

Groundwater education infiltrates Wisconsin's classrooms: Ten years of providing models and training to educators



“The value of this program is endless. Not only have I learned new things, but the students have a better understanding of many concepts including the desire to take better care of a precious natural resource.”

- Past workshop participant

Situation

Wisconsin relies heavily on groundwater supplies to provide water for its citizens and many important industries. For nearly 90% of Wisconsin communities, groundwater is their primary water supply. Groundwater also represents an important supply of water for the states lakes, rivers, streams and wetlands.

Groundwater is often referred to as Wisconsin's "buried treasure". Not the mysterious resource that some people believe it to be, groundwater is a local resource water occupying void spaces in the soil and rock below the land surface that is replenished by the rain and snowmelt that infiltrate the earth. Many everyday activities that we do on the land surface have the potential to impact the quality and quantity of our groundwater resources below.

Educating the public about the basics of groundwater and important issues is a necessary strategy to foster informed groundwater management decisions that help preserve our high quality of life and maintain a strong economy.

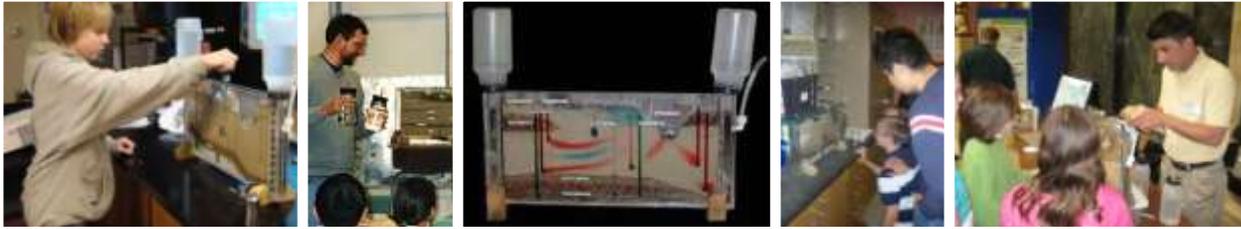
Response

One of the best tools to educate people about groundwater is the sand-tank groundwater model. The sand-tank model is a highly visual teaching tool that represents a cross section of the earth and allows people to see how groundwater moves through the soil and rock layers below us. By adding colored dye to simulate pollutants, or pumping wells to simulate groundwater withdrawals; viewers are better able to visualize and understand complex groundwater principles.

For the past 10 years, UW-Extension's Center for Watershed Science and Wisconsin Geological and Natural History Survey have been teaming up with the Wisconsin Dept. of Natural Resources to get sand-tank groundwater models into the hands of Wisconsin educators. Since 2001, using funding from an EPA grant, we have awarded nearly 250 models to Wisconsin schools and nature centers. In addition to receiving the sand-tank model each school also sent two teachers to attend a day-long workshop to receive training on using the model and effectively integrating groundwater into their curriculum.

In the spring of 2010, an electronic survey was emailed to all past participants of the workshops. In the survey, participants were asked how the model is being utilized, how many students are exposed to the model and identify problems that have developed





with the models. The survey also asked for respondents' opinion to a series of questions regarding the sand-tank model and its utility as an instructional tool.

Outcomes

Nearly 30% of those invited to participate in the online survey, accessed the link and answered all questions.

The information collected through the survey has provided useful information on how the models are currently being utilized and participant's satisfaction with the sand-tank groundwater models as an instructional tool:

- 92% of those who responded indicated that models are still operational and being put to use educating students.
- Nearly 1/3 of respondents have trained one or more of their colleagues on using the sand-tank groundwater models.
- Over half of respondents indicated using the model to teach 100 or more students each year about groundwater.
- More than half of respondents indicated that students are exposed to the sand-tank model 4 or more days each year.

Importance as a teaching tool

Based on survey data, 90% agree that the sand-tank model is a

necessary instructional tool for teaching about groundwater.

When asked whether if they agreed that traditional teaching methods were *equally* as effective for teaching students about groundwater, 88% disagreed.

Improving student understanding

Respondents indicated that students are actively engaged while they use the sand-tank model in the classroom, 95% agreed with 65% indicating that they strongly agree.

When asked to show their level of agreement to the following statement "My students understanding of groundwater principles and issues would be the same if I did *not* incorporate the groundwater model into the curriculum", 72% disagreed.

Quality of instruction

Over 80% of respondents said that the sand-tank model has increased their own understanding of groundwater principles.

Meanwhile, 90% indicated that their confidence in teaching about groundwater has increased as a result of the model and their attendance at the workshop.

Summary

Overall a large percentage of models are still being put to use in Wisconsin's classrooms. Satisfaction with the model is high, and there is a preference amongst

educators for the hands-on visual approach of groundwater education that is made possible by the sand-tank model. With the large number of models that have been and will hopefully continue to be awarded; the number of students who will learn about groundwater using the models continues to grow each year.

These results clearly show the sand-tank groundwater models and workshops have enhanced the quality of education as it relates to groundwater concepts. Enhanced understanding of groundwater concepts is an important to groundwater management. The sand-tank models and these workshops have been extremely successful at educating students and adults alike, helping to dispel many previously held myths regarding groundwater that continue to make managing the resource a challenge.

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