CASES Online
Creating Active Student Engagement in the Sciences

GRADUATION RATES: TEACHER GUIDE

Subject: Physical Science
Grade Level: Middle School
Last Updated: September 18, 2008

Case Summary
Jereme tells Jessica that his mom read in the AJC that the graduation rate in Georgia in only 58%, but Jessica has heard a different number. Which percentage is correct, and how does Georgia compare to other states? Jereme and Jessica must use their research skills and what they have learned about evaluating websites to determine the facts!

Credits
This case was written by Alysse Kowalski (teacher, Luther Judson Price Middle School, Atlanta, GA) and Brandie L. Littlefield (PhD student, Anthropology, Emory University, Atlanta, GA) and fellows of the Emory University PRISM program (http://www.prism.emory.edu). Authors may be contacted at alyssekowalski@gmail.com and bllittl@emory.edu.

This case was adapted from *Bone Lickin' Good* (Gregory & McKee, 2008).
Gregory, C., & McKee, Y. (2008). *Bone Lickin' Good*. Retrieved June 5, 2008 from Emory University, CASES Online Web site: http://www.cse.emory.edu/cases/casedisplay.cfm?case_id=1403.

Learning Objectives
1. Analyze and draw conclusions from charts, tables, and graphs.
2. Create a list of criteria for evaluating websites.
3. Evaluate the validity of different sources.
4. Identify different forms of plagiarism.
5. Distinguish between fact and opinion in a source.
6. Recognize that there is more than one way to interpret different findings.
7. Recognize that there is more than one way to investigate the same problem.

Georgia Performance Standards
S8CS3. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations (NSES Content Standard A).
   a. Analyze scientific data by using, interpreting, and comparing numbers in several equivalent forms, such as integers, fractions, decimals, and percents.
S8CS7. Students will question scientific claims and arguments effectively (NSES Content Standard A)**.**
   a. Question claims based on vague attributions (such as "Leading doctors say...") or on statements made by people outside the area of their particular expertise.

b. Identify the flaws of reasoning in arguments that are based on poorly designed research (e.g., facts intermingled with opinion, conclusions based on insufficient evidence).
c. Question the value of arguments based on small samples of data, biased samples, or samples for which there was no control.
d. Recognize that there may be more than one way to interpret a given set of findings.

S8CS8. Students will be familiar with the characteristics of scientific knowledge and how it is achieved (NSES Content Standard A). Students will apply the following to scientific concepts:
    a. When similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant, which often requires further study. Even with similar results, scientists may wait until an investigation has been repeated many times before accepting the results as meaningful.

S8CS9. Students will understand the features of the process of scientific inquiry (NSES Content Standard A). Students will apply the following to inquiry learning practices:
    a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing different theories. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.

Assessment

Students write a letter to either: 1) the principal, 2) Dr. Hall, superintendent, or 3) their parents expressing their opinion concerning graduation rates in Georgia, supported by the facts they have accumulated from at least three web sources. The students must also include two of their own ideas for improving Georgia graduation rates, discussing the pros and cons of their ideas.

Implementation Strategy

This case was implemented in four physical science classes over five days. The classes are 55 min long.

Day 1:   Students read Scene 1 and broke into their lab groups of four to complete the box Chart for learning issues (Facts, Ideas, Learning Issues, Vocab). We then handed out the Web Evaluation Article and questions for groups to work on in class and complete as homework.

Day 2:   Students broke into pairs and researched the learning issues their groups had come up with the day before. Each student was responsible for checking at least two websites and filling out the Web Evaluation Checklist for each site.

Day 3:   Students read Scene 2 and worked as groups to fill out box chart (Facts, Learning Issues, Ideas, Action Plan). They continued internet research in pairs.

Day 4:   Ms. Kowalski lead students in a plagiarism mini-lecture and provided them with a worksheet to work on in groups. Students were given their final project assignment and began group work.

Day 5:   Students were given more class time to complete their final assessments.

Case Notes

After students compiled their box charts on the first day, we collected their work and made a master list of the learning issues that their groups had decided upon. There were eight learning issues total that we then handed back to the students on the second day and as a group they assigned two learning issues to each member to research. Ms. Kowalski developed a webpage for her physical science class, and we provided them with links to helpful sources (see below) to research learning issues. They were expected to use these sources first, although some students also choose to do their own internet searches using Google. We faced challenges with the internet research part of this case in that it was difficult to maintain group cohesion. We had the students either pair up or work on their own computers depending upon the number of computers we had operating at the time. Internet was very slow, and unfortunately this led to a lot of student frustration when they were unable to get certain websites to load. Given the layout of the computer room (where all the computers are lined against the wall), it was hard to have groups sit together to continue working on learning issues. We tried to get them to come back together as a group on the second day to read the next scene and generate more learning issues, but when it came time to do research, they mostly did this on their own or in pairs. Perhaps, if this case was taking place in longer class periods with faster computers, it would be worthwhile to make the students stop at a certain point and reconvene with their group before moving forward to another learning issue or website.

We also faced a great deal of resistance and frustration from the students about the case overall – there was a lot of confusion as to what this had to do with science and why they were being asked to research graduation rates. Although we were hopeful that this would be a topic of interest to them and generate some proactive and creative responses for improving graduation rates in the state, we found that many of the students were not engaged in the topic and didn't feel like it was relevant to them personally. While this wasn't true of all of the students, it generated enough frustration that it was difficult to keep them on task during the research segment. Although having a case that focuses on research is probably very useful, the expectations might have been too high this early on given their limited experience with PBL and internet research in general. Perhaps this case would lend itself better to high school students who have more general research skills. In addition, the web sources that we found for the students appeared to overwhelm them because they were too wordy – although we had some nice interactive sites that would have been more engaging, we were unable to load them on the school computers.

We hoped that once students came back together as groups to work on their final projects, they would begin to see how everything fit together, but unfortunately we were still met with some resistance. We were also having some issues with students coming to us to ask questions first instead of using their group as a sounding board for questions. We began to implement a system where each group received three question cards that they can use during the period to ask

a question from a teacher, which prompted them to go to group members first and seemed to assist with group cohesion. In the future, we will probably also assign individual group roles, and use evaluations to hold them accountable for those responsibilities. Ms. Kowalski also used a graphic organizer to help them get started on their final project, which was especially helpful for students who have less experience with organizing a formal letter.

Resources

Helpful websites to direct the students to about graduation rates:

AJC article about GA grad rates:
http://www.ajc.com/metro/content/printedition/2008/06/05/gradrate.html

Calculation of graduation rates:
http://www.boston.com/news/education/k_12/articles/2007/11/09/calculation_of_graduation_rates_differ/

What you can do to improve education in your state:
http://www.all4ed.org/what_you_can_do/ed_in_your_state

Georgia DOE record of grad rates:
http://www.gadoe.org/pea_communications.aspx?ViewMode=1&obj=1404

Connect for Kids - grad rates:
http://www.connectforkids.org/taxonomy/term/245

Grad Rates Map (this is cool – allows you to click on different states to see graduation rates around the country):
http://www.edweek.org/apps/maps/

Alliance for Excellent Education - Understanding Grad Rates in GA:
http://www.all4ed.org/files/archive/publications/wcwc/Georgia_wc.pdf

Every Child a Graduate:
http://www.all4ed.org/files/Elements_Brch.pdf

Business Bureau of Research...GA grad rates: what does it mean?:
http://www.livingoak.org/index2.php?option=com_content&do_pdf=1&id=78

Report on Calculating Grad Rates (may be too technical, but useful teacher reference):
http://www.manhattan-institute.org/html/cr_baeo.htm