

Flexibility of Use

You can tailor the Materials World Modules to fit the time you have, the teaching style you prefer, and the abilities of your students.

Time

The Smart Sensors module was designed to be completed in eleven to twelve class periods. If you have more time, you can extend time for projects and class discussion. If you have less time, use the chart below as a guide.

If you have	Activities	Design Projects	Homework or Extra Credit
11 to 12 class periods	1 Evading Motion Detection 2 Taking a Tour of Some Sensors 3 Making a Microphone 4 Exploring the Piezo Effect: The Inside Story 5 Measuring Piezoelectric Response	1 Designing a Coin Counter or 2 Designing a New Sensor	The Design Project not done in class
9 to 10 class periods*	1 Evading Motion Detection 2 Taking a Tour of Some Sensors 3 Making a Microphone 5 Measuring Piezoelectric Response	1 Designing a Coin Counter	4 Exploring the Piezo Effect: The Inside Story 2 Designing a New Sensor
6 to 8 class periods*	1 Evading Motion Detection 3 Making a Microphone 5 Measuring Piezoelectric Response	2 Designing a New Sensor	2 Taking a Tour of Some Sensors 4 Exploring the Piezo Effect: The Inside Story 1 Designing a Coin Counter

* If you skip Activities, you may wish to introduce relevant information by demonstration or explanation.

Teaching Style

The Materials World Modules are patterned after the inquiry method of learning, in which students generate questions about a subject and find ways that they can answer those questions. However, the format is very flexible, and you can adapt it for your own use. For example, you can use the

questions in the gray box on the first page of each Activity as examples of questions students might ask before starting the Activity. As they do the Activity, they can generate their own answers. Another way to use these questions would be to list them as objectives and have stu-

dents answer the questions after completing the Activity. Making predictions about Activity outcomes can increase students' motivation to do an Activity. And reflecting on previous predictions can help students gain insight into their unfolding understanding of science concepts. Students can

Classes of Varying Abilities

The Activities in the Smart Sensors module were designed and tested by high-school teachers for use in their science and math classes. Students find the ideas presented in the module new and exciting. They can quickly and easily relate what they learn from doing the Activities to things they see around them. They enjoy the independence of designing, building, and testing something on their own.

Students of all abilities can gain from the Smart Sensors module. If you have classes with students who have higher-than-average abilities or lower-than-average abilities, you can tailor your teaching to suit individual classes or individual students. Your own experience will certainly be your best guide, but the tips below may also prove useful.

With Advanced Students

- Plan the Activities as open activities, in which students design their own ways of finding answers to the questions posed. Tips in the margin notes of the Teacher's Edition give specific suggestions.
- Challenge these students to try out their own ideas for procedures and data collection.
- At the predictions and/or reflections stage, ask students to take turns leading class discussions.
- Have students set up and keep their own design logs, allowing them a large degree of freedom in their work.
- Have students do both design projects, perhaps doing the second project on their own, for extra credit.

With Students Who Need Extra Work on Academic Skills

- Because of the hands-on nature of the Activities and Design Projects, many students who tend to have trouble with science enjoy the module and do very well. Here are some additional suggestions for supporting these students:
- Do fewer Activities, but take extra time to discuss questions students have during each Activity. Help students clear up uncertainties they have about definitions, procedures, and collecting, recording, and interpreting data.
 - For each Activity, focus on two or three key questions.
 - When discussing abstract ideas, always refer to concrete

examples and give students a chance to ask questions about the examples. Bring in physical models that students can look at and handle whenever possible.

- Have students use the Design-Log Sheets provided in the Black-Line Masters. These leave ample room for experimentation with materials, but provide enough structure for students who may need extra guidance.
- Foster a positive, cooperative environment in the classroom. Encourage students to help one another in all aspects of the Activities and Design Projects—setting up and carrying out procedures, making observations, cleaning up, interpreting data, and formulating explanations.