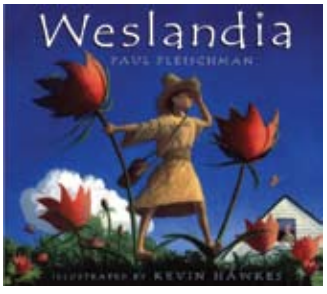
Taking Note of Natural Resources

By Christine Anne Royce

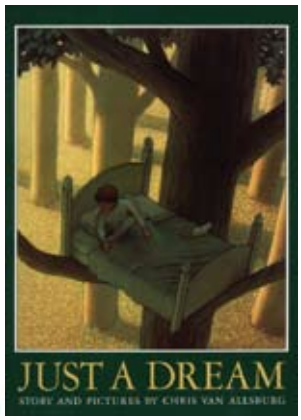
The idea of a "going green" or being aware of and reducing our impact on natural resources is receiving a lot of attention these days. Schools are starting to employ "green" practices and are soliciting help from the students to be aware of and help reduce their environmental impact. The trade books chosen for this month's issue examine the use of natural resources from two different perspectives—what we do with them and how they are depleted over time.

This Month's Trade Books



Weslandia
By Paul Fleischman
Scholastic. 2000.
ISBN 0439227771.
Grades K–3

A young boy decides to develop of a civilization of his own by growing a particular plant. All aspects of the civilization must come from what this plant produces. Through his discoveries, he examines different needs of the civilization from food to clothing to shelter and how the availability of resources affects the production of these items.



Just a Dream
By Chris Van Allsburg.
Houghton Mifflin. 1990.
ISBN 0395533082.
Grades 3–6

Chris Van Allsburg uses illustrations and narrative text to introduce the reader to the idea that they affect their environment. Through Walter's adventures when he falls asleep, he explores how resources have been depleted and how each individual can change their actions to protect the environment.

Curricular Connections

What is your environmental impact? The idea that each human impacts or leaves a footprint on their environment based on the amount and type of natural resources we use connects to the science curriculum through biology, chemistry, Earth science, and more. The idea of natural resources is presented in an important but often forgotten section of the National Science Education Standards—Content Standard F: Science in Personal and Social Perspectives. The NSES describe resources as "things that we get from the living and nonliving environment to meet the needs and wants of a population [and include] basic materials, such as air, water, and soil; [as well as] some [that] are produced from basic resources, such as food, fuel, and building materials" (NCR, 1996, p. 140).

Young students are often able to discuss the idea of pollution (the end product of natural resource use) but often have difficulty thinking about what resources go into making different items. By reading Weslandia, students will have the opportunity to think about what goes into the different products they use. They will then have the opportunity to examine how many of their items come from or contain natural resources. Older students can engage in this same activity but go one step further to examine how humans' use of these resources affects their availability over time through a mining simulation.

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For Grades K–3: What Are Objects Made Of?

Purpose: Students will classify objects as living or nonliving and investigate what natural resources make up common household items.

Materials: Pencil, toothpaste, a piece of paper, a picture of a sidewalk, a drinking glass, a fruit or vegetable, a plant; handouts from *www.mii.org/pdfs/Digs_Color_8in.pdf*.

Procedure:

1. Read *Weslandia* to the class. Afterward, ask students to describe what they think the main idea of the story is. Students will talk about the civilization that Wesley makes. Reread the book to the class, this time focusing on the different items that Wesley needs for his civilization to be successful—food, clothing, shelter, transportation, etc.
2. After the second reading, ask students to brainstorm a list of items that they use every day that they "must" have to survive. Many of the items students name (e.g., tv, ipods, computers) are not necessary for survival, but in their minds they are. Once a list is generated, introduce the idea that items fall into one of two categories—living or nonliving. After reviewing the characteristics of living and nonliving things (e.g., living things need food, water, and to be able to make new living things [like seeds and babies], and nonliving things don't need these things), introduce the idea of *renewable* and *nonrenewable resources*. Living items are capable of reproducing and are therefore renewable and able to be replenished—provided we practice sound management. Nonrenewable resources, however, are those that we cannot get more of, or replenish, because these resources take a very, very, very long time or are impossible to remake. In this scenario, living items are renewable: We can plant more crops, breed more animals, and the human population is growing. However, many nonliving items come from nonrenewable natural resources (e.g., oil, gas, metals).
3. After this discussion, call students' attention to the objects you brought to class. Ask students to think about what each item is made of, then share with them information about the various objects from the handouts. Students will likely be surprised that pencils contain both wood from trees (a living, renewable resource) and graphite (a nonliving, nonrenewable resource). The idea that many different types of resources may make up a common item is surprising to them—in fact they probably have never thought about what makes up many of the items they use every day. Then, ask students to classify each object as living or nonliving and to think about whether it is made from renewable or nonrenewable resources. Most objects that are food come from living, renewable objects, whereas most objects that they use every day come from nonliving, nonrenewable resources.
4. After students have had a chance to think about the natural resources that go into common items that are used daily, revisit their list of things they need to "survive." Ask them to determine if the items could have been made from the plant that Wesley uses in *Weslandia* and to explain their reasoning—the electronics they likely named will not be able to be made since they are not comprised of natural resources!

Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996).

Content Standards

Standard F: Science in Personal and Social Perspectives

- Types of resources (K–4)
- Changes in environment (K–4)
- Populations, resources, and environments (5–8)

For Grades 4–6: Pasta Mining

Purpose: This simulation activity helps students understand how natural resources are depleted.

Materials: One pound of six different types of pasta of varying size and shape, a large bed sheet or dropcloth, transparency graphs, and a stopwatch.

Procedure:

1. As you read *Just a Dream* to students, have them stop and discuss what they are "hearing" in the words as well as what they are "seeing" in the pictures. Ask, "What is happening to the natural resources in Walter's world?" "Do you think this happens today? Why or why not?" Many students will respond that we do need resources, but it is not as "bad" as Walter experiences. Students often don't equate what they personally use to the overall world problem of dwindling resources.
2. Next, introduce the activity on pasta mining. The premise of the activity is that there will be six different mining companies whose job it is to "mine" or "extract" their particular resource—in this case, a type of pasta.
3. Each "mining company" of five or so students can only mine their assigned resource (a type of pasta) in shifts, and they cannot destroy other resources (the other types of pasta). This would be a great point to discuss some of the restrictions associated with mining today, thus connecting to the societal perspective of the NSES. Mining companies must secure permits for the type of resource they want to mine; plans must be in place to assure that land reclamation will happen after the mining ceases; and there are many environmental laws associated with the process relating to land, water, and air pollution.
4. The "mine" is a large dropcloth or bed sheet on which the various pastas have been mixed, then spread.
5. Have each group set up a data table in which to record their results. In timed shifts, each student will take a turn for one minute to "mine" as many pieces of their resource as possible without destroying others. The student should pick up only their resource and place it into a pile before returning to their team when the time is up. The process is repeated for the number of students in the group.
6. When all the trials are completed, the group develops a line graph representing the amount of resource collected versus the trial number.
7. As this activity is conducted, several things may happen. Students may become competitive about the amount of resource mined, which also happens in the mining industry due to the limited amount of identified and located resources. The companies with larger types of pasta usually can collect their resource earlier, as it is more visible and easier to find, whereas the smaller pastas are usually more abundant in the later trials because they are easier to find after some of the other resources have been cleared away. To real-world mining companies, the size of the resource and ease of extraction will affect when and how much can be mined.
8. As students display their graphs, discuss what happened during the mining process and speculate possible reasons for success (or lack thereof) at collecting their resource. Ask, "How did resource availability change over time?" "Does the type of resource affect your ability to mine it?" "Would it have helped if companies could have worked together?" "What might happen to the resources over time?" Most students conclude that nonrenewable resources are depleted over time depending on the need for the resource and the rate of mining.

Resources

National Research Council (NRC). 1996. *National science education standards.* Washington, DC: National Academy Press.