Biology for the Grammar Stage

The authors of *The Well Trained Mind* say in their book that the goal of grammar stage science instruction is to "foster enthusiasm for science and to expose the child to basic facts about each field"[1]. My goal in writing this curriculum was to provide a hands-on science curriculum that would challenge your student and instill a love of science at an early age. I also wanted to provide you with the tools to give your grammar stage student exposure to the topics of animals, the human body and plants so that they will have a knowledge base for future studies. For this reason, I have included ongoing projects, experiments every week and narration pages.

I wrote this curriculum to be used in the grammar stage (1st-2nd grade). It is designed to be done in 10-15 minute session 5 times a week or two 30 minute sessions a week. It's up to you to choose whether you will use the five day or two day a week schedule. Also, if you desire, you could set aside an hour a week to be your science day in which you do all the readings, narrations, and activities planned for the week. Please feel free to act as your child's scribe as you complete the narrations and experiments.

Student Workbook:

This teacher's guide is designed to work in conjunction with the student workbook. It is sold separately and is critical to the success of this program. It contains all the pages you will need to complete the narrations, experiments and most of the projects. It also includes over 80 pictures for use to use with the narration sheets. The student workbook gives you the tools to create a lasting memory of your studies along with your student.

Ongoing projects:

Ongoing projects are designed to be done over several weeks. One of these projects is the bird feeder project, which is designed to be completed over 4 weeks. First, your student will build a bird feeder and hang it where it can be seen. Then they will record their observations of visiting birds and other interesting happenings in their journal. Other ongoing projects are the food chart, the animal study, the body project and the plant growth project. The pages and pictures needed for these projects are included in the student workbook or directions for creating them are found in this guide.

Experiments:

Experiments are easy to do and whenever possible they tie into what is being studied. With the exception of a few fun experiments, each one is written up. This gives your child a beginning look at what the scientific method is and how a scientific test works. At this stage it is not necessary to ask your student to predict the outcome of the experiment as they have no knowledge base to determine what the answer should be.

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[1] Susan Wise Bauer & Jessie Wise, The Well Trained Mind: A Guide to Classical Education at Home, (W.W. Norton & Company, 1999) 375

However, if your student enjoys predicting, you can feel free to let them do so. All the pages you need are included in the student workbook.

Each experiment write-up page includes three sections, what we did, what happened and what I learned. The "what we did" section is for you to write a brief description of what you did for the experiment. The "what happened" section is for you to write down what your student observed during the experiment. Finally, the "what I learned" section is for you to write down what your student learned from the experiment. Any time you see a box for a picture of your experiment you can have your child draw what is there or you can take a picture and glue it in the box. At this point I recommend that you do all the writing for your student on the experiment pages.

Narration Pages:

The narration sheets are designed to be a record of what you have studied. They are to be completed after you have done the daily reading for a particular topic. I recommend that you have your student dictate their narration to you and then you write it into their student workbook. If your student is having difficulty knowing what to say, you could ask; What was one thing you learned about ___? What do you like the best about ___? Only expect one to two sentences. Then stick picture of what was studied and let child color (if your child is artistic you could let them draw this on their own). All the pages and pictures you need are included in the student workbook. Review these pages monthly so that your child gets review of what they have been learning.

Other Features:

- You will find vocabulary words scheduled throughout the curriculum. They are designed to be done orally and are completely optional. I have put together vocabulary cards that you can use to aid your student in recall. These can be found at the Elemental Science yahoo group.
- You will also find that before each unit I have included an overview of the study, a list of materials needed by week and a list of simple poems that you can use to help your child memorize the characteristics of animals, plants and the bodies system. These poems are included as a resource for you to enhance your students learning.
- You will also find the "Want More?" boxes on each of the plan sheets. These are designed to give you ideas for more activities and for additional reading within the planned books.
- In the appendix of this guide I have included supplemental materials for you to use along with the program. They include…
  - Teacher Helps: these include answers to the habitat chart and directions for projects, plus templates for the Animal observation sheets and Nature Walk Sheets. I have also included placement charts for the habitat diorama and for the food chart.
  - Blank pages: These are blank versions of the narration pages and the experiment page in case your student wants to do more!

Be sure to visit the Elemental Science yahoo group for additional supplemental materials, such as vocabulary cards and additionalw templates that you can use for the various projects in this guide.

Quizzes:

After the appendix in this guide I have included quizzes that you can use every week. Although they are not essential, they are helpful in assessing how much your student is retaining or to use as a review of what you have studied during the past week. You can choose to give these orally or copy them for your student to fill out.

Coordinating Resources:

The following programs are sold separately from Elemental Science. They coordinate with Biology for the Grammar Stage and are designed to enhance your study of Biology.

- ✓ *Lapbooking through Biology:*

  This program is a unique and versatile program that leads your student through a survey of animals, the human body and plants. This program also includes plans for 4 lapbooks and all the templates and pictures you need are included to make them.
- ✓ *Nature Studies in Biology*:

  This program will lead you and your student through discovering the field of biology in nature. It gives you a plan for weekly outdoor time, science journaling and additional readings and activities that coordinate with what the student has been observing outdoors.

What if I have an older student? How do I include them?

If you want your older student to work along with your other students and you feel the resources are to "easy" for them. Simply used the following books instead…

- Usborne's Internet-linked Animal World (or World of Animals)—not all of the animals studied are found in this resource, so you will need to use the internet or books from the library for some of the animals studied
- Usborne's Internet-linked Encyclopedia of Science

Have your older child look up the corresponding section in their book and read it, then look up the websites if applicable. (I have included a topical index in this guide to aid you in this.) Next have them write about the topic. If you want more than just a simple narration, have them write a mini-report (one to two paragraphs) on a separate sheet and paste the picture to that. I would suggest that you let your older student do all their own writing for this program.

Final Thoughts:

As the author and publisher of this curriculum I encourage you to contact me with any questions or problems that you might have concerning Biology for the Grammar Stage

at info@elementalscience.com. I will be more than happy to answer them as soon as I am able. You may also get additional help at our yahoo group (http://groups.yahoo.com/group/elemental_science/). I hope that you will enjoy Biology for the Grammar Stage!

Copyright Policy

Book List

The following are the books that I used while planning out this curriculum. The encyclopedias are absolutely necessary and I recommend that you purchase these. The books by Janice VanCleave contain almost all of the planned experiments. I recommend that you purchase these or check out a copy from your local library as you will need these if you intend to do the experiments included.

Encyclopedias:

- *Kingfisher First Encyclopedia of Animals (lizard on the cover)*
- *DK First Human Body Encyclopedia*
- *Plant Parts (Life of Plant Series)*

Experiment Books:

- *Janice VanCleave's Science Around the World (SATW)*
- *Janice VanCleave's Biology for Every Kid* (Biology)*

I chose not to include a list of other resources because every library is different and books frequently go out of print. If you want to supplement this curriculum with other books by all means, do! I highly recommend the *Let's Read and Find Out Series* for this age group. Also, your local librarian is an excellent resource and can point you in the direction of some excellent books about the subjects studied.

*A brief word about *Biology for Every Kid*-The explanations for the results of the experiments are a bit over the heads of most children at the grammar stage level. However the experiments themselves are excellent learning tools. You may want to read ahead and just summarize or pull out the important information given to share with your student as they complete the experiment.

Animal Study Overview (20 weeks)

Ongoing activities:

- Habitat project: pick one habitat, make a diorama in a shoebox and add animals as studied.
- Food Chart: add animals studied under Omnivore, Carnivore, Herbivore
- Animal Study (pick one and fill out the My Animal Study book):
  - Raise a frog or butterfly
  - make a worm or ant farm
- Narration Pages: Picture (if possible) and child's summary of what learned
- Experiment Pages: Fill out an experiment page for each experiment performed
- Animal Observation Sheet: When you observe an animal in its' habitat, fill out an observation sheet
- Vocabulary
- Visit Zoo at end of animal study

Books used:

- *Kingfisher First Encyclopedia of Animals*
- *Janice VanCleave's Science Around the World*
- *Janice VanCleave's Biology for Every Kid*

Sequence for Study:

- Week 1
  Animal Lives
- Week 2
  Habitats (Forests, Grasslands, Desert, Tundra)
- Week 3-20 Animal Study (54 animals)
  - Mammals—8 weeks
  - Birds—4 weeks
  - Reptiles & Amphibians—2 weeks
  - Fish—1 week
  - Invertebrates—3 weeks

Animal Supply List At a Glance

Week	Supplies needed
1	Newspaper for Day 3
2	Shoebox for diorama, Construction paper for habitat
3	2 toilet paper tubes, piece of foil, piece of black construction paper, 2 rubber bands, flashlight
4	Liquid Soap, Pepper
5	4x4 piece of cardboard, 1 cup sand or salt, Dime, large jar lid
6	2 small cans, Washcloth and rubber band
7	Paper cups, Ticking watch, Ruler
8	Two thermometers, 2 glasses, One large bowl
9	Rubber bands
10	2 glass jars, Box at least 2 inches wider and taller than the jars, Cotton balls, 2 thermometers
11	Plastic soda bottle, wood dowel, seeds
12	1 clear glass bowl, measuring cup, liquid oil, powdered detergent, measuring spoon
13	Scissors, notebook paper, ruler
14	1 raw egg, 1 jar with lid, white vinegar, measuring tape
15	2 thermometers, trowel, white towel
16	Clear plastic or glass container, water, vinegar, baking soda, food coloring, items
17	Salt, measuring spoon, 2 shallow bowls, 1 small cucumber, masking tape, marker
18	Suction cup, rock
19	String
20	Paper clip, printout from *Science Around the World,* paint for butterfly, construction paper

Animal Lesson Plans Week 5

<table>
<tr><th>Day 1</th><th>Day 2</th><th>Day 3</th><th>Day 4</th><th>Day 5</th></tr>
<tr><td>Kingfisher Encyclopedia of Animals
Pg.34
(Giraffe)</td><td>Kingfisher Encyclopedia of Animals
Pg. 35
(Camel)</td><td rowspan="2">Experiment: Camels
Science Around the World pg. 82
Write-up on SW pg. 65</td><td>Kingfisher Encyclopedia of Animals
Pg. 38
(Deer)</td><td rowspan="3">1. Finish weekly Activities
2. Add Animals to Food Chart
3. Add Animals to Diorama
4. Give Animal Week 5 Quiz</td></tr>
<tr><td>Narration Page
SW pg. 29
(pictures pg. 95)</td><td>Narration Page
SW pg. 29
(pictures pg. 95)</td><td>Narration Page
SW pg. 29
(pictures pg. 95)</td></tr>
<tr><td colspan="4">Pretend to be the Animal Studied
If Possible: Observe Animal in their Natural Habitat, fill out Observation Sheet</td></tr>
</table>

Notes:

Supplies Needed:

- 4 x 4 piece of cardboard
- 1 cup sand or salt
- Dime, large jar lid

Experiment: Camels

See *Janice VanCleave's Science Around the World* pg. 82-83. This experiment will help your student see the how the way a camel's toes are designed helps them to carry heavy loads across the soft desert sand.

Want More?

- Read about…
  Antelope
  Buffalo
  Llama
  Elk
  Reindeer
- Do the additional experiment described in *Science Around the World* on pg. 83.
- Continue working on poem

Animal Lesson Plans Week 5 (2-day)

	Day 1	Day 2
Reading	*Kingfisher Encyclopedia of Animals Pg. 35(Camel)*	*Kingfisher Encyclopedia of Animals Pg.34 (Giraffe) & Pg. 38 (Deer)*
Activity	Narration Page SW pg. 29 (pictures pg. 95) & Experiment: Camels *Science Around the World* pg. 82 Write-up onSW pg. 65	Narration Page SW pg. 29 (pictures pg. 95), Add Animals to Food Chart, Add Animals to Diorama & Give Animals Week 5 Quiz
Additional Activity	Pretend to be the Animal Studied If Possible: Observe Animal in their Natural Habitat, fill out Observation Sheet	

Notes:

Supplies Needed:

- 4 x 4 piece of cardboard
- 1 cup sand or salt
- Dime, large jar lid

Experiment: Camels

See *Janice VanCleave's Science Around the World* pg. 82-83. This experiment will help your student see the how the way a camel's toes are designed helps them to carry heavy loads across the soft desert sand.

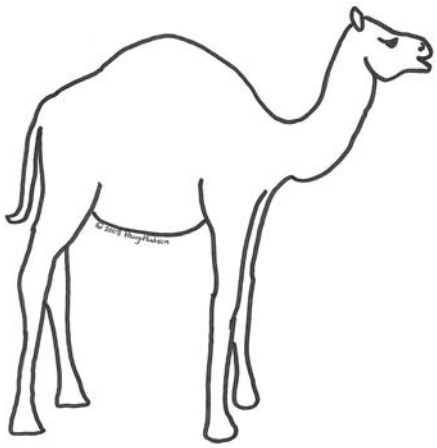
Want More?

- Read about…
  Antelope
  Buffalo
  Llama
  Elk
  Reindeer
- Do the additional experiment described in *Science Around the World* on pg. 83.
- Continue working on poem

From the Student Workbook: Pictures are included here in this sample of the student workbook, but in the program they are on a separate sheet to be cut out and colored by child, then pasted in these squares.

Giraffe

Camel



Deer

Name: _____

Date: _____

Camels: How do camels walk across the sand without sinking?

What we did:

From the Student Workbook

What my experiment looked like

What happened:

What I learned:

Animal Week 5 Quiz

1. Giraffe's are the world's _____ animals.

   shortest fattest tallest

2. True or False. The male deer grows a new set of antlers each year.

3. Circle the two characteristics that help a camel's feet from sinking into the sand...

   big small wide thin

4. What is the most interesting thing you learned this week?

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

Human Body Study Overview (10 weeks)

Ongoing Activities:

- The Body Project—Paste the parts of the human body on the outline as you learn about them throughout the 10 weeks
- Narration Pages: Picture if possible and child's summary of what learned
- Experiment Pages: Fill out an experiment page for each experiment performed
- Vocabulary

Books Used:

- *DK First Human Body Encyclopedia*
- *Janice VanCleave's Biology for Every Kid*

Sequence for Study:

- Week 1—Basic Building Blocks
- Week 2—Skeletal System
- Week 3—Muscular System
- Week 4—Nervous System
- Week 5—Senses
- Week 6—Cirulatory System
- Week 7—Respiratory System
- Week 8—Digestive System
- Week 9—Urinary & Reproductive Systems
- Week 10—Immune System

Human Body Supply List At a Glance

Week	Supplies needed
1	Typing paper, pencil, clear tape, magnifying glass
2	1 thin uncooked chicken bone, 1 jar with lid, white vinegar
3	Items of various weights, such as a paper clip, toothbrush, glass, a can, a book
4	A large books or something else that will make a loud noise, Cotton balls (or rolled-up paper towels), see-through barrier (a wire screen, plastic or glass window)
5	Mirror, toothpicks, blindfold, clothespin, apple, onion, pencils, masking tape
6	Modeling clay, paper, match
7	Plastic dishpan, 2 feet of aquarium tubing, 1 gallon milk jug, masking tape, pens
8	Paper towels, slender glass jar, masking tape, marking pen
9	Family pictures, 11 x 17 piece of paper
10	Piece of paper

Human Body Lesson Plans Week 1

Day 1	Day 2	Day 3	Day 4	Day 5
DK First Human Body Encyclopedia pg. 4-5 (Your Amazing Body)	*DK First Human Body Encyclopedia pg. 8-9 (Building Blocks)*	*DK First Human Body Encyclopedia pg. 68-69 (All Wrapped Up)*	Experiment: Fingerprints *Biology pg. 176* Write-up on SW pg. 78	*DK First Human Body Encyclopedia Pg. 72-73 (Fairly Hairy)*
Introduce the body project	Narration Page SW pg. 45 (Pictures pg. 107)	Narration Page SW pg. 45 (Pictures pg. 107)		Narration Page SW pg. 45 *(see below) & Give Human Body Week 1 Quiz
Introduce Vocabulary	Look for the Vocabulary in your Reading			Oral Vocabulary Test

Notes:

Supplies Needed:
- Pencil
- Clear tape
- Magnifying glass

Vocabulary:
- Cell—your body is made up of billions of these tiny, living units

Experiment: Fingerprints

See *Janice VanCleave's Biology* pg. 176-177 This experiment will help your student to observe patterns in their fingerprints. (Just paste the fingerprints on your experiment sheet instead of a separate sheet of paper)

Want More?

- Read about…
  Organization of the Body
  At your fingertips
- Make a jello cell mold of the cell.
- For the body project: You could make a life size version of this. Just trace your child's body. Then use a copier to blow up the parts found in the student guide to fit your life size body.
- Begin memorizing the Human Body poem

The Body Project:

This is an ongoing project. Every week you will paste the parts of the body you are learning about onto the outline. You can do this at the end of the week while doing an oral review of what you have learned (ie. Do you remember what this part for?) This project will continue through week 9. The only thing to add in week one is hair, which can be drawn on by your student. The body outline is found on pg. 17 & 18 of the student workbook; the pictures are found on pg. 19 of the student workbook.

Day 5—Narration Page: have your student draw their own hair on the head on the narration page

Human Body Lesson Plans Week 1 (2-day)

	Day 1	Day 2
Reading	*DK First Human Body Encyclopedia pg. 4-5 (Your Amazing Body) & pg. 8-9 (Building Blocks)*	*DK First Human Body Encyclopedia pg. 68-69 (All Wrapped Up) & Pg. 72-73 (Fairly Hairy)*
Activity	Introduce the body project & Narration Page SW pg. 45 (Pictures pg. 107)	Narration Page SW pg. 45 (Pictures pg. 107) & Experiment: Fingerprints *Biology pg. 176* Write-up on SW pg. 78
Additional Assignments	Introduce Vocabulary & Look for the Vocabulary in your Reading	Oral Vocabulary Test & Give Human Body Week 1 Quiz

Notes:

Supplies Needed:

- Pencil
- Clear tape
- Magnifying glass

Vocabulary:

- Cell—your body is made up of billions of these tiny, living units

Experiment: Fingerprints

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Want More?

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  At your fingertips
- Make a jello cell mold of the cell.
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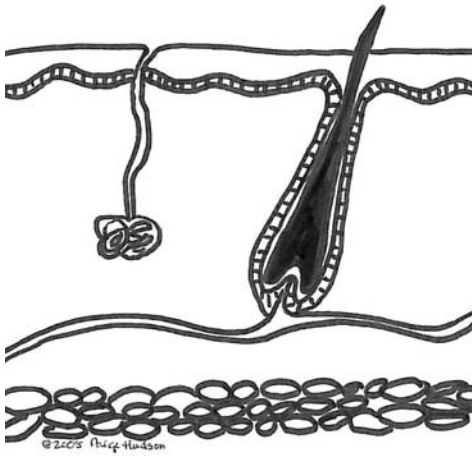
This is an ongoing project. Every week you will paste the parts of the body you are learning about onto the outline. You can do this at the end of the week while doing an oral review of what you have learned (ie. Do you remember what this part for?) This project will continue through week 9. The only thing to add in week one is hair, which can be drawn on by your student. The body outline is found on pg. 17 & 18 of the student workbook; the pictures are found on pg. 19 of the student workbook.

Day 2—Narration Page: have your student draw their own hair on the head on the narration page

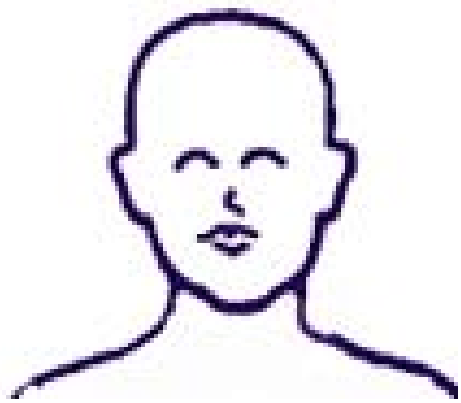
From the Student Workbook:
Pictures are included here in this sample of the student workbook, but in the program they are on a separate sheet to be cut out and colored by child, then pasted in these squares.

Cells

Skin



Hair



Name: _____

Date: _____

Fingerprints
Are there patterns in my fingerprints?

What we did:

From the Student Workbook

_____

_____

_____

My fingerprints

What I saw:

_____

_____

_____

What I learned:

_____

_____

_____

Human Body Week 1 Quiz

1. Your body has _____ of cells.

   a few a couple hundred billions

2. Circle the two layers of skin...

   dermis prodermis epidermis

3. True or False. Hair is alive and hurts when you cut it.

4. What is the most interesting thing you learned this week?

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

Plant Study Overview (6 weeks)

Ongoing Activities:

- Plant Growth Project:
  Begin by planting your seed. Record the growth at the end of each week, for the six weeks of the plant study.
- Take Nature walks:
  When you take a nature walk, if possible pick the flowers you find, take them home and press them. Identify the flower you found using a wildflower guide book from the library or from the internet. Record you finding on the Spring Nature Walk Summary Sheet. If you are doing this unit in the fall I have included and fall version of the Nature Walk Summary. Simply collect leaves and press them instead of the flowers
- Narration pages: Picture if possible and child's summary of what learned
- Experiment Pages: Fill out an experiment page for each experiment performed
- Vocabulary

Books Used:

- *Plant Parts (Life of Plant Series)*
- *Janice VanCleave's Biology for Every Kid*

Sequence for Study:

- Week 1—leaves
- Week 2—flowers
- Week 3—fruit/seeds
- Week 4—nuts/cones/spores
- Week 5—stems
- Week 6—roots/review of parts

Plant Supply List At a Glance

Week	Supplies needed
1	Alcohol, green leaf, coffee filter, pencil, baby food jar, ruler
2	Measuring cup, 2 glasses, 1 white carnation with long stem, red and blue food coloring
3	10 or 12 dry pinto beans, jar, paper towels
4	Pinecone, newspaper, washcloth
5	1 drinking glass, one wilted celery, blue food coloring
6	Paper towels, 4 pinto beans, masking tape, drinking glass, marking pen

Plant Lesson Plans Week 3

<table>
<tr><th>Day 1</th><th>Day 2</th><th>Day 3</th><th>Day 4</th><th>Day 5</th></tr>
<tr><td>Plant Parts
Pg. 18-19
(Fruit)</td><td>Plant Parts
Pg. 20-21
(Why Plants
Have Fruit)</td><td>Plant Parts
Pg. 22-23
(Seeds)</td><td rowspan="2">Experiment:
Baby bean
Biology
Pg. 42
pre-soak beans
Write-up on
SW pg. 89</td><td rowspan="2">1. Finish weekly activities
2. Take a nature walk, press and record flowers found
3. Record Growth of Plant on chart
4. Give Plant Week 3 Quiz</td></tr>
<tr><td>Narration Page
SW pg. 56
(Pictures pg. 111)</td><td>Narration Page
SW pg. 56
(*see below)</td><td>Narration Page
SW pg. 56
(Pictures pg. 111)</td></tr>
<tr><td>Introduce Vocabulary</td><td colspan="3">Look for the Vocabulary in your Reading</td><td>Oral Vocabulary Test</td></tr>
</table>

Notes:

Things to Do:

- Soak beans for 24 hours before Day 4 Experiment

Supplies Needed:

- 4 or 5 dry pinto beans
- Jar
- Paper towel

Vocabulary:

- Seed—part of the plant that contains the beginnings of a new plant

Experiment: Baby bean

See *Janice VanCleave's Biology* pg. 42-43, this experiment will help your student identify the parts of the seed.

Day 2: Narration—written only, no picture

Want More?

- Examine different fruits to see what types of seeds they have and where they are located.
- Choose different types of seeds to soak and dissect. Observe and discuss the differences.
- Continue working on the poems

Plant Lesson Plans Week 3 (2-day)

	Day 1	Day 2
Reading	*Plant Parts* *Pg. 18-19 (Fruit) & Pg. 20-21 (Why Plants Have Fruit)*	*Plant Parts* *Pg. 22-23 (Seeds)*
Activity	Narration Page SW pg. 56 (Pictures pg. 111), Record Growth of Plant on chart & Take a nature walk, press and record flowers found	Narration Page SW pg. 56 (Pictures pg. 111) & Experiment: Baby bean *Biology Pg. 42* ***pre-soak beans*** Write-up on SW pg. 89
Additional Assignments	Introduce Vocabulary & Look for the Vocabulary in your Reading	Oral Vocabulary Test & Give Plants Week 3 Quiz

Notes:

Things to Do:

- Soak beans for 24 hours before Day 4 Experiment

Supplies Needed:

- 4 or 5 dry pinto beans
- Jar
- Paper towel

Vocabulary:

- Seed—part of the plant that contains the beginnings of a new plant

Experiment: Baby bean

See *Janice VanCleave's Biology* pg. 42-43, this experiment will help your student identify the parts of the seed.

Want More?

- Examine different fruits to see what types of seeds they have and where they are located.
- Choose different types of seeds to soak and dissect. Observe and discuss the differences.
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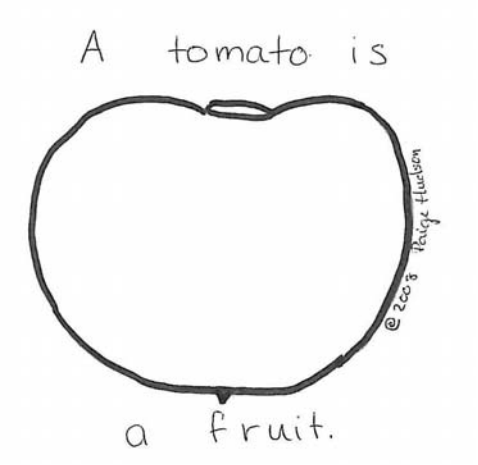
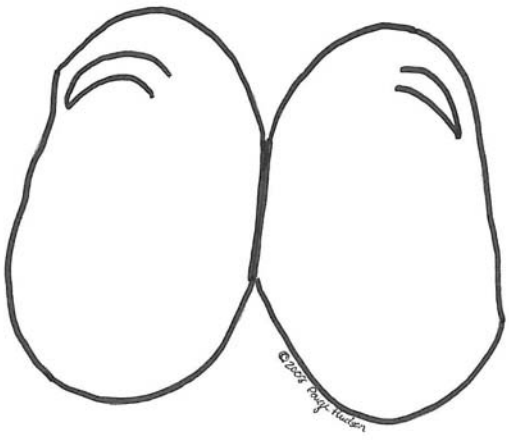
Fruit



Why do plants have fruit?

Seeds



Name: _____

Date: _____

Baby bean

What's on the inside of a pinto bean?

From the Student Workbook

What I discovered about pinto bean seeds…

What my seed looked like inside

What my seed looked like outside

Plants Week 3 Quiz

1. True or False. Seeds contain a baby plant.

2. Fruits help to _____ seeds

   protect disperse protect & disperse

3. Plants have fruit to _____.

   move seeds look pretty have something to eat

4. What is the most interesting thing you learned this week?

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____