work.
- D. carrying out experiments to solve problems of interest about the world around us.
- E. inventing or designing things (for example, artificial hearts, computers, space vehicles).
- F. finding and using knowledge to make this world a better place to live in (for example, curing diseases, solving pollution and improving agriculture).
- G. an organization of people (called scientists) who have ideas and techniques for discovering new knowledge.
  
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**10211 Defining what technology is, can cause difficulties because technology does many things in Canada. But MAINLY technology is:**

**Your position, basically:** (Please read from A to J, and then choose one.)

- A. very similar to science.
- B. the application of science.
- C. new processes, instruments, tools, machinery, appliances, gadgets, computers, or practical devices for everyday use.
- D. robotics, electronics, computers, communication systems, automation, etc..
- E. a technique for doing things, or a way of solving practical problems.
- F. inventing, designing and testing things (for example, artificial hearts, computers, space vehicles).
- G. ideas and techniques for designing and manufacturing things, for organizing workers, business people and consumers, for the progress of society.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**10311 Science and technology are important to the research and development R & D) in Canadian industry. What does “research and development” mean to you?**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. R & D means finding new answers to questions about the world and about people.
- B. R & D means progress by making life easier and the quality of life better.
- C. Research is exploring for new facts, ideas and information. Development is putting them to use in order to benefit society.
- D. Research is exploring for new facts, ideas and information. Development is putting them to use by coming up with new and creative ideas.
- E. R & D means exploring new ideas and problems in industry, in order to help an industry overcome its problems and thereby produce newer and better products.
- F. R & D means a combination of science and technology. Research leads to development, and development leads to improved research.
- G. R & D usually means helping humanity by finding medical cures and new technologies. But **unanticipated** effects of R & D can also cause social problems.
- H. R & D usually means helping humanity by finding medical cures and new technologies. But R & D also means harming society by creating such things as nuclear arms and other wasteful technologies, it depends on the R & D or how it is used.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

## 10411 Science and technology are closely related to each other:

**Your position, basically:** (Please read from A to H, and then choose one.)

They are closely related to each other:

- A. because science is the basis of all technological advances; though it's hard to see how technology could aid science.
- B. because scientific research leads to practical applications in technology, and technological developments increase the ability to do scientific research.
- C. because although they are different, they are linked so closely that it's hard to tell them apart.
- D. because technology is the basis of all scientific advances; though it's hard to see how science could aid technology.
- E. Science and technology are more or less the same thing.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.



**10421 In order to improve the quality of living in Canada, it would be better to spend money on technological research RATHER THAN scientific research.**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. Invest in **technological** research because it will improve production, economic growth, and unemployment. These are far more important than anything that scientific research has to offer.

Invest in **both**:

- B. because there is really no difference between science and technology.
- C. because scientific knowledge is needed to make technological advances.
- D. because they interact and complement each other equally. Technology gives as much to science as science gives to technology.
- E. because each in its own way brings advantages to society. For example, science brings medical and environmental advances, while technology brings improved conveniences and efficiency.
- F. Invest in **scientific** research — that is, medical or environmental research — because these are more important than making better appliances, computers or other products of technological research.
- G. Invest in **scientific** research because it improves the quality of life (for example, medical cures, answers to pollution, and increased knowledge). Technological research, on the other hand, has worsened the quality of life (for example, atomic bombs, pollution, automation, etc.).
- H. Invest in **neither**. The quality of living will not improve with advances in science and technology, but will improve with investments in other sectors of society (for example, social welfare, education, job creation programs, the fine arts, foreign aid, etc.).
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**10431 Technologists have their own body of knowledge to build on. Few developments in technology have come directly from discoveries made in science.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Technology advances **mainly** on its own. It doesn't necessarily need scientific discoveries.
- B. Technology advances by relying **equally on both** scientific discoveries and technology's own body of knowledge.
- C. Both scientists and technologists depend on the same body of knowledge, because science and technology are so similar.

EVERY technological development builds on a scientific discovery:

- D. because scientific discoveries always find a use, whether for technological developments or for other scientific uses.
- E. because science provides the background information and the new ideas for technology.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**20111 The Canadian government should give scientists research money to explore the curious unknowns of nature and the universe.**

**Your position, basically:** (Please read from A to I, and then choose one.)

Money should be spent on scientific research:

- A. so Canada does not fall behind other countries and become dependent upon them.
- B. in order to satisfy the human urge to know the unknown: that is, to satisfy scientific curiosity.
- C. even though it's often impossible to tell ahead of time whether the research will be beneficial or not. It's an investment risk, but we should take it.
- D. because by understanding our world better, scientists can make it a better place to live in (for example, using nature's environment and resources to our best advantage, and by inventing helpful technology).
- E. only when the research is directly related to our health (especially finding cures for diseases), to our environment or to agriculture.
- F. **Little or no money** should be spent on scientific research because the money could be spent on other things, such as helping Canada's unemployed and needy, or helping less fortunate countries.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**20121 Community or government agencies should tell scientists what to investigate; otherwise scientists will investigate what is of interest only to them.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Community or government agencies should tell scientists what to investigate:

- A. so that the scientists' work can help improve society.
- B. only for important public problems; otherwise scientists should decide what to investigate.
- C. All parties should have an equal say. Government agencies and scientists together should decide what needs to be studied, even though scientists are usually informed about society's needs.
- D. Scientists should **mostly** decide what to investigate, because they know what needs to be studied. Community or government agencies usually know little about science; their advice, however, might sometimes be helpful.
- E. Scientists should **mostly** decide because they know best: which areas are ready for a break-through, which areas have the experts available, which areas have the available technology, and which areas have the greatest chance of helping society.
- F. Scientists should decide what to investigate, because they alone know what needs to be studied. Governments often put their own interests ahead of society's needs.
- G. Scientists should be free to decide what to investigate, because they must be interested in their work in order to be creative and successful.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**20131 Science would advance more efficiently in Canada if it were more clearly controlled by the government.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Government should control science and make it more efficient by coordinating research work and by providing the money.
- B. The government's control should depend upon how useful the particular scientific research will be for Canadian society. Useful research should be more closely controlled and money should be provided.
- C. Government should NOT control science, but should give it money and leave the conduct of science up to scientists.
- D. Government should NOT control science but should leave the scientific research to private agencies or corporations: though government should provide the money for the scientific research.
- E. Government cannot make science more efficient because government is inefficient and cannot always be trusted.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**20141 A country's politics affect that country's scientists. This happens because scientists are very much a part of a country's society (that is, scientists are not isolated from their society).**

**Your position, basically:** (Please read from A to M, and then choose one.)

Scientists ARE affected by their country's politics:

- A. because funding for science comes mainly from governments which control the way the money is spent. Scientists sometimes have to lobby for funds.
- B. because governments set policy for science by giving money to some research projects and not others.
- C. because governments set policy regarding new developments and new projects, whether the government funds them or not. Government policy affects the type of projects scientists will work on.
- D. because politics limits and controls scientists by telling them what research to do.
- E. because governments can force scientists to work on a project which scientists feel is wrong (for example, weapons research), and therefore not allow the scientists to work on projects beneficial to society.
- F. because scientists are a part of society and are affected like everyone else.
- G. because scientists try to understand and help society and thus, because of their involvement and importance to society, scientists are closely tied to society.
- H. It depends on the country, and the stability or type of government it has.

Scientists are NOT affected by their country's politics:

- I. because scientific research has nothing to do with politics.
- J. because scientists **are** isolated from their society.
- K. I don't understand.
- L. I don't know enough about this subject to make a choice.
- M. None of these choices fits my basic viewpoint.

**20151 Politics in Canada affects Canadian scientists, because scientists are very much a part of Canadian society (that is, scientists are not isolated from society).**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists ARE affected by Canadian politics:

- A. because funding for science comes mainly from governments which control the way the money is spent. Scientists sometimes have to lobby for funds.
- B. because governments not only give money for research, they set policy regarding new developments. This policy directly affects the type of projects scientists will work on.
- C. because scientists are a part of society and are affected like everyone else.
- D. because scientists try to help society and thus they are closely tied to society.

Scientists are NOT affected by Canadian politics:

- E. because the nature of a scientist's work prevents the scientist from becoming involved politically.
- F. because scientists are isolated from society; their work receives no public media attention unless they make a spectacular discovery.
- G. because Canada is a free country, and so scientists can work quite freely.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**20211 Scientific research would be better off in Canada if the research were more closely controlled by corporations (for example, companies in high-technology, communications, pharmaceuticals, forestry, mining, manufacturing).**

**Your position, basically:** (Please read from A to I, and then choose one.)

Corporations **should** mainly control science:

- A. because closer control by corporations would make science more useful and cause discoveries to be made more quickly through faster communication, better funding, and more competition.
- B. in order to improve the cooperation between science and technology, and thus solve problems together. C. but the public or government agencies should have a say in what science tries to achieve.

Corporations should **not** control science:

- D. because if corporations did, scientific discoveries would be restricted to those discoveries that benefit the corporation (for example, making a profit). important scientific discoveries that benefit the public are made by unrestricted pure science.
- E. because if corporations did, corporations would obstruct scientists from investigating important problems which the companies wanted kept quiet; for example, pollution by the corporation.
- F. Science cannot be controlled by corporations. No one, not even the scientist, can control what science will discover.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.



**20311 In North America, most scientific and technological research is done for the military and industry. Only a small amount is done for health, agriculture and for the sole pleasure of discovering more about nature.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Most research is done for the military and industry in North America. I know this is true:

- A. because they are always trying to make things like new weapons, nuclear bombs, satellites, computers and robots.
- B. because greater amounts of money are spent on military and industrial research, and therefore this is where the greatest amount of discoveries are occurring.
- C. because research will be done only where there is the most money, not for the pleasure of discovering more about nature.
- D. Most research is done for the military and industry **but only** in the U.S. where defence spending is a high priority. In Canada, more research is done for health, agriculture and pure science.
- E. I feel **quite sure** that in North America the amount of research for the military and industry is **about the same** as the research for health, agriculture and pure science.
- F. There seems to be a lot of research done in all areas.
- G. More research is done for health, agriculture and discovering about nature than for the military and industry. There is actually a lot of research being done on cures for diseases, on soil, and about nature.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**20321 Few scientists and technologists would choose to work on military research and development.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Few would do research and development for the military:

- A. because many scientists and technologists would rather work in other areas which benefit human life and the environment.
- B. because many scientists and technologists would not sacrifice their morals and contribute to the violence of war.
- C. It depends on the person's values and research interests. Some scientists would find the military projects interesting and rewarding; other scientists would rather not work on projects related to war.

**A number** of scientists and technologists choose to work for the military:

- D. because most of the research money is in arms technology and military related research. The military offers large budgets, excellent equipment and more recognition for scientists.
- E. because they know that our country's defence is important. We need more scientists in military research and development.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**20411 Some cultures have a particular viewpoint on nature and man. Scientists and scientific research are affected by the religious or ethical views of the culture where the work is done.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Religious or ethical views DO influence scientific research:

- A. because some cultures want specific research done for the benefit of that culture.
- B. because scientists may unconsciously choose research that would support their culture's views.
- C. because most scientists will not do research which goes against their upbringing or their beliefs.
- D. because everyone is different in the way they react to their culture. It is these individual differences in scientists that influence the type of research done.
- E. because powerful groups representing certain religious, political or cultural beliefs will support certain research projects, or will give money to prevent certain research from occurring.

Religious or ethical views do NOT influence scientific research:

- F. because research continues in spite of clashes between scientists and certain religious or cultural groups (for example, clashes over evolution and creation).
- G. because scientists will research topics which are of importance to science and scientists, regardless of cultural or ethical views.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**20511 The success of science and technology in Canada depends on us having good scientists, engineers and technicians. Therefore, Canada should require students to study more science in school.**

**Your position, basically:** (Please read from A to K, and then choose one.)

Students should be required to study more science:

- A. because it is important for helping Canada to keep up with other countries.
- B. because science affects almost every aspect of society. As in the past our future depends on good scientists and technologists.
- C. Students should be required to study more science, but a different kind of science course. Students should learn how science and technology affect their everyday lives.

Students should NOT be required to study more science:

- D. because other school subjects are equally or more important to Canada's successful future.
- E. because it won't work. Some people don't like science. If you force them to study it, it will be a waste of time and will turn people away from science.
- F. because not all students can understand science, even though it would help them in their life.
- G. because not all students can understand science. Science is not really necessary for everyone.
- H. because it's not right for someone else to decide if a student should take more science.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**20521 The success of science and technology in Canada depends on how much support the public gives to scientists, engineers and technicians. This support depends on high school students — the future public — learning how science and technology are used in Canada.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Yes, the more students learn about science and technology:

- A. the better they will keep the country running. High school students are the future.
- B. the more students will become scientists, engineers and technicians, and so Canada will prosper.
- C. the more **informed** the future public will be. They will be able to form better opinions and make better contributions to how science and technology are used.
- D. the more the public will see that science and technology are **important**. The public will better understand the views of experts and will provide the needed support for science and technology.

E. No, support does **not** depend on students learning more about science and technology. Some high school students are not interested in science subjects.

F. I don't understand.

G. I don't know enough about this subject to make a choice.

H. None of these choices fits my basic viewpoint.

**20611 Within Canada there are groups of people who feel strongly in favour of or strongly against some research field. Science and technology projects are influenced by these special interest groups (such as environmentalists, religious organizations, and animal rights people).**

**Your position, basically:** (Please read from A to K, and then choose one.)

Special interest groups do have an influence:

- A. because they have the **power to stop** some research projects and that field of science suffers.
- B. because they have the **power to tell** scientists which projects are important to do or not to do.
- C. because they **influence public** opinion and therefore the scientists.
- D. because they **influence government** policy and governments decide whether to fund a research project or not.
- E. because some special interest groups **give money** for certain research projects. Some other special interest groups give money to prevent certain research projects.
  
- F. Special interest groups try to have an influence but they don't always succeed because scientists and technologists have the final say.

Special interest groups do NOT have an influence:

- G. because the government decides the direction that research will take.
- H. because science and government decide what projects are important and they do them **no matter what** special interest groups say.
  
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**20711 Some communities produce more scientists than other communities. This happens as a result of the upbringing which children receive from their family, schools and community.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Upbringing is mostly responsible:

- A. because some **communities** (for example, industrial towns such as Sudbury) place greater emphasis on science than other communities.
- B. because some **families** encourage children to question and wonder. Families teach values that stick with you for the rest of your life.
- C. because some **teachers or schools** offer better science courses or encourage students to learn more than other teachers or schools.
- D. because the **family, schools and community** all give children with an ability in science the encouragement and opportunity to become scientists.
- E. It's difficult to tell. Upbringing has a definite effect, but so does the individual (for example, intelligence, ability and a natural interest in science). It's about half and half.

Intelligence, ability and a natural interest in science are mostly responsible:

- F. in determining who becomes a scientist. However, **upbringing has an effect.**
- G. because people are **born with these traits.**
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40111 Most Canadian scientists are concerned with the potential effects (both helpful and harmful) that might result from their discoveries.**

**Your position, basically:** (Please read from A to J, and then choose one.)

- A. Scientists only look for **beneficial effects** when they discover things or when they apply their discoveries.
- B. Scientists are most concerned with the possible **harmful effects** of their discoveries, because the goal of science is to make our world a better place to live in. Therefore, scientists test their discoveries in order to prevent harmful effects from occurring.
- C. Scientists are concerned with **all the effects** of their experiments because the goal of science is to make our world a better place to live in. Being concerned is a natural part of doing science because it helps scientists understand their discoveries.
- D. Scientists are concerned but they can't possibly know all the long-term effects of their discoveries.
- E. Scientists are concerned but they have little control over how their discoveries are used for harm.
- F. It depends upon the field of science. For instance, in medicine Canadian scientists are highly concerned. However, in nuclear power or in military research, Canadian scientists are least concerned.
- G. Scientists may be concerned, but that doesn't stop them from making discoveries for their own fame, fortune, or pure joy of discovery.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.



**40121 Canadian scientists should be held responsible for the harm that might result from their discoveries.**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. Scientists should be held responsible because it's part of a scientist's job to **ensure** that no harm comes from a discovery. Science should cause no harm.
- B. Scientists should be held responsible because, if a discovery can be used for both good and bad purposes, the scientists must promote the good use and stop the bad use.
- C. Scientists should be held responsible because they must be **aware** of the effects of their experiments ahead of time. Science should cause more good than harm.
- D. The responsibility should be shared about equally between the scientists and society.

Scientists should NOT be held responsible:

- E. because it's the people who use the discoveries who are responsible. Scientists may be concerned, but they have no control over how others use their discovery.
- F. because the results of scientific work can't be foreseen (we can't predict if the results will be harmful or not). It's a chance we have to take.
- G. because otherwise scientists would quit doing research and science would not progress.
- H. because once a discovery is made, **others** should check its effects. The scientist's job is only to make the discoveries. Science and moral questions are separate.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**40131 Canadian scientists should be held responsible for reporting their findings to the general public in a manner that the average Canadian can understand.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists should be held responsible:

- A. because otherwise scientific findings are too difficult and complex for the average person to understand, and this makes science appear to progress too fast.
- B. because the public should be able to see how public money is being spent on science.
- C. because the public has the right to know what's going on in Canada. The public should know in order to improve their own lives through an awareness of scientific benefits; and to make informed, responsible choices about whatever affects their future.
- D. because the public might be **interested** or curious in learning about new discoveries.
- E. Scientists should be held responsible for reporting **some findings** (for example, the significant new discoveries that might affect the public), but some others would be better left unreported.
- F. Scientists can try to report their findings, but the average Canadian won't understand or be interested.
- G. Scientists should NOT be held responsible since the public often does not seem to care. It's up to the public to learn enough science to understand the reports.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40141 When engineers come upon a dangerous idea or product in their work, they actually do inform the public authorities, no matter if it means losing their job or being demoted.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Engineers do tell the authorities:

- A. because an engineer's job is to help the public, not harm them.
- B. because engineers want to avoid the severe consequences if something goes wrong. if the public finds out, there could be lawsuits.
- C. It depends on the engineer and the danger. Some engineers tell the authorities because of the dangerous possibilities. Others do not because they need their job to support a family or to become successful.
- D. Engineers do **not**, in good conscience, tell the authorities because engineers do not want to lose their jobs or frighten the public. Instead they conceal the idea or destroy the product so no one would know or get hurt.
- E. Engineers do **not** tell the authorities because engineers want to keep their jobs and make money, even if the public is in danger.
- F. It's not the engineer's responsibility. It's the company's responsibility. Engineers discuss the dangers with the company, and then the company tells the authorities.
- G. Nobody knows. We hear about the engineers who do tell the authorities. We don't hear about the secrets kept from the public.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40142 When engineers come upon what *might be* a dangerous idea or product in their work, they actually do inform the public authorities, no matter if it means losing their job or being demoted.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Engineers do tell the authorities:

- A. because an engineer's job is to help the public, not harm them.
- B. because engineers want to avoid the severe consequences if something goes wrong. if the public finds out, there could be lawsuits.
- C. It depends on the engineer and the danger. Some engineers tell the authorities because of the dangerous possibilities. Others do not because they need their job to support a family or to become successful.
- D. Engineers do **not**, in good conscience, tell the authorities because engineers do not want to lose their jobs or frighten the public. Instead they conceal the idea or destroy the product so no one would know or get hurt.
- E. Engineers do **not** tell the authorities because engineers want to keep their jobs and make money, even if the public is in danger.
- F. It's not the engineer's responsibility. It's the company's responsibility. Engineers discuss the dangers with the company, and then the company tells the authorities.
- G. Nobody knows. We hear about the engineers who do tell the authorities. We don't hear about the secrets kept from the public.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40161 Heavy industry has greatly polluted North America. Therefore, it is a responsible decision to move heavy industry to underdeveloped countries where pollution is not so widespread.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Heavy industry should be moved to underdeveloped countries to save our country and its future generations from pollution.
- B. It's hard to tell. By moving industry we would help poor countries to prosper and we would help reduce our own pollution. But we have no right to pollute someone else's environment.
- C. It doesn't matter where industry is located. The effects of pollution are global.

Heavy industry should NOT be moved to underdeveloped countries:

- D. because moving industry is not a responsible way of solving pollution. We should reduce or eliminate pollution here, rather than create more problems elsewhere.
- E. because those countries have enough problems without the added problem of pollution.
- F. because pollution should be confined as much as possible. Spreading it around would only create more damage.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40211 Scientists and engineers should be the ones to decide what types of energy Canada will use in the future (for example, nuclear, hydro, solar, or coal burning) because scientists and engineers are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the informed public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40212 Scientists and engineers should be the ones to decide on Canadian air pollution standards (for example, industrial emissions of sulfur dioxide, pollution control gadgets for your car or truck, sour gas emissions from oil wells, etc.) because scientists and engineers are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the **informed** public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40213 Scientists and engineers should be the ones to decide on future biotechnology in Canada (for example, recombinant DNA, gene splicing, developing ore-digging bacteria or snow-making bacteria, etc.) because scientists and engineers are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the **informed** public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.



**40215 Scientists and engineers should be the ones to decide whether or not to build a nuclear reactor and where it should be built, because scientists and engineers are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the informed public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40216 Scientists should be the ones to decide what techniques will be used with unborn babies in Canada (for example, amniocentesis for analyzing chromosomes of the fetus, altering embryo development, test-tube babies, etc.) because scientists are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the **informed** public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40217 Scientists and engineers should be the ones to decide on world food production and food distribution (for example, what crops to plant, where best to plant them, how to transport food efficiently, how to get food to those who need it, etc.) because scientists and engineers are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies, both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved — either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the informed public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40218 Scientists and engineers should be the ones to decide on nuclear disarmament because scientists and engineers are the people who know the facts best.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists and engineers should decide:

- A. because they have the training and facts which give them a better understanding of the issue.
- B. because they have the knowledge and can make better decisions than government bureaucrats or private companies both of whom have vested interests.
- C. because they have the training and facts which give them a better understanding; BUT the public should be involved—either informed or consulted.
- D. The decision should be **made equally**; viewpoints of scientists and engineers, other specialists, and the informed public should all be considered in decisions which affect our society.
- E. The **government** should decide because the issue is basically a political one; BUT scientists and engineers should give advice.
- F. The **public** should decide because the decision affects everyone; BUT scientists and engineers should give advice.
- G. The **public** should decide because the public serves as a check on the scientists and engineers. Scientists and engineers have idealistic and narrow views on the issue and thus pay little attention to consequences.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40221 Science and technology can help people make some moral decisions (that is, one group of people deciding how to act towards another group of people).**

**Your position, basically:** (Please read from A to I, and then choose one.)

Science and technology can help you make some moral decisions:

- A. by making you more informed about people and the world around you. This background information can help you cope with the moral aspects of life.
- B. by providing background information; but moral decisions must be made by individuals.
- C. because science includes areas like psychology which study the human mind and emotions.

Science and technology **cannot** help you make a moral decision:

- D. because science and technology have nothing to do with moral decisions. Science and technology only discover, explain and invent things. What people do with the results is not the scientist's concern.
- E. because moral decisions are made solely on the basis of an individual's values and beliefs.
- F. because if moral decisions are based on scientific information, the decisions often lead to racism, by assuming that one group of people is better than another group.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40231 Science and technology can NOT help people make legal decisions; for example, deciding if a person is guilty or not guilty in a court of law.**

**Your position, basically:** (Please read from A to G, and then choose one.)

Science and technology can NOT help:

- A. because they have nothing to do with legal decisions, since legal decisions are based on moral values and beliefs.
- B. because it's wrong to base legal decisions on technology such as the lie detector.

Science and technology CAN help in a number of cases:

- C. by developing ways to gather evidence and by testifying about the physical facts of a case.
- D. by studying human behavior and explaining the human circumstances of a case.

- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**40311 We always have to make trade-offs (compromises) between the positive and negative effects of science and technology.**

**Your position, basically:** (Please read from A to K, and then choose one.)

There are always trade-offs between benefits and negative effects:

- A. because every new development has at least one negative result. If we didn't put up with the negative results, we would not progress to enjoy the benefits.
- B. because scientists cannot predict the long-term effects of new developments, in spite of careful planning and testing. We have to take the chance.
- C. because things that benefit some people will be negative for someone else. This depends on a person's viewpoint.
- D. because you can't get positive results without first trying a new idea and then working out its negative effects.
- E. but the trade-offs make no sense. (For example: Why invent labour saving devices which cause more unemployment? or Why defend a country with nuclear weapons which threaten life on earth?)

There are NOT always trade-offs between benefits and negative effects:

- F. because some new developments benefit us without producing negative effects.
- G. because negative effects can be **minimized** through careful planning and testing.
- H. because negative effects can be **eliminated** through careful planning and testing. Otherwise, a new development is not used.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**40321 More money should be spent on science and technology in Canada even though this money will not be available for other things, such as social programs, education, business incentives and lower taxes.**

**Your position, basically:** (Please read from A to H, and then choose one.)

MORE money should be spent on science and technology:

- A. so Canada can be competitive with the rest of the world.
- B. so Canadians' daily lives can be improved; for example, by making things easier to do, creating new industries and jobs, helping the economy, and solving health problems.
- C. but only if the money is spent on such things as curing diseases, working on pollution, or improving the food supply for the starving.
- D. The money should be spent in a **balanced** way as it is today. Science and technology are very important but they are not the only things that need money for progress in Canada.
- E. LESS money should be spent on science and technology so more money is available for such things as social programs, education, business incentives and lower taxes.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.



**40412 Science and technology offer a great deal of help in resolving such social problems as poverty, crime and unemployment.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Science and technology can certainly help to resolve these problems. The problems could use new ideas from science and new inventions from technology.
- B. Science and technology can help resolve some social problems but not others.
- C. Science and technology solve many social problems, but science and technology also **cause** many of these problems.
- D. It's not a question of science and technology helping, but rather it's a question of **people** using science and technology wisely.
- E. It's hard to see how science and technology could help very much in resolving these social problems. Social problems concern human nature; these problems have little to do with science and technology.
- F. Science and technology only make social problems worse, It's the price we pay for advances in science and technology.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40413 Science and technology offer a great deal of help in resolving such social problems as pollution and overpopulation.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Science and technology can certainly help to resolve these problems. The problems could use new ideas from science and new inventions from technology.
- B. Science and technology can help resolve some social problems but not others.
- C. Science and technology solve many social problems, but science and technology also **cause** many of these problems.
- D. It's not a question of science and technology helping, but rather it's a question of **people** using science and technology wisely.
- E. It's hard to see how science and technology could help very much in resolving these social problems. Social problems concern human nature; these problems have little to do with science and technology.
- F. Science and technology only make social problems worse. It's the price we pay for advances in science and technology.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40421 In your everyday life, knowledge of science and technology helps you personally solve practical problems (for example, getting a car out of a snowdrift, cooking, or caring for a pet).**

**Your position, basically:** (Please read from A to J, and then choose one.)

The systematic reasoning taught in science classes (for example, hypothesizing, gathering data, being logical):

- A. helps me solve some problems in my daily life. Everyday problems are more easily and logically solved if treated like science problems.
- B. gives me greater knowledge and understanding of everyday problems. However, the problem solving techniques we learn are not directly useful in my daily life.
- C. Ideas and facts I learn from science classes sometimes help me solve problems or make decisions about such things as cooking, keeping healthy, or explaining a wide variety of physical events.
- D. The systematic reasoning **and** the ideas and facts I learn from science classes help me a lot. They help me solve certain problems and understand a wide variety of physical events (for example, thunder or quasars).
- E. What I learn from science class generally **does not help me** solve practical problems; but it **does help me** notice, relate to, and understand, the world around me.

What I learn from science class does **not** relate to my everyday life:

- F. biology, chemistry and physics are not practical for me. They emphasize theoretical and technical details that have little to do with my day-to-day world.
- G. my problems are solved by past experience or by knowledge unrelated to science and technology.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**40431 Scientists can solve any practical everyday problem best (for example, getting a car out of a ditch, cooking, or caring for a pet) because scientists know more science.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Scientists are better at solving any practical problem. Their logical problem-solving minds or specialized knowledge give them an advantage.

Scientists are **no better than** others:

- B. because science classes help everybody learn enough problem-solving skills and knowledge to solve practical problems.
- C. because a scientist's education doesn't necessarily help with practical things.
- D. because in everyday life scientists are like everyone else. **Experience** and **common sense** will solve everyday practical problems.
- E. Scientists are probably **worse** at solving any practical problem because they work in a complex abstract world, far removed from everyday life.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**40441 In spite of their knowledge and training, scientists and technologists can be fooled by what they see on TV or read in newspapers.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Scientists and technologists CAN BE fooled by the media:

- A. because they are so open-minded and always accept new ideas.
- B. because their special knowledge doesn't help them detect errors in the media.
- C. because they are only human. Like everyone, **they are influenced** by the media (except when the topic is in their field of specialization).

Scientists and technologists are NOT fooled by the media:

- D. because they know the facts. Knowledge of science tells them what is correct.
- E. because they are trained to look at things logically. They know the correct information or they know how to check it out.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**40451 We have to be concerned about pollution problems which are unsolvable today.  
Science and technology cannot necessarily fix these problems in the future.**

**Your position, basically:** (Please read from A to I, and then choose one.)

Science and technology can NOT fix such problems:

- A. because science and technology are **the reason** that we have pollution problems in the first place. More science and technology will bring more pollution problems.
- B. because pollution problems are so **bad today** they are already beyond the ability for science and technology to fix them.
- C. because pollution problems **are becoming** so bad that they may soon be beyond the ability of science and technology to fix them.
- D. No one can predict what science and technology will be able to fix in the future.
- E. Science and technology **alone cannot** fix pollution problems. It is everyone's responsibility. The public must insist that fixing these problems is a top priority.
- F. Science and technology **can** fix such problems because the success at solving problems in the past means science and technology will be successful in the future at fixing pollution problems.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40511 The more Canada's science and technology develop, the wealthier Canada will become.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Science and technology will increase Canada's wealth:

- A. because science and technology bring greater efficiency, productivity and progress.
- B. because more science and technology would make Canada less dependent on other countries. We could produce things for ourselves.
- C. because Canada could sell new ideas and technology to other countries for profit.
- D. It depends on which science and technologies we invest in. Some outcomes are risky. There may be other ways besides science and technology that create wealth for Canada.
- E. Science and technology **decrease** Canada's wealth because it costs a great deal of money to develop science and technology.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**40521 High-technology industries will provide most of the new jobs in the next twenty years.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Yes. New information and rapid change are the keys to society's future.
- B. Yes, because Canada's industries will have to become more efficient by installing hi-tech systems in order to compete.
- C. Yes, because new Canadian industries will produce hi-tech products. Public demand for these products will create new jobs.
- D. Yes. There will be many new jobs. Specially trained people will be needed to run and repair the new technology and to develop new kinds of hi-tech industries.
- E. Yes. Specially trained people will be needed to run and repair the new technology, BUT it will replace some of today's jobs. Overall, the total number of jobs will be about the same.
- F. No. Only a few new jobs will be created. More jobs will be lost because of mechanical or computerized hi-technology.
  
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.



**40531 More technology will improve the standard of living for Canadians.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Yes, because technology **has always** improved the standard of living, and there is no reason for it to stop now.
- B. Yes, because the more we know, the better we can solve our problems and take care of ourselves.
- C. Yes, because technology creates jobs and prosperity. Technology helps life become easier, more efficient and more fun.
- D. Yes, but only for those who can afford to use it. More technology will cut jobs and cause more people to fall below the poverty line.
- E. Yes and no. More technology would make life easier, healthier and more efficient. BUT more technology would cause more pollution, unemployment and other problems. The standard of living may improve, but the quality of life may not.
- F. No. We are irresponsible with the technology we have now; for example, our production of weapons and using up our natural resources.
  
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40611 The most powerful countries of the world have military strength because of the country's superior science and technology.**

**Your position, basically:** (Please read from A to I, and then choose one.)

Military strength depends a **great deal on** science and technology:

- A. because the greater the development in science and technology, the more modern, accurate and destructive the weapons.
- B. because the military usually has a strong voice in government, and the military will insist on using science and technology to build its strength.
- C. because the more advanced the country's science and technology, the **richer** the country. Its money can be spent on making the military stronger.
- D. Military strength depends not only on science and technology for powerful weapons, but also on the size of its armed forces.
- E. Military strength depends **partly on** science and technology and partly on a government's decision to develop weapons to increase its power.
- F. Military strength does **not** depend on science and technology, but on the government. Some countries which are strong in science and technology have weak militaries (for example, Japan). Some countries which have a strong military are weak in science and technology (for example, China).
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**40711 Science and technology influence our everyday thinking because science and technology give us new words and ideas.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Yes, because the more you **learn about** science and technology, the more your vocabulary increases, and thus the more information you can apply to everyday problems.
- B. Yes, because we use the **products** of science and technology (for example, computers, microwaves, health care). New products add new words to our vocabulary and change the way we think about everyday things.
- C. Science and technology influence our everyday **thinking** BUT the influence is mostly from new ideas, inventions and techniques which broaden our thinking.

Science and technology are the most powerful influences on our everyday lives, **not** because of words and ideas:

- D. but because almost everything we do, and everything around us, has in some way been researched by science and technology.
- E. but because science and technology have changed the way we live.
- F. No, because our everyday thinking is mostly influenced by non-scientific things. Science and technology influence only a few of our ideas.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**50111 There seems to be two kinds of people, those who understand the sciences and those who understand the arts (for example, literature, history, business, law). But if everyone studied more science, then everyone would understand the sciences.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. There ARE these two kinds of people. If the arts people did study more science, they would come to understand science, too, because the more you study something, the more you come to like and understand it.

There ARE these two kinds of people. But if the arts people did study more science, they would NOT necessarily come to understand it better:

- B. because they may not have the **skill or talent to** understand science. Studying will not give them this skill.
- C. because they may not be **interested** in science. Studying will not change their interest.
- D. because they may not be **oriented or inclined** toward science. Studying science will not change the kind of person you are.
- E. There are **not** just two kinds of people. There are as many kinds as there are individual preferences, including people who understand both the arts and sciences.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**50211 Science classes have given me the confidence to figure things out and decide if something (for example, an advertisement) is true or not. Because of my science classes I have become a better shopper.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Science classes have helped me become a better shopper:

- A. because science has given me valuable facts and ideas.
- B. because science teaches the scientific method for figuring things out.
- C. because science teaches valuable facts **and** the scientific method for figuring things out.
- D. because learning about products in the marketplace is part of what we do in science class.

Science classes have NOT helped me become a better shopper:

- E. even though science teaches valuable facts and the scientific method.
- F. because consumers are influenced by their upbringing, their family, or what they hear or see. Consumers are not influenced by science.
- G. because science classes have nothing to do with consumers or the real world. For example, photosynthesis, atoms and density do not help me make better consumer decisions.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**50311 Science TV programs (for example, Nature of Things and NOVA) give a *more* accurate picture of what science really is in Canada, compared to the picture offered by science classes.**

**Your position, basically:** (Please read from A to K, and then choose one.)

Science TV programs give a **more** accurate picture:

- A. because they show all sides of science. In science classes, you may not get the whole picture because of the teacher's bias.
- B. because they are more up-to-date in their coverage.
- C. because they use pictures. Pictures usually describe events more clearly than words do.
- D. because they concentrate more on new developments which show how science is put to use in the real world. Science classes only give you notes, problems, laws and theories that do not apply to everyday life.
- E. **Both** TV programs and science classes give accurate pictures of science. TV programs concentrate more on new developments which show how science is put to use in the real world. Science classes concentrate more on the underlying principles that help explain what the TV programs are reporting on.
- F. **Neither** TV programs nor science classes give accurate pictures of science. TV programs exaggerate, distort and oversimplify. Science classes only give you notes, problems and details that do not apply to everyday life.

Science classes give a **more** accurate picture because classes give the facts, the explanations, and the chances to do it yourself through studying science step by step (that is, you learn how science really happens). Science TV programs:

- G. only give specific or simple examples, though they may be interesting to watch. These examples produce a narrow view of science.
- H. basically give people what they want to see: controversy, opinions, exaggerations and simple explanations.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**50313 The mass media in general (TV, newspapers, magazines, movies, etc.) give a *more* accurate picture of what science really is in Canada, compared to the picture offered by science classes.**

**Your position, basically:** (Please read from A to K, and then choose one.)

The mass media give a more accurate picture:

- A. because the media show all sides of science. in science classes, you may not get the whole picture because of the teacher's bias.
- B. because the media are more up-to-date in their coverage.
- C. because the media use pictures. Pictures usually describe events more clearly than words do.
- D. because the media concentrate more on new developments which show how science is put to use in the real world. Science classes **only** give you notes, problems, laws and theories that do not apply to everyday life.
- E. **Both** the media and science classes give accurate pictures of science. The media concentrate more on new developments which show how science is put to use in the real world. **Science classes concentrate more** on the underlying principles that help explain what the media are reporting on.
- F. **Neither** the media nor science classes give accurate pictures of science. The media exaggerate, distort and oversimplify. Science classes only give you notes, problems and details that do not apply to everyday life.

Science classes give a **more** accurate picture because classes give the facts, the explanations, and the chances to do it yourself through studying science step by step (that is, you learn how science really happens). The media:

- G. only give specific or simple examples, though they may be interesting to look at. These examples produce a narrow view of science.
- H. basically give people what they want to see: controversy, opinions, exaggerations and simple explanations.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**60111 Most Canadian scientists are motivated to work hard. The MAIN reason behind their *personal* motivation for doing science is:**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. earning recognition, otherwise their work would not be accepted.
- B. earning money, because society pressures scientists to strive after financial rewards.
- C. acquiring a bit of fame, fortune and power, because scientists are like anyone else.
- D. satisfying their curiosity about the natural world, because they like to learn more all the time and solve mysteries of the physical and biological universe.
- E. solving curious problems for personal knowledge, AND discovering new ideas or inventing new things that **benefit society** (for example, medical cures, answers to pollution, etc.). Together these represent the main personal motivation of most scientists.
- F. unselfishly inventing and discovering new things for technology
- G. discovering new ideas or inventing new things that benefit society (for example, medical cures, answers to pollution, etc.).
- H. It's not possible to generalize because the main personal motivation of scientists varies from scientist to scientist.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.



**60211 The best scientists are always very open-minded, logical, unbiased and objective in their work. These personal characteristics are needed for doing the best science.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. The best scientists display these characteristics otherwise science will suffer.
- B. The best scientists display these characteristics because the more of these characteristics you have, the better you'll do at science.
- C. These characteristics are not enough. The best scientists also need other personal traits such as imagination, intelligence and honesty.

The best scientists do NOT necessarily display these personal characteristics:

- D. because the best scientists sometimes become so deeply involved, interested or trained in their field, that they can be closed-minded, biased, subjective and not always logical in their work.
- E. because it depends on the individual scientist. Some are always open-minded, objective, etc. in their work; while others can be come closed-minded, subjective, etc. in their work.
- F. The **best** scientists do NOT display these personal characteristics **any more than** the average scientist. These characteristics are NOT necessary for doing good science.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**60221 Certain personal characteristics can be important in science (for example, being open-minded, logical, unbiased, objective). Scientists display these characteristics, not only in their research work, but in their home life as well.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Scientists display these characteristics at work **and** at home. Personal characteristics used by scientists at work (by habit or by training) carry over into their daily life.
- B. Scientists display these characteristics at work (they are needed for proper science) but NOT necessarily at home. These personal characteristics **often carry over** into daily life, but not necessarily for all scientists, it depends upon the individual scientist.
- C. Scientists display these characteristics at work (they are needed for proper science) but NOT necessarily at home. Scientists, being human, will be like most other people when it comes to daily life.
- D. You can't assume that scientists display these characteristics at work or at home, any more than other people do.
- E. Scientists do NOT display these characteristics at work or at home, any more than other people do. When scientists are so deeply involved, interested and educated in their specific field, scientists can be narrow-minded, creatively illogical, biased and subjective.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**60222 Certain personal characteristics can be important in science (for example, being open-minded, logical, unbiased, objective, honest). *In their personal lives at home*, scientists display these personal characteristics **MORE THAN** other Canadians do in their home life.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Scientists display these characteristics at home **more than** other people do. Personal characteristics used by scientists at work (by habit or by training) carry over into their daily life.
- B. Scientists display these characteristics at home **more than** other people do. Scientists know more about the physical world compared with other Canadians. This extra knowledge enhances their personal characteristics listed above.
- C. Scientists display these characteristics at home a **bit more than** other people do. These personal characteristics are needed in proper science and they **carry over** into daily life for many scientists, but not necessarily for all. It depends upon the individual scientist.
- D. Scientists display these characteristics at work (they are needed for proper science) but not necessarily at home. Scientists, being human, will display these characteristics **just as much** as other people do when it comes to daily life.
- E. You can't assume that scientists display these characteristics at work or at home, any more than other people do.
- F. Scientists do NOT display these characteristics at work or at home any more than other people do. When scientists are so deeply involved, interested and educated in their specific field, scientists can be narrow-minded, creatively illogical, biased, subjective, and less than honest.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fit my basic viewpoint.

**60223 Certain personal characteristics can be important in science (for example, being open-minded, logical, unbiased, objective). In their research work, scientists display these personal characteristics more than other Canadians do *at work*.**

**Your position, basically:** (Please read from A to G, and then choose one.)

- A. Scientists display these personal characteristics MORE because science is more important to the future of society than other professions. if scientists didn't work that way, disasters may occur.
- B. Scientists display these personal characteristics MORE because of the nature of their work. Most other Canadians at work don't need to be that way as much.
- C. Everyone must have these personal characteristics as much as possible in their work, scientists and non-scientists alike.
- D. Scientists display these personal characteristics LESS, and they can also display the opposite characteristics (being narrow-minded, creatively illogical, biased and subjective), because they are so deeply involved, interested and educated in their specific field.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**60224 Scientists are open-minded, not only in their research work, but in their home life as well.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Scientists are open-minded at work AND at home. Either by training or by habit, scientists are open-minded at work, and this carries over into their daily life.
- B. Scientists are open-minded at work (it's needed for proper science) but NOT necessarily at home. Open-mindedness **may carry over** into daily life, but not for all scientists. It depends on the individual scientist.
- C. Scientists are open-minded at work (it's needed for proper science) but NOT necessarily at home. Scientists, being human, will be like most other people when it comes to daily life.
- D. You can't assume that scientists are more open-minded at work or at home, any more than other people are.
- E. Scientists can be LESS open-minded, because their success at work depends on being single-minded or narrow-minded.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**60225 Scientists are logical, not only in their research work, but in their home life as well.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Scientist are logical at work AND at home. Either by training or by habit, scientists are logical at work, and this carries over into their daily life.
- B. Scientists are logical at work (it's needed for proper science) but NOT necessarily at home. Being logical **may carry over** into daily life, but not for all scientists. It depends on the individual scientist.
- C. Scientists are logical at work (it's needed for proper science) but NOT necessarily at home. Scientists, being human, will be like most other people when it comes to daily life.
- D. You can't assume that scientists are more logical at work or at home, any more than other people are.
- E. Scientists can be LESS logical, because their success at work depends on being creatively illogical.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**60226 Scientists are honest in their research work (for example, when they write a research report).**

**Your position, basically:** (Please read from A to J, and then choose one.)

- A. Everyone, including a scientist, tries to be honest.
- B. Scientists are honest in their work because their results must be accurate and precise.
- C. Scientists are honest in their work because their work affects the well-being of society.
- D. Scientists are honest in their work because all results are checked by other scientists; so they need to be honest.
- E. Scientists are usually honest in their work. **But** sometimes they doctor their results because of the need for more research funding, time deadlines, the need to please an employer or government agency, or the desire for recognition.
- F. Scientists are NOT honest in their work because sometimes they doctor their results out of the need for more research funding, time deadlines, the need to please an employer or government agency, or the desire for recognition.
- G. Some scientists are honest, some are dishonest. You cannot generalize because scientists are individuals like any other group of Canadians.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**60311 A scientist's religious views will NOT make a difference to the scientific discoveries he or she makes.**

**Your position, basically:** (Please read from A to G, and then choose one.)

- A. Religious views do **not** make a difference. Scientists make discoveries based on scientific theories and experimental methods, not on religious beliefs. Religious beliefs are outside the domain of science.
- B. It depends on the particular religion itself, and on the strength or importance of an individual's religious views.

Religious views do make a difference:

- C. because religious views will determine how you **judge** science ideas.
- D. because sometimes religious views may affect what scientists do or what problems they choose to work on.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.



**60411 Scientists have practically no family life or social life because they need to be so deeply involved in their work.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Scientists **need to be** very deeply involved in their work in order to succeed. This deep involvement takes away from one's family and social life.
- B. it depends on the person. Some scientists are so involved in their work that their families and social lives suffer. But many scientists take time for family and social things.
- C. At work scientists look at things differently than other people, but this doesn't mean they have practically no family or social lives.

Scientists' family and social lives are normal:

- D. otherwise their work would suffer. A social life is valuable to a scientist.
- E. because very few scientists get so wrapped up in their work that they ignore everything else.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**60421 The best scientists have the patience and determination to get through times of frustration and boredom (for example, doing the same experiment many times to get reliable results).**

**Your position, basically:** (Please read from A to G, and then choose one.)

- A. Yes, because frustration and boredom challenge the best scientist to struggle and work even harder.
- B. Yes, because patience and determination are **part of the job**. Without them, scientists would not get absolutely correct results.
- C. No, because even some of the best scientists cannot cope with frustration. Scientists have varying degrees of patience, like everyone else.
- D. No, because the best scientists are clever enough to avoid most frustration and boredom. Frustration and boredom make it harder for anyone to succeed.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**60511 There are many more women scientists today than there used to be. This will make a difference to the scientific discoveries which are made. Scientific discoveries made by women will tend to be different than those made by men.**

**Your position, basically:** (Please read from A to M, and then choose one.)

There is NO difference between female and male scientists in the discoveries they make:

- A. because **any good scientist** will eventually make the **same** discovery as another good scientist.
- B. because female and male scientists experience the **same training**.
- C. because overall women and men are equally intelligent.
- D. because women and men are the same in terms of what they want to discover in science.
- E. because research goals are set by demands or desires from others besides scientists.
- F. because everyone is equal, no matter what they do.
- G. because any differences in their discoveries are due to differences between individuals. Such differences have nothing to do with being male or female.
  
- H. Women would make **somewhat different** discoveries because, by nature or by upbringing, females have different values, viewpoints, perspectives, or characteristics (such as sensitivity toward consequences).
- I. Men would make **somewhat different** discoveries because men are better at science than women.
- J. Women would likely make **somewhat better** discoveries than men because women are generally better than men at some things such as instinct and memory.
- K. I don't understand.
- L. I don't know enough about this subject to make a choice.
- M. None of these choices fits my basic viewpoint.

**60521 When doing science or technology, a good female scientist would carry out the job basically *in the same way* as a good male scientist.**

**Your position, basically:** (Please read from A to L, and then choose one.)

There is NO difference between female and male scientists in the way they do science:

- A. because **all** good scientists carry out the job the **same** way.
- B. because female and male scientists experience the **same training**.
- C. because overall women and men are equally intelligent.
- D. because women and men are the same in terms of what is needed to be a good scientist.
- E. because everyone is equal, no matter what the job.
- F. because any differences in the way scientists do science are due to differences between individuals. Such differences have nothing to do with being male or female.
  
- G. Women would do science **somewhat differently** because, by nature or by upbringing, females have different viewpoints, perspectives, imagination, or characteristics (such as patience).
- H. Men would do science **somewhat differently** because men do science better.
- I. Women would likely do science **somewhat better** than men because women must work harder in order to compete in a male dominated field such as science.
- J. I don't understand.
- K. I don't know enough about this subject to make a choice.
- L. None of these choices fits my basic viewpoint.

**60531 Male scientists concentrate only on the facts which support an idea. Female scientists in the lab ALSO pay attention to human values.**

**Your position, basically:** (Please read from A to K, and then choose one.)

There is NO difference between female and male scientists:

- A. because there is **no room** for human values in the lab. All good scientists pay attention only to the facts.
- B. because it takes **intelligence** to pay attention to values. Intelligence has nothing to do with being male or female.
- C. because it's a scientist's **training** which affects whether he or she pays attention to facts more than human values.
- D. because it's a scientist's **individual personality** which affects whether he or she pays attention to facts more than to human values.
- E. because good scientists pay attention to **both** the facts and human values when in the lab.
- F. because female and male scientists are **the same**. Men are as sensitive to human values as women are and women are as logical with facts as men are.
- G. because everyone is equal no matter what the job.
  
- H. Female scientists are more likely to consider human values in research, as well as the facts.
  
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**60532 Male scientists concentrate only on objective (“factual”) reasoning. Female scientists ALSO pay attention to subjective (“personal”) feelings.**

**Your position, basically:** (Please read from A to K, and then choose one.)

There is NO difference between female and male scientists:

- A. because there is **no room** for subjective feelings in the lab. All good scientists pay attention only to objective reasoning.
- B. because it takes **intelligence** to pay attention to subjective feelings. Intelligence has nothing to do with being male or female.
- C. because it's a scientist's **training** which affects whether he or she pays attention to objective reasoning more than subjective feelings.
- D. because it's a scientist's **individual personality** which affects whether he or she pays attention to objective reasoning more than subjective feelings.
- E. because good scientists pay attention to **both** objective reasoning and subjective feelings when in the lab.
- F. because female and male scientists are **the same**. Men are as sensitive to subjective feelings as women are and women are as capable of objective reasoning as men are.
- G. because everyone is equal no matter what the job.
  
- H. Female scientists are more inclined to pay attention to subjective feelings as well as objective reasoning. Generally, women are more in tune with their inner thoughts.
  
- I. I don't understand “objective reasoning” or “subjective feelings”.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**60611 Today in Canada, there are many more male scientists than female scientists. The MAIN reason for this is:**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. males are stronger, faster, brighter, and better at concentrating on their studies.
- B. males seem to have more scientific abilities than females, who may excel in other fields.
- C. males are just more interested in science than females.
- D. the traditional stereotype held by society has been that men are smarter and dominant, while women are weaker and less logical. This **prejudice** has caused more men to become scientists, even though females are just as capable in science as males.
- E. the **schools** have not done enough to encourage females to take science courses. Females are just as capable in science as males.
- F. until recently, science was thought to be a man's vocation. (Women didn't fit television's stereotype image of scientist.) In addition, most women were expected to work in the home or take on traditional jobs. (Thus men have had more encouragement to become scientists.) But today this is changing. Science is becoming a vocation for women, and women are expected to work in science more and more.
- G. women have been discouraged, or not allowed, to enter the scientific field. Women are just as interested and just as capable as men; but the established scientists (who are male) tend to discourage or intimidate potential female scientists.
- H. There are NO reasons for having more male scientists than female scientists. Both sexes are equally capable of being good scientists, and today the opportunities are equal.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**70111 Loyalties affect how scientists do their work. When scientists work together as a team, their *loyalty to the ideals* of science (open-mindedness, sharing results with others, etc.) is replaced by a *loyalty to the team* (for example, putting the team's interests ahead of the interests of science, or conforming to the team's views).**

**Your position, basically:** (Please read from A to I, and then choose one.)

Loyalty to the ideals of science is **replaced** by a loyalty to the team:

- A. because team loyalty helps scientists work better and achieve more fame, fortune and success.
- B. because the strong bonds of a team will cause scientists to stand by each other, even though scientists keep the ideals of science at heart.
- C. Both types of loyalties are important to scientists. The individual scientist is loyal to the team but loyalty to the ideals of science is not forgotten.
- D. It depends on the personal qualities of a scientist. One scientist will follow the ideals of science, while another will put the interests of the team first.

Loyalty to the ideals of science is NOT affected by a loyalty to the team:

- E. because scientists do research to find the real facts and not to conform to the team's viewpoint.
- F. because successful scientists are usually creative individuals who have the freedom to go their own way.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.



**70121 Loyalties affect how scientists do their work. When scientists work together for a company, *their loyalty to the ideals of science* (open-mindedness, honesty, sharing results with others, etc.) is replaced by a *loyalty to the company* (for example, the company is always right).**

**Your position, basically:** (Please read from A to J, and then choose one.)

Loyalty to the ideals of science is **replaced** by a loyalty to the company:

- A. because most scientists are affected by the politics involved in doing science, such as conforming to a company's viewpoint.
- B. because most scientists want to keep their jobs.
- C. because most scientists want the company to get ahead so they can personally make more money and get promoted.
- D. because company loyalty helps most scientists work together better and achieve more success.
- E. It depends on the personal qualities of a scientist. One scientist will follow the ideals of science, while the other will put the interests of the company first.

Loyalty to the ideals of science is NOT affected by a loyalty to the company:

- F. because by putting the ideals of science ahead of the company, a scientist is more likely to contribute to society or achieve personal success.
- G. because most scientists do research to find the real facts, even though the facts may show that the company is wrong.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**70212 When scientists disagree on an issue (for example, whether or not low-level radiation is harmful), they disagree mostly because they do not have all the facts. Such scientific opinion has NOTHING to do with moral values (right or wrong conduct) or with personal motives (personal recognition, pleasing employers, or pleasing funding agencies).**

**Your position, basically:** (Please read from A to J, and then choose one.)

Disagreements among scientists can occur:

- A. because not all the facts have been discovered. Scientific opinion is based entirely on observable facts and scientific understanding.
- B. because different scientists are aware of different facts. Scientific opinion is based entirely on a **scientist's awareness** of the facts.
- C. when different scientists **interpret** the facts differently (or interpret the significance of the facts differently). This happens because of different scientific theories, NOT because of moral values or personal motives.
- D. **mostly** because of different or incomplete facts, **but partly** because of scientists' different personal opinions, moral values, or personal motives.
- E. for a number of reasons — any combination of the following: lack of facts, misinformation, different theories, personal opinions, moral values, public recognition, and pressure from companies or governments.
- F. When different scientists **interpret** the facts differently (or interpret the significance of the facts differently). This happens **mostly** because of personal opinions, moral values, personal priorities, or politics. (Often the disagreement is over possible risks and benefits to society.)
- G. because they have been influenced by companies or governments.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**70221 When a new scientific theory is proposed, scientists must decide whether to accept it or not. Their decision is based objectively on the facts that support the theory. Their decision is *not* influenced by their subjective feelings or by personal motives.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Scientists' decisions are based **solely** on the facts, otherwise the theory would not be properly supported and the theory could be inaccurate, useless or even harmful.
- B. Scientists' decisions are based on **more than** just the facts. Decisions are based on whether the theory has been successfully tested many times, on how logical the theory is compared with other theories, and on how simply the theory explains all the facts.
- C. It depends on the individual scientist. Some scientists will be influenced by personal feelings, while others will live up to their duty to make decisions based only on the facts.
- D. Because scientists are only human, their decisions are, to **some extent**, influenced by inner feelings, by the personal way a scientist views a theory, or by personal gains such as fame, job security or money.
- E. Scientists' decisions are based less upon the facts and **more upon** inner feelings, upon the personal way a scientist views a theory, or upon personal gains such as fame, job security or money.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**70231 When a new scientific theory is proposed, scientists must decide whether to accept it or not. Scientists make this decision by consensus; that is, proposers of the theory must convince a large majority of fellow scientists to believe the new theory.**

**Your position, basically:** (Please read from A to I, and then choose one.)

Scientists who propose a theory must convince other scientists:

- A. by showing them conclusive evidence that proves the theory true.
- B. because a theory is useful to science only when most scientists believe the theory.
- C. because when a number of scientists discuss a theory and its new ideas, scientists will likely revise or update the theory. In short, by reaching a consensus, scientists make the theory more accurate.

Scientists who propose a theory do **not** have to convince other scientists:

- D. because the supporting evidence speaks for itself.
- E. because individual scientists will decide for themselves whether to use a theory or not.
- F. because an individual scientist can apply a theory as long as the theory explains results and is useful, no matter what other scientists believe.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**70311 Scientists publish their discoveries in scientific journals. They do this mainly to achieve credibility in the eyes of other scientists and funding agencies; thus, helping their own careers to advance.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists publish their discoveries:

- A. mainly to get credit for their achievements, to become better known, or to profit from any financial success. if scientists were denied these personal benefits, science would come to a standstill.
- B. **both** to benefit personally from any credit, fame or fortune that a discovery may bring; **and** to advance science and technology by sharing ideas, and thus building upon each other's work.
- C. mainly to advance science and technology. By sharing their ideas publicly, scientists build upon each other's work. Without this open communication, science would come to a standstill.
- D. mainly for other scientists to evaluate the discovery. This criticism and checking ensure that science will advance on the basis of true results.
- E. to share ideas publicly, **and** to have the discovery evaluated by other scientists.
- F. mainly to help other scientists in all parts of the world. Good communication prevents wasteful duplication of effort and consequently speeds the advance of science.
- G. to advance science and technology through open communication, **and** to inform the general public about the latest discoveries.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**70321 When a research team makes a discovery, it is all right for them to announce it to the press before other scientists have discussed it.**

**Your position, basically:** (Please read from A to H, and then choose one.)

The research team should announce it directly to the public:

- A. to **get the credit** for the discovery and prevent other scientists from stealing the idea.
- B. because the public has the **right to know** about a discovery as soon as it is made. Other scientists can discuss it later
- C. The research team should be free to decide who hears about it first.

The research team should first present it to other scientists for discussion:

- D. to **test and verify** the discovery and prevent inaccurate stories from being published. This would ensure that harmful or embarrassing errors are worked out before it is made public.
- E. to improve the discovery before it is made public.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**70411 Scientists compete for research funds and for who will be the first to make a discovery. Sometimes fierce competition causes scientists to act in secrecy, lift ideas from other scientists, and lobby for money. In other words, sometimes scientists ignore the ideals of science (ideals such as sharing results, honesty, independence, etc.).**

**Your position, basically:** (Please read from A to H, and then choose one.)

Sometimes scientists ignore the ideals of science:

- A. because this is the way they achieve success in a competitive situation. Competition pushes scientists to work harder.
- B. in order to achieve personal and financial rewards. When scientists compete for something they really want, they'll do whatever they can to get it.
- C. in order to find the answer. As long as their answer works **in the end**, it doesn't matter how they got there.
- D. It depends. Science is no different from other professions. Some will ignore the ideals of science to get ahead and others will not.
- E. Most scientists do **not** compete. The way they really work, and the best way to succeed, is through **cooperation** and by following the ideals of science.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**70412 Scientists compete for research funds and for who will be the first to make a discovery. Sometimes fierce competition causes scientists to act in secrecy, lift ideas from other scientists, and lobby for money. In other words, sometimes scientists break the rules of science (rules such as sharing results, honesty, independence, etc.).**

**Your position, basically:** (Please read from A to H, and then choose one.)

Sometimes scientists break the rules of science:

- A. because this is the way they achieve success in a competitive situation. Competition pushes scientists to work harder.
- B. in order to achieve personal and financial rewards. When scientists compete for something they really want, they'll do whatever they can to get it.
- C. in order to find the answer. As long as their answer works **in the end**, it doesn't matter how they got there.
- D. It depends. Science is no different from other professions. Some will break the rules of science to get ahead and others will not.
- E. Most scientists do **not** compete. The way they really work, and the best way to succeed, is through **cooperation** and by following the rules of science.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.



**70511 A scientist may play tennis, go to parties, or attend conferences with other people. Because these social contacts can influence the scientist's work, these social contacts can influence the content of the scientific knowledge he or she discovers.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Social contacts influence the content of what is discovered:

- A. because scientists can be helped by the ideas, experiences, or enthusiasm of the people with whom they socialize.
- B. because social contacts can serve as a refreshing or relaxing break from work; thus revitalizing a scientist.
- C. because scientists can be encouraged by people to apply or change their research to a new area relevant to the needs of society.
- D. because social contacts allow scientists to observe human behavior and other scientific phenomena.
  
- E. Social contacts do NOT influence the content of what is discovered because a scientist's work is unrelated to socializing.
  
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**70611 With the same background knowledge, two scientists can develop the same theory independently of each other. The scientist's individuality does NOT influence the content of a theory.**

**Your position, basically:** (Please read from A to I, and then choose one.)

The scientist's individuality will NOT influence the content of a theory:

- A. because this content is based on facts and the scientific method, which are not influenced by the individual.
- B. because this content is based on facts. Facts are not influenced by the individual. However, the way a scientist **conducts an experiment** will be influenced by his or her individuality.
- C. because this content is based on facts. The way a scientist **interprets the facts** will, however, be influenced by his or her individuality.

A scientist's individuality WILL influence the content of a theory:

- D. because different scientists conduct research differently (for example, probe deeper or ask slightly different questions). Therefore they will obtain different results. These results then influence the content of a theory.
- E. because different scientists will **think** differently and will have slightly different ideas or viewpoints. F. because a theory's content may be influenced by what a scientist **wants** to believe. Bias has an influence.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**70621 Some brilliant scientists such as Einstein have their personal, peculiar ways of looking at things. These unique viewpoints determine how other scientists in the same field interpret things.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Brilliant scientists do greatly influence other scientists:

- A. because scientists, being human, will adopt the personal and peculiar viewpoints of the scientists they admire.
- B. because brilliant scientists have radically different views on a subject, and these creative thoughts cause others to see things differently, too.
- C. Brilliant scientists influence other scientists, BUT only if there is good **evidence or reasoning** to back up their personal viewpoint.
- D. Brilliant scientists **may** have an influence if other scientists decide to include the brilliant scientist's unique views in their own point of view.
- E. Brilliant scientists do **not** influence other scientists. Each individual scientist has a particular way of looking at things. This leads to new ideas in science.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**70711 Scientists trained in different countries have different ways of looking at a scientific problem. This means that a country's education system or culture can influence the conclusions which scientists reach.**

**Your position, basically:** (Please read from A to I, and then choose one.)

The country DOES make a difference:

- A. because education and culture **affect all aspects** of life, including the training think about a scientific problem.
- B. because each country has a different system for teaching science. The way scientists are **taught to solve** problems makes a difference to the conclusions scientists reach.
- C. because a country's government and industry will only fund science projects that meet their needs. This affects what a scientist will study.
- D. It depends. The way a country trains its scientists might make a difference to some scientists. BUT other scientists look at problems in their own individual way based on personal views.

The country does NOT make a difference:

- E. because scientists look at problems in their own **individual** way regardless of what country they were trained in.
- F. because scientists all over the world use the same scientific method which leads to similar conclusions.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**70721 A team of scientists in any part of the world (for example, Italy, China or Nigeria) would investigate the atom in basically the same way as a team of Canadian scientists.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientists conduct their investigations **in the same way** all over the world:

- A. because science is universal. All scientists use the scientific method regardless of where they live.
- B. because scientists share their views and ideas with each other.
- C. Every team of scientists has its own methods and ideas. This has **nothing to do** with the country they live in. Everyone is different.

Scientists from different countries conduct their investigations **differently**:

- D. because the way you do science depends on the **technology** available.
- E. because the way you do science depends on the technology available. But even though scientists use different technology, they use the **same scientific method**.
- F. because the way you do science depends on your education AND on the technology available.
- G. because of the different social conditions, resources, ideas and culture which affect everything, including the methods used by scientists.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**70811 BACKGROUND:** A team of scientists worked together “in private” in their lab for 3 years and developed a new theory. The team will present their theory to a group of scientists at a science conference and the team will write a scientific journal article explaining their theory (that is, the team will work “in public” with other scientists). The following statement compares *private* and *public* science.

**STATEMENT:** When scientists do their *private* science (for example, when they work in a lab), their thinking is open-minded, logical, unbiased and objective; just as it is when they do their *public* science (for example, when they write an article for presentation).

**Your position, basically:** (Please read from A to J, and then choose one.)

- A. Private science is basically the same as public science. A scientist’s thinking is most often open-minded, logical, unbiased and objective, in private as well as in public.
- B. It depends on the individual scientist. Some scientists act differently in their private work than in their public work, while other scientists act the same.
- C. In their **private** work, scientists are NOT necessarily open-minded, logical, etc. because they become very involved in their work and become sure about their ideas. Thus, private science can be different from public science.
- D. In their **public** work, scientists are NOT necessarily open-minded, logical, etc. because by the time scientists go public their minds are pretty well made up, or else they need to persuade other scientists. Thus, private science can be different from public science.
- E. The process of publicly discussing a presentation with other scientists makes a scientist’s conclusions more objective etc., since biases will be modified by the views of other scientists. Thus, private science is different from public science.
- F. Natural biases or jealousies of scientists are brought out **more** when they are in public than in private. Thus, private science is different from public science.
- G. In public science there is much more pressure to follow “the rules” of public science (to appear to be open-minded, logical, unbiased and objective).
- H. I don’t understand.
- I. I don’t know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**80111 When a new technology is developed (for example, a new computer), it may or may not be put into practice. The decision to use a new technology depends *mainly* on how well it works.**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. The decision to use a new technology depends **mainly** on how well it works. You don't use something unless it works well.
- B. The decision depends on several things, such as its cost, its efficiency, its usefulness to society, and its effect on employment.

The decision does NOT depend necessarily on how well it works:

- C. but on how cost effective it is.
- D. but on what society wants or needs.
- E. but on whether it helps the world and has no negative effects. New technologies are not used if they are harmful.
- F. but on whether the government in power supports it.
- G. but on whether it will make a profit for a company.
- H. because some technologies are put into practice before they work well. They are improved later.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.

**80112 When a new technology is developed (for example, a nuclear reactor), it may or may not be put into practice. The decision to put a new technology into use depends *mainly* on how well it works.**

**Your position, basically:** (Please read from A to K, and then choose one.)

- A. The decision to use a new technology depends **mainly** on how well it works. You don't use something unless it works well.
- B. The decision depends on several things, such as its cost, its efficiency, its usefulness to society, and its effect on employment.

The decision does NOT depend necessarily on how well it works:

- C. but on how cost effective it is.
- D. but on what society wants or needs.
- E. but on whether it helps the world and has no negative effects. New technologies are not used if they are harmful.
- F. but on whether the government in power supports it.
- G. but on whether it will make a profit for a company.
- H. because some technologies are put into practice before they work well. They are improved later.
- I. I don't understand.
- J. I don't know enough about this subject to make a choice.
- K. None of these choices fits my basic viewpoint.



**80121 When a new technology is developed (for example, a new computer), it may or may not be put into practice. The decision to use a new technology depends on whether scientists have been able to explain why it works.**

**Your position, basically:** (Please read from A to I, and then choose one.)

The decision to use a new technology depends MAINLY on whether scientists have been able to explain why it works:

- A. so that they can tell what problems may arise.
- B. so that society can decide whether or not to use it; and if so, how to use it properly and without fear.
- C. because a technological development has to work in theory before it will work in practice.

The decision to use a new technology does NOT depend on whether scientists can explain why it works:

- D. because the decision depends on how safe it is.
- E. because the decision depends on a number of things: how well it works, its cost, its efficiency, its usefulness to society, and its effect on employment.
- F. because a new technology can work well without a scientist explaining **why** it works.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**80122 When a new technology is developed (for example, a new medicine to fight cancer), it may or may not be put into practice. The decision to use a new technology depends on whether scientists have been able to explain why it works.**

**Your position, basically:** (Please read from A to I, and then choose one.)

The decision to use a new technology depends MAINLY on whether scientists have been able to explain why it works:

- A. so that they can tell what problems may arise.
- B. so that society can decide whether or not to use it; and if so, how to use it properly and without fear.
- C. because a technological development has to work in theory before it will work in practice.

The decision to use a new technology does NOT depend on whether scientists can explain why it works:

- D. because the decision depends on how safe it is.
- E. because the decision depends on a number of things: how well it works, its cost, its efficiency, its usefulness to society, and its effect on employment.
- F. because a new technology can work well without a scientist explaining why it works.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**80131 When a new technology is developed (for example, a new computer), it may or may not be put into practice. The decision to use a new technology depends on whether the advantages to society outweigh the disadvantages to society.**

**Your position, basically:** (Please read from A to G, and then choose one.)

- A. The decision to use a new technology depends mainly on the benefits to society because if there are too many disadvantages, society won't accept it and may discourage its further development.
- B. The decision depends on more than just the technology's advantages and disadvantages. It depends on how well it works, its cost, and its efficiency.
- C. It depends on your point of view. What is an advantage to some people may be a disadvantage to others.
- D. Many new technologies have been put into practice to make money or gain power, even though their disadvantages were greater than their advantages.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**80132 When a new technology is developed (for example, a new type of nuclear missile), it may or may not be put into practice. The decision to use a new technology depends on whether the advantages to society outweigh the disadvantages to society.**

**Your position, basically:** (Please read from A to G, and then choose one.)

- A. The decision to use a new technology depends mainly on the benefits to society, because if there are too many disadvantages, society won't accept it and may discourage its further development.
- B. The decision depends on more than just the technology's advantages and disadvantages. It depends on how well it works, its cost, and its efficiency.
- C. It depends on your point of view. What is an advantage to some people may be a disadvantage to others.
- D. Many new technologies have been put into practice to make money or gain power, even though their disadvantages were greater than their advantages.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**80133 When a new technology is developed (for example, a better type of fertilizer), it may or may not be put into practice. The decision to use a new technology depends on whether the advantages to society outweigh the disadvantages to society.**

**Your position, basically:** (Please read from A to G, and then choose one.)

- A. The decision to use a new technology depends mainly on the benefits to society, because if there are too many disadvantages, society won't accept it and may discourage its further development.
- B. The decision depends on more than just the technology's advantages and disadvantages, it depends on how well it works, its cost, and its efficiency.
- C. It depends on your point of view. What is an advantage to some people may be a disadvantage to others.
- D. Many new technologies have been put into practice to make money or gain power, even though their disadvantages were greater than their advantages.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

## 80211 Technological developments can be controlled by citizens.

**Your position, basically:** (Please read from A to J, and then choose one.)

- A. Yes, because from the citizen population comes each generation of the scientists and technologists who will develop the technology. Thus citizens slowly control the advances in technology through time.
- B. Yes, because technological advances are sponsored by the government. By electing the government, citizens can control what is sponsored.
- C. Yes, because technology serves the needs of consumers. Technological developments will occur in areas of high demand and where profits can be made in the market place.
- D. Yes, but only when it comes to putting new developments into use. Citizens cannot control the original development itself.
- E. Yes, but only when citizens get together and speak out, either for or against a new development. Organized people can change just about anything.

No, citizens are NOT involved in controlling technological developments:

- F. because technology advances so rapidly that the average citizen is left ignorant of the development.
- G. because citizens are prevented from doing so by those with the power to develop the technology.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**90111 Scientific observations made by competent scientists will usually be different if the scientists believe different theories.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. Yes, because scientists will **experiment** in different ways and will notice different things.
- B. Yes, because scientists will **think** differently and this will **alter their observations**.
- C. Scientific observations will **not differ** very much even though scientists believe different theories. If the scientists are indeed **competent** their observations will be similar.
- D. No, because observations are as exact as possible. This is how science has been able to advance.
- E. No, observations are exactly what we see and nothing more; they are the facts.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**90211 Many scientific models used in research laboratories (such as the model of heat, the neuron, DNA, or the atom) are copies of reality.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientific models ARE copies of reality:

- A. because scientists say they are true, so they must be true.
- B. because much scientific evidence has proven them true.
- C. because they are true to life. Their purpose is to show us reality or teach us something about it.
- D. Scientific models come close to being copies of reality, because they are based on scientific observations and research.

Scientific models are NOT copies of reality:

- E. because they are simply helpful for learning and explaining, within their limitations.
- F. because they change with time and with the state of our knowledge, like theories do.
- G. because these models must be ideas or educated guesses, since you can't actually see the real thing.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.



**90311 When scientists classify something (for example, a plant according to its species, an element according to the periodic table, energy according to its source, or a star according to its size), scientists are classifying nature according to *the way nature really is*; any other way would simply be wrong.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Classifications match the way nature really is, since scientists have proven them over many years of work.
- B. Classifications match the way nature really is, since scientists use observable characteristics when they classify.
- C. Scientists classify nature in the most simple and logical way, but their way isn't necessarily the only way.
- D. There are many ways to classify nature, but agreeing on one universal system allows scientists to avoid confusion in their work.
- E. There could be other correct ways to classify nature, because science is liable to change and new discoveries may lead to different classifications.
- F. Nobody knows the way nature really is. Scientists classify nature according to their perceptions or theories. Science is never exact, and nature is so diverse. Thus, scientists could correctly use more than one classification scheme.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**90411 Even when scientific investigations are done correctly, the knowledge that scientists discover from those investigations may change in the future.**

**Your position, basically:** (Please read from A to G, and then choose one.)

Scientific knowledge changes:

- A. because new scientists **disprove** the theories or discoveries of old scientists. Scientists do this by using new techniques or improved instruments, by finding new factors overlooked before, or by detecting errors in the original “correct” investigation.
- B. because the old knowledge is **reinterpreted** in light of new discoveries. Scientific facts can change.
- C. Scientific knowledge APPEARS to change because the **interpretation** or the application of the old facts can change. Correctly done experiments yield unchangeable facts.
- D. Scientific knowledge APPEARS to change because new knowledge is **added on to** old knowledge; the old knowledge doesn’t change.
- E. I don’t understand.
- F. I don’t know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**90511 Scientific ideas develop from *hypotheses* to *theories*, and finally, if they are good enough, to being scientific *laws*.**

**Your position, basically:** (Please read from A to H, and then choose one.)

Hypotheses can lead to theories which can lead to laws:

- A. because an hypothesis is tested by experiments, if it **proves** correct, it becomes a theory. After a theory has been **proven** true many times by different people and has been around for a long time, it becomes a law.
- B. because an hypothesis is tested by experiments, if there is **supporting evidence**, it's a theory. After a theory has been tested many times and seems to be **essentially correct**, it's good enough to become a law.
- C. because it is a logical way for scientific ideas to develop.
- D. Theories can't become laws because they both are different types of ideas. Theories are based on scientific ideas which are less than 100% certain, and so theories **can't** be proven true. Laws, however, are based on facts only and are 100% sure.
- E. Theories can't become laws because they both are different types of ideas. Laws **describe** things in general. Theories **explain** these laws. However, with supporting evidence, hypotheses may become theories (explanations) **or** laws (descriptions).
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**90521 When developing new theories or laws, scientists need to make certain assumptions about nature (for example, matter is made up of atoms). These assumptions *must be true* in order for science to progress properly.**

**Your position, basically:** (Please read from A to I, and then choose one.)

Assumptions **MUST** be true in order for science to progress:

- A. because correct assumptions are needed for correct theories and laws. Otherwise scientists would waste a lot of time and effort using wrong theories and laws.
- B. otherwise society would have serious problems, such as inadequate technology and dangerous chemicals.
- C. because scientists do research to prove their assumptions true before going on with their work.
  
- D. It depends. Sometimes science needs true assumptions in order to progress. But sometimes history has shown that great discoveries have been made by **disproving** a theory and learning from its false assumptions.
- E. It doesn't matter. Scientists **have to** make assumptions, true or not, in order to get started on a project. History has shown that great discoveries have been made by **disproving** a theory and learning from its false assumptions.
- F. Scientists do **not** make assumptions. They research an idea to find out if the idea is true. They don't assume it is true.
  
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**90531 In reaction to Einstein's equation,  $E = mc^2$ , scientists said, "Such a beautifully elegant equation must be a true description of nature." This quotation shows that scientists *assume* their equations or ideas should match the elegance of nature.**

**Your position, basically:** (Please read from A to I, and then choose one.)

Scientists ASSUME their ideas should be elegant:

- A. in order to be **true to nature**. Scientists know that nature is beautiful or elegant if looked at in the correct way.
- B. because scientific ideas should be simple, consistent, and logical. Nature's elegance has **nothing to do** with it.
- C. The elegance of scientific ideas is due to the fact that scientists worked long and hard to produce them and so the scientists find the ideas elegant. Nature's elegance has nothing to do with it.

Scientists do NOT assume their ideas should be elegant:

- D. although scientists may feel that nature is beautiful or elegant.
- E. because scientists know that not everything in nature is beautiful or elegant.
- F. because scientists know that everyone sees elegance differently.
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**90541 Good scientific theories explain observations well. But good theories are also *simple* rather than *complex*.**

**Your position, basically:** (Please read from A to I, and then choose one.)

- A. Good theories are simple. The best **language** to use in science is simple, short, direct language.
- B. It depends on **how deeply** you want to get into the explanation. A good theory can explain something either in a simple way or in a complex way.
- C. It depends **on the theory**. Some good theories are simple, some are complex.
- D. Good theories can be complex, but they must be able to be **translated** into simple language if they are going to be used.
- E. Theories are usually **complex**. Some things cannot be simplified if a lot of details are involved.
- F. Most good theories are **complex**. if the world was simpler, theories could be simpler.
  
- G. I don't understand.
- H. I don't know enough about this subject to make a choice.
- I. None of these choices fits my basic viewpoint.

**90611 When scientists investigate, it is said that they follow the scientific method. The scientific method is:**

**Your position, basically:** (Please read from A to M, and then choose one.)

- A. the lab procedures or techniques; often written in a book or journal, and usually by a scientist.
- B. recording your results carefully.
- C. controlling experimental variables carefully, leaving no room for interpretation.
- D. getting facts, theories or hypotheses efficiently.
- E. testing and retesting – proving something true or false in a valid way.
- F. postulating a theory then creating an experiment to prove it.
- G. questioning, hypothesizing, collecting data and concluding.
- H. a logical and widely accepted approach to problem solving.
- I. an attitude that guides scientists in their work.
  
- J. Considering what scientists actually do, there really is no such thing as the scientific method.
  
- K. I don't understand.
- L. I don't know enough about this subject to make a choice.
- M. None of these choices fits my basic viewpoint.

**90621 The best scientists are those who follow the steps of the scientific method.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. The scientific method ensures valid, clear, logical and accurate results. Thus, most scientists will follow the steps of the scientific method.
- B. The scientific method should work well for most scientists; based on what we learned in school.
- C. The scientific method is useful in many instances, but it does not ensure results. Thus, the best scientists will **also use** originality and creativity.
- D. The best scientists are those who use any method that might get favourable results (including the method of imagination and creativity).
- E. Many scientific discoveries were made by accident, and not by sticking to the scientific method.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.



**90631 Scientific discoveries occur as a result of a series of investigations, each one building on an earlier one, and each one leading logically to the next one, until the discovery is made.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Scientific discoveries result from a logical series of investigations:

- A. because experiments (for example, the experiments that led to the model of the atom, or discoveries about cancer) are like laying bricks onto a wall.
- B. because research begins by checking the results of an earlier experiment to see if it is true. A new experiment will be checked by the people who come afterwards.
- C. **Usually** scientific discoveries result from a logical series of investigations. But science is not completely logical. There is an element of trial and error, hit and miss, in the process.
- D. **Some** scientific discoveries are accidental, or they are the unpredicted product of the actual intention of the scientist. However, **more** discoveries result from a series of investigations building logically one upon the other.
- E. **Most** scientific discoveries are accidental, or they are the unpredicted product of the actual intention of the scientist. **Some** discoveries result from a series of investigations building logically one upon the other.

Scientific discoveries do **not** occur as a result of a logical series of investigations:

- F. because discoveries often result from the piecing together of previously unrelated bits of information.
- G. because discoveries occur as a result of a wide variety of studies which originally had nothing to do with each other, but which turned out to relate to each other in unpredictable ways.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**90641 Scientists publish the results of their work in scientific journals. When scientists write an article for a journal, they organize their report in a very logical orderly way. However, scientists actually do the work in a much less logical way.**

**Your position, basically:** (Please read from A to J, and then choose one.)

Articles are written in a more logical way than the actual work:

- A. because scientists can think and work without following a set plan. Consequently, if you read the actual order of their thoughts and procedures, it would be confusing. Therefore, scientists write logically so other scientists will understand the results.
- B. because scientific hypotheses are personal views or guesses and thus are not logical. Scientists, therefore, write logically so other scientists will understand the results.
- C. Scientists usually don't want to give away "the recipe" but they do want to tell the world about their results. So they write it up logically but in a way that does not reveal how it was actually done.
- D. It depends. Sometimes scientific discoveries happen by accident. But other times discoveries happen in a logical orderly way, just like the articles are written.

Articles are written in a logical way showing how the actual work was done:

- E. because a scientist's work is conducted logically; otherwise, it would not be useful to science and technology.
- F. because scientists do work in a logical way so that their published report will be easier to write in a logical way.
- G. Articles are not necessarily written in a logical way. They're written the way the work was done. This can be complicated or straightforward.
- H. I don't understand.
- I. I don't know enough about this subject to make a choice.
- J. None of these choices fits my basic viewpoint.

**90651 Scientists should NOT make errors in their work because these errors slow the advance of science.**

**Your position basically:** (Please read from A to H, and then choose one.)

- A. Errors slow the advance of science. Misleading information can lead to false conclusions. If scientists don't immediately correct the errors in their results, then science is not advancing.
- B. Errors slow the advance of science. New technology and equipment reduce errors by improving accuracy and so science will advance faster.

Errors CANNOT be avoided:

- C. so scientists reduce errors by checking each others' results until agreement is reached.
- D. some errors can slow the advance of science, but other errors can lead to a new discovery or breakthrough. If scientists **learn** from their errors and correct them, science will advance.
- E. Errors most often **help** the advance of science. Science advances by detecting and correcting the errors of the past.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**90711 Even when making predictions based on accurate knowledge, scientists and engineers can tell us only what *probably* might happen. They cannot tell what will happen for certain.**

**Your position basically:** (Please read from A to H, and then choose one.)

Predictions are NEVER certain:

- A. because there is always room for error and unforeseen events which will affect a result. No one can predict the future for certain.
- B. because accurate knowledge changes as new discoveries are made, and therefore predictions will always change.
- C. because a prediction is not a statement of fact. It is an educated guess.
- D. because scientists **never** have all the facts. Some data are always missing.
  
- E. It depends. Predictions are certain, only as long as there is accurate knowledge and enough information.
  
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**90721 Even when people use mathematics accurately in science and engineering, they can only predict what will probably happen. They can never conclude with 100% certainty.**

**Your position, basically:** (Please read from A to G, and then choose one.)

Predictions are **never** 100% certain:

- A. because there is always measurement error or human error.
- B. because there are always unknown or unforeseen events which will affect a result.
- C. Predictions with mathematics are **usually** 100% certain, because they are based on tested results.
- D. Predictions with mathematics are **always** 100% certain because mathematics itself is certain.
- E. I don't understand.
- F. I don't know enough about this subject to make a choice.
- G. None of these choices fits my basic viewpoint.

**90811 If scientists find that people working with asbestos have twice as much chance of getting lung cancer as the average person, this must mean that asbestos causes lung cancer.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. The facts obviously prove that asbestos causes lung cancer. If asbestos workers have a greater chance of getting lung cancer, then asbestos is the cause.

The facts do NOT necessarily mean that asbestos causes lung cancer:

- B. because **more research** is needed to find out whether it is asbestos or some other substance that causes the lung cancer.
- C. because asbestos might work **in combination with** other things, or may work indirectly (for example, weakening your resistance to other things which cause you to get lung cancer).
- D. because if it did, **all** asbestos workers would have developed lung cancer.
- E. Asbestos **cannot** be the cause of lung cancer because many people who don't work with asbestos also get lung cancer.
- F. I don't understand.
- G. I don't know enough about this subject to make a choice.
- H. None of these choices fits my basic viewpoint.

**90921 Science rests on the assumption that the natural world can *not* be altered by a supernatural being (for example, a deity).**

**Your position, basically:** (Please read from A to H, and then choose one.)

Scientists assume that a supernatural being will NOT alter the natural world:

- A. because the supernatural is beyond scientific proof. Other views, outside the realm of science, may assume that a supernatural being can alter the natural world.
- B. because if a supernatural being did exist, scientific facts could change in the wink of an eye. BUT scientists repeatedly get consistent results.
- C. It depends. What scientists assume about a supernatural being is up to the individual scientist.
- D. Anything is possible. Science does not know everything about nature. Therefore, science must be open-minded to the possibility that a supernatural being could alter the natural world.
- E. Science can investigate the supernatural and can possibly explain it. Therefore, science can assume the existence of supernatural beings.
- F. I don't understand.
- G. I don't know enough about this topic to make a choice.
- H. None of these choices fits my basic viewpoint.

**91011 For this statement, assume that a gold miner “discovers” gold while an artist “invents” a sculpture. Some people think that scientists *discover* scientific LAWS. Others think that scientists *invent* them. What do you think?**

**Your position, basically:** (Please read from A to H, and then choose one.)

Scientists **discover** scientific laws:

- A. because the laws are out there in nature and scientists just have to find them.
- B. because laws are based on experimental **facts**.
- C. but scientists invent the **methods** to find those laws.
  
- D. Some scientists may stumble onto a law by chance, thus discovering it. But other scientists may invent the law from facts they already know.
- E. Scientists **invent** laws, because scientists interpret the experimental facts which they discover. Scientists don't invent what nature does, but they do invent the laws which **describe** what nature does.
  
- F. I don't understand.
- G. I don't know enough about this topic to make a choice.
- H. None of these choices fits my basic viewpoint.



91012 For this statement, assume that a gold miner “discovers gold” while an artist “invents” a sculpture. Some people think that scientists *discover* scientific HYPOTHESES. Others think that scientists *invent* them. What do you think?

**Your position, basically:** (Please read from A to I, and then choose one.)

Scientists **discover** an hypothesis:

- A. because the idea was there all the time to be uncovered.
- B. because it is based on experimental **facts**.
- C. but scientists invent the **methods** to find the hypothesis.
- D. Some scientists may stumble onto an hypothesis by chance, thus discovering it. But other scientists may invent the hypothesis from facts they already know.

Scientists **invent** an hypothesis:

- F. because an hypothesis is an interpretation of experimental **facts** which scientists have discovered.
- F. because inventions (hypotheses) come from the mind — we create them.
- G. I don’t understand.
- H. I don’t know enough about this topic to make a choice.
- I. None of these choices fits my basic viewpoint.

**91013 For this statement, assume that a gold miner “discovers” gold while an artist “invents” a sculpture. Some people think that scientists *discover* scientific THEORIES. Others think that scientists *invent* them. What do you think?**

**Your position, basically:** (Please read from A to I, and then choose one.)

Scientists **discover** a theory:

- A. because the idea was there all the time to be uncovered.
- B. because it is based on experimental **facts**.
- C. but scientists invent the **methods** to find the theories.
- D. Some scientists may stumble onto a theory by chance, thus discovering it. But other scientists may invent the theory from facts they already know.

Scientists **invent** a theory:

- E. because a theory is an interpretation of experimental **facts** which scientists have discovered.
- F. because inventions (theories) come from the mind — we create them.
- G. I don’t understand.
- H. I don’t know enough about this topic to make a choice.
- I. None of these choices fits my basic viewpoint.

**91111 Scientists in different fields look at the same thing from very different points of view (for example,  $H^+$  causes chemists to think of acidity and physicists to think of protons). This makes it difficult for scientists in different fields to understand each others' work.**

**Your position, basically:** (Please read from A to H, and then choose one.)

It is difficult for scientists in different fields to understand each other:

- A. because scientific ideas depend on the scientist's **viewpoint** or on what the scientist is used to.
- B. because scientists must make an effort to understand the language of other fields which overlap with their own field.

It is fairly **easy** for scientists in different fields to understand each other:

- C. because scientists are intelligent and so they can find ways to learn the different languages and points of view of another field.
- D. because they have likely studied the various fields at one time.
- E. because scientific ideas overlap from field to field. Facts are facts no matter what the scientific field is.
- F. I don't understand.
- G. I don't know enough about this topic to make a choice.
- H. None of these choices fits my basic viewpoint.

**91121 Scientists in different fields look at the same thing from very different points of view (for example,  $H^+$  causes chemists to think of acidity and physicists to think of protons). This means that one scientific idea has different meanings, depending on the field a scientist works in.**

**Your position, basically:** (Please read from A to H, and then choose one.)

- A. because scientific ideas can be interpreted differently in **one field** than in another.
- B. because scientific ideas can be interpreted differently, depending on the **individual** scientist's point of view or on what the scientist already knows.

A scientific idea will have the SAME meaning in all fields:

- C. because the idea still refers to the **same real thing** in nature, no matter what point of view the scientist takes.
- D. because all sciences are **closely related** to each other.
- E. in order to allow people in different fields to communicate with each other. Scientists must **agree** to use the same meanings.
- F. I don't understand.
- G. I don't know enough about this topic to make a choice.
- H. None of these choices fits my basic viewpoint.