The Population Education program is pleased to announce Terri Clark as the 2013 Most Valuable Trainer! Terri is the Community Resource Manager at Central Florida Zoo & Botanical Gardens in Sanford, FL, where she conducts teacher workshops for surrounding school districts, and creates zoo programs implementing state education standards. Terri has held leadership positions with many local environmental groups and is a member of several state and national zoo-related organizations. She has been a trainer with Population Connection for 10 years, and has facilitated over 50 workshops. I had the opportunity to interview Terri about her population education work.

When did you begin using Population Connection materials? I went through training June 2002. The Zoo received a mailing from Population Connection that they would be holding a training session in Tampa and I was teaching several teacher workshops for the Zoo so this topic was a welcomed addition. There is a natural connection between animals and human population. Loss of habitat due to an increase in population is one of the main reasons for the decline of many species. Working for a small non-profit, the “free” training price made it possible for me to attend!

I conducted my first workshop at University of Central Florida and that was all it took. My strong interest for the topic took over and now 10 years and over 50 workshops later, I’m still excited about teaching this awesome workshop. I began implementing activities into the Zoo programs as soon as I went through training. They were such a natural fit into the lesson plans we were teaching at the Zoo; lessons about carrying capacity, natural resources, and space were easily explained using Population Connection activities like “Panther Hunt”,...
“Earth: The Apple of our Eye” and “Mining for Chocolate.” The kids really like being able to actively participate in the process. We, as teachers, can foster a deeper understanding with hands-on concepts.

What are some specific qualities that you love about Population Connection materials? As we are all aware, teachers don’t make large salaries and usually spend their own money on school supplies. I like to point out to the participants to notice the materials being used during the activities are all designed to be simple with no cost or very little cost to the teacher. They really appreciate that we are aware of this issue.

What is your favorite lesson to facilitate and why? I have lived in Florida for 50+ years. I’m pre-Disney. The growth Florida has experienced since the arrival of Disney has been unprecedented. Sharing ways we can all ease Florida’s and the earth’s resources are important to me. That’s why “Who Polluted the River?” is my favorite activity. It allows me the opportunity to discuss Florida’s limited water supplies and how we will be drinking the St. Johns River as our “back up” plan when/if the aquifer runs dry. That simple statement really opens their eyes as the participants pollute the river one by one doing their everyday activities.

Do you have a favorite audience/presentation you like to facilitate? At the Zoo I teach environmental education to elementary students. When I first started the population workshops, teaching adults made me a little nervous, but that quickly changed. I liked that the adult audience challenged me to learn a great deal about the subject matter.

Any memorable experience as a trainer that you’d like to share? Any tips? Keep it simple and fun! You never really know who you are influencing. When talking with one of the college professors, we discovered her son and his family lived in my neighborhood. A couple of weeks later she called to ask if she could bring her grandson over to borrow some population materials for a school project he was working on. The three of us sat down in my dining room and discussed all sorts of population facts. He returned my materials a week later and also brought his paper sporting a big A+. The teachers comment was “This was a fascinating paper to read. I had no idea!” Now isn’t that what we as trainers are all about? Getting the word out!

The activity featured in this newsletter is “Mining for Chocolate” from the new Counting on People kit!

Click on the activities for a link to check out the activities Terri mentioned:

**Who Polluted the River**
Through an interactive story, students learn how our rivers have been affected by our growing population.

**Panther Hunt**
A simulation in which participants are cougars trying to amass enough food to survive, leading to discussions of carrying capacity and resource distribution.

**Earth: The Apple of our Eye**
A demonstration of worldwide land distribution -- the instructor slices an apple to represent land used for farming.
Film Review: Human Footprint

Human Footprint is a fascinating, 90-minute documentary produced by National Geographic that reveals the unseen consequences of human consumption, specifically that of a typical American. Elizabeth Vargas from ABC News narrates the film as it profiles an average American boy and girl over the course of their lives to calculate their lifetime personal consumption - everything from diapers to prescription medicine is considered. What makes this film unique and a useful teaching tool is that it does not simply tell the viewer the numbers or statistics. It shows them powerful visuals like cracking 19,826 eggs to create the “omelet of a lifetime” or laying out all of the clothes we will wear in our lives. In some cases, the investigation goes even further in showing all the individual items and resources that are used to create something else, or how far some items have to travel to reach us. A memorable visual from the film is the number of diapers an average American baby uses. In one shot, all 3,796 diapers are shown. This visual puts a large number into perspective but, the film doesn't stop there. In the next image, all of the ingredients used to produce all 3,796 diapers are shown in a staggering display as the narrator walks the viewer around 1,898 pints of crude oil, 715 pounds of plastic, and four and a half trees. All these ingredients to make enough diapers for just one American baby!

In today’s society with millions of different products and enormous accessibility to the consumer, it's easy to forget that even a small item may have a long list of ingredients and a lengthy process by which it is made, using lots of resources. The film is an excellent way to introduce a discussion on the impacts of personal consumption and examine that notion environmentally, socially, and economically. Human Footprint can be purchased on the National Geographic website, or on Amazon for between $10-20. It’s also available for viewing for free online at National Geographic video (http://channel.nationalgeographic.com/channel/videos/human-footprint/).

Discussion questions for your class

1. What was most surprising to you about the film? Why?
2. How does your consumption compare to the average American?
3. What effects could your consumption have environmentally? socially? economically?
4. As the world population grows, how do you think human consumption will change?
5. What can be done to address this issue as a society? What can you do personally?

Suggested Population Education lessons to pair with the film:
- Are People the Problem?
- Changing Values
- Global Warming Begins at Home
- Needs vs Wants
- Good News, Bad News: Where Do We Stand?
- Talkin’ Trash on Tropico
- Watch Your Step

Thanks to Nathan Wallace, Population Education Fellow for this review!
Student Video Contest
The World of 7 Billion Student Video Contest is wrapping up! The deadline is Thursday February 21. If you haven’t gotten your submission in yet, there is still time! An informational flyer is included in this newsletter, or visit the World of 7 Billion website for contest rules, guidelines and for more information.

Mother:Caring for 7 Billion
The documentary *Mother: Caring for 7 Billion* is a great tool for high school science and social studies classrooms. The film explores the complexities of population growth, highlighting environmental and social impacts. *Mother* is available for purchase at www.motherthefilm.com. The academic version is now $74.95 and comes with a few Population Connection lesson plans. Purchase orders are accepted. The film can also be rented for $3.99 and streamed off of the website, or downloaded for $15.

National Science Teachers Association Conference
Pop Ed will be at the National Science Teachers Association annual conference in San Antonio April 12-14! Please stop by our booth, #1633, and say hello!

Counting on People
*Counting on People: K-5 Activities for Global Citizenship* is now available! This collection of 40 interdisciplinary, hands-on activities helps students explore their connections to other people, all living things and the world that sustains them. Activities are designed for the core curriculum in K-5 math, language arts, social studies and science, and employ a variety of learning styles. They emphasize building learning skills for life including problem solving, critical thinking and working together to accomplish goals. The CD includes activity matches to national, state and Common Core standards. Recommended service learning ideas, children’s literature, multimedia and online resources accompany each of eight units. *Counting on People* can be purchased for $10.

Hey! We want YOUR opinion!
One of the major projects for PopEd in 2013 is a complete redesign of our website, www.PopulationEducation.org. We are wondering what you think - what is the most useful part of our current website? Is there anything that you wish we had on our website? All suggestions are welcome! Please send your comments and thoughts to Pam@popconnect.org. We appreciate your feedback.
World population reached seven billion in late 2011. Create a 30-45 second public service announcement that illustrates the connection between world population at seven billion and one of the following topics:

**Food Security**
Erosion, Global food prices, Sustainable diets...

**Wildlife Habitat**
Land area, Biodiversity, Endangered species...

**Global Status of Women/Girls**
Girls education, Women’s roles (family, community, politics), Maternal health...

- Cash prizes awarded to FOUR winners in each topic area
- Three grand prizes of $1,000 will be awarded
- All students in grade 9-12 eligible

Deadline for submissions: February 21, 2013

Visit www.Worldof7Billion.org for full contest information and to see past winners!
Check Us Out: To see how hands-on population activities can fit into your classroom, attend a workshop! Our staff and volunteer trainers will conduct teacher trainings at the following conferences in the next few months. Visit the website of the sponsoring organization to find out how to attend the conference. To schedule a teacher training workshop for your education methods class, conference or in-service day, please visit www.PopulationEducation.org or call (800) 767-1956.

- Science Education Council of Ohio, Dayton, OH - 2/08/13
- Hoosier Association of Science Teachers, Indianapolis, IN - 2/08/12
- Minnesota Association for the Education of Young Children, St. Paul, MN - 2/09/13
- Virginia Association for Early Childhood Education, Reston, VA - 2/15/13
- Oklahoma Association of Gifted, Creative and Talented, Edmond, OK - 2/15/13
- California Association for the Gifted, Anaheim, CA - 2/16/13
- Arkansas for Gifted and Talented Education, Little Rock, AR - 2/21/13
- Minnesota Science Teachers Association, Duluth, MN - 2/22/13
- Missouri Council for the Social Studies, Chesterfield, MO - 2/23/13
- Louisiana Environmental Education Symposium, Baton Rouge, LA - 2/23/13
- Georgia Middle School Association, Savannah, GA - 2/26/13
- North Carolina Association for the Gifted and Talented, Winston-Salem, NC - 2/28/13
- Texas Middle School Association, Arlington, TX - 2/28/13
- North Carolina Association for the Gifted and Talented, Winston-Salem, NC - 2/28/13
- Texas Middle School Association, Arlington, TX - 2/28/13
- Southern Early Childhood Association, Mobile, AL - 3/01/13
- South Carolina Middle School Association, Myrtle Beach, SC - 3/01/13
- California League of Middle Schools - North, Sacramento, CA - 3/01/13
- Middle States Council for the Social Studies, Dover, DE - 3/01/13
- New York State Council for the Social Studies, Rye Brook, NY - 3/02/13
- New Jersey Association for Gifted Children, Somerset, NJ - 3/08/13
- California Council for the Social Studies, Burlingame, CA - 3/08/13
- Environmental Education Association of Alabama, Fort Payne, AL - 3/08/13
- Michigan Science Teachers Association, Ypsilanti, MI - 3/08/13
- Georgia Association for Gifted Children, Athens, GA - 3/11/13
- Michigan Association of Middle School Educators, Dearborn, MI - 3/14/13
- South Carolina Science Council - Regional, Aiken, SC - 3/16/13
- Pennsylvania Association of Environmental Educators, Bushkill, PA - 3/16/13
- Wisconsin Council for the Social Studies, Middleton, WI - 3/17/13
- North Carolina Middle School Association, Greensboro, NC - 3/18/13
- Michigan Association for the Education of Young Children, Grand Rapids, MI - 4/05/13
- Colorado Council for the Social Studies, Greenwood, CO - 4/05/13
- National Science Teachers Association, San Antonio, TX - 4/12/13
- Environmental Education Council of Ohio, Loudonville, OH - 4/13/13
MINING FOR CHOCOLATE

METHOD
After matching everyday products to their rock or mineral sources, students “mine” chocolate chip cookies to discover the impacts of many mining operations.

MATERIALS
Part 1:
• Student Worksheet

Part 2:
• Hard chocolate chip cookies (1 per student)
• Toothpicks
• Napkins
• Mining Area Grid (provided)

INTRODUCTION
Many of the products we use everyday – from plastic water bottles to wrist watches and crayons to headphone wires – are produced from rocks and minerals mined from the earth. These rocks and minerals are considered a non-renewable resource because there is only a set amount of each and once it is used up, it will be gone forever. Some of these resources are very common and others are scarce. As the human population has grown, the demand for these resources has grown as well.

Extracting rocks and minerals from the earth is typically done by mining. Large scale mining operations are used all over the world and can often damage the land on which they take place. Unfortunately, the end result of mining (the profits made by selling the ore) can at times overshadow the damage done by the process (destroyed animal habitat, clear cutting of trees, pollution of local streams, etc.).

CONCEPT
Nonrenewable resources are mined from the earth to meet the wants and needs of humans and there are often environmental costs to the mined land as a result.

GRADE LEVEL
Upper elementary

SUBJECTS
Science, Social Studies, Math

OBJECTIVES
Students will be able to:
• Use observation to make an estimation.
• Identify the difficulties of mining ore from the earth.
• Describe how mining operations can affect the land.
• Examine the opportunity costs associated with full-scale mining operations and name two examples.
• Match everyday items with the ore from which they are made.

SKILLS
Estimating, drawing connections, fine motor skills, brainstorming
PART 1: MINERAL MATCHING

PROCEDURE

1. To get your class thinking about how we depend on mined rocks and minerals, distribute copies of the Student Worksheet and have them fill it out. The worksheet asks students to match up some common household items with the rocks/minerals from which they were made. After students have completed the worksheet, go over it as a group.

2. Ask students to name some items which they enjoy using. This might include television, computer games, MP3 players, certain toys, and appliances. After listing their suggestions on the board, have the students brainstorm as a class what elements from the ground, perhaps some that were on the worksheet, may have been used to produce each item. For instance, electronic equipment may have a plastic shell (a petroleum product), copper wiring, etc. Some of them may be obvious, others they may have to look up. You could extend this as a library activity for finding out some of the answers.

STUDENT WORKSHEET ANSWERS


PART 2: HANDS-ON MINING

PROCEDURE

1. Distribute the cookies to the students (but they must not eat them!). Explain that the cookies represent the land and the chocolate chips represent an ore, like coal, which they will be mining from the cookie. With the cookie flat on the desk, and without picking it up, ask students to estimate the number of chips in their cookie.

2. Distribute a copy of the Mining Area Grid to the students. Explain that the images on the grid represent various attributes of the environment where they’ll be mining. Students should place their cookie on the grid and, using a pencil, trace the outline of the cookie.

3. With their toothpicks, students will attempt to extract the chips from the cookie. Cookies should stay flat on the paper (in the real world, you can’t pick up the earth and dig from the bottom!). After a few minutes of mining, ask students if they wish to change their estimate of how many chips are in their cookies.

4. After students have finished mining their cookies, have everyone outline the area on their grid paper that is covered by cookie crumbs. A rough estimate is fine; this doesn’t need to be exact.

5. Have the students share their experiences. What was their goal at the beginning of the activity – to extract many chips or keep the cookie intact? What was their mining strategy? Did they experience any difficulties? Do they think mining companies might have the same kinds of difficulties?
6. Ask the students to count the number of chips they extracted. (Broken chips can be combined and counted as one chip.) Have the class look at the cookies of the students that extracted the most chips and the least chips. Do the cookies look different? Do they see a connection between the amount of chips extracted and the state of the cookie?

7. Now have the students “reclaim” the land. Using just the toothpick (no hands!) instruct them to try and get the cookie crumbs and pieces back inside the original circle. Is it difficult? Do they think reclaiming actual mined land would be difficult?

8. Ask the students to count how many squares on their grid paper have any bit of cookie in them. What attributes are located in those squares?

**DISCUSSION QUESTIONS**

1. Which students did the most damage to the earth? *(The students who covered the most squares on the grid paper.)* Which students make the most money from their mining operations? *(The students who extracted the most chips.)*

2. **Opportunity cost** is the value of the next best choice that one gives up when making a decision. For example: If you choose to go see a movie, you cannot spend that time reading a book and you cannot spend the ticket money on something else. The opportunity cost of attending the movie is the pleasure you’d have reading and the price of the ticket. The opportunity cost of using a resource, is the value of an alternative use of that resource.

   In regards to the cookie, what is the opportunity cost of “mining” your cookie and turning it into crumbs?

   *Getting to enjoy the cookie as a snack.*

3. We put a monetary value on the rocks and minerals mined from the earth. Do we put a price on the natural attributes included on the grid and the services they provide – trees that provide oxygen, vistas that provide beautiful natural views, etc? Why not? Would it be possible?

   *Answers will vary.*

4. What do you think it means when an attribute square on your grid has cookie on it?

   *That the specific natural attribute has been damaged or lost.*

   Thinking specifically about the water, does covering just one or two “water squares” with cookie impact just those two squares or does it impact additional squares?

   *It impacts all of the water squares downstream. The water is moving down the stream so pollution at any point will have an impact on the entire resource.*

5. What about the squares that have been “reclaimed” – those located between the original circle and the
new outline. Just because they’re no longer covered by cookie, do you think that area is completely back to normal?

No. Even the reclaimed land will be different than it was originally.

When you first put your cookie down on the grid, did you consider what natural attributes you’d be covering? What was your reasoning for the cookie’s placement?

Answers will vary. Some students may have tried to cover the least total natural attributes; others may have tried to cover a small amount of many types of natural attributes or mostly only one type. Alternatively, some students may not have thought about what was being covered.

6. Have students brainstorm ways to reclaim their cookies (put them back together). They might think to use frosting to stick the pieces together, or get the crumbs wet and mush them back together. But will the cookie ever be the same as it was?

MEASURING LEARNING
Review the Student Worksheet and have students write a journal entry about their experiences mining the cookies. Have them answer the following questions:

a. What was my original goal when I started mining the cookie? What difficulties did I have while mining my cookie?

b. If I were to mine another cookie, would I have the same goal? If not, what would my new goal be and why?

c. How is your experience similar or different than the goals and difficulties of real mining operations?

d. Give an example of a time when you had to make a choice. What did you choose to do and what was the opportunity cost of that choice?

FOLLOW-UP ACTIVITY
Because minerals are nonrenewable resources, they need to be conserved and recycled so that we don’t run out of minerals that are in short supply. Select several of the minerals listed on the Student Worksheet and ask students to offer suggestions on how these elements might be conserved. For instance, tin and aluminum cans are often recycled as part of curbside recycling programs. Tin cans can be washed and reused as containers for pennies or paper clips. Gold can be melted down and redesigned for other uses. Aluminum cans can be remade, saving 95 percent of the energy used to make new cans from newly mined aluminum.

Adapted, with permission, from OUTLOOK Environmental Education Enrichment, published jointly by the Iowa Natural Heritage Foundation, the Iowa Department of Education and the University of Northern Iowa, © 1983.
All of the items listed below are made of minerals mined from the ground. In the blank to the left of the items listed, write the letter of the element from which these items were made.

The elements are listed at the bottom of the page.

1. _____ Soup cans
2. _____ Matches, gunpowder, rubber
3. _____ Watches, radios, televisions, radar instruments
4. _____ Pencil
5. _____ Bricks, pottery, tennis courts
6. _____ Pennies, stereo wire, brass instruments
7. _____ Wedding band, first-place medal, nuggets
8. _____ Soda pop cans, foil wrap, baseball bats, house siding
9. _____ Horseshoe, hammer, steel products (cars, eating utensils, swords)
10. _____ Food seasoning and preserver
11. _____ Plastics, heating fuel, gasoline, vinyl, synthetic fabrics
12. _____ Old five-cent coins, paper clips
13. _____ Baby powder, crayons, soap
14. _____ Jewelry, drill bits
15. _____ Charcoal, tar
16. _____ Pipes, old paint, X-ray shields
17. _____ Flatware (forks, knives, spoons), jewelry, second-place medal

A. Gold  E. Tin  I. Silver  M. Quartz
B. Aluminum  F. Talc  J. Coal  N. Copper
C. Oil (Petroleum)  G. Lead  K. Salt  O. Iron
D. Clay  H. Nickel  L. Sulfur  P. Graphite
Q. Diamond
Natural Attributes:

- Tree
- Deer habitat
- Rich top soil
- Water
- Beautiful vista

Unit 6 | People and Resource Use
Activity: Mining for Chocolate
Mining Area Grid