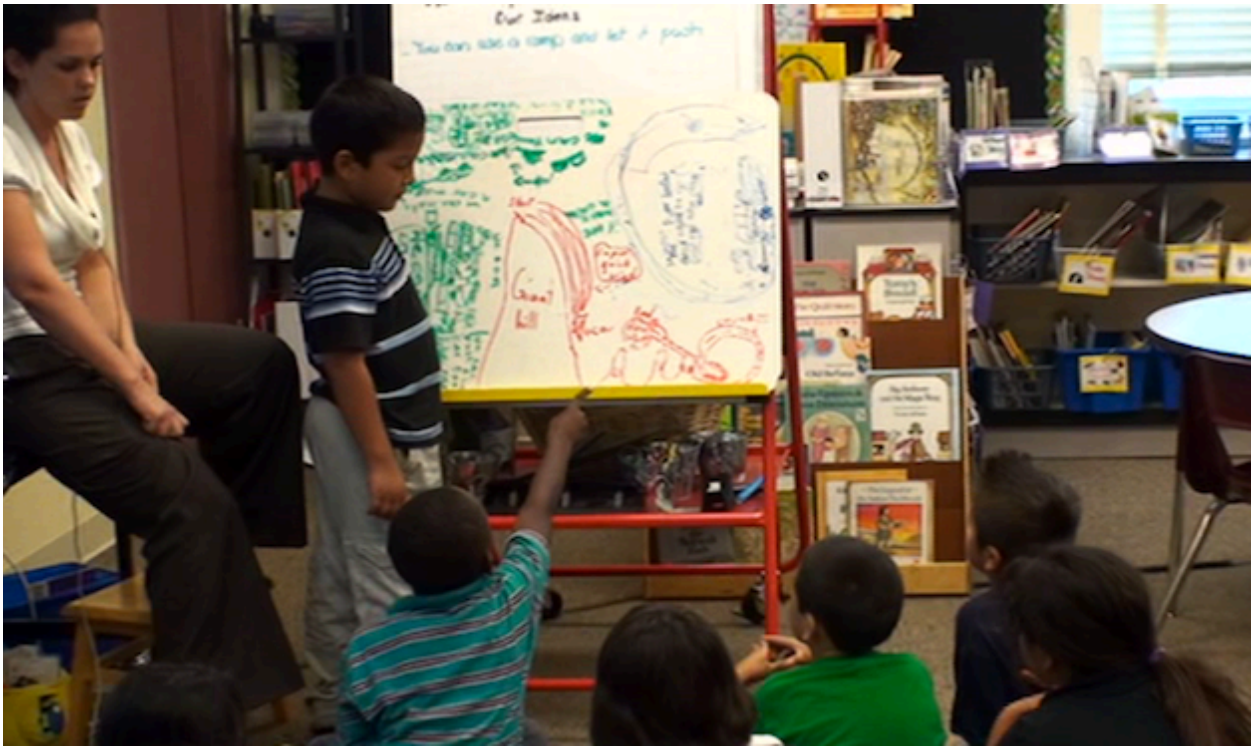
A Responsive Curriculum: Toy Cars

From Responsive Teaching in Science: http://cipstrends.sdsu.edu/responsiveteaching

Responsive teaching places unique demands on curriculum. While the teacher may start with a set of goals and a sense of where things might go, the 'enacted' curriculum emerges from the ideas students suggest and the next move decisions the teacher makes based on those ideas. At the start of an implementation of *toy cars,* students discuss various ways to make a toy car move. Over several subsequent class periods, this initial seeding of student ideas leads to discussions about motion, forces, and energy, driven by the students' substantive engagement in scientific inquiry. In the Responsive Teaching Project, we have closely monitored several implementations of toy cars, and have found that, despite the contextual nature of the enacted curricula, students in all the classes share many common ideas, and they engage in similar kinds of classroom activity (although usually in different sequences). In this section of the website, we describe several such implementations, focusing in particular on the students' ideas as they emerge and the next move decisions that the teachers make. In our responsive teaching in science project, *toy cars* was implemented in second-, third-, and fourth-grade classrooms.



A student in the class asks a question about an idea the presenting student has about a car moving along a series of hills and ramps, while the teacher (Sharon) looks on from the left.

Launching Activity: How Can You Get a Toy Car to Move?

Begin the toy car module by presenting the scenario below.

"How can you get a toy car to move?"

Menu of Possible Follow-up Activities

The curriculum begins with the **launching activity**, **How Can You Get a Toy Car to Move?**. Depending on the ideas that emerge in that discussion, and your assessment of them, there are many possible next moves and follow-up activities. Below are links to follow-up activities that might be appropriate for your class. They are listed in four categories: *Organizational* (some general strategies for dealing with a list of ideas), *Exploring/ Discussing* (using regular toy cars with additional equipment, or toy cars that work by some specific mechanism), and *Issues* (these may arise in class conversation and may be worthy of significant time spent on them). Each 'activity' can last from 30 minutes to several hours.

Although your whole class can be engaged in any one of these activities, there are several that 'go together,' so you can assign different groups to different activities. For example, each of the *Exploring/Discussing* activities can be done as a whole-class activity, or you can also assign different types of toy cars to different groups and have each group share what it learned with the rest of the class. Links from each activity (that is currently highlighted) takes you to a page where you can link to one or more examples of the implementation of the activity.

Though most of these follow-up activities can be done in any order, there are some that would naturally follow others. To give you a sense of how some activities may follow from others, our website provides the enacted trajectories of activities for eight different implementations of the toy car module.

Organizational	Exploring/Discussing	Issues
Making Ideas Clear and Precise (in a list)	**Exploring Regular Toy Cars**	**Faster versus Further**(How do you know who wins the race?)
Combining (or Grouping Similar) Ideas	**Ramps**	**Lighter versus Heavier**(Effects of Weight)
How to Make Other Toy Cars Move	**Rubber Bands**	**Fair Test**
	Fans	**Surface Effects**
	Magnets	**Energy**
	Pullback Car	**Lab & Real World Connections**
	Windup (or Key) Car	**Gravity**
	Propeller (or Air) Car	
	Balloon Car	
	Battery Car	
	Solar Car	
	Combined Activities	