**Introduction**
In this activity, students distinguish between religious, scientific, metaphysical and moral ideas. It helps to frame the way students think about the world, and also helps them to understand, categorise and respect different ways of addressing questions about the universe. If students can do this, it is more likely they will be able to avoid bringing in religious or other unscientific arguments in the place of genuine science.

**The activity**
It is important to set ground rules to provide a safe environment where students are respected as they explore their own viewpoints.
Suggested answers

1. Match these definitions of the four realms of science, morality, religion and metaphysics, by drawing an arrow between each statement and its correct definition:

<table>
<thead>
<tr>
<th>Science</th>
<th>Explanations of the universe based on observations and experiments, and subject to being tested and falsified.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metaphysics</td>
<td>The study of the nature of reality. This includes the physical world as experienced by humans in addition to the invisible processes that organise the universe.</td>
</tr>
<tr>
<td>Religion</td>
<td>A world view based on faith in divine revelations.</td>
</tr>
<tr>
<td>Morality (and ethics)</td>
<td>A code of conduct based on values defining what is right and wrong.</td>
</tr>
</tbody>
</table>

2.  
- crystal power – metaphysics
- life after death – this could be answered by metaphysics and religion. It is also possible to ask scientific questions about this.
- origins of the universe – both science and religion hold views on this.
- faith healing – scientific questions could be asked about this – but it is mainly framed within religion.
- the structure of atoms – science
- making decisions about euthanasia – moral questions include whether or not this is right or wrong. Scientific questions include whether someone is capable of making the decision. Religion also has views on this, based on moral frameworks.

Many questions fall into more than one category. It is worth teasing out the purely religious arguments based on scripture, and those which a humanist could equally hold. This may be more appropriate in the context of a lesson on ethical issues.

3. The shaded grey area in the Venn diagram represents the questions which can be addressed by both religion and science. A religious person may, for example hold both scientific and religious views on evolution or life after death.

The idea of the Venn diagram is to get students to start to separate questions into different frameworks. Discussion should include whether they think these realms have anything to contribute to the question, and whether the Venn diagram actually overlaps. For example, some people would say that religion has things to say about evolution, as does science. You should make it clear that this does not mean religious questions are necessarily scientific.
4. Four statements are provided in the table below.
   i) Refer back to the definitions in question 1 to add ticks in the last four columns. This shows which realms you think can contribute to answering questions about each statement. You need to be able to justify your answers.

<table>
<thead>
<tr>
<th>Question</th>
<th>Science</th>
<th>Morality</th>
<th>Metaphysics</th>
<th>Religion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living beings are reincarnated, so people alive today were likely to have been alive in a different form at the beginning of life on Earth.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>The universe started with a ‘Big bang’.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human beings were created as superior to other living things.</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>The Fossil record shows gradual changes in species over millions of years.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   ii) and iii) This is an opportunity to emphasise the need for scientific questions to be testable, and refutable.

5. In your group, discuss which of the following statements you agree with:
   • Religious views do not change, even if evidence from observation and experiment suggest that they are incorrect or incomplete.
     Religious views are based on scriptures and dogma. This is a set of rules which are not based on any empirical evidence. The interpretation of religious scriptures has changed over the ages, but again, these changes are based on society’s views, not observation.
   • Scientific theories can’t be refuted by religious statements, they can only be refuted by new evidence from observation or experiment.
     The definition of what makes a scientific statement is very precise, and scientific theories do change or are refined as new evidence becomes available. The peer review process also helps to refine new theories.
   • It is possible to hold world views which involve all four realms, depending on the questions being asked.
     Some people bring in different frameworks depending on what they are discussing.

6) It is a good idea to have a whole class brainstorm of the main points to include:

   A scientific theory must make predictions that can be tested. It must be supported by evidence from observations or experiments in the natural world and it must be open to refutation or modification as more evidence becomes available.

   Creationism fails to meet any of these criteria, the evidence is in a book, not from the physical world. Its authority comes from a book that Creationists believe to be the true word of God. Science’s authority comes from the community of scientists.

   Intelligent design does not specifically invoke God or the Bible so it sounds more scientific. However when it discusses any phenomenon that science can not yet fully explain it does not suggest that
new research is needed. It claims that the explanation must be the intervention of some unspecified superior intelligence. No evidence is offered for the existence of this ‘being’ and no prediction that could be tested by science.

You may wish to provide the following definitions.

**Creationism** is the belief that the account of the origins of different life forms given in the early chapters of the Bible is a true and scientifically valid explanation. The Bible is cited as the main source of evidence although many creationists claim that there is scientific evidence supporting their belief.

**Intelligent design** is belief that many of the features of living organisms can best be explained by the idea that they had an intelligent designer rather than arising from natural selection. Advocates of this belief claim that it is a scientific theory but the implication is that the designer is supernatural.

*November 2008*
Introduction

Many people hold views or beliefs which appear to be in conflict. For example, some scientists believe in ghosts, or hold religious views which have no scientific evidence. Other people take great care of their pets, giving them the sort of value normally attributed to human beings, but are quite happy to eat other closely related animals. It is useful to think about the realms which categorise your world views. This helps to frame the way you think about the world, and also helps to understand and respect different ways of addressing questions. In this activity you will distinguish between religious, scientific, metaphysical and moral ideas.

The activity

1.Match these definitions of the four realms of ideas; science, morality, religion and metaphysics, by drawing an arrow between the name of each realm and its correct definition:

<table>
<thead>
<tr>
<th>Realm</th>
<th>Definition</th>
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<tr>
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2. In your group, categorise the following according to the realm of ideas you consider that they belong to. You need to justify your choice in each case:

- crystal power
- life after death
- origins of the universe
- faith healing
- the structure of atoms
- making decisions about euthanasia

Were there any areas which did not fall neatly into one or other category?
Your world view as a diagram
A person’s world view can be represented by a Venn diagram, using four circles to represent the four realms. Using the example of research on embryos, some people may think religion and morality provide them with all they need to decide whether or not this should be allowed. Other people may think metaphysics gives them answers to whether or not the embryo has a ‘soul’ or ‘spirit’, and others will need to ask scientific questions relating to the evidence we have about whether or not embryos can suffer.

Imagine a rectangle which represents the universe. The size of the four circles within the rectangle represents the number of questions about the universe which can be answered by a) science b) religion c) morality d) metaphysics. If there are many questions which can be answered by two or more realms, these circles overlap by a large amount. If any of these realms are able to address very few if any questions about the universe, then the circle may only appear as a small dot, or not be present at all.

Figure 1 shows the ‘world view’ of a student who thinks science and religion are almost equally able to answer questions about the universe, and that all questions of morality and metaphysics can be answered by religion.

![Venn diagram](image)

Figure 1

What do you think the area shaded in grey represents?

3. In your group, make sure you all understand the task, then each of you should draw your own personal ‘world view’ on a piece of A4 paper, where the paper represents the universe. It may help to think of actual questions to help you. For example, Is there a God? When did the universe begin? Should we allow embryo research?

When you have had a go at this, share it with one other student, and compare it with their diagram. Discuss whether you agree about how you would address some specific questions. What does it mean when two circles overlap?

4. Four statements are provided in the table below.
   i) Refer back to the definitions in question 1 to add ticks in the last four columns to show which realms you think can contribute to answering questions about each statement. You need to be able to justify your answers.

   ii) In your pairs, think of four additional statements about evolution or the origins of life on Earth. Add these to the table, and fill in the last columns as before. One of these statements should be ‘creationist’, and one should be about ‘intelligent design’.
### Statement

Questions would be answered by which realm?

<table>
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iii) In your group, discuss the table each pair has produced. Agree on the criteria you are using to decide whether or not a question is 'scientific'.

iv) Look back at your ‘world view’ diagram. Do you need to revise this in view of your discussions?

5. In your group, discuss which of the following statements you agree with:

- Religious views do not change, even if evidence from observation and experiment suggest that they are incorrect or incomplete.

- Scientific theories can’t be refuted by religious statements, they can only be refuted by new evidence from observation or experiment.

- It is possible to hold world views which involve all four realms, depending on the questions being asked.

6. Write a short article for a school magazine, explaining why creationism and intelligent design are not scientific theories.