



Science Centers for All

With diversity in classrooms across the nation increasing every year, teachers are more challenged than ever to equitably engage all students in high quality science activities. No longer is it unusual for elementary teachers to have students from different cultural, socioeconomic, physiological, and linguistic backgrounds in the same classroom.

Children's differences can present unique needs that may require adjustments of teaching environments and styles. But how can a teacher meet these special needs and still provide quality learning for all? We suggest it can be done by fostering cultural awareness and sensitivity among students through the use of science centers in the classroom.

As professors of education at Arizona State University West in Phoenix, we have seen the success of science centers through our work with children and preservice teachers and would like to share our experiences.

*Suggestions on
using classroom
science centers
to engage
every learner.*

By Leslie Irwin, Christine Nucci,
and E. Carol Beckett



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Celebrating Students' Differences

Science learning can be made more effective when teachers acknowledge and appreciate students' differences—whether they are gender, ethnic, exceptional, or other—and tailor classroom learning to embrace the differences. And science learning centers—designated areas in the classroom where students explore materials or objects and conduct open-ended science activities in a nonthreatening way—can be an excellent tool for teachers to encourage positive interaction among students of different backgrounds and ability levels.

At science centers, students can begin to develop understanding of topics from their own cultural perspective at their own pace. Typically, activities conducted at classroom science centers are open-ended in nature and address the current topics of study. Many times the activities focus on enrichment or concept review.

Teachers can drive the planning and creation of science centers that celebrate the diversity of the students in their classroom. Some ideas:

- Find books, resources, or information cards that identify positive contributions of individuals from the people of the same cultural backgrounds as the students in your class and create a science center that identifies them.
- Offer opportunities for children to investigate something from their backgrounds. For example, in a geology science center include samples of rocks indigenous to countries from which students come.
- Have students bring in cultural objects from home to investigate at a science center.

In these ways, students and teachers can learn about each other as they share their discoveries.

Working Together to Learn More

Depending on its purpose, a science center can involve either independent or group work. Group work at science centers particularly helps English language learners and students for whom language skills do not come easily.

For example, teachers might have a group of students with different backgrounds and ability levels work together to develop hypotheses and agree on those to pursue for experimentation. By working together at a science center, everyone in the group is an active participant in the project and feels "ownership" of the assignment.

Group work can also facilitate acquisition of both social and academic listening, speaking, reading, and writing skills, which can help to build students' self esteem. Often students' self esteem rises as their language skills increase, making them feel more a part of the class. Additionally, English language learners benefit by learning names and vocabulary associated with the objects found in the science centers through the manipulations and modifications of these materials (Kessler and Quinn 1987).

Access for All

The space allocated for a science center is another important factor in its success. An effective science center is accessible to *all* students, including exceptional students, those needing better interpersonal skills, English language learners, and others. There should be ample space for students to maneuver around, the materials should be available and within easy reach, and the center should not be disruptive to the classroom flow.

We've found it effective to set up a science center in a corner of the classroom or along the classroom's center wall space. There we've placed tables with three-sided cardboard dividers for displays—changed according to the topics of study—and room for two or

three chairs. This setup allows the teacher maximum flexibility—some children can be working at the science center while others are involved in teacher-directed learning in the rest of the room.

Times for students to work at the science center can be scheduled in various ways, such as during regular science instruction; during individual time (i.e., when other tasks are completed, such as a “free time” choice); or, if a teacher is available to supervise, prior to and/or after the scheduled school day. The key is making sure all of the students have an opportunity to explore the materials at the center at one time or another.

Diversity in Materials

Careful selection of culturally or age-appropriate activities and materials is also vital in providing meaningful experiences for students at science centers. To ensure that the center reflects the diversity of students in your classroom, provide a wide variety of materials from children’s surroundings, including some familiar and unfamiliar cultural objects or artifacts. One suggestion might be to ask students to bring in some interesting objects from their own homes to investigate at a science center. Such an activity would give all students an opportunity to share something important from their own backgrounds.

Some common science center materials might include bamboo and gourds (for creating sound); empty cans and strings (for making string telephones); and paper, sticks, glue, rubber bands, paper towel tubes, and bottle caps (to create items such as kites, periscopes, or pinhole cameras, that demonstrate scientific concepts).

Provide materials that children can manipulate in any manner without concern for destruction or cost of replacement and that can be modified with any possible imagination. These experiences with household items turned into “experimental” objects may be the ones that help students learn basic science approaches.

Simplicity in Directions

Another element that is important to the success of a science center is clarity in instruction. Be sure that the center includes clear directions for the activity and rules of conduct at the center. Providing activity sheets with icons illustrating the scientific terms or the steps of the activity are helpful to children who are not fully fluent in English.

Tape recorders and tapes containing information about the center topic will provide auditory lesson review for English language learners, sharpening their listening comprehension at the same time.

Finally, providing a selection of books with both illustrations and text allows all students to expand their field of information gathering.

Benefits for All

Children are captivated by scientific investigations and describe what they observe in language characteristic of their background, experience, and level of development. These include reactions of disbelief, invitation to other students to come see what is happening, taking ownership for results, calling the teacher’s attention to something “weird” happening, and wanting to do the activity over and over for the sheer joy of it.

It is through these types of activities that children develop such skills of scientific inquiry as classification, comparison, communication, inference, prediction, measurement, use of numbers, space/time relations, conclusions, and observation, thereby discovering the natural scientist within them. Through such learning processes, children are able to formulate knowledge, attitudes, behaviors, and views of the world in which they live.

Classroom science centers allow children to collaborate and be instrumental in their science learning—an ongoing process they create to investigate and understand their environments. By encouraging and providing equal opportunities for all students regardless of ethnicity, gender, language, class, and exceptionalities, the pursuit of science can be a motivating and exciting experience for all involved. In these situations a sense of acceptance, belonging, and cooperation exists among the students. Ultimately, the sharing and cooperation among students at science centers culminates in the learning of science.

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Resources

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