

LET THEM QUESTION! A CURIOSITY-DRIVEN APPROACH TO IGNITE LEARNING

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Introduction

This lesson harnesses an untapped resource often overlooked in much of our science curriculum: student curiosity and the questions that they develop about the scientific world they live in. To foster curiosity and question asking, I have created an implementation method surrounding a curriculum unit that brings small groups of students together who use their questions to build knowledge and understanding about the way their world works, referred to as Knowledge Building (Scardamalia, 2002). Knowledge Building (KB) was implemented as a 5 stage process outline below applied to my Earth and Space SES 4U course. Greater detail and the implementation process can be found in the PDF attached in this catalyst. For a series of small videos outlining my work on Knowledge Building please visit:

<https://thelearningexchange.ca/projects/knowledge-building/?pcat=999&sess=6>

Stage 1: Select a Curriculum Topic that Fosters Question Asking

The Space portion of the Earth and Space course gives plenty of entry points to ask interesting questions about space such as the formation of the solar system, detection of exoplanets, the Big Bang and the evolution of the universe. In this work the focus of question-asking was on stellar evolution.

Stage 2: Encouraging the Development of Questions and Ideas

During this stage, students are given a variety of media on stellar evolution (e.g. video, simulations, text-based material) to introduce students to the topic. Then, students create questions based on what they would like to learn more about. Students were required to create 'open' and 'closed' question about what interests them, with the understanding that open questions lead to much deeper understanding and conversations.

Stage 3: Forming Knowledge Building Communities

Once the questions have been developed, students form groups of 4 to 6 students. Students are given the curriculum expectations, particularly the overall expectations. Then, students share their questions with the group. They then select 2 or 3 starting questions that their group believes best helps them meet the overall expectations outlined.

Stage 4: Building Knowledge Together

The essence of this stage (and the most challenging to describe in text form) is to encourage discussion and discourse as a group surrounding their questions that lead to deeper understanding of the topic under investigation (see attached examples). Students practice the the spirit of Knowledge Building remembering that "to give knowledge is to get knowledge". Students seeking out authoritative sources of knowledge for their questions where they 'get' knowledge from articles, relevant video, guest speakers, magazines, books and so on. I provide students with a public, online space called Knowledge Forum where they 'give' their knowledge to their group where others can comment on it and/or build upon it to improve the knowledge and ideas of others. This is part of a *collective responsibility* that students are required to promote when working

Stage 5: Assessing the Constructed Knowledge

After approximately 2 to 3 weeks, students analyze those discussions on stellar evolution where they believed collective responsibility was at its best, where students shared their knowledge in productive ways, raised new questions for discussion and acted upon those new questions that resulted in deeper understanding for the whole group. There are several ways for students to express their understanding. I chose the 'literature review' method. In this method, students used their own work and the work of others to express their understanding. They do this by creating a review of the group's 'literature' on stellar evolution. They use their own work but also reference the work of others in their group to trace out a path of understanding on stellar evolution (see attached example).



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RESOURCES



Glenn Wagner, A Secondary School Case Study (<https://thelearningexchange.ca/projects/knowledge-building/>)



Detailed Implementation of Knowledge Building (https://connex.stao.ca/sites/default/files/knowledge_building_article_-_iop_-_2017.pdf)



Knowledge Forum View for Earth and Space (https://connex.stao.ca/sites/default/files/knowledge_forum_view_for_earth_and_space.pdf)



Sample note produced by student (https://connex.stao.ca/sites/default/files/sample_note.pdf)



Sample literature review produced by student (https://connex.stao.ca/sites/default/files/sample_literature_review.pdf)

ELEMENT



Inquiry (/expert-elements/inquiry)



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