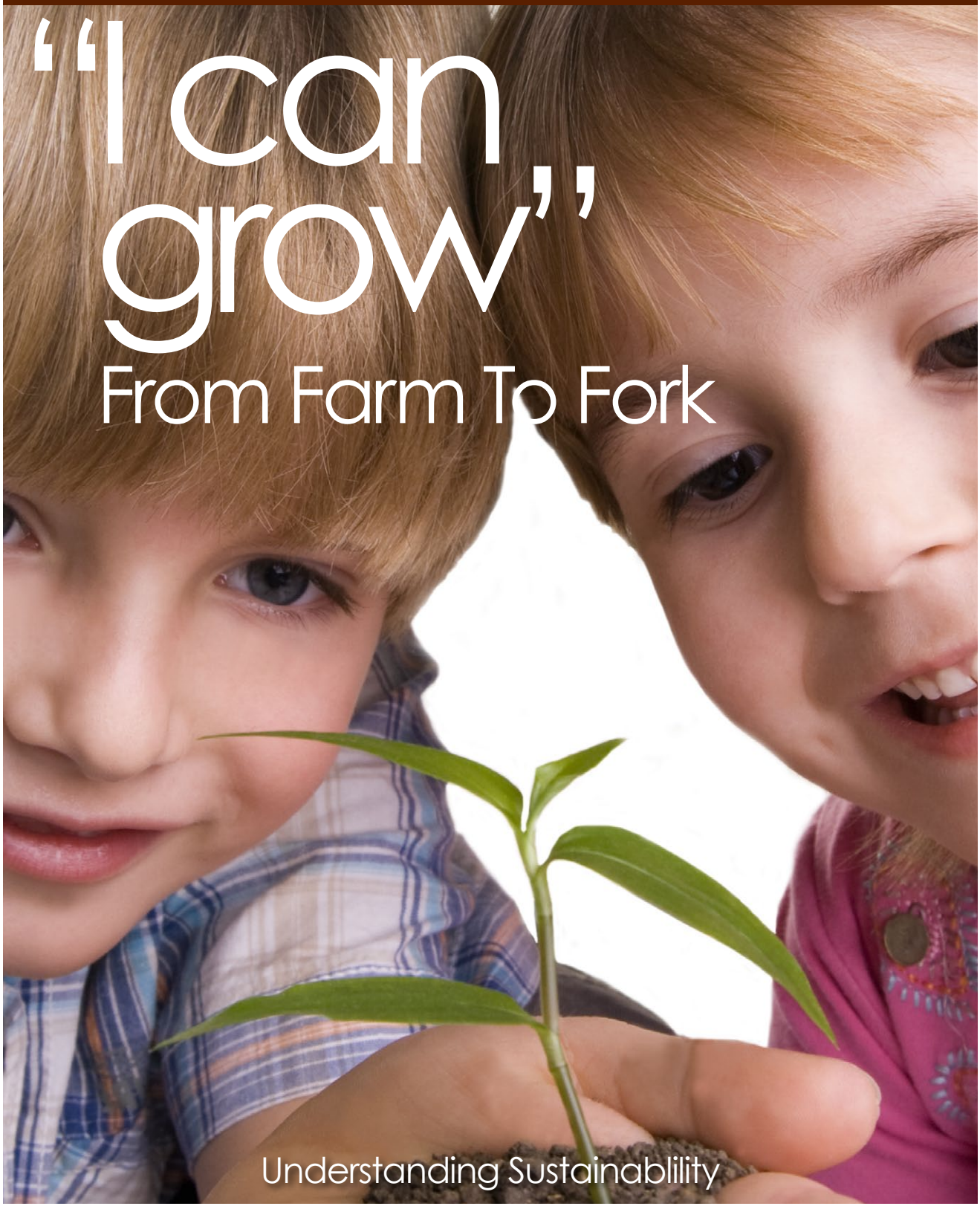
BURPEE
HOME GARDENS®

"I can grow"

From Farm To Fork



Understanding Sustainablility

Burpee Home Gardens acknowledges the National Gardening Association for their participation in developing the “I Can Grow” guide and educational materials.

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There is nothing like seeing the joy of discovery and self-satisfaction in the eyes of a child! At Burpee Home Gardens, we believe the vegetable garden offers the perfect opportunity to sow the seeds of a healthy mind, body and soul. It can teach children the wonders of nature along with hands-on skills that will stay with them – for a lifetime of good eating habits and environmental stewardship.

As the interest in school garden programs rises, so does the need for useful and fun curriculum guides and activities. In partnership with the National Gardening Association, Burpee has developed the "I Can Grow" guide for educators, and now expands that resource with individual lesson activities. These educational guides cover a range of subjects with activities rooted in the ground and in the world around us.

"I Can Grow" remains Burpee Home Gardens' initiative to support the new, popular interest in vegetable gardening among younger and novice gardeners. The program reflects a growing interest in fresher, more nutritious food; supporting community needs and environmental responsibility; saving money; and finding personal satisfaction through home gardening.

From seed science and plant classification, to basic genetic and heredity lessons, and on to sustainability and nutrition practices, we hope these "I Can Grow" educational resources complement lessons in the classroom to discover a newfound awareness of the benefits of homegrown vegetables.

Understanding Sustainablility

Objectives: Students will increase their understanding of renewable and nonrenewable resources and how the proper use of these natural resources will result in sustainable systems. Students will examine sustainable agricultural practices and determine personal practices that will increase sustainability within their local region.

Grade Level: 5-9

Time: 30 minutes per activity

Materials:

For Everyone:

- 1 large apple
- Knife*
- Paper towels
- Soil Chart worksheet for each student

For Older Students:

- 2 medium-sized suitcases or plastic bins
- A random assortment of things that are used every day (e.g., clothing items, water bottles, food labels or empty food packages, wood products, plastic products, electronics). Pictures can be used in place of these items if preferred. There should be at least one item for each student in the class or more.
- 4 small-sized plastic bins, labeled “Garden or Farm,” “Store,” “Natural Resources,” and “Factory”

For Younger Students:

- Map of the United States for each student
- Fruit and Vegetable State Chart
- Markers, crayons and/or colored pencils

** Young children should be supervised carefully at all times when using scissors, knives, etc.*

Background:

The natural resources of the Earth can be divided into renewable and nonrenewable resources. A renewable resource is one that can be renewed through the Earth's natural processes within one generation of time. A nonrenewable resource is a natural resource that cannot be renewed within one generation of time. In fact, most nonrenewable resources on the Earth can take multiple generations, or even millions of years, to regenerate to a useable form.

Trees and plants are excellent examples of renewable resources. We use them for food, clothing and shelter by growing them for our use. When we have used that resource, we can renew it by planting more seeds and growing more of the same resource. Water, soil and petroleum (oil) are examples of important nonrenewable resources. Soil, for instance, is essential to our survival. Good soils are a limited resource because it takes an average of 100 to 500 years to make 1 inch of topsoil!

Growing food and making it available to all people is necessary to sustain the human population. Farming uses both renewable and nonrenewable resources. Agricultural scientists work hard to find out how we can conserve the nonrenewable resources that are available and be less wasteful with the renewable resources in order to sustainably grow and produce food. This area of agricultural research, called sustainable agriculture, involves studying methods and practices that keep topsoil (the most important layer of soil) in its place, increase soil fertility and lower the energy inputs necessary to produce our food. Sustainable agricultural practices are also important in a school, home or community garden—and they aren't difficult to accomplish. Using compost as a fertilizer, planting a cover crop (like clover or vetch) to hold the soil in place and add nitrogen to the soil, selling crops or foods produced from them locally and recycling water are excellent sustainable practices for any garden.

Lesson Takeaways:

- Natural resources on Earth can be divided into renewable and nonrenewable resources.
- Water, soil and petroleum are examples of nonrenewable resources.
- Plants, animals and forests are examples of renewable resources.
- Farmers use both renewable and nonrenewable resources.
- Sustainable agriculture studies methods and practices to conserve resources and lower energy inputs necessary to produce our food.

Plant Vocabulary

Renewable resource
Natural resources that can be replaced by human efforts. However, these resources can be used up without proper management. Examples include forests, fish, wildlife, agricultural products, plants, and animals.

Nonrenewable Resource
These are limited natural resources that cannot be replaced or reproduced within a generation. They cannot be managed for renewal: when they are gone, they cannot again be added to the Earth. Examples include oil, minerals, metals and soil.

Nonexhaustible Resource
Natural resources that can last forever regardless of human activities. While they renew themselves continuously, human misuse can damage these resources and limit our use of them. Examples include surface water (little can be done to affect the total amount of water, but it can be polluted), air (air pollution can damage this resource, but it cannot be "used up"), and sunlight (pollution can limit this resource).**Radicle**
The embryonic root of the plant that grows downward in the soil. It is the first part of a seedling to emerge from the seed during the process of germination.

For Everyone: The Value of Soil

1. Hold up the apple for the students to see. Tell the students that the apple represents the Earth.

2. Give each student a copy of the *Soil Chart Worksheet.* Ask them to fill out the chart while you cut up the apple.

3. Cut the apple into quarters. Explain that ¾ of our Earth is occupied by ocean water. Only ¼ of the Earth is land mass area. Place ¾ of the apple down on the table.

4. Take the remaining ¼ of apple and cut it in half, you now have two 1/8th sections of land. One of these sections represents land that is not suitable for producing food. These areas are deserts, swamps, mountains and the polar regions. The other section represents land where people can live and grow food.

5. Slice this 1/8th section lengthwise into four equal parts *(cutting it lengthwise is important for the demonstration).* Each of these four sections represents 1/32nd of the apple. The first section represents the areas of the world which have rocky soil that is too poor for food production. The next section represents soils which are too wet; while the third section represents soils located in climates that are too hot for good food production. The fourth section represents the area of the world developed by man.

6. Remove the skin of the apple from this final section. This small bit of apple peeling represents all the soil of our earth which humans depend upon for food production.

7. Have the students examine the apple peeling and complete their worksheet.

8. Ask the students:

a. How is land measured in the United States? By the acre.

b. How big is an acre? *It may help to give the students a reference point by asking if it is as big as a football field—which it is, if you include the end zones. 43,560 square feet.*

c. What would be the cost to purchase an acre of land in our local area? *Land prices will vary greatly.*

d. Who and/or what determines the price of land? *Developers, population density, home prices, investors, the level of economic development, agricultural importance, etc.*

e. What is the difference between cost and value? If soils provide our food, clothing and shelter (basic needs), how can we place an actual value on them?

f. What are some ways that we can help others to understand the value—and not just the cost—of soil and other nonrenewable resources?

For Older Audiences: Resource Relay

Teacher's Note: This activity requires an open field or gymnasium to run the relay race.

1. Divide the students into two groups. Have the students line up in single-file lines.

2. Place the filled suitcases or bins at the head of each of the lines. Place the bins marked "Garden or Farm," "Factory," "Store," and "Natural Resources" at a distance from the students.

3. Tell the students that inside the suitcases are items that they use every day. During the relay race, the students need to grab one item from the suitcase and run down to the marked bins. The students will need to decide "where the item comes from" and place it in the correct bin. They must then return to the line and tag the hand of the next person in line so that they can complete the task. The first team to complete the task—WINS!

4) Play the relay game.

5. After the activity, assemble the students so that you can review (and correct) their choices. Hold up each item and ask where it comes from, then help the students to think about the raw products associated with their item. *Note: There will most likely be several items in the "Store" and "Factory" bins, and relatively few in the "Garden/Farm" and "Natural Resources" bins. Students may not have seen that all of the food items, several clothing items (wool and cotton), even paper products will be from the farm or garden. Help the students to understand that all items that contain metals, or minerals that are mined from the earth, items that contain plastics (made from petroleum), polyester fabrics, synthetic rubber, glass, seafood from the ocean, even bottled water and salt are all from natural resources.*

6. The point of this activity is for the students to realize that nothing "comes" from the store or from a factory. Things can be manufactured at a factory and sold at a store, but the "stuff" we use every day has to come from the garden, farm or natural world. Make sure to remove all items from the "Store" and "Factory" bins to reinforce this point. You can summarize this activity by telling the students that the things we use every day are "either grown or mined."

7. Hold up the "Natural Resource" bin. Ask the students if most of the items in the bin are from renewable or nonrenewable resources. Most of the items will be nonrenewable. Ask the students to describe the difference between something that is renewable and something that is recyclable. *There are often misconceptions surrounding these points, so you may wish to recite the actual definition.* Were there any items in this bin that were from nonexhaustible resources?

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Resource Relay *continued*

8. Hold up the "Garden/Farm" bin. Ask the students if most of the items in the bin are renewable or recyclable. Place this bin inside of the "Natural Resource" bin and ask the students if what happens in the garden affects the state of resources within the natural world? Why is it important to properly manage gardens (or farms) to maintain an overall quality of life?

9. Ask the students to sort all of the items into two piles. One pile should represent "needs" and one pile should represent "wants". Are there any items that students feel that they "need" but aren't necessarily associated with survival?

10. Have the students write a reflection paper regarding observations made during this activity. Ask them to write about their feelings related to those items that they want but aren't required for survival. How can consuming less "stuff" contribute to a more sustainable resource system? Why would it be important to understand where food and clothing are grown or produced in relation to sustainability?

[Portions of these activities were adapted from resources created by the *Utah Agriculture in the Classroom*.]

Activity for Younger Students: Going the Distance

1. Show the students a map of the United States. Have them identify their state and city on the map.
2. Read the following paragraph to the students, or provide copies for them to read:

> It is estimated that fruits and vegetables travel about 1200 miles to get from the farm to the American dinner plate. The distance that is required for food to travel from the location where it is produced to the location where it will eventually be eaten is measured in "food miles". The food mile is a new concept. It helps people determine if our food system is sustainable, meaning that we don't misuse the environment to produce and provide our food.
>
> Many people are concerned about how far our food is traveling before being consumed. There are three main reasons for concern: 1) Long distance transportation requires lots of petroleum-based fuel. Petroleum-based fuel is a nonrenewable resource. 2) Transporting food across the country creates a large amount of air pollution (carbon dioxide emissions). 3) In order for food to be fresh when it arrives at the store, it must be picked early so that it won't over ripen while it is being transported long distances. Foods that are harvested early will not taste as good as foods that are picked when they are ripe and may not have the same nutrient content. People do not want to eat food that does not taste good—and fruits and vegetables are critical for staying healthy.
>
> Consumers like to have a wide variety of fresh fruits and vegetables available all year long. They also like to buy produce that is inexpensive. The choices that consumers make, however, can have a big impact on the sustainability of the food system. By comparing the impact of eating foods that have travelled many food miles with that of eating foods that are available locally or even home grown, consumers can make choices to enjoy fresher produce and decrease negative effects on the environment.

3. Divide the students into small groups. Give each group a map of the United States. Assign each group two or three different fruits and vegetables from the list below.

4. Ask the students to write in their state name and mark their city with a black dot. Then color their state blue.

5. Ask the students to locate the states which produced their assigned fruits and vegetables. Have the students write in the state names and the capitals of those states. The state capitals should be marked with a black dot. Also have the students draw a small picture of the fruit or vegetable that is grown near the capital mark.

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Going the Distance *continued*

6. Have the students draw a line from those states which produced the fruits and vegetables to their state where they will be consumed (eaten).

7. Ask the students:

a. Which fruit or vegetable has the largest food mile? Which has the shortest?

b. Have you ever eaten that fruit or vegetable before? How frequently do you eat it?

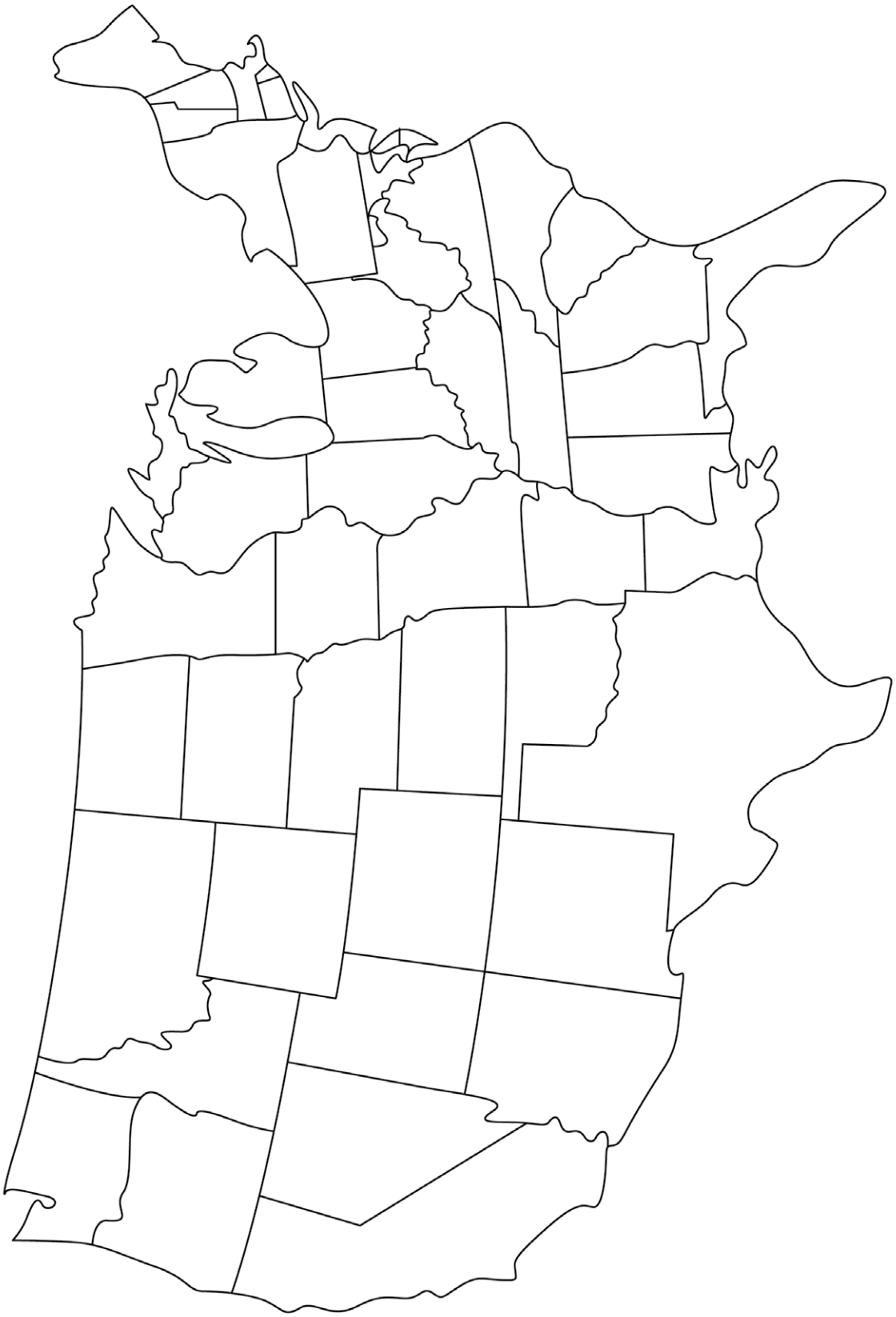
c. How do you think that it is transported to our state? Who does that job? Are those jobs important to the economy?

d. Do you think that the fruit or vegetable could be grown in our state? Why or why not?

8. Depending upon time, teachers may have their students determine the actual number of miles from the state capital of the producing state to the students' state. Teachers could also examine the number of miles for foods grown in other countries (i.e., carrot from China, kiwis from Italy, peppers from Mexico and grapes from Chile).

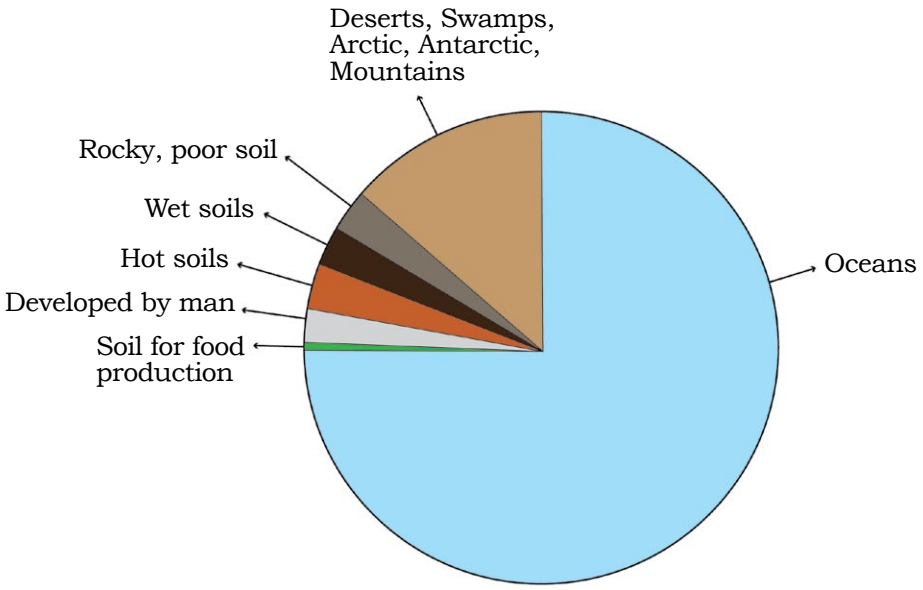
Fruits & Vegetables State Chart

Fruits and Vegetables	State
Carrots, Peas, Celery, Grapes, Oranges, Strawberries	California
Potatoes	Idaho, Maine
Peaches	Georgia, South Carolina
Cranberries	New Jersey, Wisconsin
Broccoli	Texas
Apples	Washington, New York
Green Beans	Michigan
Sweet Corn	Florida
Sweet Potatoes	North Carolina
Oranges, Strawberries, Tomatoes, Winter Squash	Florida
Blueberries	Maine, Michigan
Onions	Washington, Idaho, Oregon
Lettuce	Arizona



Example: Soil Chart Worksheet

Below is the completed example, while the student copy would contain blank spaces for them to fill in the chart.



Soil Chart Worksheet