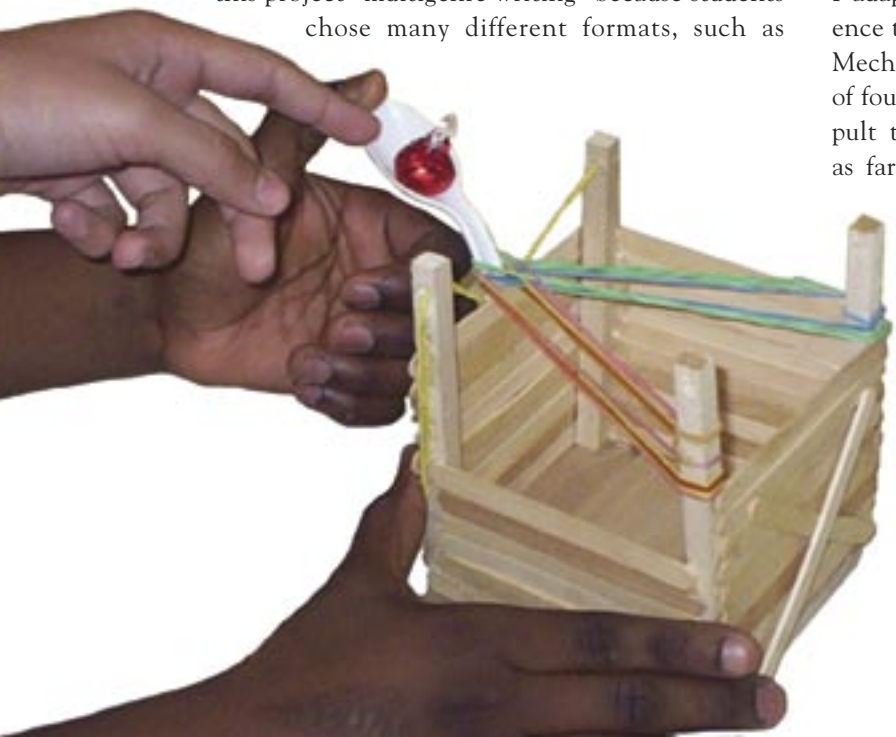
Multigenre Lab Reports

Connecting Literacy and Science

by Leonora Rochwerger, Shelley Stagg Peterson, and Theresa Calovini

The development of communication skills is a key component in any science program. However, I have often found that students do not see the connections between writing and science. In particular, I have experienced students' lack of enthusiasm when the time comes to write lab reports. Students say that they do not see why they should have to write dry, boring lab reports following an enjoyable hands-on activity or lab. This deepens the perceived disconnection between writing and science.

Recently, we conducted an action research project that provided students with alternatives to traditional lab report writing. Students used whatever genre they thought would best communicate what they had learned in a science unit. Basing our project on the work of Grierson, Anson, and Baird (2002), we called this project "multigenre writing" because students chose many different formats, such as comic strips and stories, to show what they had learned in a catapult unit.



The hands-on activity

I adapted an activity that had been used by other science teachers in my school as part of the "Structures and Mechanisms" strand of the science curriculum. In groups of four, students designed and built a popsicle-stick catapult that launched small chocolates (Hershey's kisses) as far as possible—an assignment we called Throwing Kisses. Students had to maximize distance and accuracy because their catapult needed to knock down a LEGO prince sitting on a cardboard castle. After five catapult attempts, students received a number of chocolates to take home equal to the number of successful hits.

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All hands-on work was done in class. We used one class period to form the groups of four, introduce the project, and explain how the evaluation would be done. As a way to add excitement and help visual learners, I also showed videos with catapults in action (see Resources).This was followed by a computer-lab period in which students did research on catapults (see Resources) and then four, 50-minute class periods for the construction and testing of the catapults.

For the construction, students were only allowed to use popsicle sticks, white or wood glue, rubber bands, plastic spoons and one additional element of their choice. All construction was done in the classroom with simple hand tools. They were required to use safety goggles throughout the building activity. Students had been introduced to safety considerations using hand tools at the beginning of the year. (See Resources for suppliers of technology tools for the classroom.)

The catapults were tested in the hallway and a tape measure was used to measure the distance traveled by the chocolates. Because the catapults were not very big, they could be easily manipulated and stored.

The multigenre lab report

To introduce to students the concept of *multigenre*, I brought in examples of different approaches to communicating information (e.g., newspaper articles, recipes, letters, and postcards). After students became familiar with the concept of multigenre writing, we discussed what a multigenre lab report could look like. Together we came to the conclusion that although it did not have to take the form of a lab report, their multigenre writing should include information that would normally be in a lab report. I then distributed the lab report handout (see sample at right).

Demonstrating learning

While I wanted students to enjoy and be motivated by this project, the critical part was that they clearly and accurately represented the science involved. I evaluated the students' learning on the final project using multiple forms of assessment: checklists of individual participation, group and peer evaluations, and a rubric based on the necessary information about catapults and student creativity (see rubric in Figure 1).

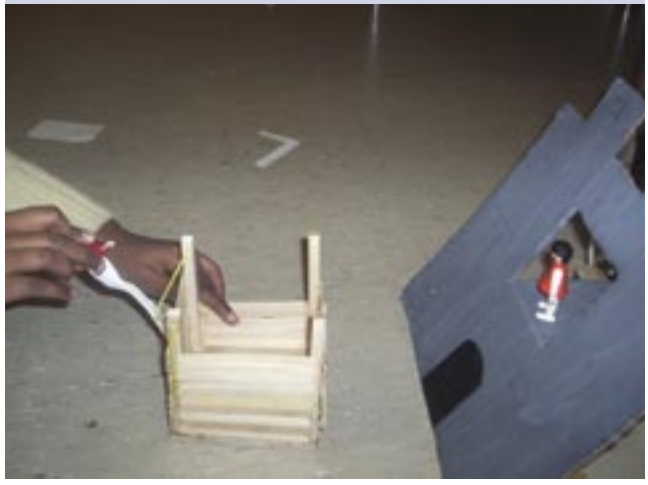
Students' multigenre writing took the form of comic strips, video scripts, fiction stories, and even a puppet show. Students were clearly proud of their final work and we all laughed and enjoyed listening to these presentations. The purpose of these presentations was to provide an opportunity for students to share and appreciate each other's work.

Throwing kisses lab report

Because this is a multigenre lab report, you may choose any style (i.e., cartoons, comic strips, storyboard, or newspaper article) to communicate what you did. You may use more than one style. There will be bonus marks for creativity, so be as creative as you can! The following must be included in your lab report:

- Title—In big bold letters; a cover page wouldn't hurt.
- Purpose (or Question or Problem)—What you wanted to find out.
- Hypothesis—What you thought would happen and why.
- Procedure—Materials (what you used to build your machine and measure the results) and method (what steps you followed to build and test your machine; diagrams with labels should be included).
- Observations—Charts and tables with the results obtained and graph(s).
- Conclusions—Include answers for the following questions: What type of simple machines are included in your catapult? If a lever is part of it, which class is it? Why? Calculate the mechanical advantage of your machine and show the calculation. How did the class lever you chose and the mechanical advantage of it affect the results you got? Was your hypothesis supported? How? What would you do differently if you had more time?
- Sources—Where did you obtain information about the topic? List books and websites you consulted.

One report per group must be submitted. I suggest that you divide the work among group members. You will have three, 50-minute in-class working periods to complete this lab.



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They were done in a rather informal way, with no specific guidelines other than the time, which had to be within 5–10 minutes. Students varied in how well they were able to articulate the science of catapults. For example, one group, in their earliest discussions, clearly stated that the purpose of the project was to "show the use of the catapult." This group decided to build a news report around the three musketeers and an evil King Hershey. This group incorporated many aspects of the traditional lab report into the final piece. After introducing the characters—the evil, chocolate-loving King Hershey, the tax-burdened villagers, and the three musketeers who assisted in killing the evil

FIGURE 1 **Rubric for multigenre lab report**

Category/Criteria	Level 1	Level 2	Level 3	Level 4
INQUIRY PROCESS				
Problem	• not clearly stated	• stated vaguely in teacher's words	• stated briefly in student's words	• stated precisely in student's words
Hypothesis	• poorly stated	• general hypothesis stated	• general hypothesis stated and "if/then" format used correctly	• general hypothesis stated and "if/then" format used correctly with a reason given
Materials and method	• very incomplete	• somewhat complete but not detailed	• complete	• complete and very detailed
Observations	• very incomplete	• somewhat complete but not detailed	• complete	• complete and very detailed
Conclusions	• shows understanding of few of the basic concepts • gives explanations showing limited understanding of the concepts	• shows understanding of some of the basic concepts • gives partial explanations	• shows understanding of most of the basic concepts • usually gives complete or nearly complete explanations	• shows understanding of all the basic concepts • always gives complete explanations
COMMUNICATION Communication of required knowledge	• communicates with little clarity and precision • rarely uses appropriate science and technology terminology	• communicates with some clarity and precision • sometimes uses appropriate science and technology terminology	• generally communicates with clarity and precision • usually uses appropriate science and technology terminology	• consistently communicates with clarity and precision • consistently uses appropriate science and technology terminology
MAKING CONNECTIONS Relating of science and technology with the outside world	• shows little understanding of connections between science and technology and the world outside the classroom	• shows some understanding of connections between science and technology and the world outside the classroom	• shows understanding of connections between science and technology and the world outside the classroom using one or two examples	• shows understanding of connections between science and technology and the world outside the classroom using several thoughtful examples
CREATIVITY	• poor creativity in the use of the genre of choice	• some creativity in the use of the genre of choice	• good creativity in the use of the genre of choice	• outstanding creativity in the use of the genre of choice

king—the students described how the catapult was made from "low-tech materials such as glue, giant popsicle sticks, and massive iron strings." The musketeers donated elastic bands, magnets, and gravity. The group described in detail how the catapult was constructed and how it was tested. They included a table and graph of the test results. In the end, the villagers lured the evil king into an abandoned castle with chocolate, which the musketeers catapulted with a "giant shower of rocks" and "the abandoned castle quickly fell apart."

In comparison, another group did not incorporate the science into a story. This group spent most class periods creating characters, such as Glueman and Popsicleman, from the in-class materials. Their final project had two distinct parts. The first part was a video of the student-generated characters helping a prince catapult his way into a castle where a princess was being held captive. There was no explicit direction on how to build or test a catapult. The second part was a traditional written lab report with sections on materials, methods, and data. This group failed to interpret the data both in the video and the traditional lab report.

Assessing the success

In response to student feedback, we continue to consider these questions:

- How can a teacher encourage students to expand their thinking about catapults beyond the classroom activities?
- How do we help students to articulate their ideas in writing?
- How do we help students to clearly and accurately represent science in their stories?

This project made us look more deeply at the issue of written communication in science, and of the role of science teachers in helping students write more effectively.

Time was the biggest obstacle for students and for teachers. To help students with time organization in the future, we plan to provide checkpoints along the way to monitor progress. Either peers or teachers need to give feedback on a regular basis to students' first drafts, especially on how well they are incorporating the science information into their writing.

This project made us look more deeply at the issue of written communication in science, and the role of science teachers in helping students write more effectively. In their projects, many students successfully showed the science of catapults through creative, innovative, and imaginative writing. Students appreciated the opportunity to choose the format they used to show what they had learned in the unit. They were able to draw upon the various talents of their group members to create the catapults. Students had opportunities for physical activity, creative expression, and positive social interaction with peers while working in their small groups on both the hands-on activity and the multigenre writing activity. Being able to resolve the catapult problem in their own way and to choose the genre for their reports gave students a sense of competence and achievement. Developing their science knowledge and writing skills through open-ended activities with clear limits allowed students to participate in the group activities in meaningful ways.

Students reported, "By using this approach, I actually learned that science is in almost everything, all the way from history to geography," and, "The multigenre writing is funnier and not less work but it feels like it pays off more when you finish because it seems like you did more." Isn't this what every science teacher would like to hear her students say? ■

Acknowledgments

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References

Grierson, S.T., A. Anson, and J. Baird. 2002. Exploring the past through multigenre writing. *Language Arts*, 80 (1), 51–59.

Resources

Bill Nye, "Simple Machines"—*dep.disney.go.com/educational/billnye*

Trebuchet catapult—*www.trebuchet.com*

Mangonel catapult—*www.mangonel.com*

Build Your Own Catapult—*www.discoverengineering.org/cool_things/highperf/index_activity.asp*

Technology Teaching Systems—*www.tts.ca/catalogue/cat_home.htm*