

TAP 701- 1: What do you know about cosmology?

Everybody knows something

Many people have a great interest in cosmology – and already know a lot about it. But what they know may be disorganised - and self contradictory. This activity will help you find out how much you already know about this topic.

You will need

- ✓ copies of statements about cosmology on card
- ✓ a large card with the headings 'Agree', 'Disagree', 'Don't know'

What you have to do

You will probably learn most by working in groups – your teacher will organise this. You will be given a set of statements about cosmology.

1. Read each statement in turn.
2. Discuss with your partners whether or not you agree with the statement.
3. Put the statement cards in a pile under the appropriate headings. Use the 'Disagree' heading when the whole group thinks that the statement is incorrect. If the members of the group disagree about the statement then classify the statement as a 'Don't know'!

Finally, your teacher will discuss your decisions with you: be prepared to defend them.

Outcome

1. You will have a good idea about what you already know and what you still have to learn about cosmology.

Practical advice

This activity is the kind of activity that students usually find interesting and often leads to some spirited discussions. It will also give the teacher an idea of how well-informed the students are, and so help in planning future lessons and activities. Cosmology is a popular topic and some students will have read a great deal and have at least a good, if superficial, general knowledge. If they do 'know everything' then subsequent lessons may be able to concentrate more on how this knowledge is obtained by astronomers.

Introduce the topic briefly, without giving too much away. You might simply give a very brief résumé of how people's ideas about the Universe have changed over time, for example, from the Babylonian idea of an island supported by elephants on the back of a tortoise to a round Earth surrounded by crystal spheres with stars merely holes through which the outermost element of fire was to be seen.

Prepare copies of the statements, each on a separate slip of paper or card, and number them to aid later identification. You might decide to use a subset of the statements, to save time or to match your knowledge of the students' abilities and interests. Divide the class into groups of three or four students and explain the task – to agree on the statements, or not, and place

them into two piles accordingly. If they can't agree one way or the other, or simply don't know, they should put the statement card into a 'Don't know' pile.

Allow about 15 minutes for this group discussion – or longer if discussions are fruitful. But consider that it might be a waste of time to allow unsubstantiated argument to go on too long.

Finally, summarise the outcome as a simple 'straw poll' under the three headings.

Raise the question: what evidence is there for or against the statements on the cards?
Answering this will provide the programme for the rest of the topic.

Statements for the activity

(delete items or add your own if you wish):

The Universe was created about 5000 years ago.

The Universe was created about 14 billion years ago (14×10^9 years).

On average, the Universe is a vacuum, with about one hydrogen atom to every 10 cubic metres of space.

The Universe is expanding.

The Universe began as a very small point and then exploded with a 'big bang', so creating matter, energy, space and time.

When we look into the night sky, without the aid of a telescope, we can see about 5000 stars.

The solar system is at the centre of an expanding Universe.

Astronomers have measured the movements of the stars we can see in the night sky and shown that they are all moving away from us.

Galaxies are huge collections of many hundreds of millions of stars.

The Universe is eternal and has always been the same as it is today.

The Universe is infinitely large.

New stars are being created today.

Stars don't stay bright forever, eventually they will 'die' and stop radiating.

The Universe will keep on expanding forever.

Eventually the Universe will stop expanding and start collapsing back to a point.

The most common element in the Universe is hydrogen.

When you see a star through a telescope it might no longer be there.

External References

This activity is taken from Advancing Physics, chapter 12, 10E