



Photo courtesy of the Pioneer Library System

You Don't Have to be a Sage on the Stage — Be a Guide on the Side for Effective STEM Learning

STEM (Science, Technology, Engineering, and Math) is so much more than memorizing a bunch of facts — it is a process of inquiry, exploration, and creativity!

To facilitate STEM programs, first let go of the expectation that you are a lecturing, all-knowing “Sage on the Stage,” or even a “Trivia Master” who asks questions pitched at recalling facts and simple “yes/no” answers. While these facilitation methods may be appropriate in certain contexts, such as giving safety instructions, they discourage participation from the learners. Allow participants to actively drive the learning by taking a “Guide on the Side” approach instead, using open-ended questions that have multiple “right” answers and playful activities that encourage deep thinking and exploration. Libraries are ideal places for this type of learning, since participants are not concerned about passing or failing grades as they are in school. Participants can dive into the fun side of exploring an activity by taking risks and engaging in lively discussions, all the while learning about STEM concepts!

“Guide on the Side” Best Practices:

- Create an atmosphere where learners aren't afraid to answer questions.
- Ask questions that access prior knowledge and experiences.
- Use “wait time” of approximately 5 seconds after asking a question.
- When providing feedback to participants' answers, comment on the process of how they came to that answer, rather than on whether it is “right” or “wrong.”
- Use probing questions to encourage learners to deepen their thinking.

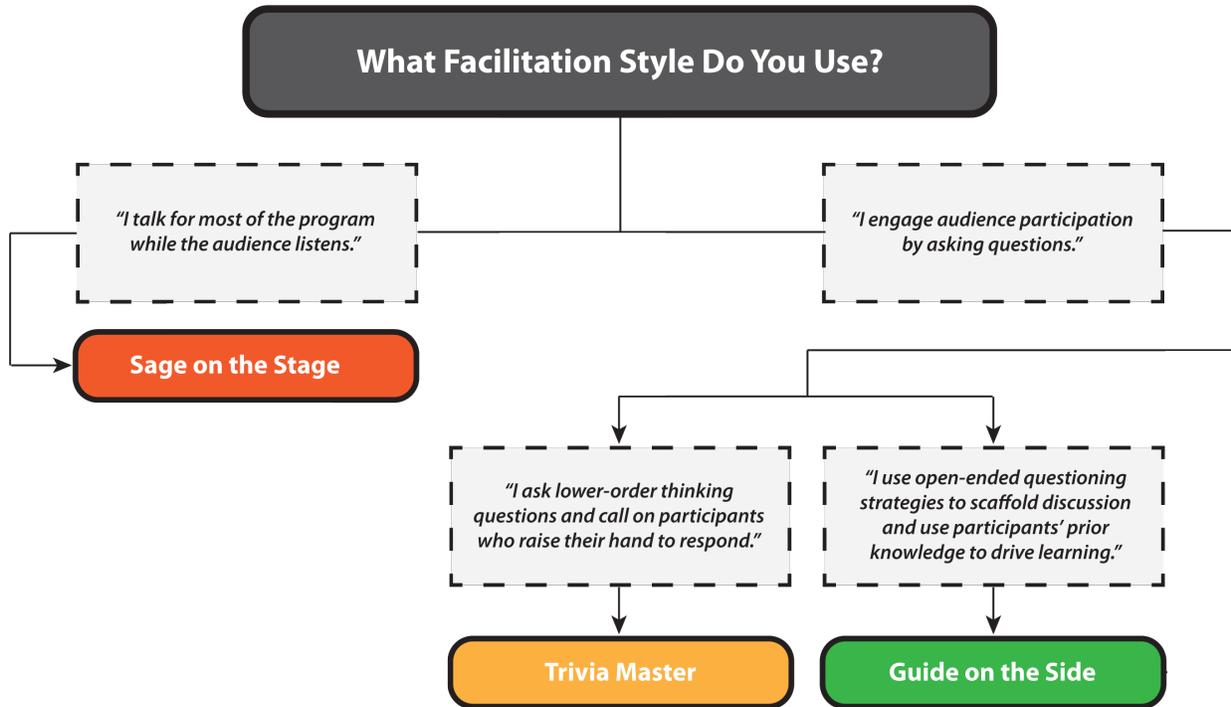
Avoid:

- Rapid-fire questioning, which can result in low-level cognitive thinking.
- Providing answers through rephrasing. This inadvertently reinforces the idea that the facilitator holds all of the knowledge.

Sample Questions and Prompts:

- Please turn and tell your family member or friend something you already know about <this topic>.
- Design this with your friend/caregiver. Help each other figure this out. Take your time. Work on this with your friend/caregiver and I will come back in a few minutes to see how you're doing.
- What do you notice about...? Can you tell me more?
- Can you show me how this works?
- I know how disappointed you were when your first design didn't work out. I'm glad you didn't give up.

What facilitation style did you use for your last program?



For more guidance on creating tween STEM programs, visit:

<http://www.starnetlibraries.org/resources/guide-on-the-side/>



The [Urban Libraries Council](#) and the Space Science Institute's National Center for Interactive Learning partnered on the Partners for Middle School STEM project. [HG&Co](#) provided evaluation. This initiative was made possible in part by an Institute of Museum and Library Services Leadership Grant (LG-95-18-0025-18).