

Science is... Science is not... Nature of Science Lesson STEMAZing Virtual Adaptation

From original ENSI Sunsets, Souls, and Senses Lesson:
<https://bit.ly/ENSIsunsetsoulssenses>

Overview:

Explores the realm and limits of science. Engages students to give examples of topics that can be studied by science, and those that cannot. This also takes a look at descriptive terms that reflect the true nature of modern science, and those that do not, especially those that do not fit the popular perceptions of science.

Lesson Concepts:

- Science is limited to the study of the natural universe*.
- Science is limited to natural explanations.
- The natural universe* refers to that which is perceived directly or indirectly by our senses.

*Universe was substituted for world from original document because science studies things beyond Earth – our world.

Grade Span: 5-12

Timing: 30-50 minutes

STEMAZing Virtual Adaptation:

This lesson can basically be done as it would be in class. You will have options to assign the sorting of statements to all students to sort asynchronously and then work in groups or just to work in groups from the beginning. The virtualized version of this lesson is a slide in either PPT or Google Slides that looks like image below. Students drag and drop the statements to sort them under either the Science is... or Science is not... headers.

<p>STRONG THEORIES INFERRED FROM SOLID EVIDENCE</p> <p>LIMITED TO THE NATURAL UNIVERSE</p> <p>BUILT UPON TESTABLE PREDICTIONS</p> <p>BASED ON EXPERIMENTATION</p> <p>BASED ON AUTHORITY</p> <p>A SEARCH FOR UNDERSTANDING</p> <p>DECIDED BY DEBATE OR LAW</p> <p>A SEARCH FOR TRUTH</p> <p>ABLE TO SOLVE ALL PROBLEMS</p> <p>MADE STRONGER BY DIFFERENT LINES OF EVIDENCE</p> <p>A COLLECTION OF FACTS</p> <p>BASED ON PROOF</p> <p>BIASED</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">Science is...</div> <div style="width: 10%; border-left: 1px solid black; border-right: 1px solid black; height: 100px;"></div> <div style="width: 45%;">Science is not...</div> </div>	<p>BASED ON BELIEF</p> <p>BASED ON FAITH</p> <p>OPEN TO CHANGE</p> <p>TESTABLE</p> <p>REPEATABLE</p> <p>ABSOLUTE</p> <p>OBSERVABLE</p> <p>OBJECTIVE</p> <p>MEASURABLE</p> <p>VERIFIABLE</p> <p>DISPROVABLE</p> <p>DEMOCRATIC</p> <p>CERTAIN</p> <p>FAIR</p> <p>MODIFIABLE</p> <p>RIGID</p>
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Engagement Options:

In this lesson, students sort statements out under the Science is... Science is not... headings and then you facilitate a conversation about where these statements really belong. Even if you have students sort the statements themselves initially, they should be given time in a group to sort the statements out as well. The conversations they have with each other trying to decide where the statements go is a critically important part of this lesson.

Option 1: Individual Sort to Group Sort and Class Discussion

In Google Classroom, you can assign each student a copy of the Science is Science is not online version Google Slide file (<https://bit.ly/ScienceisScienceisnotVirtual>). Asynchronously, their assignment would be to sort out the statements under either Science is... or Science is not... with the rule that no statements can be left to the sides or put in the middle. They must make a decision. Then, when you meet synchronously with students, put them into Breakout Rooms of 3-4 students and have them use one student's (the Recorder) copy of the file to come to consensus about where the statements belong. When the groups return from the Breakout Rooms, you can facilitate a conversation about where the statements really belong using the **Science is... Science is not... KEY** (<https://bit.ly/ScienceisScienceisnotKEY>). You might start with statements they easily agreed upon and then follow that with statements they debated in their small groups. The advantage of this option is that it gives slower processing students a chance to think about the statements before they are put in a group to sort them.

Option 2: Group Sort and Class Discussion

In Google Classroom, you can still assign each student a copy of the Science is Science is not online version Google Slide file (<https://bit.ly/ScienceisScienceisnotVirtual>). During synchronous instruction, you will put students into Breakout Rooms of 3-4 students. The Recorder will then open their copy of the file and share their screen. The Facilitator will then lead the group as they sort the statements out. When the groups return from the Breakout Rooms, you can facilitate a conversation about where the statements really belong using the **Science is... Science is not... KEY** (<https://bit.ly/ScienceisScienceisnotKEY>). You might start with statements they easily agreed upon and then follow that with statements they debated in their small groups.

Class Discussion Notes

Review **Science is... Science is not... KEY** (<https://bit.ly/ScienceisScienceisnotKEY>) to prepare to facilitate class discussion. Note that statements which are often debated include: "LIMITED TO THE NATURAL UNIVERSE", "BASED ON AUTHORITY", "A SEARCH FOR TRUTH", "ABLE TO SOLVE ALL PROBLEMS", "BASED ON PROOF" (This statement would be Science is... if it said EVIDENCE in place of PROOF, we don't like saying we "prove" things in science, because we can't 100% prove anything.), "BASED ON BELIEF/FAITH" and others depending on the group. Use the statements provided in the key if you are struggling to explain the idea.