
Session 12 – Modelling the Universe: The Sequel

General Description

This is a repeat of the first session where students were challenged to create a model of the universe. Now that students have participated in the sessions of the *Afterschool Universe* program, this activity will illustrate what students have learned about where we fit in the universe. As before, the activity has three major steps: discussion, modelling, and sharing models with the group. Students work in groups of three or four.

Objectives

- To revisit students’ understanding of the current scientific model for the structure of the Universe and the evidence that supports that model.
- To reflect on the concepts and activities covered in previous sessions.

Concepts Addressed

- Earth’s physical place in the solar system and Universe
- Astronomical size and scale

Materials

- Copy of *Universe Model Analysis Student Worksheet* for each group of students (included in Appendix E)
- A variety of crayons/colored pencils/markers
- Model construction supplies — these should be the same supplies (or as close as possible) that were used during Session 1
- Large sheet of sturdy paper on which students create their models — one per group
- Scissors, glue, and tape
- Models from Session 1 (or photos of them)

Other Requirements

- Enough table or floor space for several groups of students to work together on their models.

Session Overview

Students draw on the knowledge they have gained during the *Afterschool Universe* program to make physical models of the universe. They then analyze their own and others’ models with regard to what they represent and misrepresent, what they omit, and what questions they raise.

Students and the program leader also engage in a comparison of their original models and the new ones they create during this session. This will allow a discussion of how their ideas about the Universe may have evolved.

Preparation

- Make copies of the Universe Model Analysis Student Worksheet for each group
- Set out all listed materials equally among the groups

Activity

(Adapted with permission from the Cosmic Questions Educator's Guide)

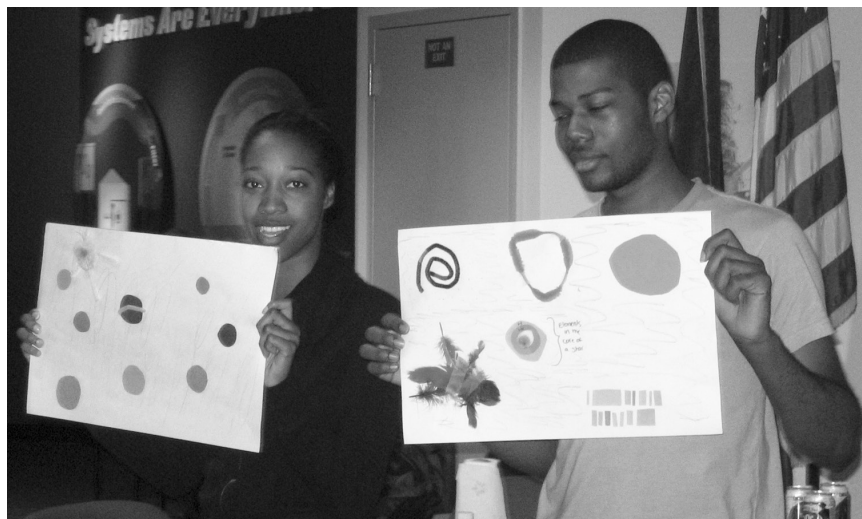
1. Lead a discussion about the modelling activity. Remind students of what they did in their first session.
2. Now challenge the students to create a model of the Universe based on all they have learned during the course of the *Afterschool Universe* program, showing the organization or hierarchy they have learned about. This activity is the same as before — with students working in groups of 3–4. Groups should decide among themselves who will fill the roles of Model Maker, Recorder of Model Features, and Spokesperson. Students may have more than one role, but all three must be filled.
3. As they work, the Recorder in each group should use the *Universe Model Analysis Student Worksheet* to list information about the features of their model, and any questions or other thoughts that arise on this topic.



A student model after they have gone through the program.

4. Now, ask the spokesperson in each group to present their model. As they do so, ask them to comment on these four questions:

- *What features of the Universe does your model represent?*
- *What things — that you know of — does your model misrepresent?*
- *What things — that you know of — does your model omit, or not represent at all?*
- *What questions came up as your group worked on your model?*
- *How does this model compare to the one you did at the beginning of the program?*



Participants comparing their models from Session 1 and Session 12.

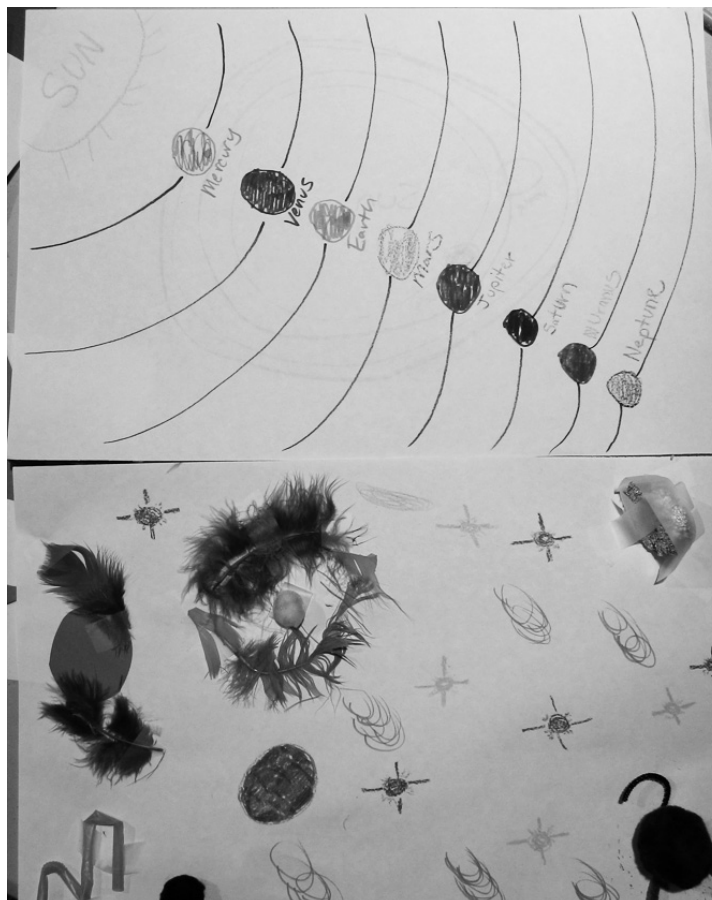
5. Use the following questions with the whole group to further probe students' understanding of their models:

- *Do you see any patterns?*
- *Which parts of the models do you think represent the “real thing” particularly well? Why?*
- *Which parts of the models do you think misrepresented the “real thing”?*
- *Are these models to scale or not to scale? Why?*
- *Why is making a model of the whole Universe so difficult?*
- *How can these models be used to predict what might happen in the Universe?*
- *What would an observer on Earth see if they lived in this Universe? (Where is Earth in your model?)*
- *What would you need to know to design a better model?*

These new models represent students' revised understandings of the universe, which should be thought-provoking for them and for you as the facilitator. During Session 1, we advised that there were no right or wrong answers in their original models - it was just the collection of ideas. This time, you should ask more probing questions about their models and what has changed, especially if the content seems contradictory to what they learned during the program.

For example, if they've put a galaxy in the middle of the solar system, ask, “Where is that galaxy?” and lead them through a recollection of what they learned about galaxies in Session 10. You don't want to put any students on the spot or make them uncomfortable, but it's

alright to challenge their ideas and ask questions wherever appropriate. Make sure that you understand why they've made their models the way they have - and make sure they understand, too.



One group's models from Session 1 and 12. Note the increasing complexity, and the expansion from just the Solar System to more of the Universe.

6. Make notes on students' ideas and how they have evolved from the first session. If you still have the models from the first session (or even photographs of the models), ask the students to comment on any similarities or differences between the two.
7. At the end of the activity, ***collect and save the model (or take a digital photo of them).*** You can compare them with their model from the first session to evaluate student progress.

Suggestions for Running this Session

- As much as possible, you should use the same supplies that you used in Session 1, as the types of supplies will affect what they think to put in their model. Likewise, you should try to have the same groups of people work together, whenever possible.