

**Provide an example of a true conspiracy theory.**

A secret US government project called PRISM has allowed the NSA to listen in on the mobile phone conversations of anyone in the world they wish without getting a warrant from a judge.

**What is a good method of finding out the truth?**

Scientific method is a good method to finding the truth.

**What is mysticism?**

Mysticism is where the ultimate reality, knowledge or spiritual truth is realised through direct experience, intuition or instinct and involves the practice of prayer, meditation or ritual. Today, mysticism is associated with non-mainstream esoteric beliefs such as alchemy, crystal power and witchcraft.

**Is mysticism the same as religion?**

Mysticism is not the same thing as religion since you can practice mysticism without being religious and some religions do not practice mysticism.

**What is theism?**

Theism is the belief in God, or gods, especially when worship is practiced in groups. Knowledge comes from direct experience of the voice of God in visions or prayer. They find answers to important questions by faith alone.

**Who is associated with Rationalism?**

Plato.

**What did Plato believe to create Rationalism?**

Plato believed that knowledge was innate (instinctive) and came from moments of contact with a sort of abstract, mathematical heaven that he called the extended. Rationalism is considered logical.

**What did Plato teach in his academy?**

Plato taught that anything we could see, hear or touch was merely a pale, rough shadow of its real, perfect form, a projection from the extended.

**What was Plato very interested in?**

Plato was very interested in geometrical shapes because these were as perfect as thus as real as we can imagine. Plato's attitude towards mathematics was much more mystical and religious than today.

**What is Hermeneutics?**

Much religious knowledge is organised around the idea of authoritative texts or Holy Scriptures which hold the answers to everything important. There is no arguing against the text only how to properly interpret it.

**What is Skepticism?**

Skepticism is the doubt about the truth of something and the disbelief in any claims of ultimate knowledge.

**What is Rene Descartes quote regarding Skepticism?**

"I can doubt the existence of the world and other people, even my own body, but I cannot doubt that there is a mind here doing all this doubting. Cogito, ergo sum, I think, therefore, I am."

**How does skepticism affect science?**

Skepticism is an important intellectual movement in science because it helps resist human temptation to believe something without evidence.

**What is Empiricism?**

Empiricism is the idea that the true essence of things was to be discovered in real, particular objects, not abstract forms. Empiricism promotes the study of the natural world, natural philosophy, to seek knowledge.

**What is Science 2.0?**

Science 2.0 concerns new practices of posting raw experimental data, undeveloped theories, claims of discoveries and draft papers on the web for anyone to see and comment about.

### List 1 benefit of Science 2.0?

The open access practice of Science 2.0 makes scientific method more collaborative and therefore more productive.

### List 4 risks of Science 2.0?

- Publishing preliminary findings online risks having others copy or exploit the work to gain credit or even patent.
- Authorities who hand out jobs, promotions and grants don't yet recognise Science 2.0 so scientists risk time invested being wasted.
- Science and technology is powerful and some is dangerous and may result in knowledge-enabled mass destruction if end up the hands of worst-case extremists.
- We don't currently have a censorship filter to control release of certain information.

### What is the mutant bird flu controversy?

Two groups of scientists created mutant strains of the H5N1 avian influenza virus which could be transmitted between mammals more easily than naturally-occurring strains of the virus. During attempt to publish their work, the US National Science Advisory Board for Biosecurity (NSABB) recommended that the mutant bird flu work should not be published in full.

### What is Citizen Science?

Citizen science is when volunteers perform or manage research-related tasks such as observation, measurement or computation.

### What is deduction?

Deduction is the act of subtracting; reasoning from the general to the particular e.g. Dr. John Snow.

### What is induction?

Induction is the process of drawing general laws from a lot of specific observations e.g. all swans are white.

### Who is associated with induction?

Francis Bacon.

### What is a weakness about induction?

Induction isn't logical. You can't observe every individual case to prove your theory. It is also not defined how many observations are required to develop a theory. PAST PERFORMANCE DOES NOT PREDICT FUTURE.

### Who is associated with Falsification?

Karl Popper.

### What is falsification?

Falsification is the idea that science cannot prove anything but it can disprove theories. Any good theory must be falsifiable and the work of the science is to collect evidence to try to falsify it.

### What is proof?

Proof is a legal and mathematical concept but science cannot prove anything. Science can only build evidence to support a theory.

### List 6 uses for mathematics in science.

- Making **precise** observations
- **replicating** observations
- **Communicate** with others
- quantifying **uncertainty**
- Detecting **laws** of the universe
- Models to **describe, explain, predict and control** phenomena

### What is bad mathematics?

Bad mathematics is where overly complicated maths is used in reports that can only be understood by other mathematicians and do not actually portray their findings effectively.

### Identify the following symbols.

- |   |                                 |   |                 |   |           |
|---|---------------------------------|---|-----------------|---|-----------|
| + | Plus sign                       | √ | Square root     | ∑ | Summation |
| - | Minus sign                      | ≈ | Almost equal to | ∏ | Product   |
| e | Euler's number (equal to 2.718) |   |                 |   |           |

### What are nominal scales?

With nominal scales, the numbers are only used to distinguish between individuals e.g. the numbers on the backs of football players.

### What are ordinal scales?

With ordinal scales, the numbers are only allowed to be sorted according to some criterion. We can have gold, silver and bronze placings but we cannot know how close they are.

### What are interval scales?

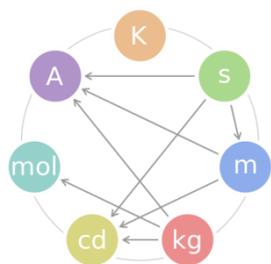
With interval scales, the numbers can be sorted and we can say how far apart they are on an arbitrary scale e.g. temperature measured on a Celsius thermometer. An interval scale has no natural zero point.

### What is a ratio scale?

With a ratio scale, the numbers distinguish between individuals, are sorted according to some criterion and are on a scale that does have a natural zero point e.g. temperature measured on a Kelvin scale has an absolute zero which is at the point which all thermal motion of molecules ceases.

### What is the SI system of measurement?

The SI system is a system of metric units of measurement built around seven base units and a larger number of derived units.



K	=	kelvin
s	=	seconds
m	=	meters (distance that light can travel)
kg	=	kilograms
cd	=	candela
mol	=	mole
A	=	ampere

### What is a null hypothesis?

A null hypothesis means nothing was found and observations prove the theory wrong.

### What is a hypothesis?

A hypothesis is what you think will happen in terms of the variables involved.

### How is an argument deemed invalid?

An argument based on faulty logic is invalid.

### What is a slippery slope argument?

A slippery slope argument suggests that if one step is taken, that will inevitably lead to similar steps or actions, in a downhill walk that will end in disaster.

### Provide an example of a slippery slope argument.

"If the government allows abortion, next thing you know they'll allow euthanasia and it won't be long before they dispose of anyone unwanted or undesirable."

### What is an equivocation argument?

Equivocation is when a key word shifts its meaning during the course of the argument so the premises are about something different to the conclusion.

### Provide an example of an equivocation argument.

"Only man is rational. No woman is a man. Therefore, no woman is rational."

### What is a hasty generalisation argument?

A hasty generalisation bases a claim on too small a sample or an unrepresentative sample. Often only one example is used for the broadest generalisation.

### Provide an example of a hasty generalisation.

"All of these movie stars are really rude. The other day I asked Kevin Costner for his autograph in a restaurant and he told me to get lost."