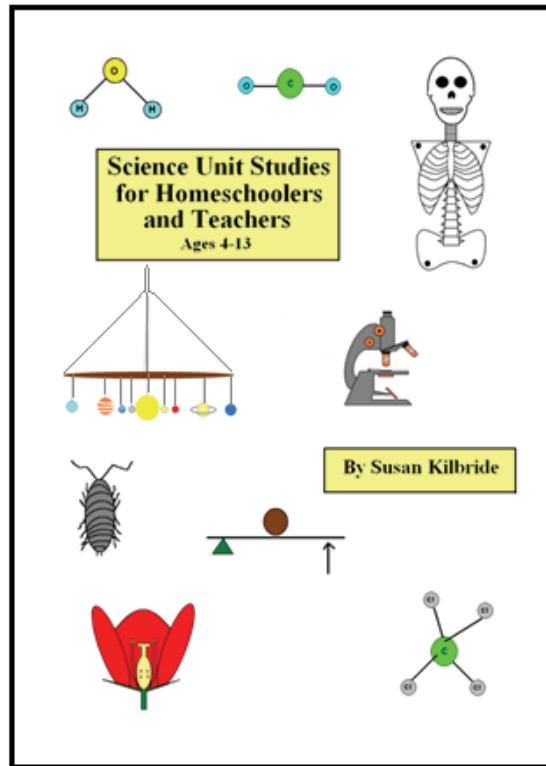


Beginning Plants
An excerpt from the book:

Science Unit Studies for Homeschoolers and Teachers
Ages 4-13



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If you are interested in purchasing the complete book, it is available in paperback at Amazon.com and in paperback or pdf format at iUniverse at www.iuniverse.com/Bookstore/BookstoreHome.aspx. **This particular excerpt is in color, but the book itself is in black and white.**

A table of contents that shows the age ranges for each chapter in the book "Science Unit Studies for Homeschoolers and Teachers" is included in this excerpt.

Praise for Science Unit Studies for Homeschoolers and Teachers

You make learning science fun!

-Brianna, homeschooler, age 10-

My two boys absolutely love Sue's unit studies. Their favorite activity has been building molecules out of colored marshmallows and toothpicks. That project really helped them to grasp the concept of atoms and molecules, and gave them a terrific introduction to the Periodic Table. The lesson plans in "Science Unit Studies for Homeschoolers & Teachers" provide step-by-step instruction to parents to guide them simply and easily through each day's science activities. It makes science fun for students and parents.

-Claire Brouwer, homeschooling mother of two boys, ages 9 and 11-

We used "Science Unit Studies for Homeschoolers and Teachers" at home as part of our homeschooling science lessons. The directions were easy to follow and I loved that they used materials that could be purchased from the grocery store. My children, ages 5, 7 and 9 became excited about learning science, actually jumping up and down when it was time to start Science lessons!

-Ilya Perry, homeschooling mother of three with a degree in elementary education-

Excellent age-appropriate activities and effective assessment tools with which to measure authentic learning

-Frank Hustace, Masters in Education, Stanford University and former Headmaster of Waimea Country School-

Sue's science units made learning fun and introduced key scientific concepts that will serve as building blocks for our daughter's ongoing science education.

-Mia King, national bestselling author of *Good Things* and homeschooling mother of three-

The best part is seeing how proud they feel when they really understand what they are learning, and they realize it is fun. This is not just a science curriculum with a bunch of reading and answering questions. "Science Unit Studies for Homeschoolers & Teachers" introduces children to even the more difficult concepts in a way that has their interest and holds their interest all the way through to the next lesson. I definitely recommend this book for any family wanting to nurture the innate love of learning about the world around them.

-Rachel, homeschooling mother of three-

It's obvious Ms. Kilbride's units of study were developed using both her extensive knowledge of the scientific realm, and how children learn best. Her activities are well thought out, age-appropriate, and easy to follow. I thoroughly enjoyed our well-guided exploration of weather!

-Christine Hustace, Homeschooling mom and resource teacher for over fifteen years-

"What I liked best about Sue's science class is learning about atoms and molecules, and weather. I enjoyed the experiment we did on cookies--and we got to eat them! What I liked about Sue as a teacher is that she gave us fun tests. I learned a lot and want to take another class from her.

-Maya Gee, homeschooler, age 8-

I'm impressed with the weather lesson. It's very thorough and easy to follow. You do a really good job of writing this down.

-Susan L., homeschooling mother of three and science educator for 33 years-

Book Overview

If you are a homeschooler or teacher who is looking for fun ideas on how to teach science, then this book is for you! Its hands-on approach is designed to capture student's interest and promote a love of science and learning. The first ten chapters are for younger children ages 4-7, while the second ten chapters are for children ages 8-13. Each chapter is filled with fun science activities that teach a particular science concept. The activities are designed to use common household items, so you won't need to buy lots of expensive scientific equipment or chemicals. This book is sure to get your kids loving science!

Note to the Reader

This book was written by a homeschooling parent for other homeschooling parents. However, it can also easily be used by elementary school teachers since most of the units have been tested in a classroom setting. Homeschoolers vary greatly in ability, so the suggested ages are just listed as a general guideline. The units build upon each other, so it is recommended that you teach them in the same order as the table of contents, though since homeschooling parents are inclined to want to go their own way in teaching, it is not necessary that you do so! Please, however, do not go your own way when it comes to any of the safety precautions mentioned in the book, especially those regarding checking for food allergies. This book was written for homeschooling parents and teachers, not for students to do on their own. Some of the activities, such as those using a stove, should have adult supervision, and some of the activities use small items which could be a choking hazard for young children, so make sure that the younger siblings of your students don't get hold of them (or that your students themselves don't put them in their mouths!)

There is a materials list in the beginning of each chapter. The amounts listed on these materials lists are based on one student, so if you have more than one student, you will need to increase the quantities of some of the items. Check the individual activities within the chapter to determine the amounts you will need for more students. Most of the materials needed for these units are either common household items or are easily obtained from grocery, hardware, drug, discount stores, the local library, or pet stores. However, there is one chapter (Microscopes and Invisible Creatures) that requires the use of a microscope for some of the activities. A number of the activities in that chapter can be completed without a microscope, but if you can find access to one, the experience will be much more fun for your students.

“Fun” is the key word here, the goal in writing this book was to give homeschooling parents and teachers some ideas for how to teach science in a way that will capture students' interest, and open their eyes to the fun in the world of science.

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Chapter 9: Beginning Plants

Ages 4-7

Materials Needed for this Unit

Clear plastic disposable cups
Potting Soil
Bean seeds
Potted plant
A vegetable platter
Broccoli
Tomato
Celery
Beans or peas
X-Acto® or other sharp knife
Carrot
Black construction paper
Ranch salad dressing
One sixteen ounce carton sour cream
One package dried onion soup mix
Trowel or small shovel
Contact paper
Styrofoam drinking cups
Cross-section of either a branch or trunk of a tree
Paper plate
Crayons
Blank address labels
Adult-sized shoebox with lid
Small plant pot
Cardboard
Packaged sugar cookie dough
Yellow food coloring
Shelled sunflower seeds
Picture of a sunflower with the seeds in it from the local library or internet
Two pieces of corrugated cardboard at least 8 ½ x 11 inches each
Small re-closable plastic sandwich bag, the kind where you don't use a zipper to zip it
Colored Construction paper
Colored tissue paper
Green pipe cleaners
One or two bags of dried Lima Beans (see activity under "Part 2: Seeds")
Green masking or floral tape
"Seed" foods such as bread, nut butters, sunflower seeds, granola, soybeans
Seeds and materials to start a vegetable garden

Grass or chive seeds
Empty egg carton
"The Tiny Seed" by Eric Carl
Potato
Toothpicks
Wax paper
Drawing paper
Lettuce
Stapler
Newspaper
Non-toxic acrylic paints
Clay flower pot
Flower seeds
Blender
Soy beans in their pods
Varnish (optional)
Eyedropper or spray bottle
Flashlight
Markers
A variety of fruits and vegetables

Part 1: Introduction

Ask your students what their favorite plant is and why. Then ask “Has a plant done anything for you today?” Possible answers are: we eat plants for food, wood from trees is used to build houses, plants give off oxygen that we breath, some clothes are made from cotton or flax, and bees use nectar from flowers to make the honey that we eat. Now bring out a potted plant and ask if they can tell you the three main parts of a plant (roots, stem, and leaves). Ask them if they know what these three main parts do (the roots anchor the plant and take up water and nutrients from the ground, the stem holds the plant up and moves water and nutrients, the leaves take in the sunlight that the plant needs to grow, the flowers produce the seeds, and the seeds grow into new plants).

Activity:

Show your students various vegetables and fruits and ask them what part of the plant they are from. Some examples you could use are: celery for stems, broccoli for flowers, lettuce for leaves, carrots for roots, tomatoes for fruit, beans or peas out of the pod for seeds.

Activity:

Make a vegetable platter for your students to eat with one or more dips for them to try. You can use ranch salad dressing for one dip and mix a carton of sour cream with a package of dried onion soup mix for another (or make your own favorite dip). Tell your students that you have a snack for them, but that first they have to guess what vegetables are on the platter. Give them hints that include what part of the plant it is, what color, etc...

Activity:

If you have more than one student, play a version of duck, duck, goose, but instead say “Leaf, Leaf, Flower.”

Part 2: Seeds

Activity:

Read the story “The Tiny Seed” by Eric Carl. Follow it up with the next activity.

Activity:

Tell your students that you want them to curl up on the floor and pretend that they are seeds in the ground. Tell them that you are going to cover them with dirt and pretend to throw dirt on them. Next shine a flashlight on them and say: “Now the sun is shining on the little seeds.” Then take an eyedropper and drop a bit of water on their cheeks and say that it is raining on them (or you could give them a squirt with a spray bottle). Finally, tell them that it is time for them to start to grow and have them slowly unfold and stand up tall with their arms held up like leaves. Ask each student what kind of plant they are.

Activity:

Give each of your students an egg carton to collect seeds in. Now go outside and have your students go on a scavenger hunt for seeds. See how many different kinds they can find. Tell them that plants can't move very much so their seeds have to move for them, otherwise they would all grow too close together. Look at the various seeds you found and see if you can figure out what mechanism the seed has for dispersal. Tell them that seeds can be blown on the wind, float in the water, or stuck to animals. Some seeds are even transported in poop! An animal will eat the fruit and poop out the seeds far away from where the animal found the fruit. Sometimes squirrels will store acorns for the winter and forget where they hid them. The acorns then grow into oak trees.

Activity:

Tell your students that you want them to pretend they are seeds and act out what the seeds are doing as you tell them the following story:

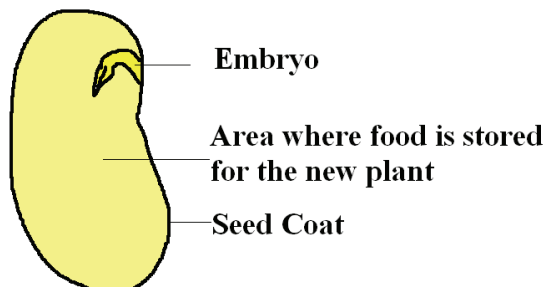
I am a little seed and I'm curled up in a ball. Suddenly, a human comes along, accidentally kicks me and I roll away. Then a cat walks by and I get stuck to its foot. The cat carries me on its foot to the side of a river and I fall off into the water. I move with the water downstream and I get washed up into the sand. A bird sees me and picks me up and carries me far away to its nest. I fall out of the nest and land on the ground where a squirrel finds me and hides me in a hole in the ground for the winter. The squirrel forgets all about me, and I stay there until the spring; when I feel the warm sun and feel the nice water and start to grow. I grow and grow until I am a beautiful plant.

Activity:

Take a small re-closable sandwich bag (not the kind that uses an actual zipper to close it) and fill it with lima bean seeds. Add as much water as the bag can hold and seal it shut. Place the bag on a plate in the sun and wait a few hours. The seeds should swell up and burst out of the bag. Tell your students that before seeds can grow, they need to soak up lots of water. These seeds soaked up so much water that they burst the bag open! Use some of the seeds for the following activity.

Activity:

Take one of the seeds from the previous activity and using a sharp knife (like an X-Acto® knife), slice it open lengthwise. The thin layer on the outside of the seed is called the **seed coat**. The little plant on the inside is called the **embryo** (or you could just call it a baby plant). The bulk of the rest of the seed is used for food for the new plant as it starts to grow.



Beginning Plants

Activity:

Ask your students to try and think of as many seeds that people eat as possible. Then have a “seed snack,” where you eat things made of seeds. Possibilities are sunflower seeds, bread (made from wheat) with various nut butters on it, soybeans, and granola. Show them how peanut butter is made by taking some shelled peanuts and grinding them up in a blender (you can add a tiny bit of water if needed). **Make sure that none of your students have any nut or other types of food allergies before doing this or any food activity.** One fun way to eat soybeans is to fry them in the pods with garlic salt. Let them cool and pop the seeds out to eat them.

Part 3: Roots

Remind your students that roots help keep the plant in place and take up water and nutrients from the soil that plants need to grow.

Activity:

Take your students outside and pull up a weed by its roots so they can see what roots look like. You might need to bring a trowel to help you get the plant up! Try digging up more than one weed to compare their roots.

Activity:

Tell your students that you want them to draw a picture that shows the hidden parts of plants; the roots. They can just draw one plant, showing its roots, leaves, and stem, or they could draw a whole group of plants.

Activity:

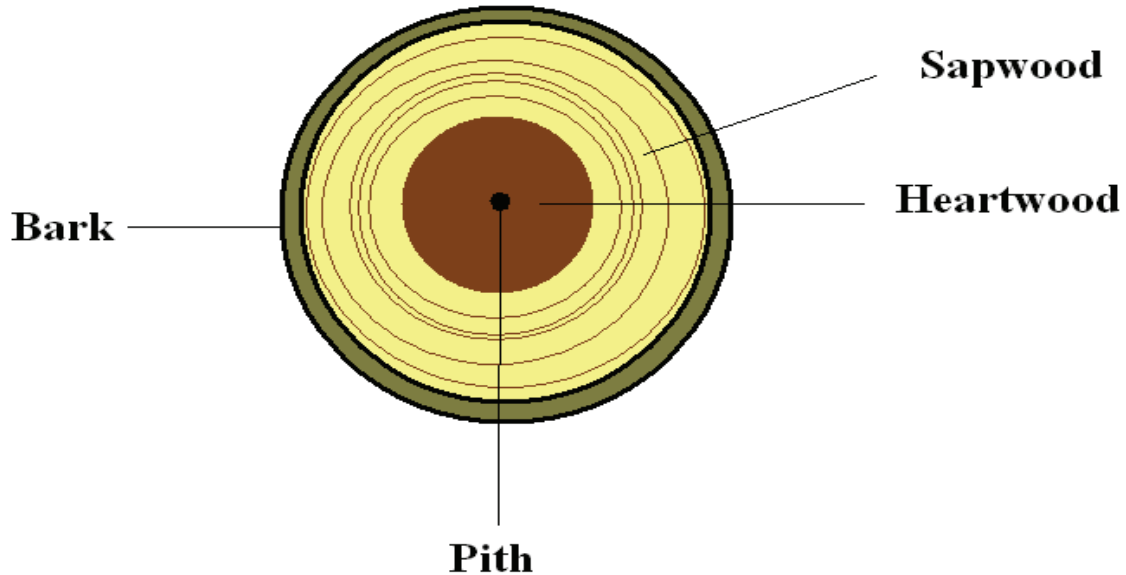
Take a clear disposable plastic cup and fill it with potting soil. Next, plant a bean seed right next to the side of the cup so that as it grows, your students will be able to watch the roots of the plant and how they grow. Tape some black construction paper over the side of the cup that the roots will be growing on; this will protect the roots from too much light. Lift off the paper to look at the roots as they grow.

Part 4: Stems

Remind your students that the stems of plants are used to support the plant and to move nutrients and water from the roots to the leaves.

Go outside and show your students a tree. Ask them to show you what part of the tree is the stem. Now show them a cross-section of either a branch or trunk. Point out where the bark, sapwood, heartwood and pith are. Tell them that the bark protects the tree from disease and insects. The sapwood is the part of the tree that carries the water and nutrients from the roots to the leaves. The heartwood and pith are old sapwood that no longer carries nutrients.

Tell your students that in places where there are definite seasons, you can tell how old a tree is by counting the rings. Each ring stands for a new year of growth.



Activity:

Give each of your students a paper plate and have them draw a picture of a cross section of a tree on it. If they can write, have them label the parts themselves, or you can label it for them. One way to do this is to take blank address labels and write “Bark, Sapwood, Heartwood, and Pith” on them to make little stickers to place on the appropriate parts of their plates.

Part 5: Leaves

Tell your students that the leaves of the plant are where the plant takes in sunlight to help it grow.

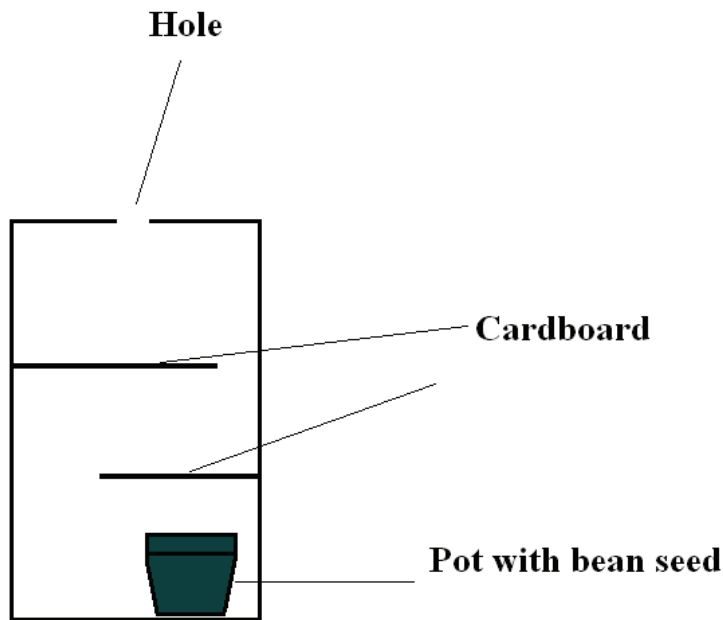
Activity:

Take your students on a leaf hunt. Before you do this activity, learn about any poisonous leaves in your area such as poison oak, ivy, or sumac so that you don't have any bad reactions to the leaves you might find. Go outside and have your students collect different types of leaves. Point out to them how different types of trees have different leaves; then make leaf rubbings of them by placing a piece of paper over the leaves and rubbing the paper with the side of a crayon.

Beginning Plants

Activity:

Take an adult-sized shoe box and tape pieces of cardboard in it so it looks like the diagram below. Cut a hole about 1 ½ by 1 ½ inches wide in the middle of the top of the shoebox. Plant a bean seed in a small pot and place it in the bottom of the box. Put a small plate or jar lid under the pot so that water doesn't leak out when you water it. Put the lid back on the shoebox (while still keeping the whole thing upright) and place it in a sunny room. Only open the shoe box when the plant needs watering. Eventually the bean plant will grow toward the hole in the top of the box, weaving around the cardboard like a maze! Tell your students that this is because plants need sunlight to grow, so it is going through the maze you have made to get to the sunlight.



Part 6: Flowers

Remind your students that flowers are the parts of the plants where the seeds are made.

Activity:

Show your students a picture of a sunflower with the seeds in it (from your local library or the internet) and tell them that you are going to make sunflower cookies! As always, make sure that your students don't have any food allergies before doing any projects involving food. Take some pre-made sugar cookie dough and mix a bit of yellow food coloring into it. Give each of your students a piece of wax paper with a bit of dough on it. Have them form the dough into a flat circle. Next, have them draw another circle inside the cookie with a toothpick and press shelled sunflower seeds onto the inner circle. Then have them draw petals on the outer part of the circle with their toothpick. Put on a cookie tray and bake according to the packaged directions. **Be sure to tell your students not to eat the raw cookie dough and to have them wash their hands before and after this project. People have gotten deathly ill from eating raw cookie dough!**

Activity:

Take your students outside and collect some flowers to press. Once you have them collected, put down a piece of corrugated cardboard and lay at least two sheets of newspaper on top of it. Spread out your flowers over the newspaper and lay two more sheets of newspaper on top of them. If you have more flowers you can keep layering them between the newspapers until you are done. Finish it off with another piece of cardboard on top. Pile some heavy books on top of the whole stack and let it sit for about two weeks in a cool, dry place. If some of your flowers are very thick, you can take a sharp knife and cut them in half to make them thinner.

When it is time to take them out, do it carefully, so that you do not damage the flowers. Give each child a piece of contact paper to arrange their flowers on. Carefully cover it with another piece of contact paper to make a flower placemat.

Activity:

Have your students make tissue paper flowers by taking a green pipe cleaner, folding it in half and twisting it to make a stem. Next, take a piece of colored tissue paper and cut it into a circle that is about four inches in diameter. Grab it in the center and twist it to make a flower shape. Now, take the pipe cleaner and twist the two free ends around the tissue paper flower. Cover the stem where the flower attaches with green masking or floral tape. Give your students lots of color choices and have them make a few flowers so they can design a bouquet. Take a piece of construction paper and staple it into a cone-shape that they can put their bouquet in.

Part 7: Growing Plants

Activity:

Remind your students what plants need to grow (water, sunlight, nutrients from the soil). Tell them that you are going to do an experiment to prove that plants need water to grow. Give them each two styrofoam drinking cups with potting soil in them. Plant a bean seed in each cup. Label one cup with the word "water," and the other cup with the words "no water." Over the next few days, regularly water the bean in the cup labeled "water." The best way to water the plant is let the dirt dry out between each watering so that the plant does not get over-watered. Do not water the bean in the other cup. Point out to your students that the bean in the cup with no water was not able to grow like the bean in the cup with water. This is because plants need water to grow and survive.

Activity:

Give each of your students a styrofoam drinking cup and have them use markers to draw faces on their cups. Fill the cups with dirt and plant lots of grass or chive seeds in them. Water them regularly and eventually the cups will grow "hair" that your students can cut with scissors!

Activity:

Start a vegetable garden. Be sure to include a variety of plants so that your students can see how the different vegetables grow.

Beginning Plants

Activity:

Tell your students that sometimes you can grow whole new plants from things other than seeds. Show them a potato and tell them that because potatoes grow underground, many people think that they are roots, but they are wrong. Potatoes are actually a special type of stem called a **tuber**. Farmers use these tubers to grow more potatoes by cutting them into pieces and planting them. Give each of your students a piece of potato that is about 1 ½ inch by 1 ½ inch to plant, making sure that each piece still has its skin and has some eyes on it. Plant it the same way you planted the bean seed earlier, in a clear plastic disposable cup filled with dirt. Place the potato piece along the side of the cup so that you can see the roots grow. Cover the cup with dark construction paper that you can easily lift off to watch the roots grow. After you have had a chance to watch the plant grow, you might want to plant the potato outside so that eventually you can have potatoes for dinner!

Activity:

Give each of your students a clay pot and have them decorate it with non-toxic acrylic paints. Fill it with dirt and give them a choice of flower seeds to plant in it. If you want, you can varnish the pots after they are done to make them shiny and more durable.

Part 8: Review

Activity:

Tell your students the following riddles and see if they can guess the answers:

- 1) I start with the letter "W" and plants need me to grow (water).
- 2) I am tiny and start with the letter "S." I am a baby plant (seed).
- 3) I am big and tall and people use me to build houses (tree).
- 4) I protect trees from disease and start with the letter "B" (bark).
- 5) I am very warm and plants can't grow without me. I start with the letter "L" (light).
- 6) I am the part of the plant that carries water to the leaves (stem).
- 7) I am a flower that people like to eat. I start with a "B" (broccoli).
- 8) People put seeds in me to help them grow. I start with a "D" (dirt).
- 9) I am the part of the plant that gathers sunlight for the plant to grow. I start with an "L" (leaves).
- 10) I am a leaf that people like to eat. I start with the letter "L" (lettuce).
- 11) I am the part of the plant that makes the seeds. I start with the letter "F" (flower).

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- 12) *I am the part of the wood that moves water through a tree. I start with the letter "S." (sapwood).*
- 13) *I am a root that people like to eat. I start with the letter "C" (carrot).*
- 14) *Plants put this back into the air for people to breathe. I start with the letter "O" (oxygen).*
- 15) *I am the part of the wood that is dark and in the middle of the tree. I start with the letter "H" (heartwood).*

Beginning Plants

If you enjoyed this chapter and would like to purchase the rest of the book, you can order it through Amazon.com in paperback by searching for the title, or you can use the following link:

http://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Daps&field-keywords=science+unit+studies+for+homeschoolers+and+teachers&x=22&y=18

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