Pesticide Watch Card

GRADE LEVEL	2nd-8th, science content standards for 6th and 8th in extension activities
SUBJECTS	Health, Life science, Physical science
DURATION	Preparation: 20 minutes Activity: 30 - 60 minutes
SETTING	Classroom

Objectives

Students will:

1. create a pocket-sized card with their favorite fruits and vegetables listed.
2. learn which of their favorite fruits and vegetables should be purchased organically grown and which items are okay to eat non-organically grown.
3. bring this card home and share the information with their family.
4. understand that some of the chemicals we add to food crops may have harmful consequences on our health and the health of the environment.

Materials

card stock
ranking list for pesticide watch card
colored pencils/markers/crayons
pencil

Vocabulary

- **chemical:** A substance having a specific molecular composition, obtained by or used in a chemical process.
- **pesticide:** A chemical used to kill harmful animals or plants. Pesticides are used especially in agriculture and around areas where humans live. Some are harmful to humans, either from direct contact or as residue on food, or are harmful to the environment because of their high toxicity, such as DDT (which is now banned in many countries). Pesticides include fungicides, herbicides, insecticides, and rodenticides.
- **conventional (agriculture):** an industrialized agricultural system characterized by mechanization, monocultures, and the use of synthetic inputs such as chemical fertilizers and pesticides, with an emphasis on maximizing productivity and profitability. Industrialized agriculture has become "conventional" only within the last 60 or so years (since World War II).
- **organic (agriculture):** referring to a type of agriculture that promotes the use of renewable resources and management of biological cycles to enhance biological diversity, without the use of genetically modified organisms, or synthetic pesticides, herbicides, or fertilizers.

Teacher Background

California pesticide use data show that between 1991 and 2000 almost 2 billion pounds of active ingredients were applied in California alone. After a massive increase in pesticide use in the early to mid-1990's, reported use has stabilized at about 200 million pounds of active ingredients each year. This figure only includes farm use and professional pesticide use. Not included are consumer and much institutional pesticide use. Also not included in this figure are so-called 'inert' ingredients. U.S. pesticide use is about 1.2 billion pounds each year, and worldwide pesticide use is about 5 billion pounds each year.

There is growing consensus in the scientific community that small doses of pesticides and other chemicals can adversely affect people, especially during vulnerable periods of fetal development and childhood when exposures can have long lasting effects. Because the toxic effects of pesticides are worrisome, not well understood, or in some cases completely unstudied, shoppers are wise to minimize exposure to pesticides whenever possible.

The produce ranking was developed by analysts at the not-for-profit Environmental Working Group (EWG) based on the results of nearly 43,000 tests for pesticides on produce collected by the U.S. Department of Agriculture and the U.S. Food and Drug Administration between 2000 and 2004. A detailed description of the criteria used in developing the rankings is available as well as a full list of fresh fruits and vegetables that have been tested (see below).

In reference to the accompanying list of 45 typically eaten fruits and vegetables: Nearly all of the data used to create these lists already considers how people typically wash and prepare produce (for example, apples are washed before testing, bananas are peeled). While washing and rinsing fresh produce may reduce levels of some pesticides, it does not eliminate them. Peeling also reduces exposures, but valuable nutrients often go down the drain with the peel. The best option is to eat a varied diet, wash all produce, and choose organic when possible to reduce exposure to potentially harmful chemicals.

Activity

Introduction

Discuss with students their feelings on eating fruits and vegetables. Do they like them? What are their favorite fruits? Do their parents make any dishes with vegetables that they really like? Is there any fruit in their lunch they prefer? Do they tell their parents what they like to eat so they will buy that at the store?

Give some background information on conventional and organic farming. If you have already done the Farmers' Market Visit activity, review what they learned there about organic farming. If you have already done the Celery Action activity, review how plants can take up chemicals from their environment. If you have already done the Pollution in Your Watershed activity, review how pesticides can end up in our drinking water and environment. And if you have already completed the Digestion Drama activity, review how our bodies can absorb chemicals through our digestive systems. All of these activities set the stage for this one.

Ask the students if they have ever seen the Seafood Watch Card from the Monterey Bay Aquarium; some of them may be familiar with this. Explain that you will be making a card similar to this, but with their favorite fruits and vegetables listed on it indicating which ones are okay to eat conventionally grown and which are better to eat organically grown.

Begin by describing the Pesticide Watch Card spreadsheet and explaining the "Amount of Pesticides" column. The produce is arranged from worst, at the top of the list, to best, at the bottom of the list: the highest amounts of pesticides are applied to peaches and the lowest amounts to onions.

Procedure

1. Students begin by circling 6 – 10 of their favorite fruits and vegetables on the activity sheet.
2. They will then look in the right hand column and determine the amount of pesticide residues found on their choices.
3. Students will need to understand that anything in the medium to high ranking zone may be unhealthy and should try to find these items grown organically.
4. On the card, students can then draw pictures or list their favorite items and highlight which ones they want to buy organically grown.
5. Students can organize their cards in many different ways. For example, having a panel for organic, one for either way, and one for conventional mirrors the seafood watch card and keeps the list organized and clear.

Alternative for Grades 2-4:
Have students draw their favorite fruits and vegetables on the card and color them in. Send the activity home to complete with their families. At home, they can figure out which fruits and vegetables are safe to eat, and which ones they might want to consider buying organic.

Wrap-Up

- Why is it important to pay attention to what we are eating?
- How do pesticides affect our environment; not only our health, but other animals and plants, as well?
- How can we make our families aware of the effects of pesticides?

Extensions

Related activities: *Pollution in Your Watershed*

Grades 5-8: Learn new vocabulary from the "Top 20 Chemicals used in California" sheet by studying the vocabulary list included at the end of this activity. On the Top 20

sheet, there is a category of "Uses" underneath each pesticide describing what it is used for. Chemical compositions of various pesticides can be researched online at: www.pesticideinfo.org

6th grade: Many pesticides are derived from petroleum sources which are non-renewable resources. The sheet of "Top 20 Chemicals used in California" lists several petroleum derivatives that are used routinely in agriculture. Under the "Chemical Class" category, their petroleum affiliation is identified. By reviewing the list and discussing non-renewable resources, one can see how dependent we are on these chemicals for pest control. What are some alternatives? How can we reduce dependence on non-renewable resources, especially petroleum?

8th grade: Several of the pesticides listed on the "Top 20 Chemicals" sheet are compounds created by combining more than one element; for example, Copper sulfate and Sodium chlorate. Many are organic compounds. Students can research these commonly used pesticides and discover what elements are used to create them. For a larger list of pesticides to choose from, see the website listed below under resources.

References

[1] Vocabulary definitions: *The American Heritage® Science Dictionary*. Retrieved October 22, 2007, from Dictionary.com website: http://dictionary.reference.com/browse

[2] Shopper's guide. Retrieved October 22, 2007 from: http://www.foodnews.org/walletguide.php

[3] Top 50 Pesticides Used on All Sites in California in 2005. Retrieved October 22, 2007 from: http://www.pesticideinfo.org/DCo.jsp?cok=00

Resources

Shopper's Guide - www.foodnews.org
Top 50 Pesticides Used on All Sites in California in 2005: www.pesticideinfo.org
California Daily Food Guide
5-A-Day Food Guide Pyramid

Correlated California State Content Standards

Grades Two through Five

Health

Expectation 1. Students will demonstrate ways in which they can enhance and maintain their health and well-being. Food choices: Making healthy food choices. Disease prevention: Practicing positive health behaviors to reduce the risk of disease, such as making healthy food choices.

Expectation 4. Students will understand and demonstrate how to play a positive, active role in promoting the health of their families.

Grade Six

Life Sciences

6b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.

Health

Expectation 1: Students will demonstrate ways in which they can enhance and maintain their health and well-being. Food choices: Making healthy food choices

Expectation 4: Students will understand and demonstrate how to play a positive, active role in promoting the health of their families.

Grade Seven

Health

Expectation 3: Students will practice behaviors that reduce the risk of becoming involved in potentially dangerous situations and react to potentially dangerous situations in ways that help to protect their health. Potentially dangerous situations: Identifying environmental factors that affect health and safety.

Grade Eight

Life Sciences

3b Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.

Health

Expectation 3: Students will practice behaviors that reduce the risk of becoming involved in potentially dangerous situations and react to potentially dangerous situations in ways that help to protect their health. Potentially dangerous situations: Identifying environmental factors that affect health and safety.

Pesticide Vocabulary

The word pesticide is often used incorrectly to refer to products for controlling insects. Pesticide is a generic term, covering all products used for controlling any kind of pest. Under the broad heading of pesticide, there are many sub-categories, including:

1. Algicide – for controlling algae, such as in swimming pools
2. Bactericide – for controlling bacteria
3. Biocide – for controlling microorganisms
4. Fungicide – for controlling fungi (mushrooms) and molds
5. Herbicide – for controlling pest plants or weeds
6. Insecticide – for controlling various types of insects
7. Miticide – for controlling mites (small insects in the spider family)
8. Molluscicide – for controlling snails and slugs
9. Nematicide – for controlling nematodes (parasitic microscopic worms that live in the soil)
10. Ovicide – for controlling the eggs of insects and mites
11. Rodenticide – for controlling mice, rats, gophers and other rodents

Pesticide Watch Card Ranking List

CALIFORNIA ACADEMY OF SCIENCES

RANK	FRUIT OR VEGGIE	AMOUNT OF PESTICIDES
1	Peaches	HIGHEST
2	Apples	HIGH
3	Sweet Bell Peppers	HIGH
4	Celery	HIGH
5	Nectarines	HIGH
6	Strawberries	HIGH
7	Cherries	HIGH
8	Lettuce	HIGH
9	Grapes - Imported	HIGH
10	Pears	HIGH
11	Spinach	HIGH
12	Potatoes	HIGH
13	Carrots	HIGH
14	Green Beans	HIGH
15	Hot Peppers	HIGH
16	Cucumbers	HIGH
17	Raspberries	MEDIUM
18	Plums	MEDIUM
19	Oranges	MEDIUM
20	Grapes - Domestic	MEDIUM
21	Cauliflower	MEDIUM
22	Tangerine	MEDIUM
23	Mushrooms	MEDIUM
24	Cantaloupe	MEDIUM
25	Lemon	MEDIUM
26	Honeydew Melon	MEDIUM
27	Grapefruit	MEDIUM
28	Winter Squash	MEDIUM
29	Tomatoes	MEDIUM
30	Sweet Potatoes	MEDIUM
31	Watermelon	MEDIUM
32	Blueberries	MEDIUM
33	Papaya	MEDIUM
34	Eggplant	LOW
35	Broccoli	LOW
36	Cabbage	LOW
37	Bananas	LOW
38	Kiwi	LOW
39	Asparagus	LOW
40	Sweet Peas - Frozen	LOW
41	Mango	LOW
42	Pineapples	LOW
43	Sweet Corn - Frozen	LOW
44	Avocado	LOWEST
45	Onions	LOWEST