

Paula Kluth

Toward Inclusiveness In Classrooms

This website is dedicated to promoting inclusive schooling and exploring positive ways of supporting students with autism and other disabilities. Most of my work involves collaborating with schools to create environments, lessons, and experiences that are inclusive, respectful, and accessible for all learners.

Readings



20 Ways to Adapt the Science Lab

Too often, students with disabilities, especially those with more moderate and significant disabilities, are excluded from the rich and complex experience of the science lab. This is unfortunate as many a teacher would argue that if students are not engaged in hands-on science, then they are not really “doing” science. In other words, science is about learning ideas and concepts, studying vocabulary, and understanding theories, but it is also about observation, exploration, and discovery.

Another reason to give all students access to lab work is to pique their interest and enhance their learning. It is widely accepted that students who participate in labs and other hands-on science activities will remember the material better and be able to transfer the learning across situations and lessons. Students who have learning difficulties or differences are often more on task during hands-on activities because there are typically a wide variety of ways to participate and the active and social nature of the science lab keeps students engaged. Finally, lab work helps all students hone social and communication skills, making it ideal for learners with disabilities who may need help with asking and answering questions, taking turns in a conversation, or knowing how to enter a discussion.

Having shared all of these benefits, many learners will need adaptations or modifications in order to be successful in a lab situation. Twenty ideas that can help you support diverse learners in your science classroom are offered here:

1. Be explicit about what you want students to know and do in each lesson and model what you want to see (e.g., language, behaviors, techniques) in the lab.
2. Post expected lab behavior on a poster or chart that is clear for all to see- (emphasizing safety guidelines). Draw students' attention to this information every time they work in the lab.
3. Organize your lab around “big questions” that all students can answer in some way. For instance, the question, “What is a rock?”, can be answered on many different levels. One learner will be able to show or give an example of a rock while other learners will learn that it is “consolidated mineral matter”.
4. Be sure to create very clear step-by-step directions for the lab. If needed, provide a checklist or even an illustrated checklist of steps.
5. Instead of pairing students alphabetically or randomly, think about individual needs to determine best partnerships. You might also give students a questionnaire to find out not who they want to work with but who they think they can work effectively with. Get suggestions from them but make the final decisions based on your observations. Some learners might have difficulty working with new or unfamiliar people. You may want to pair these students with a familiar peer.
6. Give different students different roles based on their strengths. For example, a student who is a strong writer might take notes for the group, while a student who enjoys public speaking might present the group's findings to the class. You can also assign roles based on student needs. For instance, an individual who needs more practice with social skills might be asked to serve as the group facilitator.
7. Some students may be better served by working across groups instead of within a group. For instance, if measurement is a skill you are targeting for a particular student, you might have him visit each group to measure and pour liquids. If calculations are a target skill, perhaps he can help each group check and re-check their work.
8. If the experiment or lab requires procedures that are complicated or has directions that are easily misunderstood, be sure to clearly demonstrate these pieces in front of the students.

9. If reading the supporting materials will be a challenge for one or more learners, consider simplifying the directions, highlighting key words, or adding icons, tables, or photos to the text.
10. If you work with students who struggle with the writing requirements of labs, allow all or some to use portable word processors or to speak observations and findings into a tape recorder or digital voice recorder.
11. Add additional roles or tasks for students who are working on individual goals that would not typically be addressed during lab. If a student is learning to use a new communication device, for instance, you might ask her group to allow her to direct or, at least, introduce the activity with pre-programmed messages on the device.
12. Look for a range of materials that diverse learners can access to understand the key concepts or ideas being explored in the lab. For a lab on dissecting frogs, for instance, you might have a plastic model of a dissected frog, books on frogs, and an on-line virtual dissection available to learners who need extra support.
13. Provide more durable materials, if needed. Plastic beakers might be a better choice than glass ones for some learners, for instance.
14. When necessary, incorporate adapted materials that help students with sensory differences (e.g., talking thermometers, laboratory glassware with raised numbers).
15. Use technology as a support for diverse learners. For example, digital cameras can help students record steps of an experiment. An iPad can be used as a tool for collaboratively recording data.
16. For those who need repeated practice or extra materials for review, you might record experiments and give them to certain learners to view. Or you can post parts of your labs on a classroom website or on a site such as TeacherTube.com.
17. Reduce the writing component of the lab work. Instead of asking for the purpose, materials, procedure, and the conclusion, you might have some students responsible for writing only the conclusions. Or you might prepare a set of guided notes (a map or outline of the lab notes) for some learners; these individuals would only need to fill in the blanks where content is missing or finish diagrams or charts that have been partially completed.
18. Allow students to report their findings in a variety of ways. They might choose from writing a description, drawing a diagram, or explaining findings to a peer.
19. If a particular student needs supplemental activities or supports, he or she might spend some class time away from the lab gathering information that can be brought back to the whole group. For example, a student might explore websites for visuals that can be presented to the whole group.
20. To challenge some or all learners, ask them to design a new lab or experiment.

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