Evaluation: Concept Cards

Age Range

Ages 10+

Participants

~ 15

Duration

10 minutes at the end of one lesson, and 10 minutes at the start of the next lesson.

Special Notes

Reading and preparing answers to the concept cards is done by the instructor in between lessons. This is a great task for college students to do if they are guest instructors in the afterschool program.

Overview

The Concept Cards are an informal formative evaluation activity which can be added to any of the lesson plans. Concept Cards can help alleviate participants' self-consciousness about asking questions and help the instructor check the participants' level of understanding of the lesson content. Instructors can monitor the learning progress of the participants and go more in-depth with the material. They can also be used as a way to facilitate discussion between participants and college students who are guest instructors about the college student's own pathway to studying science.

Materials

- Index cards, Post-It notes or small slips of scrap paper – at least one per participant
- Pencils or pens

Activity Goals

Participants will:

- Have the opportunity to ask questions or request clarification about material covered in the session and/or ask questions relating to studying science in college.

Lesson Plan

1. Distribute index cards or papers to students and encourage (but do not obligate) them to write down any questions or to request clarification about material taught during that session. Students may write their questions anonymously. Emphasize to the participants that asking questions is part of being a scientist!
2. Collect questions from participants.
3. Later, review the questions and write down answers on a document to be passed out at the beginning of the next session. (Adapt the question/answer if necessary to make it more widely applicable.)
4. At the start of the next session, briefly address a few chosen questions to validate the importance of asking questions and to review the last sessions' material.

Multiverse

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Sample Concept Cards

The following examples are real questions asked by middle school girls at Girls Inc. of the Island City afterschool program in Alameda, California as part of the Five Stars Pathway program. Answers were provided by Siara Hunt, who was then an undergraduate student at the University of California at Berkeley.

Q: What is the process of the Sun "shutting down"?

A: As the Sun dies or "shuts down" and runs out of fuel, it heats up its outer layers and blasts them off into space, causing the Sun to expand into a red giant star, swallow the Earth, and then eventually become a "planetary nebula," a ring of beautiful colored gas and dust. This won't happen for another several billion years, so we don't have to worry about finding another planet quite yet. Different stars "shut down" and die in different ways, depending on their mass. More massive stars end their death-process as black holes.

Q: Why is the night sky black?

A: Very intelligent ancient minds have asked this very question! This question is known as Olber's Paradox. The paradox is if the night sky is full of huge, bright stars and the universe is full of huge, bright galaxies, then why isn't the night sky, or the space in the universe, bright? The basic answer is that the universe is not infinitely old. The light from all the stars in the universe take a very long time to reach us and all that light hasn't had enough time to create a bright sky, so we see a dark sky, spotted with some of the stars that are close enough to us for their light to have made it to earth. If there was no Big Bang and the universe had been around forever, then the night sky would be bright, not dark! So the answer to this question proves the Big Bang!

Q: Which Advanced Placement (AP) classes should you take to get into the college or graduate school of your choice?

A: I would recommend that you take as many AP classes and AP tests as possible. AP and honors classes are closer to what college courses are like, so if you start taking these as soon as you can in your high school years, you will be better equipped to succeed in college courses. If you have a certain major in mind for college, then take as many AP classes that are related to that major as possible. For instance, if you are interested in going to medical (graduate) school after majoring in biology in college, you should take AP biology and AP chemistry in high school.

Thanks to Siara Hunt, former UC Berkeley undergraduate student, for providing this content.