**Best Practices Handout for SGF Fundamentals Training**

This list of facilitator behaviors and skills evolved from observations of actual introductory STEM courses at Brown University during the 2013-2014, 2014-2015, and 2015-2016 academic years. Please note: while the list represents a variety of situations and experiences, it is by no means a complete list of all the ways to facilitate well.

Best Practices

**Ask students to write their names on the board at the beginning of the session.**

*Why?* Breaks the activation barrier to writing on the board, and helps facilitators and other students learn names.

**Use questioning strategies (a.k.a. the Socratic Method).**

*Why?* Guides students through the problem solving process rather than simply providing an answer.

*Examples:*

* “Can you take me through your thinking on this problem?”
* “How did you arrive at your question? What is the sticking point in this problem?”
* If the student has offered an incorrect response, rather than saying “That is wrong,” try “What led you to that conclusion?” or, after working through the problem correctly, “In what situation would the answer you initially gave be correct?”

**Model board use for students.**

*Why?* Encourages students to follow your example and extend your work on the board after you have moved on to another group.

**Provide students space to struggle.**

*Why?* Encourages students to author their and their peers’ own learning, and builds comfort with uncertainty.

*Examples:*

* Let students discuss each other’s questions.
* Have students write on the whiteboard or explain to one another.
* Ask students to discuss as a team before calling you over.
* Spend less than three minutes with a team at a time (enough time to gauge their understanding and drop a hint if necessary before moving to next team).

**Give context-rich, real-world responses to student questions whenever possible.**

*Why?* Gives students a glimpse into the relevance of the subject in the real world, and helps students connect with the facilitator through sharing personal narratives about the subject.

**Encourage students by genuinely complimenting their work and effort.**

*Why?* Makes students feel as though they belong in the course.

*Examples:*

* “Your work looks great! I can see that you are approaching this as a scientist.”
* “Good effort so far. Let’s take a closer look at this step…” (good way to remain encouraging, but also address concerns with students’ work)
* Avoid praising the right answer for its own sake and replace statements like “That is right!” with statements like the first example above.

**Best Practices Handout for SGF Fundamentals Training (Continued)**

Behaviors to Avoid

**Try NOT to use controlling or condescending language because:**

* telling students exactly how to do something stifles their own creative processes and limits deep learning, and
* making students feel foolish reduces motivation and desire to persist.

**Try NOT to erase student work to replace with your own because:**

* it is a form of controlling language (see above).

*EXCEPTION:* Students have given their permission for you to erase their work.

**Try NOT to hover over students’ shoulders because:**

* it is the opposite of providing students space to struggle (see best practices);
* many students find hovering annoying or, worse, anxiety-inducing; and
* spending too much time with one team limits their deep processing and alienates other teams.

*NOTE:* If you find yourself hovering because there are not enough teams to keep you busy (e.g., three teams and two facilitators) you can send one of the facilitators home or consider rearranging staffing to better fit the session attendance.

**Try NOT to append “basically,” “simply,” “obviously,” etc. to your explanations because:**

* it is a form of condescending language (see above), and
* whatever you are explaining may not seem simple to students.

*NOTE:* Some people use these as spacer words (e.g., uh, um) to cover thinking time. Be aware and try to reduce usage if you do the same.

**Try NOT to ask questions like “Does that make sense to you?” or “Do you get it?” because:**

* they are risky for students to answer (students must verbalize their lack of understanding).

REPLACEMENT 1: Move focus to facilitator instead with questions like “Did ***I*** answer your question?” or “Was ***my*** explanation clear?”

REPLACEMENT 2: Move focus to content instead with questions like “Can you describe [insert concept here]?” or “What would happen if [insert concept here]?”

**Try NOT to use handheld electronic devices while facilitating because:**

* it makes you appear unavailable even if you are using the device for purposes related to the course.

NOTE: If you must answer a phone call, reply to a text message, or check your email, move to the hallway or outside of the room for clear separation from the session.

**Fermi Practice Problems for SGF Fundamentals Training**

Please form groups of four and work through the four Fermi practice problems below. Your group has five minutes to work on each problem. During this time, three group members act as “students” and one as the “facilitator.” Students work on problem while facilitator facilitates. While playing the role of facilitator, consider what we have just discussed about best practices and try some of them out for yourself (see Best Practices Handout). After the five minutes are up, rotate the role of facilitator and students and go to the next problem until all group members have been the facilitator at least once. At the end can ask facilitators how they might use these strategies in their class and share with group. Ask facilitators to reflect on part of the practice they found most useful and what they found most challenging. [Delete these instructions when handing these problems out for the actual activity.]

1. How many snow shovelers would take to clear the sidewalks on the Brown campus in 24 hours?
2. How many cars park on the Brown campus on a weekday in the summer?
3. How many MacBook Airs would fit under the desk at which you are currently sitting?
4. How many cups of coffee are consumed daily in the average academic building at Brown?

**Problem Solving Session Scenarios for Addressing Challenges Training**

You are co-facilitating a large problem solving session with several other people where students work in teams of three to solve problems from a worksheet packet. During a particular session, you observe the following scenarios:

1. One student is dominating their team. They are the only student speaking in the team, working on the whiteboard, and asking you questions. The other students in the team can be seen frantically writing as the other student dictates the problem to them.
2. A team of students is very quiet. They do not ask any questions or use the whiteboard.
3. All of the students in a team can be seen working on separate problems.
4. Two of the students in a team can be seen working on the same problem, but the third student is on a different problem farther into the packet.
5. Two of the students in a team can be seen working on the same problem, but the third student is on a different problem a few problems behind in the packet.
6. All of the students in the team you are working with are stumped by one of the problems and reluctant to move on until they solve it.
7. A student asks you a question and you do not know the answer.
8. A team of students is very loud and disruptive to others. They can be heard talking about a recent sporting event they all attended and are no longer working on the problems.
9. One student is overheard being rude to others and making inappropriate comments.
10. A student comes 20 minutes late and all the teams already have three students.

Choose one of the scenarios above and brainstorm a) how you would approach the scenario and b) how doing so might be difficult.