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To accompany the peer-reviewed article by Carlos L. de la Rosa, Ph.D.:
"Improving Scientific Literacy and Conservation in Developing Countries" (Oct. 2000)
http://www.actionbioscience.org/newfrontiers/delarosa.html

Science Literacy: Building a Better World (October 2002)

Lesson by Kim Burley
Science teacher, Lindsay Thurber Comprehensive High School
Alberta, Canada

Grades & Levels:

- **Handout 1:** grades 6-12 (general)
- **Handout 2**: grades 9-12 (advanced/AP)
- **Handout 3:** undergraduate (year 1-2)

Time Recommendations:

- **Handout 1:** up to 1 week
- **Handout 2:** up to 2 weeks
- **Handout 3:** up to 3 weeks

NSES (USA) Content Standards, 5-8 and 9-12:

- 2.2. Science as Inquiry: understanding about scientific inquiry
- 7.6. Science in Personal & Social Perspectives: sci. & tech. in local, national, & global challenges
- 8.2. History & Nature of Science: nature of scientific knowledge

Note: View the NSES content standards on this site to choose other curricular applications for additional activities at:
http://www.actionbioscience.org/educators/correlationcharts.html

Learning Objectives: Students will…

- discuss the nature of science and science literacy
- examine the relationship of science literacy and sustainable development
- consider issues of science literacy in developing nations
- investigate actions individuals and communities can take to foster science literacy and conservation

Key Words Include:
bibliography, citations (in a report), developing nations, ecoculture, enlightened, industrialized nations, philanthropist, science literacy, subsidy, sustainable development

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Preparation

Article Discussion:

- Distribute copies or have students download the article "Improving Scientific Literacy and Conservation in Developing Countries" at http://www.actionbioscience.org/newfrontiers/delarosa.html.
- Review the keywords with the students or assign the definitions as independent research.
- Questions on the article are on page 2. These may be used to guide discussion in small groups or with the class as a whole.

Student Handouts:
Student **Handout 1** is suitable for both middle school and high school (general level) whereas **Handout 2** is appropriate for high school only, particularly advanced and AP students. **Handout 3** is more appropriate for undergraduate students; however, it can be used in advanced senior high classes with slight modifications.

- All three handouts require research and specific Internet references for some activities, provided in *Useful Links* found in the "Educator Resources" section at the end of de la Rosa's article.
- Summaries/products of research assignments may be in multimedia, written or oral presentations.

For Educators: Article Discussion

About the article by Carlos de la Rosa Ph.D.:
"Improving Scientific Literacy and Conservation in Developing Countries"
http://www.actionbioscience.org/newfrontiers/delarosa.html

Article Content Questions:

1. How do citizens of industrialized nations access scientific information?
2. What are some of the barriers to scientists in developing nations?
3. How is science literacy important to conservation in developing nations?
4. How might science exchange programs help improve science literacy in developing nations?
5. What other actions can industrialized nations take to help improve science literacy in developing nations?

Extension Questions:

1. Why is science literacy important for the general population?
2. Speculate about why the majority of scientific information is available in English rather than the native languages of various cultures.
3. Although translation software is available, what problems may arise in the translation of scientific literature?
4. List some actions that your school or community can undertake to help science education in developing countries.

Science Literacy: Building a Better World

Student Handout 1

1. Class Project: Adopt-a-School

Group 1

Brainstorm about why science literacy is important for everyone. Have someone take notes during the brainstorming session. To complete the activity:

- review the notes and rewrite ideas into one-liners, e.g., *to understand why species are in danger*
- create a flyer listing the one-liners

Group 2

Collect science papers written by students in your school on the subject of conservation. Show them to your teacher to verify that the papers are scientifically sound.

Group 3

Choose a developing nation. Find a listing of middle schools or high schools in that nation on the Internet. Make contact with a school of your choice and inform its science department that you would like to send a package. Send the school:

- the flyer (group 1's activity)
- student science papers (group 2's activity)

Variations

- translate the flyer into the language of the developing nation you have chosen
- publish the flyer and/or papers on your school's web site and inform the schools you have chosen that these materials are available for their use

2. Conservation Journalist

Choose an endangered species found in a developing region. Find the following information about it:

- name (common and scientific)
- distribution (countries or regions)
- best estimate of the number remaining
- reasons for the population decrease
- conservation efforts being made to save the species
- reasons to save the population

Write a newspaper article about this species that tells, who, what, where, when, why and how. Or record your news story on audio or video tape.

Student Handout 2

1. Science Activist

Write a letter to a member of government in your country that clearly states and supports your opinion on whether it is important for industrialized nations to support science literacy programs in developing nations. You will need to determine an appropriate person in government and find the correct mailing address. In the letter, explain why this person was selected to receive your comments. The letter should be polite and well written.

2. Class Project: Adopt-a-School

Group 1

Brainstorm about why science literacy is important for everyone. Have someone take notes during the brainstorming session. To complete the activity:

- review the notes and rewrite ideas into one-liners, e.g., *to understand why species are in danger*
- create a flyer listing the one-liners

Group 2

Collect magazines or articles about biodiversity, the environment, and conservation. Review the material to verify that it is scientifically sound. Ask the teacher to review your collection.

Group 3

Choose a developing nation. Find a listing of high schools in that nation on the Internet. Make contact with a school and inform its science department that you would like to send a package. Send the flyer and magazine/article collection to the school.

Variations

- translate the flyer into the language of the developing nation you have chosen
- publish the flyer and/or articles (with reprint permission) on your school's web site and inform the schools you have chosen that these materials are available for their use

2. Academy of Sciences

In groups, find out which nations are considered developing nations. Each group should then choose one developing region of the world. Research on the Internet to see if the region has an Academy of Sciences organization. Review the organization's web site and tell the class about the scientists and scientific programs you discovered.

3. Earth Day

Choose a developing region of the world and find out on the Internet about its conservation problems and efforts to solve these problems. Design a pamphlet or flyer for a display that would suit Earth Day activities in your community.

Science Literacy: Building a Better World

Student Handout 3

1. Conservation Action Plan

Research the *conservation challenges* of a developing nation or region. Devise an action plan for this region. The plan could be a comprehensive one or it may address a single issue. To devise a plan you will have to examine several types of information, such as economic and demographic factors as well as model programs used by nations and organizations.

In your action plan:

- identify the long-term and short-term goals
- give specific targets where possible
- identify the resources needed to meet these targets and who would be responsible for implementation

2. Course Syllabus

Choose a developing region. Research on the Internet to find a university in that area that offers an introductory conservation biology course. Obtain the course syllabus online or request a copy from its biology department (you may need to use an online translation service if the syllabus is not in your language). Compare this course to an equivalent one at your college or university.

- create a chart or other graphic presentation to illustrate the comparison
- summarize how each course covers conservation problems specific to a region

3. Information Exchange

Before the conclusion of his article, de la Rosa offers his own responses to the question: "What can we do to improve scientific literacy in developing countries?" Using one of his five suggestions, create a specific plan of action that your college could implement.

4. Bad Science?

Dr. de la Rosa states that "the advent of electronic information, particularly the World Wide Web and other means of global information access, has multiplied the ways in which people can obtain information." But do all science sites provide sound information? On the Internet, search for examples of "bad science" on the subject of conservation (environment/ biodiversity/ management). Quote the incomplete/incorrect claims and cite the source. When done, explain what is wrong with the selected information and suggest ways to improve/correct it. You may want to include your university web site in the search for questionable scientific material and contact the appropriate department should you find any!