Alignment
of

Project Learning Tree Environmental Education Pre K-8 Activity Guide

to

California Science Content Standards

Introduction

The purpose of this document is to provide California educators who use Project Learning Tree materials with an easy reference guide as to how PLT's activities align to the California Science Content Standards for grades K through 8. As part of the national movement to reform education, the California State Board of Education has adopted criteria to measure the skills, knowledge and ability that all students should be able to master within life, physical and earth sciences, including investigation and experimentation.

Project Learning Tree is an interdisciplinary environmental education program.
PLT activities supplement curriculum and can be used to organize instructional units in a variety of subjects. As this alignment will demonstrate, educators can use PLT activities to introduce, practice, and reinforce many science concepts.

It is the goal of this document to help teachers provide students with lessons that reinforce critical and creative thinking while also covering the required science topics. All PLT lessons can be easily adapted or extended by the classroom teacher to address specific Science standards. The PLT lessons included in this alignment have activities that can be used to reinforce the listed Science Content Standard(s) either in the actual lesson, the extensions, variations, or suggested assessments.

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A copy of the Science Content Standards for Grades K-12 can be obtained at:
http://www.cde.ca.gov/be/st/ss

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KINDERGARTEN

PHYSICAL SCIENCES

1. Properties of materials can be observed, measured and predicted. As a basis for understanding this concept, students know:

    a. objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size, shape, weight, texture, flexibility, attraction to magnets, floating and sinking, etc.).

Project Learning Tree Activity Guide
The Shape of Things (1)
Get in Touch with Trees (2)
Picture This! (6)
We All Need Trees (13)
Adopt a Tree (21)
Have Seeds Will Travel (43)
The Closer You Look (61)
Looking at Leaves (64)
How Big is Your Tree? (67)
Soil Stories (70)

LIFE SCIENCES

2. Different types of plants and animals inhabit the Earth. As a basis for understanding this concept, students know:

    a. how to observe and describe similarities and differences in the appearance and behavior of plants and of animals (e.g., seed-bearing plants, birds, fish, insects).

Project Learning Tree Activity Guide
Picture This! (6)
Adopt a Tree (21)
Trees as Habitats (22)
How Plants Grow (41)
Have Seeds, Will Travel (43)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
The Closer You Look (61)
Looking at Leaves (64)
Bursting Buds (65)
How Big is Your Tree? (67)
Signs of Fall (78)

    b. stories sometimes give plants and animals attributes they do not really have.

Project Learning Tree Activity Guide
Tale of the Sun (18)
Pollution Search (36)
Earth Manners (87)

c. how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs)

Project Learning Tree Activity Guide
Picture This! (6)
Pass the Plants, Please (16)
Adopt a Tree (21)
Trees as Habitats (22)
Every Tree for Itself (27)
Have Seeds, Will Travel (43)
The Closer You Look (61)
To Be a Tree (62)
Tree Factory (63)
Looking at Leaves (64)
Bursting Buds (65)
How Big is Your Tree? (67)
Signs of Fall (78)
Tree Lifecycle (79)

EARTH SCIENCES

3. The Earth is composed of land, air and water. As a basis for understanding this concept, students know:

a. characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.

Project Learning Tree Activity Guide
The Forest of S.T. Shrew (8)

b. changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.

Project Learning Tree Activity Guide
Adopt a Tree (21)
Trees as Habitats (22)
School Yard Safari (46)
Field, Forest, and Stream (48)
Bursting Buds (65)
Tree Cookies (76)
Signs of Fall (78)

c. how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.

Project Learning Tree Activity Guide
We All Need Trees (13)

Environmental Exchange Box (20)
Three Cheers for Trees (30)
Make Your Own paper (51)
Earth Manners (87)

INVESTIGATION AND EXPERIMENTATION

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in the other three strands, students should develop their own questions and perform investigations. Students will:

   a. observe common objects using the five senses.

   Project Learning Tree Activity Guide
   Get in Touch With Trees (2)
   Peppermint Beetle (3)
   Sounds Around (4)
   We All Need Trees (13)
   Adopt a Tree (21)
   Trees as Habitats (22)
   Pollution Search (36)
   School Yard Safari (46)
   The Closer You Look (61)
   Looking at Leaves (64)
   Soil Stories (70)

   b. describe the properties of common objects.

   Project Learning Tree Activity Guide
   The Shape of Things (1)
   Get in Touch with Trees (2)
   Sounds Around (4)
   Picture This! (6)
   Adopt a Tree (21)
   Have Seeds, Will Travel (43)
   The Closer You Look (61)

   d. compare and sort common objects based on one physical attribute (including color, shape, texture, size, weight).

   Project Learning Tree Activity Guide
   The Shape of Things (1)
   Picture This! (6)
   We All Need Trees (12)
   Birds and Worms (25)
   How Plants Grow (41)
   Have Seeds, Will Travel (43)
   How Big is Your Tree? (67)
   Signs of Fall (78)

e. communicate observations orally and in drawings.

Project Learning Tree Activity Guide
The Shape of Things (1)
Get in Touch with Trees (2)
Sounds Around (4)
Picture This! (6)
Adopt a Tree (21)
Trees as Habitats (22)
How Plants Grow (41)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
The Closer You Look (61)
Bursting Buds (65)
Soil Stories (70)

GRADE 1

LIFE SCIENCES

2. Plants and animals meet their needs in different ways. As a basis for understanding this concept, students know:

   a. different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

   Project Learning Tree Activity Guide
   Picture This! (6)
   The Forest of S.T. Shrew (8)
   Trees as Habitats (22)
   Nature's Recyclers (24)
   Birds and Worms (25)
   Plant a Tree (31)
   Have Seeds, Will Travel (43)
   School Yard Safari (46)
   Are Vacant Lots Vacant? (47)
   Field, Forest, and Stream (48)
   To Be a Tree (62)
   Tree Factory (63)
   Soil Stories (70)

   b. plants and animals both need water; animals need food, and plants need light.

   Project Learning Tree Activity Guide
   The Forest of S.T. Shrew (8)
   Adopt a Tree (21)
   Nature's Recyclers (24)
   Every Tree for Itself (27)
   Plant a Tree (31)
   How Plants Grow (41)
   School Yard Safari (46)
   Are Vacant Lots Vacant? (47)
   To Be a Tree (62)
   Tree Factory (63)
   Soil Stories (70)
   Tree Cookies (76)

   c. animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.

   Project Learning Tree Activity Guide
   Picture This! (6)
   The Forest of S.T. Shrew (8)
   Pass the Plants, Please (16)
   Adopt a Tree (21)
   Trees as Habitats (22)
   Nature's Recyclers (24)

Birds and Worms (25)
Three Cheers for Trees (30)
Plant a Tree (31)
A Forest of Many Uses (32)
Have Seeds, Will Travel (43)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
The Closer You Look (61)
To Be a Tree (62)
Bursting Buds (65)
Tree Cookies (76)
Tree Lifecycle (79)

e. roots are associated with the intake of water and soil nutrients, green leaves with making food from sunlight.

Project Learning Tree Activity Guide
Every Tree for Itself (27)
Plant a Tree (31)
How Plants Grow (41)
To Be a Tree (62)
Tree Factory (63)

EARTH SCIENCES

3. Weather can be observed, measured and described. As a basis for understanding this concept, students know:

a. how to use simple tools (e.g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.

Project Learning Tree Activity Guide
Field, Forest, and Stream (48)

b. the weather changes from day to day, but trends in temperature or of rain (or snow) tend to be predictable during a season.

Project Learning Tree Activity Guide
Field, Forest, and Stream (48)
Signs of Fall (78)

c. the sun warms the land, air, and water.

Project Learning Tree Activity Guide
Field, Forest, and Stream (48)

INVESTIGATION AND EXPERIMENTATION

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the

other three strands, students should develop their own questions and perform investigations. Students will:

a. draw pictures that portray some features of the thing being described.

Project Learning Tree Activity Guide
The Shape of Things (1)
Get in Touch with Trees (2)
Sounds Around (4)
The Forest of S.T. Shrew (8)
Environmental Exchange Box (20)
Adopt a Tree (21)
Three Cheers for Trees (30)
Pollution Search (36)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
The Closer You Look (61)
Tree Factory (63)
Bursting Buds (65)
Soil Stories (70)
People, Places, and Things (74)
Tree Cookies (76)
Trees in Trouble (77)
Signs of Fall (78)

b. record observations and data with pictures, numbers, and/or written statements.

Project Learning Tree Activity Guide
The Shape of Things (1)
Get in Touch with Trees (2)
Sounds Around (4)
Environmental Exchange Box (20)
Adopt a Tree (21)
Nature's Recyclers (24)
Birds and Worms (25)
Every Tree for Itself (27)
Pollution Search (36)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
The Closer You Look (61)
Bursting Buds (65)
Soil Stories (70)
Trees in Trouble (77)
Signs of Fall (78)

c. record observations on a bar graph.

Project Learning Tree Activity Guide
The Shape of Things (1)
Pass the Plants, Please (16)
Birds and Worms (25)
Pollution Search (36)
How Plants Grow (41)

GRADE 2

LIFE SCIENCES

2. Plants and animals have predictable life cycles. As a basis for understanding this concept, students know:

   a. organisms reproduce offspring of their own kind. The offspring resemble their parents and each other.

   Project Learning Tree Activity Guide
   How Plants Grow (41)
   Have Seeds, Will Travel (43)
   Tree Factory (63)
   Tree Lifecycle (79)

   c. many characteristics of an organism are inherited from the parents. Some characteristics are caused by, or influenced by, the environment.

   Project Learning Tree Activity Guide
   Habitat Pen Pals (7)
   Adopt a Tree (21)
   Trees as Habitats (22)
   Birds and Worms (25)
   Every Tree for Itself (27)
   Plant a Tree (31)
   How Plants Grow (41)
   Have Seeds, Will Travel (43)
   Tree Cookies (76)
   Trees in Trouble (77)
   Signs of Fall (78)

   d. there is variation among individuals of one kind within a population.

   Project Learning Tree Activity Guide
   Habitat Pen Pals (7)
   Adopt a Tree (21)
   How Plants Grow (41)
   The Closer You Look (61)
   Looking at Leaves (64)
   How Big is Your Tree? (67)
   Name That Tree (68)
   Tree Cookies (76)

   e. the germination, growth, and development of plants can be affected by light, gravity, touch, or environmental stress.

   Project Learning Tree Activity Guide
   Adopt a Tree (21)
   Every Tree for Itself (27)

Plant a Tree (31)
Pollution Search (36)
How Plants Grow (41)
Sunlight and Shades of Green (42)
Have Seeds, Will Travel (43)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Bursting Buds (65)
Tree Cookies (76)
Trees in Trouble (77)
Signs of Fall (78)
Tree Lifecycle (79)
Living with Fire (81)
Earth Manners (87)
Trees for Many Reasons (89)

f. in plants flowers and fruits are associated with reproduction.

Project Learning Tree Activity Guide
Have Seeds, Will Travel (43)
Tree Factory (63)

EARTH SCIENCES

3. Earth is made of materials that have distinct properties and provide resources for human activities. As the basis for understanding this concept, students know:

c. that soil is made partly from weathered rock and partly from organic materials and that soils differ I their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.

Project Learning Tree Activity Guide
The Forest of S.T. Shrew (8)
Soil Stories (70)

e. rock, water, plants and soil provide many resources including food, fuel, and building materials that humans use.

Project Learning Tree Activity Guide
Get in Touch with Trees (2)
We All Need Trees (13)
A Few of My Favorite Things (15)
Pass the Plants, Please (16)
Environmental Exchange Box (20)
Adopt a Tree (21)
Air Plants (28)
Three Cheers for Trees (30)
Plant a Tree (31)
A Forest of Many Uses (32)
Energy Sleuths (39)
How Plants Grow (41)

Have Seeds, Will Travel (43)
Make Your Own Paper (51)
To Be a Tree (62)
Tree Factory (63)
Trees for Many Reasons (89)

INVESTIGATION AND EXPERIMENTATION

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

   a. make predictions based on patterns of observation rather than random guessing.

   Project Learning Tree Activity Guide
   Adopt a Tree (21)
   Nature's Recyclers (24)
   Birds and Worms (25)
   Every Tree for Itself (27)
   How Plants Grow (41)
   Soil Stories (70)
   Tree Cookies (76)

   b. measure length, weight, temperature, and liquid volume with appropriate tools and express measurements in standard and non-standard units.

   Project Learning Tree Activity Guide
   Sounds Around (4)
   Adopt a Tree (21)
   Every Tree for Itself (27)
   How Plants Grow (41)
   Field, Forest, and Stream (48)
   Bursting Buds (65)
   How Big is Your Tree? (67)
   Soil Stories (70)

   c. compare and sort common objects based on two or more physical attributes (including color, shape, texture, size, weight).

   Project Learning Tree Activity Guide
   Picture This! (6)
   Have Seeds, Will Travel (43)
   Looking at Leaves (64)
   Name That Tree (68)

   d. write or draw descriptions of a sequence of steps, events, and observations.

   Project Learning Tree Activity Guide
   Adopt a Tree (21)
   Trees as Habitats (22)
   Nature's Recyclers (24)

Pollution Search (36)
How Plants Grow (41)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forests, and Streams (48)
Make Your Own Paper (51)
Bursting Buds (65)
How Big is Your Tree? (67)
Soil Stories (70)
Trees in Trouble (77)
Signs of Fall (78)

e. construct bar graphs to record data using appropriately labeled axes.

Project Learning Tree Activity Guide
The Shape of Things (1)
Pass the Plants, Please (16)
Birds and Worms (25)
Pollution Search (36)
How Plants Grow (41)

f. write or draw descriptions of a sequence of steps, events and observations, and include the use of magnifiers or microscopes to extend senses.

Project Learning Tree Activity Guide
Adopt a Tree (21)
Trees as Habitats (22)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Bursting Buds (65)
Soil Stories (70)

g. follow verbal instructions for a scientific investigation.

Project Learning Tree Activity Guide
The Shape of Things (1)
Peppermint Beetle (3)
The Forest of S.T. Shrew (8)
We All Need Trees (13)
Pass the Plants, Please (16)
Adopt a Tree (21)
Trees as Habitats (22)
Nature's Recyclers (24)
Plant a Tree (31)
Pollution Search (36)
Energy Sleuths (39)
How Plants Grow (41)
Have Seeds, Will Travel (43)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Make Your Own Paper (51)
The Closer You Look (61)
Looking at Leaves (64)
Bursting Buds (65)

GRADE 3

PHYSICAL SCIENCES

1. Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept, students know:

   a. energy comes from the sun to the Earth in the form of light.

   Project Learning Tree Activity Guide
   Tale of the Sun (18)
   Every Tree for Itself (27)
   Air Plants (28)
   Energy Sleuths (39)
   How Plants Grow (41)
   Sunlight and Shades of Green (42)
   Field, Forest, and Stream (48)
   On the Move (53)
   To Be a Tree (62)
   Tree Factory (63)

   b. sources of stored energy take many forms, such as food, fuel, and batteries.

   Project Learning Tree Activity Guide
   Air Plants (28)
   Energy Sleuths (39)
   Sunlight and Shades of Green (42)
   On the Move (53)
   Tree Factory (63)

   c. machines and living things convert stored energy to motion and heat.

   Project Learning Tree Activity Guide
   On the Move (53)

   d energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.

   Project Learning Tree Activity Guide
   Sounds Around (4)
   Energy Sleuths (39)

2. Light has a source and travels in a direction. As a basis for understanding this concept, students know:

   a. sunlight can be blocked to create shadows.

   Project Learning Tree Activity Guide
   Sunlight and Shades of Green (42)

LIFE SCIENCES

3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept, students know:

   a. plants and animals have structures that serve different functions in growth, survival, and reproduction.

   Project Learning Tree Activity Guide
   Sounds Around (4)
   Picture This! (6)
   Trees as Habitats (22)
   Birds and Worms (25)
   Every Tree for Itself (27)
   Air Plants (28)
   Sunlight and Shades of Green (42)
   Have Seeds, Will Travel (43)
   To Be a Tree (62)
   Tree Factory (63)
   Bursting Buds (65)
   Tree Cookies (76)
   Trees in Trouble (77)
   Signs of Fall (78)

   b. examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

   Project Learning Tree Activity Guide
   Picture This! (6)
   Habitat Pen Pals (7)
   The Forest of S.T. Shrew (8)
   School Yard Safari (46)
   Field, Forest, and Stream (48)
   Tropical Treehouse (49)

   c. living things cause changes in the environment where they live; some of these changes are detrimental to the organism or other organisms, whereas others are beneficial.

   Project Learning Tree Activity Guide
   The Forest of S.T. Shrew (8)
   We All Need Trees (13)
   Adopt a Tree (21)
   Trees as Habitats (22)
   Nature's Recyclers (24)
   Every Tree for Itself (27)
   Air Plants (28)
   Three Cheers for Trees (30)
   Plant a Tree (31)
   A Forest of Many Uses (32)
   Who Works in This Forest? (34)

Pollution Search (36)
How Plants Grow (41)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Tropical Treehouse (49)
Trees in Trouble (77)
Tree Lifecycle (79)
Nothing Succeeds Like Succession (80)
Living with Fire (81)
Earth Manners (87)
Trees for Many Reasons (89)

d. when the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

Project Learning Tree Activity Guide
Birds and Worms (25)
Every Tree for Itself (27)
A Forest of Many Uses (32)
Pollution Search (36)
How Plants Grow (41)
Sunlight and Shades of Green (42)
Are Vacant Lots Vacant? (47)
Tropical Treehouse (49)
Tree Cookies (76)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)
Living with Fire (81)
Trees for Many Reasons (89)

INVESTIGATION AND EXPERIMENTATION

5. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

a. repeat observations to improve accuracy, and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.

Project Learning Tree Activity Guide
Adopt a Tree (21)
Trees as Habitats (22)
School Yard Safari (46)
Field, Forest, and Stream (48)

c. use numerical data in describing and comparing objects, events and measurements.

Project Learning Tree Activity Guide
The Shape of Things (1)

Pass the Plants, Please (16)
Nature's Recyclers (24)
Birds and Worms (25)
Every Tree for Itself (27)
Pollution Search (36)
How Plants Grow (41)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
How Big is Your Tree? (67)
Trees in Trouble (77)

d. predict the outcome of a simple investigation, and compare the result to the prediction.

Project Learning Tree Activity Guide
Trees as Habitats (22)
Nature's Recyclers (24)
Birds and Worms (25)
How Plants Grow (41)
Sunlight and Shades of Green (42)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Soil Stories (70)
Trees in Trouble (77)

e. collect data in an investigation and analyze them to develop a logical conclusion.

Project Learning Tree Activity Guide
We All Need Trees (13)
A Few of My Favorite Things (15)
Adopt a Tree (21)
Trees as Habitats (22)
Nature's Recyclers (24)
Birds and Worms (25)
Every Tree for Itself (27)
Plant a Tree (31)
Pollution Search (36)
How Plants Grow (41)
Sunlight and Shades of Green (42)
Have Seeds, Will Travel (43)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Trees in Trouble (77)

GRADE 4

LIFE SCIENCES

2. All organisms need energy and matter to live and grow. As a basis for understanding this concept, students know:

   a. plants are the primary source of matter and energy entering most food chains.

   Project Learning Tree Activity Guide
   Tale of the Sun (18)
   Web of Life (45)

   b. producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs, and may compete with each other for resources in an ecosystem.

   Project Learning Tree Activity Guide
   The Forest of S.T. Shrew (8)
   Trees as Habitats (22)
   The Fallen Log (23)
   Nature's Recyclers (24)
   Every Tree for Itself (27)
   Web of Life (45)
   School Yard Safari (46)
   Are Vacant Lots Vacant? (47)
   Forest for the Trees (69)
   Life on the Edge (88)

   c. decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

   Project Learning Tree Activity Guide
   The Forest of S.T. Shrew (8)
   The Fallen Log (23)
   Nature's Recyclers (24)
   Are Vacant Lots Vacant? (47)
   Trees in Trouble (77)
   Tree Lifecycle (79)

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept, students know:

   a. ecosystems can be characterized in terms of their living and nonliving components.

   Project Learning Tree Activity Guide
   Habitat Pen Pals (7)
   The Forest of S.T. Shrew (8)
   Planet Diversity (9)

Charting Diversity (10)
Can It Be Real? (11)
Environmental Exchange Box (20)
Trees as Habitats (22)
The Fallen Log (23)
Nature's Recyclers (24)
Every Tree for Itself (27)
Plant a Tree (31)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Forest for the Trees (69)
Soil Stories (70)
Nothing Succeeds Like Succession (80)

b. for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

Project Learning Tree Activity Guide
Picture This! (6)
Habitat Pen Pals (7)
The Forest of S.T. Shrew (8)
Planet Diversity (9)
Charting Diversity (10)
Can It Be Real? (11)
Birds and Worms (25)
Every Tree for Itself (27)
Plant a Tree (31)
Have Seeds, Will Travel (43)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Tropical Treehouse (49)
Nothing Succeeds Like Succession (80)
Life on the Edge (88)

c. many plants depend on animals for pollination and seed dispersal, while animals depend on plants for food and shelter.

Project Learning Tree Activity Guide
The Forest of S.T. Shrew (8)
Charting Diversity (10)
Pass the Plants, Please (16)
Tale of the Sun (18)
Adopt a Tree (21)
Trees as Habitats (22)
The Fallen Log (23)
Nature's Recyclers (24)
Have Seeds, Will Travel (43)
Web of Life (45)
Are Vacant Lots Vacant? (47)
Tropical Treehouse (49)
Nothing Succeeds Like Succession (80)
Trees for Many Reasons (89)

d. most microorganisms do not cause disease and many are beneficial.

Project Learning Tree Activity Guide
The Forest of S.T. Shrew (8)
The Fallen Log (23)
Nature's Recyclers (24)
Soil Stories (70)

EARTH SCIENCES

5. Waves, wind, water, and ice shape and reshape the Earth's land surface. As a basis for understanding this concept, students know:

c. moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

Project Learning Tree Activity Guide
Water Wonders (44)

INVESTIGATION AND EXPERIMENTATION

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

a. differentiate observation from inference (interpretation), and know that scientists' explanations come partly from what they observe and partly from how they interpret their observations.

Project Learning Tree Activity Guide
Planet Diversity (9)
Nature's Recyclers (24)
Birds and Worms (25)
Pollution Search (36)
How Plants Grow (41)
Sunlight and Shades of Green (42)
Water Wonders (44)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Tepee Talk (75)
Tree Cookies (76)
Nothing Succeeds Like Succession (80)
Living with Fire (81)

b. measure and estimate weight, length, or volume of objects.

Project Learning Tree Activity Guide

Every Drop Counts (38)
Germinating Giants (66)
How Big is Your Tree? (67)

c. formulate predictions and justify predictions based on cause and effect relationships.

Project Learning Tree Activity Guide
Planet Diversity (9)
Birds and Worms (25)
Every Drop Counts (38)
How Plants Grow (41)
Sunlight and Shades of Green (42)
Water Wonders (44)
Are Vacant Lots Vacant? (47)
Trees in Trouble (77)
Living with Fire (81)

d. conduct multiple trials to test a prediction and draw conclusions about the relationships between results and predictions.

Project Learning Tree Activity Guide
Birds and Worms (25)
Every Drop Counts (38)
School Yard Safari (46)
Field, Forest, and Stream (48)

e. construct and interpret graphs from measurements.

Project Learning Tree Activity Guide
Every Drop Counts (38)
How Plants Grow (41)
School Yard Safari (46)
How Big is Your Tree? (67)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)

f. follow a set of written instructions for a scientific investigation

Project Learning Tree Activity Guide
Adopt a Tree (21)
Germinating Giants (66)
Soil Stories (70)
Waste Watchers (73)
Signs of Fall (78)
Tree Lifecycle (79)

GRADE 5

LIFE SCIENCES

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept, students know:

   a. many multicellular organisms have specialized structures to support the transport of materials.

   Project Learning Tree Activity Guide
   Every Tree for Itself (27)
   Air Plants (28)
   Sunlight and Shades of Green (42)
   Water Wonders (44)
   Tree Factory (63)
   Tree Cookies (76)

   e. how sugar, water, and minerals are transported in a vascular plant.

   Project Learning Tree Activity Guide
   Every Tree for Itself (27)
   Air Plants (28)
   Sunlight and Shades of Green (42)
   Water Wonders (44)
   Tree Factory (63)
   Tree Cookies (76)

   f. plants use carbon dioxide (CO_2) and energy from sunlight to build molecules of sugar and release oxygen.

   Project Learning Tree Activity Guide
   Air Plants (28)
   Sunlight and Shades of Green (42)
   Tree Factory (63)

   g. plant and animal cells break down sugar to obtain energy, forming carbon dioxide (CO_2) and water (respiration).

   Project Learning Tree Activity Guide
   Air Plants (28)
   Sunlight and Shades of Green (42)

EARTH SCIENCES

3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept, students know:

   b. when liquid water evaporates, it turns into water vapor in the air and can reappear as a

liquid when cooled, or as a solid if cooled below the freezing point of water.

Project Learning Tree Activity Guide
Water Wonders (44)

c. water moves in the air from one place to another in the form of clouds or fog, which are tiny droplets of water or ice, and falls to the Earth as rain, hail, sleet, or snow.

Project Learning Tree Activity Guide
Water Wonders (44)

d. the amount of fresh water, located in rivers, lakes, underground sources, and glaciers, is limited, and its availability can be extended through recycling and decreased use.

Project Learning Tree Activity Guide
Renewable or Not? (14)
Every Drop Counts (38)
Water Wonders (44)
Our Changing World (86)

e. the origin of the water used by their local communities.

Project Learning Tree Activity Guide
Every Drop Counts (38)

INVESTIGATION AND EXPERIMENTATION

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

a. classify objects (e.g., rocks, plant, leaves) based on appropriate criteria.

Project Learning Tree Activity Guide

Picture This! (6)
We All Need Trees (13)
Renewable or Not? (14)
Pass the Plants, Please (16)
Trees as Habitats (22)
Reduce, Reuse, Recycle (37)
Have Seeds, Will Travel (43)
Looking at Leaves (64)

b. develop a testable question.

Project Learning Tree Activity Guide
Adopt a Tree (21)
The Fallen Log (23)

How Plants Grow (41)

d. identify the dependent and controlled variables in an investigation.

Project Learning Tree Activity Guide
Sounds Around (4)
Nature's Recyclers (24)
How Plants Grow (41)
Water Wonders (44)
Soil Stories (70)
Trees in Trouble (77)

e. identify a single independent variable in a scientific investigation and explain what will be learned by collecting data on this variable.

Project Learning Tree Activity Guide
Sounds Around (4)
Nature's Recyclers (24)
How Plants Grow (41)
Water Wonders (44)
Trees in Trouble (77)

f. select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.

Project Learning Tree Activity Guide
Sounds Around (4)
Adopt a Tree (21)
Reduce, Reuse, Recycle (37)
Every Drop Counts (38)
How Plants Grow (41)
Field, Forest, and Stream (48)
Bursting Buds (65)
Germinating Giants (66)
How Big is Your Tree? (67)
Soil Stories (70)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)

g. record data using appropriate graphic representation (including charts, graphs, and labeled diagrams), and make inferences based on those data.

Project Learning Tree Activity Guide
Sounds Around (4)
Planet Diversity (9)
Charting Diversity (10)
Invasive Species (12)
Renewable or Not? (14)
Trees as Habitats (22)
Birds and Worms (25)
Every Tree for Itself (27)
Pollution Search (36)
Reduce, Reuse, Recycle (37)

Every Drop Counts (38)
Energy Sleuths (39)
How Plants Grow (41)
School Yard Safari (46)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
The Closer You Look (61)
Looking at Leaves (64)
How Big is Your Tree? (67)
Soil Stories (70)
Waste Watchers (73)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)
Living with Fire (81)
In the Driver's Seat (85)
Life on the Edge (88)

h. draw conclusions based on scientific evidence and indicate whether further information is needed to support a specific conclusion.

Project Learning Tree Activity Guide
Sounds Around (4)
Planet Diversity (9)
Trees as Habitats (22)

GRADE 6
FOCUS ON EARTH SCIENCE

SHAPING THE EARTH'S SURFACE

2. Topography is reshaped by weathering of rock and soil and by the transportation and deposition of sediment. As the basis for understanding this concept, students know:

   b. rivers and streams are dynamic systems that erode and transport sediment, change course, and flood their banks in natural and recurring patterns.

   Project Learning Tree Activity Guide
   By the Rivers of Babylon (94)

Energy in the Earth System

4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept, students know:

   a. the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.

   Project Learning Tree Activity Guide
   Water Wonders (44)

ECOLOGY (LIFE SCIENCE)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept, students know:

   a. energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis, and then from organism to organism in food webs.

   Project Learning Tree Activity Guide
   Tale of the Sun (18)
   Air Plants (28)
   Sunlight and Shades of Green (42)
   Web of Life (45)

   b. over time, matter is transferred from one organism to others in the food web, and between organisms and the physical environment.

   Project Learning Tree Activity Guide
   The Fallen Log (23)
   Nature's Recyclers (24)

Web of Life (45)

c. populations of organisms can be categorized by the functions they serve in an ecosystem.

Project Learning Tree Activity Guide
Invasive Species (12)
The Fallen Log (23)
Nature's Recyclers (24)
Dynamic Duos (26)
Plant a Tree (31)
A Forest of Many Uses (32)
Web of Life (45)
Nothing Succeeds Like Succession (80)

e. the number and types of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition.

Project Learning Tree Activity Guide
Habitat Pen Pals (7)
Planet Diversity (9)
Every Tree for Itself (27)
Rain Reasons (29)
Plant a Tree (31)
Forest Consequences (33)
Loving It Too Much (35)
How Plants Grow (41)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Tropical Treehouse (49)
Nothing Succeeds Like Succession (80)
Life on the Edge (88)

RESOURCES

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept, students know:

a. the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.

Project Learning Tree Activity Guide
We All Need Trees (13)
Renewable or Not? (14)
A Few of My Favorite Things (15)
A Forest of Many Uses (32)
Loving It Too Much (35)
Energy Sleuths (39)
Make Your Own Paper (51)
A Look at Aluminum (52)
Waste Watchers (73)

Resource-Go-Round (82)
The Global Climate (84)
In the Driver's Seat (85)
Our Changing World (86)

b. different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and classify them as renewable or nonrenewable.

Project Learning Tree Activity Guide
Renewable or Not? (14)
A Few of My Favorite Things (15)
A Forest of Many Uses (32)
Forest Consequences (33)
Reduce, Reuse, Recycle (37)
Every Drop Counts (38)
Energy Sleuths (39)
Make Your Own Paper (51)
A Look at Aluminum (52)
Forest for the Trees (69)
Waste Watchers (73)
Resource-Go-Round (82)
A Peek at Packaging (83)
Trees for Many Reasons (89)
A Look at Lifestyles (92)
By the Rivers of Babylon (94)

c. natural origin of the materials used to make common objects.

Project Learning Tree Activity Guide
We All Need Trees (13)
Renewable or Not? (14)
A Few of My Favorite Things (15)
Environmental Exchange Box (20)
A Forest of Many Uses (32)
Forest Consequences (33)
Reduce, Reuse, Recycle (37)
Tropical Treehouse (49)
Make Your Own Paper (51)
A Look at Aluminum (52)
Forest for the Trees (69)
Tipi Talk (75)
Resource-Go-Round (82)
A Peek at Packaging (83)
Trees for Many Reasons (89)
A Look at Lifestyles (92)
Paper Civilizations (93)

INVESTIGATION AND EXPERIMENTATION

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform

investigations. Students will:

a. develop a hypothesis.

Project Learning Tree Activity Guide

Planet Diversity (9)
Rain Reasons (29)
How Plants Grow (41)
Trees in Trouble (77)

b. select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

Project Learning Tree Activity Guide
Sounds Around (4)
Planet Diversity (9)
Adopt a Tree (21)
The Fallen Log (23)
Nature's Recyclers (24)
Rain Reasons (29)
Reduce, Reuse, Recycle (37)
Every Drop Counts (38)
How Plants Grow (41)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Bursting Buds (65)
Germinating Giants (66)
How Big is Your Tree? (67)
Soil Stories (70)
Air We Breathe (72)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)
In the Driver's Seat (85)
Improve Your Place (96)

c. construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

Project Learning Tree Activity Guide
Sounds Around (4)
Planet Diversity (9)
Birds and Worms (25)
Every Tree for Itself (27)
Loving It Too Much (35)
Pollution Search (36)
Reduce, Reuse, Recycle (37)
How Plants Grow (41)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)

The Global Climate (84)
In the Driver's Seat (85)
Life on the Edge (88)

d. communicate the steps and results from an investigation in written reports and verbal presentations.

Project Learning Tree Activity Guide
Nature's Recyclers (24)
Rain Reasons (29)
How Plants Grow (41)
Are Vacant Lots Vacant? (47)
Bursting Buds (65)
How Big is Your Tree? (67)
Soil Stories (70)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)

e. recognize whether evidence is consistent with a proposed explanation.

Project Learning Tree Activity Guide
Sounds Around (4)
Planet Diversity (9)
Birds and Worms (25)
Rain Reasons (29)
Energy Sleuths (39)
How Plants Grow (41)
Sunlight and Shades of Green (42)
Water Wonders (44)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Bursting Buds (65)
Air We Breathe (72)
Trees in Trouble (77)
Signs of Fall (78)
Nothing Succeeds Like Succession (80)
Living with Fire (81)
Global Climate (84)

f. read a topographic map and a geologic map for evidence provided on the maps, and construct and interpret a simple scale map.

Project Learning Tree Activity Guide
Rain Reasons (29)
Plant a Tree (31)
Then and Now (40)
Are Vacant Lots Vacant? (47)
Planning the Ideal Community (55)
Improve Your Place (96)

h. identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).

Project Learning Tree Activity Guide
Adopt a Tree (21)
Trees as Habitats (22)
Field, Forest, and Stream (48)
Bursting Buds (65)
Nothing Succeeds Like Succession (80)

GRADE 7
FOCUS ON LIFE SCIENCE

EVOLUTION

3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept, students know:

    e. extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival.

    Project Learning Tree Activity Guide
    Life on the Edge (88)

STRUCTURE AND FUNCTION IN LIVING SYSTEMS

5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept, students know:

    a. plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.

    Project Learning Tree Activity Guide
    Sunlight and Shades of Green (42)
    Tree Cookies (76)

INVESTIGATION AND EXPERIMENTATION

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

    a. select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

    Project Learning Tree Activity Guide
    Sounds Around (4)
    Adopt a Tree (21)
    Trees as Habitats (22)
    The Fallen Log (23)
    Rain Reasons (29)
    Reduce, Reuse, Recycle (37)
    Every Drop Counts (38)
    How Plants Grow (41)
    Are Vacant Lots Vacant? (47)

Field, Forest, and Stream (48)
How Big is Your Tree? (67)
Watch on Wetlands (71)
Air We Breathe (72)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)
In the Driver's Seat (85)

b. utilize a variety of print and electronic resources (including the World Wide Web) to collect information as evidence as part of a research project.

Project Learning Tree Activity Guide
Sounds Around (4)
Charting Diversity (10)
Can It Be Real? (11)
Invasive Species (12)
Renewable or Not? (14)
Energy Sleuths (39)
Tropical Treehouse (49)
Planning the Ideal Community (55)
Power of Print (59)
Watch on Wetlands (71)
Living with Fire (81)
Resource-Go-Round (82)
The Global Climate (84)
Our Changing World (86)
Life on the Edge (88)
Native Ways (90)
In the Good Old Days (91)
A Look at Lifestyles (92)
Paper Civilizations (93)
By the Rivers of Babylon (94)
Did You Notice? (95)

c. communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.

Project Learning Tree Activity Guide
Sounds Around (4)
Rain Reasons (29)
How Plants Grow (41)
Water Wonders (44)
Trees in Trouble (77)

d. construct scale models, maps and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).

Project Learning Tree Activity Guide
Plant a Tree (31)
How Plants Grow (41)
Water Wonders (44)
Web of Life (45)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Name That Tree (68)

A Look at Aluminum (52)
Watch on Wetlands (71)
Nothing Succeeds Like Succession (80)
Resource-Go-Round (82)
The Global Climate (84)
Our Changing World (86)

e. communicate the steps and results from an investigation in written reports and verbal presentations.

Project Learning Tree Activity Guide
Sounds Around (4)
Rain Reasons (29)
How Plants Grow (41)
Are Vacant Lots Vacant (47)
How Big is Your Tree? (62)
Soil Stories (70)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)

GRADE 8
FOCUS ON PHYSICAL SCIENCE

STRUCTURE OF MATTER

3. Elements have distinct properties and atomic structure. All matter is comprised of one or more of over 100 elements. As a basis for understanding this concept, students know:

   d. the states (solid, liquid, gas) of matter depend on molecular motion.

   Project Learning Tree Activity Guide
   Air We Breathe (72)

INVESTIGATION AND EXPERIMENTATION

9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform investigations. Students will:

   a. plan and conduct a scientific investigation to test a hypothesis.

   Project Learning Tree Activity Guide
   Rain Reasons (29)
   How Plants Grow (41)
   Sunlight and Shades of Green (42)
   Trees in Trouble (77)

   b. evaluate the accuracy and reproducibility of data.

   Project Learning Tree Activity Guide
   Sounds Around (4)
   Rain Reasons (29)
   Field, Forest, and Stream (48)
   Nothing Succeeds Like Succession (80)

   c. distinguish between variable and controlled parameters in a test.

   Project Learning Tree Activity Guide
   Sounds Around (4)
   Rain Reasons (29)
   How Plants Grow (41)
   Soil Stories (70)
   Trees in Trouble (77)

   e. construct appropriate graphs from data and develop quantitative statements about the relationships between variables.

Project Learning Tree Activity Guide

Sounds Around (4)
Every Tree for Itself (27)
Loving It Too Much (35)
Reduce, Reuse, Recycle (37)
Every Drop Counts (38)
How Plants Grow (41)
Are Vacant Lots Vacant? (47)
Field, Forest, and Stream (48)
Trees in Trouble (77)
Nothing Succeeds Like Succession (80)
Living with Fire (81)
The Global Climate (84)
In the Driver's Seat (85)
Life on the Edge (88)