

# Grade 3: Solar System Formation

by Katelyn McDonald

<b>Tool(s) used:</b>	<ul style="list-style-type: none"><li>• Sustainability Compass</li><li>• Systems Mapping</li></ul>
<b>Purpose of using tool:</b>	<ul style="list-style-type: none"><li>• Synthesizing Thinking</li><li>• Guiding Discussion</li></ul>
<b>Context of lesson/case study:</b>	Solar System Formation
<b>Participants (# and description):</b>	16 Grade 3 students
<b>Topic, Theme, or Key Understanding of unit/project:</b>	The topic of this project was the formation of a solar system. We wanted to understand how stars and planets were born and to understand what happens to them when they die.
<b>Length of unit/project:</b>	This project was done over two days. The first day was spent learning about the concepts and using the compass to understand why the solar system matters to us as 8 and 9 year olds. The second day we used systems mapping to understand the causal relationships between collapsing clouds, gravity, pressure, space rock collisions, supernovas, and the creation or destruction of a solar system such as our own.
<b>Resources/materials &amp; setting required:</b>	Video about how a t-shirt is made, sticky notes, chart paper

## Lesson Plan/Description of the project:

1. First, we read “The Solar System” as written in the Literacy by Design Sourcebook. Any reading on the solar system would do. We used this information to create compasses with the solar system as the central idea. Students were able to relate the solar system to what they see around them, better understand why as a society we explore outer space, and understand how the greater galaxies actually do have an impact on their lives.
2. Next, we watched this documentary on the history of the solar system. It is a bit long for grade 3, so we broke it down into parts.
3. Students took the information they learned from this documentary and the books we had in the classroom and worked in groups to write down the various parts or nodes for systems mapping.
4. Once they had the various nodes written down, they attempted to create causal loops that would explain how it is possible that the universe continues to expand and even though stars are dying, new ones are being born. [While students were doing this, it would have been useful to have books or more detailed information so that they could learn about each step in the process of universe birth and death. It was difficult to keep the universe/galaxy/solar system difference straight and it may have been beneficial to closely examine the one to one relationships between each step. It was exciting seeing the students have a “circle of life” moment with our universe and seeing them realize that the explosion or destruction of matter is actually what creates new matter. In this way, using the causal loop was very helpful.]
5. Finally, students shared these projects with each other and discussed what pieces they may be missing and how they could improve their understanding of this concept.

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## Reflection

### Plusses:

- Students were able to see the process more clearly and could organize their thoughts efficiently
- Students learned that a linear explanation of events does not provide information about how this process continues to happen. They learned that the death of one star may not just mean the end, but rather the birth of a new solar system or celestial bodies
- Systems mapping helped meet the objective of understanding where our sun, planets, etc come from by making it easy for students to see the cycle in small pieces, leading to deeper conversations and understanding.

### Challenges:

- The language in this unit is very difficult for students to understand. I would have prepared them with better vocabulary beforehand, so that we could spend more time on the concepts and less on the words.
- We did the project just on desks, but spatially this may have made more sense to do on a whiteboard so they could draw in the links. Though students were aware of where the links may go, the visual representation of that arrow is really much more powerful.
- I would also want to have a larger variety of material present so that students could explore the steps that lead to the creation of a star/planet/etc. More time for these causal relationships would have fostered better understanding.

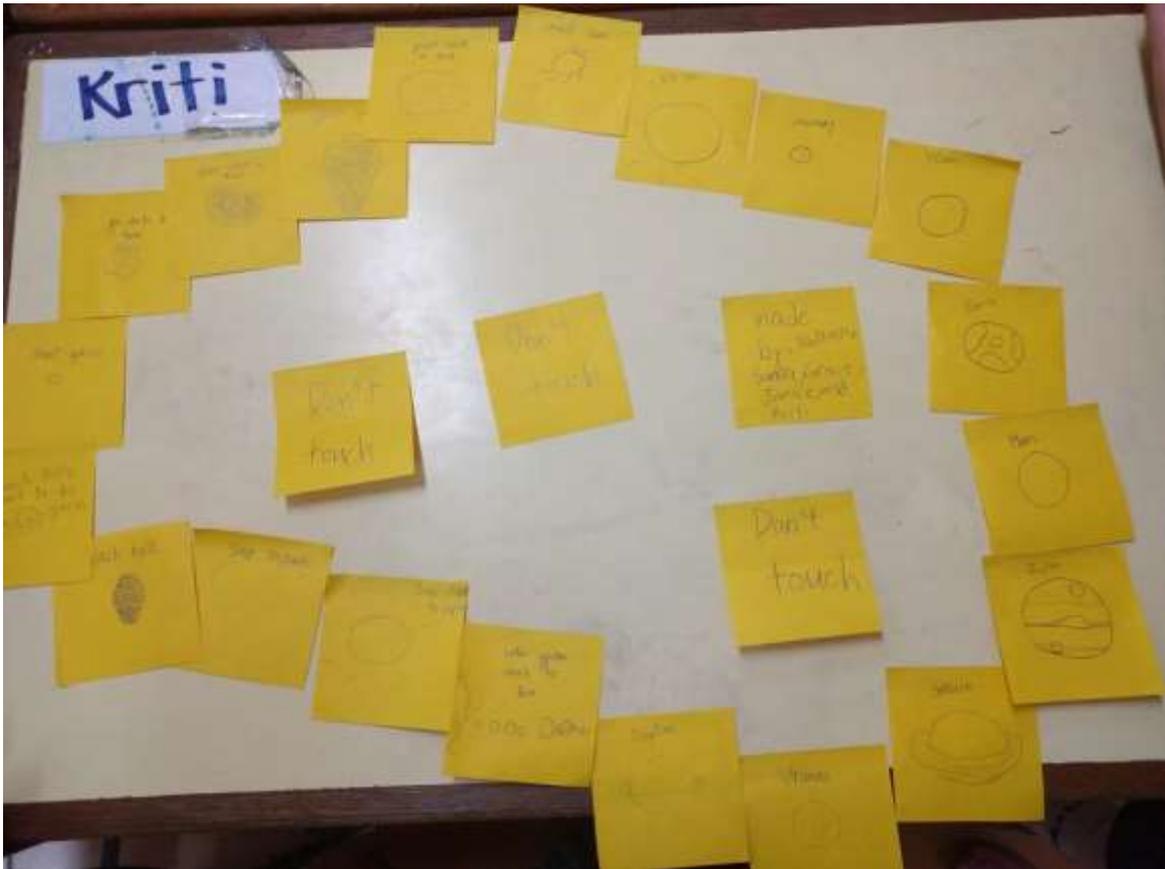
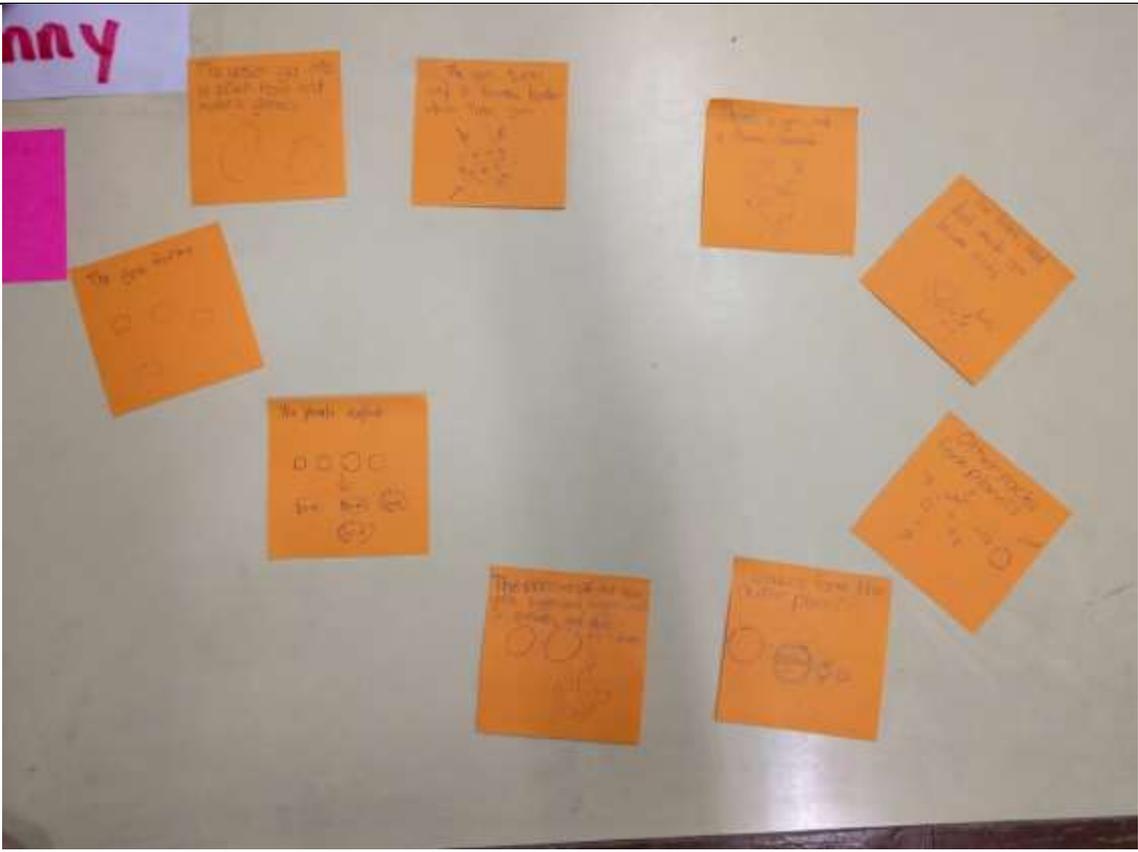
### Suggestions for other practitioners and educators:

This lesson is actually fairly simple and is a great way to stimulate discussion, check for individual understanding, and review concepts. Students were very excited by the idea that even when our sun dies, there is the possibility of new celestial beings forming. However, when using the causal loops it is easy to be overly optimistic and not demonstrate that this loop may, in fact, never be completed as we have yet to discover exactly what happens due to our limited technology, scope, and time. This lesson requires great perspective which is easy to lose when students (and teachers!) are excited about the concepts being discussed.

### Evidence and Resources

[Student Examples typed up for sharing and neatness](#)





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