Emily’s Guide to Making a Facilitator’s Guide: Designing Science Outreach Activities

The goal of this sheet is to provide directions on how to create a descriptive explanation of your science outreach activity. It is important to include specific details regarding your own experience from implementing this activity. Having yourself experienced the process of trial and error while developing this activity, you will likely have developed a unique perspective on what works, what doesn’t work, and what others may be able to do better for next time. Developing your facilitator’s guide will ultimately aid others as they are able to use your activity to carry out their own science outreach projects.

This guide provides instructions for a facilitator’s guide with seven sections. Not all of these sections may apply to your activity, or you may wish to add information.

Things to consider when writing your guide
- Anticipate a variety of learning styles. Consider incorporating a combination of written material, verbal explanations, demonstrations, videos, and hands-on activities. If possible, it is desirable to use a combination of individual and group-oriented activities.
- Be clear and descriptive. Someone should be able to use your facilitator’s guide to carry out this activity without a need for any outside information. If something in your directions seems obvious, it is okay to state it anyway for clarity.
- The design of an activity is just as important as its content. Effective delivery is a necessity for students to be able to fully appreciate the content your lesson is delivering. Plan carefully.
- Anticipate student questions and comments. If there are topics that students are likely to be wondering about, prepare the facilitator to address them.
- Science is fun! Make sure to include elements that will make the learning more relevant and exciting. This might mean including some fun facts related to your concept or relating the activity to a topic that is of interest to students.

Elements to include in your guide

I. Activity title
Activity titles should be short but descriptive. You should include your name as the author of the facilitator’s guide. Identify yourself as a member of the Latham Science Engagement Initiative or another organization.

II. Activity Description
Include a brief description of no more than 100 words. Describe the concepts illustrated by this activity and the overall goals of the activity. How does the activity reinforce the concepts covered by this lesson? Include a suggested age group.
III. Learning Goals
List three specific concepts that will be covered by this activity. Identify the scientific phenomena that will be investigated in this activity. Specify skills that will be introduced or further developed by students carrying out the activity. Consider connecting one of these learning goals towards a topic of relevance in our everyday lives. You will also need to consider what topics will be considered age-appropriate for the group the activity is targeted towards.

IV. Science Standards
Using the Next Generation Science Standards (NGSS), identify the areas of content that your activity will address. The NGSS are a set of academic standards developed by educators, policymakers, and content experts. The standards are widely used by teachers to identify age-appropriate concepts and practices that students should engage with at each grade level. Relating your activity to these standards will reinforce crosscutting concepts and approaches that students have likely already been exposed to in the classroom. If your activity is ever used in a classroom setting, this will give more meaning to your activity. The NGSS can be found at https://www.nextgenscience.org/.

V. Background information
Your guide should encourage facilitators to identify prior knowledge students completing the activity are likely to have. A facilitator using your activity will likely encounter difficulties addressing variation in background knowledge across students. Additionally, even if students are supposed to have prior knowledge about a topic, this doesn’t mean every student will recall that information. It will almost always be necessary to be adaptive to these differences between students.

That being said, determine if there is any prior information that students doing this activity will absolutely need in order to be successful. For example, if your activity is to create a model of a cell and subcellular organelles out of food, students will not be successful without prior familiarity of what a cell is. In this case, the facilitator should address the concept of a cell before or during the activity. Relevance of the activity would be lost if these concepts were not first introduced or defined.

If it is relevant, consider writing a description of the language you used to discuss the concepts in your activity. As an example, if your activity is making slime with a group of first graders, write a description of what you said to explain that content in a way that the first graders would understand. You may have found yourself unknowingly using certain vocabulary words that the students were unfamiliar with, but then found that there were other concepts that they already knew which made the topic easier to explain. Write your description in terms of these concepts.

VI. Materials List
Provide a list of all of the materials you needed to carry out this activity. If there are certain brands you used, or if you had reasons for using a certain type of material over another, that may be relevant information to include. If materials need to be prepared
ahead of time, include information on that as well. Make sure to include materials that played a supportive role in your activity, even if not directly used in the actual activity. For example, if plastic ziploc bags made it easier to distribute a certain material to each student, this would be valuable information for someone hoping to carry out this same activity.

VII. Directions
Provide a list detailing the order of events that will be used to carry out the activity. Make sure to include transitions between events if those are relevant to the progression of the activity. What worked best, in your experience?

If your activity is longer than 20 minutes, consider if a “short” version would be possible as an alternative. Include a list of directions for both the regular-length and abridged version of the activity.

VIII. Facilitator’s notes
Include other relevant information about how best to implement this activity. Discuss any potential problems that the facilitator might encounter, based on your experience, and possible approaches to anticipate and circumvent these.

Describe methods that can be used to verify and assess student understanding. Include possible discussion questions that can be asked to strengthen understanding during the activity or after the activity is complete. Discussion questions can be comprehensive (testing what the student has learned during the activity) or can ask the students to extend their knowledge beyond the activity. Consider methods that will motivate students to engage in discussion questions.

Lay out a timeline for completion of the activity. How much time will the entire activity take to complete? How much time should be spent on each component of the activity? How much buffer time should be included, and for what purpose? Are there parts of the activity that can be sped up or slowed down, depending on how the activity is received? Are there parts of the activity that must be done in a timely manner? If working with a large group, how much time should be allowed for questions, and at what points during the activity?