

# APPENDIX H

## Units of Instruction

Storylines ensure connectivity and continuity between individual activities and can serve as the “instructional glue” that bind many areas of knowledge and skills. Here are some suggestions for linking PLT activities into combined units of instruction using a storyline technique. They can serve as a springboard to help you develop education plans and instructional units tailored to the specific needs and interests of your students.

One example unit is described in detail on the facing page, and brief summaries of several suggested units follow.

All suggested units are further detailed online at [plt.org/myk8guide](http://plt.org/myk8guide).

To demonstrate the value of PLT to teachers and school administrators, all online unit writeups explicitly reference connections to the Next Generation Science Standards (NGSS).

Select units also identify relevant concepts in PLT’s *Forest Literacy Framework* (FLF). For more information and resources, visit [plt.org/forestliteracy](http://plt.org/forestliteracy).

### **SUGGESTED UNITS**

The following units of instruction are organized by grade level. All units list activities that support an intentional student learning progression, presented in a recommended sequence. Note that some units reference activities from other grade levels, offering developmentally appropriate elements that support the unit. All suggested units are further detailed online at [plt.org/myk8guide](http://plt.org/myk8guide).

#### **GRADES K–2**

##### **Benefits of Trees\***

Storyline: Trees benefit humans in a variety of ways.

FLF Concepts: 2.A.1, 2.B.3

- The Closer You Look
- Adopt a Tree
- Trees as Habitats
- We All Need Trees

##### **Exploring Urban Environments\***

Storyline: Urban environments are complex and valuable, just like environments in more natural settings.

FLF Concepts: 1.A.6, 3.A.1

- Backyard Safari
- Adopt a Tree
- Trees as Habitats
- Discover Diversity (in Grades 3–5, see Variation for K–2)

##### **Nature Appreciation**

Storyline: Nature provides people with many different benefits.

- Adopt a Tree
- Discover Diversity (in Grades 3–5, see Variation for K–2)
- Backyard Safari
- We All Need Trees
- Get Outside! (in Grades 3–5, see Variation for K–2)

##### **Plant Growth and Life Cycle**

Storyline: Plants grow and change throughout their life cycle.

- A Tree’s Life
- Bursting Buds
- Tree Cookies (in Grades 3–5, see Variation for K–2)
- Here We Grow Again
- Plant a Tree (in Grades 6–8, see Variation for 3–5)

##### **Structure and Function**

Storyline: Trees have different parts that help them grow and thrive.

- Adopt a Tree
- The Closer You Look
- Bursting Buds
- Have Seeds, Will Travel

\*Asterisks signify units with *Forest Literacy Framework* (FLF) concept connections.

## EXAMPLE UNIT

**Cycles of Matter and Energy**

GRADES 3–5

**Guiding Question**

Where do the plants and animals in our neighborhood get the food and energy they need to survive?

**Connecting Concepts**

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, water, and minerals from the environment and release waste matter (gas, liquid, or solid) back into the environment. (NGSS, LS2.B: Cycles of Matter and Energy Transfer in Ecosystems)
- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. Plants acquire their material for growth chiefly from air and water. (NGSS, LS1.C: Organization for Matter and Energy Flow in Organisms)
- As part of the forest ecosystem, trees have various roles. These roles include supplying oxygen, producing food, providing habitat for wildlife, stabilizing soil, moderating temperature, capturing and storing carbon, and cycling water and nutrients. (PLT FLF, 1.B.6)
- Forest ecosystems include processes such as photosynthesis, energy flow, and the cycling of nutrients, water, carbon, and other matter. (PLT FLF, 1.C.3)

**Scope and Sequence**

The collection and arrangement of content below supports an intentional student learning progression.

Activity	Description
<b>Web of Life</b>	By conducting research and modeling a food web, students take a close look at an ecosystem and discover ways that plants and animals are connected through the cycling of food energy.
<b>Every Tree for Itself</b>	Students engage in an active simulation to learn what resources trees need to live and grow and how trees must compete for resources.
<b>Tree Cookies</b>	Students examine a tree's growth rings, which show patterns of change in the matter and energy available to the tree.
<b>Fallen Log</b>	Students observe fallen logs or other decomposing pieces of wood and gain a deeper understanding of how matter cycles.

Detailed standards correlations for each activity can be found at [plt.org/academic-standards](http://plt.org/academic-standards)

**Storyline**

In this unit, students participate in experiences that will help them understand that matter cycles within an ecosystem.

- Begin with the activity Web of Life to introduce the concept that plants and animals are interconnected through food chains and the food web. Plants form the basis because they are able to convert the sun's energy into food.
- The activity Every Tree for Itself reinforces the role of plants in the food web. Be sure to emphasize that plants not only need sunlight and rain to grow, but also carbon dioxide from the air. Use the first Grades 6–8 variation and have students draw a "growth ring" to represent how much their tree grows each year.
- In Tree Cookies, students look at the growth rings of trees, and then in Part B they research events and correlate them to events in the tree's life. After they have completed this work, ask your students what happens to the tree after it dies.
- Conclude with Fallen Log, which focuses on the role of decomposers in food chains.

# APPENDIX H Units of Instruction (cont.)

## GRADES 3–5

### Adaptation

Storyline: Organisms have complex adaptations that enable them to survive in their habitats.

- Charting Biodiversity
- Birds and Bugs (in Grades K–2, see Variation for 3–5)
- Have Seeds, Will Travel
- Peppermint Beetle (in Grades K–2, see Variation for 3–5)

### Cycles of Matter and Energy\*

Storyline: Living organisms depend on the matter and energy that cycle through ecosystems to survive.

FLF Concepts: 1.B.6, 1.C.3

- Web of Life
- Every Tree for Itself
- Tree Cookies
- Fallen Log

### Ecosystem Services\*

Storyline: Trees and other plants are renewable natural resources that benefit humans in a variety of ways.

FLF Concepts: 1.B.6, 2.A.2, 2.B.4, 2.B.7

- Trees for Many Reasons
- We All Need Trees (in Grades K–2, see Variation for 3–5)
- Poet-Tree
- Get Outside!
- Plant a Tree (in Grades 6–8, see Variation for 3–5)

### Ecosystems

Storyline: Ecosystems are composed of interrelated systems and living things.

- Discover Diversity
- Field, Forest, and Stream (in Grades 6–8, see Variation for 3–5)
- Web of Life
- Nothing Succeeds Like Succession (in Grades 6–8, see Variation for 3–5)

### Forest Products\*

Storyline: People depend on forests for many different products and a wide range of benefits.

FLF Concepts: 2.A.10, 2.B.3, 2.B.4, 4.A.2

- Trees for Many Reasons
- Peek at Packaging
- Make Your Own Paper

### Habitats

Storyline: Organisms possess a diversity of characteristics that enable them to adapt to a wide range of habitats.

- Discover Diversity
- Every Tree for Itself
- Soil Builders
- Fallen Log
- Web of Life

### Patterns of Change

Storyline: Trees and forest ecosystems change over time.

- Did You Notice? (in Grades K–2, see Variation for 3–5)
- Signs of Fall
- Fallen Log
- A Tree's Life (in Grades K–2, see Variation for 3–5)

### Photosynthesis

Storyline: The foundation of all life on Earth is the ability of plants to use the sun's energy to make food.

- Tree Cookies
- Every Tree for Itself
- Tree Factory
- Web of Life
- Here We Grow Again (in Grades K–2, see Variation for 3–5)
- Plant a Tree (in Grades K–2, see Variation for 3–5)

\*Asterisks signify units with *Forest Literacy Framework* (FLF) concept connections.

## Tree Structure

Storyline: A tree is composed of different parts that function together to support the tree.

- The Closer You Look (in Grades K–2)
- Tree Factory
- Nature’s Skyscrapers
- Tree ID

## Water

Storyline: Water is essential for life on Earth: the water cycle is the process by which water moves through ecosystems and the atmosphere.

- Field, Forest, and Stream (in Grades 6–8, see Variation for 3–5)
- Water Wonders
- Every Drop Counts

## GRADES 6–8

### Biodiversity

Storyline: Organisms possess a diversity of characteristics that enable them to adapt to a wide range of habitats. Biological diversity is an important element of ecosystem function.

- Field, Forest, and Stream
- Invasive Species
- Life on the Edge
- If You Were the Boss

### Careers

Storyline: Green jobs provide opportunities to help ensure that forests are managed sustainably while serving the needs of society and nature.

- Every Tree for Itself (in Grades 3–5, see Variation for 6–8)
- My Green Future
- Nature’s Skyscrapers
- Our Federal Forests
- If You Were the Boss

## Climate Change\*

Storyline: Changes in the Earth’s climate impact ecosystems and human communities.

FLF Concepts: 1.D.1, 2.A.3, 3.B.7

- Exploration Energy!
- The Global Climate
- Life on the Edge
- Improve Your Place

## Community Planning

Storyline: Community planning helps increase community sustainability and resilience.

- Decisions, Decisions
- Reduce, Reuse, Recycle
- Our Federal Forests
- Forest in the City
- Environmental Justice for All

## Energy

Storyline: Energy comes from renewable and nonrenewable sources. Human use of energy has short- and long-term social, economic, environmental, and health-related impacts.

- Global Goods
- Exploration Energy!
- Renewable or Not?
- The Global Climate
- Improve Your Place

## Environmental Decision-Making

Storyline: People can improve their relationship with the environment through their collective decisions, as well as individual actions and behavior.

- Decisions, Decisions
- Exploration Energy!
- Life on the Edge
- The Global Climate
- Environmental Justice for All
- Improve Your Place

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# APPENDIX H

## Units of Instruction (cont.)

### Forest Management\*

Storyline: Humans manage forests to ensure that they remain sustainable and to derive the most benefit from them.

FLF Concepts: 3.B.2, 3.B.4, 3.C.3, 3.D.1

- Forest in the City
- Trees in Trouble
- Invasive Species
- Living with Fire
- If You Were the Boss
- Our Federal Forests
- What's in a Label?

### Natural Resources

Storyline: Humans have developed sustainable systems for managing and processing natural resources.

- Global Goods
- Exploration Energy!
- Renewable or Not?
- If You Were the Boss

### Sustainability

Storyline: Sustainable use of resources allows us to meet our needs today without compromising the ability of future generations to meet their own needs.

- Decisions, Decisions
- Exploration Energy!
- Peek at Packaging
- Global Goods
- Renewable or Not?
- Reduce, Reuse, Recycle
- What's in a Label?
- If You Were the Boss



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