Teacher Bulletin Volume 6

Plants

A Theme Unit to Support the
Science
Management
And
Resource
Tool

Spirit-compatible instruction
Cooperative learning
Multiple intelligences
Cross-curricular
Hands-on

Multi-grade lesson plans (K-8) and practical resources for the one-room or small-school teacher.

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Spirit-compatible Instruction

Spirit-compatible instruction is a modification of an approach called Integrated Thematic Instruction (ITI) which is said to be brain-compatible instruction. Spirit-compatible instruction takes ITI to another level by incorporating and emphasizing the spiritual while addressing the role of the whole person, including body and mind.

In the classroom, this approach begins by ensuring that the environment is physically and emotionally safe and supportive of the needs of the brain. We begin by addressing the following environmental issues:

- pure air (no odors caused by mildew or chemicals)
- pure water
- adequate lighting
- calming colors and decorations
- clutter free and organized
- provision for movement

Next we work to provide students with an emotional environment characterized by the following:

- an assurance of unconditional love
- personal significance
- absence of threat and strategies for conflict resolution
- clear, consistent and fair boundaries
- adequate time to complete requirements
- meaningful content
- interesting and relevant resources
- peaceful collaboration with peers
- instruction targeted to challenge without overwhelming
- reflective thinking
- choice

Throughout instruction we emphasize and integrate spiritual values. This is done by:

- assuring students of the unconditional love of God
- beginning the day with worship
- teaching students the relevance of prayer throughout the day
- systematically teaching positive character traits which embody the fruits of the Spirit
- providing discipline in a spiritual context
- the teacher acknowledging her/his dependence on God

Since spirit-compatible instruction is adapted from ITI, attempts have been made to consistently give credit. This is indicated on materials such as "light-skills" (called lifeskills by ITI) banners and bulletin boards. The credit should read: "Adapted from Susan Kovalik and Associates". ITI cannot be taught as such by anyone other than a person trained by Susan Kovalik and Associates. Therefore, caution has been taken to make SCI our own to the greatest extent possible.

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Introduction

The accompanying theme unit was written with the "one-room school" in mind, though it could easily be used in any multi-grade setting. It is meant to support the Science Management and Resource Tool (SMART), which enables teachers to provide instruction on a particular science topic across grades 1-8. Topics are organized in a four year cycle which provides for larger blocks of instructional time (a quarter per topic), allowing time to fully develop the subject. The objectives have been taken from the curriculum guide developed by the NAD. Lower grade (1-4) objectives have been meshed with upper grade (5-8) objectives when possible to do so without compromising the expectations of the older students. Some activities have been predicated on the belief that older students will often participate in activities for the benefit of younger children which they would otherwise think age-inappropriate. An advantage of this is that older students whose skills or knowledge is insufficient have an opportunity to review or learn for the first time what they may have missed in the past without the stigma of being "held back". Additionally, younger students whose knowledge or interest is advanced have opportunities to be exposed to more sophisticated material.

Cooperative learning structures have been integrated throughout the unit and explanations of these are provided in the Appendix A. The 8th grade science text "Exploring God's World" is used as a resource for the upper grade students. Cross-curricular resources and activities, including theme related worship ideas, are provided and may be used as the teacher sees fit.

This particular unit relies heavily on projects and experiments. It is suggested that these activities be done as cooperative group projects, though under particular circumstances the teacher may wish to assign them to individuals. Since many of the experiments are conducted over relatively long periods of time, it may be very helpful to set up folders for each group (or individual) containing record sheets for experiments in progress.

Kindergarteners are included in the objectives for lower grades though it is recognized that for most kindergarten students this is quite a stretch. The expectation is that they will be exposed to the terms and concepts but they should not be required to master them. It is not recommended that kindergarten students be included in a one-room school with a wide span of grades unless additional support is available. Under these circumstances, and given the extensive use of hands-on activities, it is felt that kindergarten-aged children could benefit from and enjoy these lesson plans. Make modifications as necessary to meet individual needs.

Advance Planning

Prior to beginning this unit it will be helpful to accomplish the following tasks:

- Choose and identify a meaningful field trip to be taken at or very near the beginning of the unit. This provides students with a concrete experience on which they will be able to "hang" the information they will be learning throughout the unit. Many nature centers provide naturalists or even botanists who may provide a guided tour; however, these people are accustomed to having students take field trips as culminating experiences so it is helpful to confirm the appointment with a letter, thanking the person in advance and informing them that students will not have had instruction on the topic at the time of the field trip. I also like to let them know that we are from a Christian school and believe in a loving, creator God, and as such would appreciate it if they would refrain from evolutionary comments. Phrase this so that it serves as a sensitive and positive witness to the interpretive guide.
- Arrange for a guest speaker (or several) if you choose to do a plant careers day event at or near the conclusion of the unit.
- If you plan to do a plant fair displaying students' work and offering them the opportunity to explain what they have learned through the projects and experiments, schedule this and inform parents so that they can make arrangements to attend. Doing it during lunch hours may increase parental attendance.
- Put an announcement in your church bulletin asking members to save and/or donate any of the following items which you do not already have: seed and flower catalogs, seeds and bulbs, plant cuttings, cacti, carnivorous plants, plastic soda six-pack rings, potting soil, pots, a bag of raw unshelled peanuts (WalMart Superstores sell these), popsicle sticks and wooden shish kabob skewers, dried peas. Also ask for plant "experts" who would be willing to share their knowledge and expertise with your class
- Prior to the start of the unit prepare a small aquarium or other clear glass container and begin growing peanuts as described in Peanut Anatomy (appendix A) as they take about 3 months to mature.
- Several days in advance of each lesson plan ensure that all materials are ready.

Multi-grade Theme Unit: Plants

Resources:

Books for student use:

All About Seeds by Melvin Berger
An Ancient Forest by Guy J. Spencer
Apples by Gail Gibbons
Audubon Society Beginner Guides
Backyard Attractions: The Flower Garden by Brigid Gaynor (model for writing process)
Backyard Attractions: The Vegetable Garden by Brigid Gaynor (model for writing process)
Coniferous Trees by Wong, et al
Discovering Trees by Keith Brandt
Earthworm by Andrienne Soutter-Perrot
Eating the Alphabet by Lois Ehlert
field guides to trees, flowers, wild edible plants, plants, etc
Growing Vegetable Soup by Lois Ehlert
How New Plants Grow by Colin Walker
Let's Get Growing by Crow Miller
The Magic School Bus Plants Seeds by Joanna Cole
More than 100 questions and answers… by Martin Walters
Mysteries and Marvel of Plant Life by Barbara Cork
The Oak by Andrienne Soutter-Perrot
Plants: A Creative, Hands-on Approach to Science by Wendy Baker Plants: Poisonous Plants by Suzanne M. Coil (needed for lesson Day 22)
The Popcorn Book by Tomie de Paola
Protecting Trees and Forests by Usborne
The Reason for a Flower by Ruth Heller
Red Leaf, Yellow Leaf by Lois Ehlert
The Tiny Seed by Eric Carle
Trees, Leaves and Bark by Diane Burns
The Tremendous Tree Book by May Garelick
The World of a Tree by Allen Paterson

Big books

The Carrot Seed by Ruth Do Things Grow by Althea
Growing Vegetable Soup by Lois Ehlert
How Do Things Grow by Althea
The Reason for a Flower by Ruth Heller
Red Leaf, Yellow Leaf by Lois Ehlert

Read aloud books (K-4)

The Carrot Seed by Ruth Krauss
Dandelion Adventures by L. Patricia Kite
* The Empty Pot by Demi
The Garden in Our Yard by Greg Quinn

A Gift from the Trees adapted by Doe Boyle
* The Giving Tree by Shel Silverstein
Inch by Inch: the Garden Song by David Mallett
* Johnny Appleseed by Steven Kellog
Meeting Trees by Scott Russell
* Miss Rumphius by Barbara Cooney
My Plant by Herbert Wong
Our Terrariums by Herbert Wong
Picking Apples and Pumpkins by Amy and Richard Hutchings
Plants in Winter by Joanna Cole
The Pumpkin Book by Gail Gibbons (contains references to Halloween)
Rosa's Special Garden by Dale Fife
A Seed is a Promise by Claire Merrill
The Seed the Squirrel Dropped by Petie (oldie but goodie)
Song of the Seed by Cecile Lamb and Mildred Stagg
Springtime Tree Seeds by Helen Russell
* The Story of George Washington Carver by Eva Moore
The Story of Johnny Appleseed by Aliki
The Tiny Seed by Eric Carle
This Year's Garden by Cynthia Rylant
Tops and Bottoms by Janet Stevens
A Tree is Growing by Arthur Dorros
A Tree is Nice by Janice May Udry
* The Victory Garden by Jerry Pallotta and Bob Thomson

Read aloud books (5-8)
* George Washington Carver: The Man Who Overcame by Lawrence Elliott
* George Washington Carver: Mon's Slave Becomes God's Scientist by David Collins
* George Washington Carver, Plant Doctor by Mirna Benitez
* My Side of the Mountain by Jean Craighead George
* The Secret Garden by Frances Hodgson Burnett
* indicates books with strong lightskill connections

Guided reading books (K-2)
Autumn Leaves are Falling by Maria Fleming (Hello Reader Level 1)
Big Red Apple by Tony Johnston (Hello Reader Level 1)
Fall Leaves by Mary Packard (Hello Reader Level 1)
Fall Leaves Change Colors by Kathleen Weidner Zoehfeld (Scholastic Science Reader Level 1)
The Garden That We Grew by Joan Holub
Grow a Pumpkin Pie by Jane Gerver (Hello Reader Level 1)
I am a Leaf by Jean Marzollo (Hello Reader Level 1)
I'm a Seed by Jean Marzollo (Hello Reader Level 1)
* Johnny Appleseed by Eva Moore
Johnny Appleseed by Madeline Olsen (Hello Reader Level 1)
Fall Leaves Change Colors by Kathleen Weidner Zoehfeld (Scholastic Science Reader Level 1)

Teacher resources and books helpful to direct instruction:
Essential Guide to Natural Home Remedies by Penelope Ody
The Life Cycle of a Tree by John Williams
Now You Know: Plants and Their Seeds by Anne Neigoff
Plants that Never Bloom by Ruth Heller
Plants Without Seeds by Helen Challand
The Reason for a Flower by Ruth Heller
Why Do Leaves Change Color? by Betsy Maestro

Materials to collect in advance:
- seed and flower catalogs
- potting soil and pots
- gravel or small stones for drainage in plant pots
- seeds
- a variety of plants including, if possible, carnivorous plants, water plants and cacti

Materials to prep in advance:
- photocopy, staple and bind plant books/dictionaries as needed for various age groups
- plant peanuts in clear container before unit begins as they take time to mature
- folders for managing ongoing experiments
- arrange for field trip and guest presenters
- schedule plant show if planning to do one (see lesson plans Day 24)
- collect materials specified in lesson plans

Field trip ideas:
Arboretum
Nature center
Organic farm
Plant nursery
Vegetable farm
Wildlife refuge
Zoo (focus on ecosystem and interdependence between plants and animals)

Lesson Plans

Day 1: Field trip

Plan in advance a field trip to a meaningful site where students can be immersed in experiences related to plants. If the site is providing a tour guide, be sure to inform them in advance that students are coming at the beginning of the unit and explain why so that they do not have unrealistic expectations of students. Provide students with a method for collecting information offered at the site. Consider the accompanying form (field trip record sheet).

Day 2: Characteristics of plants vs. animals

Objectives:

- (K-8): Explain how plants differ from animals.
- (K-8): Identify the characteristics of plants (have cell walls, contain chlorophyll, are usually rooted or attached so they can't move freely, reproduction is a 2-stage cycle).

Materials needed:

Magazine pictures of various plants and animals **(provided),** microscope with slides of onion skin prepared in advance, blank Venn diagram forms, students' plant dictionaries

Introduction:

Have students in cooperative groups choose roles. Give each group pictures of plants and animals. Have each group divide the pictures into two separate piles (presumably they will separate them into plants/animals). In groups, have students list characteristics that make each group unique. Have reporters share a single characteristic in turn until all ideas have been exhausted.

Procedure:

Explain that scientists who have studied plants and animals have discovered that there are four ways that plants and animals differ (record these on chart paper): 1) plants are usually rooted to something and cannot move around freely while animals can move about (have kids try to think of examples that are inconsistent with this characteristic); 2) plants, like animals, are made of tiny building blocks called cells but the cells of plants contain a substance called chlorophyll which makes them green in color; 3) plants have a tough cell wall in addition to a cell membrane (provide groups with a microscope and prepared slide of onion skin to look at, noting the cell walls); 4) unlike animals, plants reproduce in a two-stage cycle.

Ask each group to create a chant, song or set of gestures that incorporate these four differences and be sure that each group member knows it. (Allow 10 to 15 minutes for this and support groups as needed.)

Evaluation:

In turn, have groups present their activity to the rest of the class.
Alternate or supplemental activity:

Have students work in pairs to complete a Venn diagram showing similarities and differences between plants and animals. For younger students, consider creating a large Venn diagram by taping two overlapping hula hoops to the chalk board. Print, laminate and place a magnet on the back of the pictures which are **provided**. Present them to the students one at a time and have them place them in the correct section of the Venn diagram.

Extension activity or additional day's lesson plan: