



2011 AAAS/Subaru Essay Writing Competition for K-12 Educators Finalist Essay

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Using Readers' Theatre to Teach Life Science

I teach Life Science to seventh graders (12-13 year olds). My students have read the book *Search for the Golden Moon Bear: Science and Adventure in the Asian Tropics* by Sy Montgomery for a number of years in my science classroom as a culminating activity to our unit on genetics. This book describes a real-world problem in which DNA is used in the identification and classification of a possible new species of bear. *Search for the Golden Moon Bear* not only pursues the answer to a scientific question, but also describes an adventure worthy of Indiana Jones. In the book, Sy Montgomery relates how a chance meeting with a wildlife biologist from Cambodia and her friendship with an evolutionary biologist from Chicago led to their investigation of a golden color variant of the Asian moon bear (which is normally mostly black). Sy and the two scientists risk encounters with bandits and land mines in their quest to collect hair samples for DNA analysis from the golden moon bears that they seek out in Cambodia, Thailand, and Laos. Upon their return to the United States, the adventurers then enlist the help of a scientist whose specialty is the analysis of bear DNA to help them determine whether the golden moon bears are indeed a new species.

Rather than just have students read the book aloud in groups or individually, I have used the technique of readers' theatre for the past three

years to generate more student engagement with the text. Readers' theatre is a technique that may be more familiar to language arts teachers than science teachers. It is a dramatic presentation of a written text transformed into script format. Normally for readers' theatre, students read from a teacher-made or commercially available script that is prepared from a narrative work. Each student in the presentation has a copy of the script. Memorization of lines, blocking, costumes, special lighting, and props are normally not required. However, in my students' reading of *Search for the Golden Moon Bear*, student groups are allowed and even encouraged to use props and other theatrical devices. The point is to make comprehension of the text meaningful and fun for the performers and the student audience. Readers' theatre is also meant to improve fluency and expression. This is accomplished by allowing the students to practice reading their scripts in preparation for presenting them to their classmates.

The variation of readers' theatre that I have used in my classroom is that students must create their own scripts for an assigned chapter from *Search for the Golden Moon Bear*. The lesson plans that lead to student script production capitalize on other strategies to increase reading comprehension, specifically summarization, determination of main ideas, and visualization. Lesson plans are divided into six to seven class periods. The final class day is reserved for performing the scripts that students composed during the previous days' work. Since the scripts are performed for the audience in order from first to last chapter, it's like listening to the whole book in one day. Following is a summary of each day's lesson plan:



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Day 1: Introduce the book and project to students. Teacher shares directions and rubric. Teacher reads Chapter 1 aloud while students take notes on characters and major plot points using a graphic organizer. Teacher goes over student responses on the graphic organizer. Teacher shares a teacher-made model of the graphic organizer.

Day 2: Teacher reviews rubric for script production. Student volunteers perform teacher-made script of Chapter 1 while audience members use the rubric to assess it. Teacher discusses rubric scores and has students justify their scores on the teacher-made script.

Day 3: Teacher divides students into teacher-assigned groups and assigns each group a chapter to begin work. Within each group, one group member reads the chapter aloud while other group members read along in their own copies of the book and record key characters and major plot points from the chapter. Students compare notes and decide on major events and characters to go into the script. Students begin drafting their scripts.

Day 4: Students continue to draft scripts. Teacher moves from group to group, listening, offering suggestions, and keeping groups on task. If time allows and some groups have advanced in their script writing sufficiently, one group can perform a first reading of their script. Teacher (and student audience) may offer suggestions for improvement in script content and performance.

Day 5: Students finish scripts, create props and costumes (or agree on who will bring what items from home), practice performance of script, create

a multiple-choice question that will be presented in “quiz” format to the audience members, and self-assess their own as well as group members’ work habits and contributions.

Day 6: Performance day for scripts. After the final chapter script is performed, students will take the “quiz,” which is composed of questions from individual groups. Included in the quiz is a vocabulary assessment of some important words from the entire book: evolutionary biologist, classify, species, DNA, hypothesis, and mutation.

Day 7: This day may serve as a “catch-up” day. Since this is a group project with most of the work done in class, I have found that if even one or two students are absent, the group’s work may be delayed enough to warrant including an extra day in the plan.

I had two other goals for students besides the primary science goal of providing students an opportunity to experience a real-world application of genetics for the identification of a new species. I specifically selected *Search for the Golden Moon Bear* to extend my science curriculum because it was set in Southeast Asia. Our students’ state-mandated social studies curriculum includes the study of Southeast Asia. Part of the golden moon bear adventure included the avoidance of land mines on the adventurers’ trek through Cambodia. These land mines were set in place during the Vietnam War. Students read about the history of the Khmer Rouge and the consequences for the people of Cambodia today who must live in constant fear of land mine explosions. There are a number of other social studies connections in the book, for example, the use of animal parts in Asian medicine and diet. My second goal in selecting *Search for the Golden*



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Moon Bear was to possibly stimulate my students' interest in a career in evolutionary biology, molecular genetics, science writing, or wildlife biology.

In this series of lesson plans, I differentiated instruction for mixed reading levels by having a deliberate plan for assigning students to groups. In each group, students were assigned according to standardized reading test scores. These heterogeneous groups had students from the top, middle, and bottom range of the standardized scores. Thus each group had at least one strong reader. That student became the "read aloud" person for the group's assigned chapter and allowed struggling readers to access the text more successfully.

I have several indicators of success for this venture into integrating a science trade book into my curriculum. As is typical for most middle-school students, my students enjoyed the opportunity to be actively and socially engaged with an assignment, which they perceived to be a "language arts" task. My students emphasized the science concepts accurately in their scripts and still managed to inject humor and creativity into their performances. Scores on the script rubric were strong, indicating mastery of the learning objectives set for the students. Student scores on the vocabulary assessments also were universally strong. I would like to use other suitable science trade books in this manner to reinforce more science concepts in my curriculum.