



CALL FOR PARTICIPATION!

In cooperation with Eastern Suffolk BOCES, Education Development Center's Center for Children and Technology (EDC/CCT) is looking to work collaboratively with **five motivated seventh-grade science teachers from participating Model School Districts** and their students to get their feedback on an environment that uses hand-held **Nintendo DSi** games to support science learning. EDC/CCT recognizes that the only way to create educational games that are both compelling for students and useful for teachers is to involve them in all stages of development. In 2008 EDC/CCT received a grant from the Department of Education to develop *Possible Worlds*, a series of game modules that involve students in compelling problem-solving scenarios that address some of the key science misconceptions with which many middle school students struggle. We are looking to partner with **middle school science teachers** to field test the first module in their classrooms during the **2010-11 academic year, and possibly for the 2011-12 and 2012-13 academic years as well.**

Learning goals for *Possible Worlds* Module 1

The key benefit of introducing the DSi game and classroom activities into traditional instruction is that they will provide students with concrete, experience-based visualizations of a difficult and abstract concept—that in a chemical reaction atoms re-group into different configurations, creating different kinds and sometimes different states of matter, thus providing support for the notion of conservation of matter.

Using photosynthesis, respiration, artificial photosynthesis and combustion as a context, the underlying misconception we are trying to help dispel is that chemical change is the result of a separate change in the original substance, or changes—each one separate—in several original substances. For example, students often believe that photosynthesis is a process that transforms soil into a different kind of solid, such as wood or fruit, rather than the counter-intuitive but correct idea that gas becomes a solid in the presence of light and water. The specific ideas we are addressing in this first module are: (1) common materials interact to form new materials; (2) when two or more materials are combined, they may retain or lose their original properties; and (3) properties of a material made from combining two or more other materials may be the same as or different from the original materials.

Structure of *Possible Worlds* Module 1

The module consists of three parts: (1) a Nintendo DSi game, (2) a classroom activity, and (3) a teacher guide.

1. The DSi game. The game provides students with the opportunity to create chemical change, using the same input of energy, carbon dioxide and water to produce different substances, such as food and fuel, in the context of an adventure game in which players explore a vast cave to find gold. The educational purpose of the game is to provide students with a visual and visceral metaphor for how such transformations occur.
2. The classroom activity. This activity builds on the DSi adventure game, but adds a level of argument-making that is collaborative in nature and supervised more directly by the teacher. Student teams will be asked to construct arguments about how chemical changes might explain fictional occurrences, using evidence furnished in downloadable and printable forms on a website. This activity will encourage students to explore how the chemical change processes they effected in

the DSi games might explain the events presented in the classroom game scenarios. This activity is an opportunity for students to demonstrate their understanding of that chemical-change process in a science fiction context, extracting and solidifying the ideas they encountered in the game.

3. Teacher support materials. The teacher guide will provide a pedagogical overview and rationale for the use of games as teaching tools. It will also provide concrete examples of how to link the DSi game experience to in-class discussions, textbook readings, or hands-on activities. We will help teachers pose questions about the target content that will make direct ties between the game mechanics and events in the game narrative to help the teacher sustain students' focus on the transformation of matter that underlies chemical change. We will also provide teachers with concrete examples and language for discussing the difference between nature and science fiction. We will provide new materials and links to other existing web-based materials that reinforce the concepts presented in the games. In addition, the teacher guide will include logistical and classroom-management hints, from suggestions for "contracts" students and parents can sign in order to take home a DSi, to assessment opportunities built into the games.

Research plan for Module 1 field tests

During the **2010-11 academic year** we will be conducting field tests of *Possible Worlds* Module 1 in middle school science classrooms in the Northeast. In the following two years we will be conducting classroom field tests on additional modules. EDC/CCT researchers will work closely with participating teachers to tailor an intervention that fits into their existing curriculum. Participating teachers will take part in a **three-hour professional development session in August of 2010** that introduces them to the game, and shows them how to integrate the game and classroom activities into their curriculum.

During the point in the school year when the intervention takes place, researchers will make regular visits to the classroom on the days when the game is played and related classroom activities occur. We will conduct observations and interviews, ask both teachers and students to complete a survey, and ask students to complete an assessment. The data gathered from these field tests will help us revise the classroom and web-based instructional support materials and the teacher professional development. We anticipate that the intervention will take 12 hours of a teacher's time beyond normal work hours, and will take 8 hours of class time.

The research team will provide stipends of \$900 each year to teachers who fully participate in the study and provide all necessary feedback. We will also provide the Nintendo DSi devices needed for the study.

Informational meetings

We will be holding two meetings at **Eastern Suffolk BOCES** for those teachers interested in participating in this research,

March 23 from 3:30-4:00, Virtual Meeting: We will provide an overview of the study and will answer questions you have about participating. Please register at <http://webreg.esboces.org>.

April 27 from 3:30-4:30, Face-to-face Meeting: We will provide further details about the game, study participation, and the professional development session. Please bring your summer calendars to this meeting. Please register at <http://webreg.esboces.org>.

We are very excited about this proposed project, and hope to find schools and teachers who will be equally excited and motivated to work with us.

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