Astronomy and the Scientific Method

As a class, we have come up with a number of questions about astronomy. Hopefully, we'll eventually answer most of these questions in lecture over the course of the semester... but let's get a head start today by brainstorming a bit on how astronomers might be able to find these answers directly. After all, science isn't just about knowing the answers – it's about going out and finding them!

Part 1

You'll be doing this part of the exercise on the board, *not* on paper. To give everyone a fair chance, try to have a different member of your group write down the answers to each of the first five questions!

1. *As a group*, choose one question from the list we came up with - preferably one that nobody in the group actually knows the answer to *but* something that you think at least seems that it can be answered. Copy this question down onto the closest board.

2. Try to think of some hypotheses that might answer your question, and write them down on the board.

3. Discuss methods by which we might be able to try to test your various hypotheses, and write these down as well.

4. Look over your responses to (3), and classify each one as either an *experiment* (scientist actively modifies the object under study to see what happens) or an *observation* (scientist records what happens in the natural environment without disturbing it) – or perhaps a combination of both.

5. Based on your above responses, and also from thinking about the subject in general, do you think astronomy is mostly an experimental or an observational science?

Part 2

Once your group is finished with the first section, continue on to this one. Keep working as a group, but you can write your responses down on paper instead of the board this time.

6. Even though this is an astronomy course, we'll spend most of the next two weeks talking about *light* before we actually start discussing astronomical objects. Why do you think light is so important to astronomers?

7. Aside from what you've already mentioned, what major limitations on observing an object does astronomy have to deal with?

8. What about experiments? When are experiments possible in astronomy – and when aren't they?