Grade 4

Unit 3—Properties of Water (FOSS® Water)

Essential Question: What makes water so special?

Major Understandings: *Quoted from New York State Performance Indicators*

(Note: Correlation is provided at the level of FOSS "Investigation & Part." All "Steps" of an investigation must be completed to meet the standard.)

LE 6.2 Describe the relationship of the Sun as an energy source for living and nonliving cycles.

6.2c Heat energy from the Sun powers the water cycle.

PS 2.1 Describe the relationship among air, water, and land on Earth.

2.1c Water is recycled by natural processes on Earth.
- – evaporation: changing of water (liquid) into water vapor (gas)
- – condensation: changing of water vapor (gas) into water (liquid)
- – precipitation: rain, sleet, snow, hail
- – runoff: water flowing on Earth's surface
- – groundwater: water that moves downward into the ground

PS 3.1 Observe and describe properties of materials, using appropriate tools.

3.1a Matter takes up space and has mass. Two objects cannot occupy the same place at the same time.

3.1b Matter has properties (color, hardness, odor, sound, taste, etc.) that can be observed through the senses.

3.1c Objects have properties that can be observed, described, and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.

3.1d Measurements can be made with standard metric units and nonstandard units *(Note: Exceptions to the metric system usage are found in meteorology).*

3.1e The material(s) an object is made up of determine some specific properties of the object (sink/float, conductivity, magnetism). Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers, and graduated cylinders.

3.1f Objects and/or materials can be sorted or classified according to their properties.

PS 3.2 Describe chemical and physical changes, including changes in states of matter.

3.2a Matter exists in three states: solid, liquid, gas.
- – solids have a definite shape and volume
- – liquids do not have a definite shape but have a definite volume
- – gases do not hold their shape or volume

3.2b Temperature can affect the state of matter of a substance.

3.2c Changes in the properties or materials of objects can be observed and described.

PS 4.1 Describe a variety of forms of energy (e.g., heat, chemical, light) and the changes that occur in objects when they interact with those forms of energy.

4.1d Energy and matter interact: water is evaporated by the Sun's heat; a bulb is lighted by means of electrical current; a musical instrument is played to produce a sound; dark colors may absorb light, light colors may reflect light.

Grade 4

WEEK 1

Lesson 1 (45 min)

Objective(s):

Survey/Pre-assessment

Alignment with NYS Core Curriculum:

LE 6.2c; PS 2.1c, 3.1c, d, e, 3.2b, c, 4.1d

Advanced Planning / Notes to Teachers

- Note: Administration of the Survey should be a few days BEFORE the start of the unit.
- Teacher Guide, Benchmark Assessment Folio, pp. 1-25, 54
- Download optional tool: Benchmark and I-Check Assessment coding sheets at www.fossweb.com/NYC
- Kit preparation: see Teacher Guide, Materials, pp. 1-7 and Teacher Preparation Video or DVD (or view at www.fossweb.com/NYC)
- Note: see Teacher Guide, Materials, p. 3 for Materials Supplied by the Teacher and Materials from the Water Tool Kit.
- **50 Pennies, (2 oz.) dishwashing detergent and (8 oz.) white vinegar** are needed for Inv. 1.
- **Consider student recording in PENCIL instead of water soluble ink pens/markers.**

Investigation/Activity

- Benchmark Assessment Packet, Survey/Posttest pages 1-7
- Letter to Parents, Teacher Sheet No. 1

Homework/ Extra Practice

Lesson 2 (45 min)

Objective(s):

- Water has several observable properties, including transparency, shapelessness, and movement or flow.
- Water is absorbed by some materials.
- Water beads up on some materials.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1b, c, f, 3.2a, b

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 1: *Water Observations*, pp. 1-7
- Teacher Guide Inv. 1: *Water Observations*, Part 1: Looking at Water, Materials and Getting Ready, pp. 8-10j
- Teacher Guide Science Stories folio, pp. 1-3
- www.fossweb.com/NYC Check website for interactive simulations, to write questions to a scientist, for teaching tips, and other websites to support teaching Water.
- **Clean pennies for next lesson, Inv. 1, Part 2, p. 15**

Investigation/Activity

- Investigation 1: *Water Observations*, Part 1: *Looking at Water, #1-13*
- Teacher Guide, pages 11-13
- Investigation Duplication Master: Teacher Sheet No. 1
- Investigation Duplication Master: Student Sheet No. 2
- Assessment Duplication Master No. 1: Assessment Chart for Investigation 1, Part 1 – Teacher Observation
- *FOSS Science Stories: A Report from the Blue Planet, pages 1-2*

Homework/ Extra Practice

Where does the water from your faucet come from? Where will it go after you use it? Why is it important not to pour things other than waste water down the drain?

WEEK 1 (continued)

Lesson 3 (45 min)

Objective(s):

- Surface tension is the skinlike surface of water that pulls it together into the smallest possible volume.
- Drops of water form domes on pennies because of surface tension.
- Surface tension can be disrupted by the addition of some other substances.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, d, e, 3.2a

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 1: *Water Observations*, pp. 1-7
– Teacher Guide Inv. 1: *Water Observations*, Part 2 Surface Tension, Materials and Getting Ready, pp. 14-15
– Teacher Guide Science Stories folio, p. 4

Investigation/Activity

– Investigation 1: *Water Observations* Part 2: *Surface Tension, # 1-13*
– Teacher Guide, pages 16-18
– Investigation Duplication Master: Student Sheet No. 3
– Assessment Duplication Master No. 1: Assessment Chart for Investigation 1, Part 2 – Teacher Observations
– *FOSS Science Stories: Surface Tension*, page 3

Homework/Extra Practice

Lesson 4 (45 min)

Objective(s):

- Surface tension is the skinlike surface of water that pulls it together into the smallest possible volume.
- Drops of water form domes on pennies because of surface tension.
- Surface tension can be disrupted by the addition of some other substances.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, d, e, 3.2a

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 1: *Water Observations*, pp. 1-7
– Teacher Guide Inv. 1: *Water Observations*, Part 2 Surface Tension, Materials and Getting Ready, pp. 14-15
– Teacher Guide Science Stories folio, p. 4

Investigation/Activity

– Investigation 1: *Water Observations* Part 2: *Surface Tension, # 14-16*
– Teacher Guide, pages 16-18
– Investigation Duplication Master: Student Sheet No. 3
– Assessment Duplication Master No. 1: Assessment Chart for Investigation 1, Part 2 – Teacher Observations
– *FOSS Science Stories: Surface Tension*, page 3

Homework/Extra Practice

Home/School Connection, Student Sheet No. 27

WEEK 2

Lesson 5 (45 min)

Objective(s):

- Water flows downhill.
- Larger amounts of water flow more quickly.
- Increasing the slope over which water flows makes it flow more quickly.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, 3.2a

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 1: *Water Observations*, pp. 1-7

– Teacher Guide Inv. 1: *Water Observations*, Part 3: *Water on a Slope*, Materials and Getting Ready, pp. 19-20

– Teacher Guide Science Stories folio, p. 5

Investigation/Activity

– Investigation 1: *Water Observations*
Part 3: *Water on a Slope, # 1-12*
Note: Step 12 may be completed in Lesson 6

– Teacher Guide, pages 21-23

– Investigation Duplication Master: Student Sheet No. 4-5

– Assessment Duplication Master No. 1:
Assessment Chart for Investigation 1, Part 3 – Response Sheet

– *FOSS Science Stories: Which Way Does It Go?*, page 4

Homework/Extra Practice

Math Extension, Student Sheet No. 29

Lesson 6 (45 min)

Objective(s):

- Water flows downhill.
- Larger amounts of water flow more quickly.
- Increasing the slope over which water flows makes it flow more quickly.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, 3.2a

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 1: *Water Observations*, pp. 1-7

– Teacher Guide Inv. 1: *Water Observations*, Part 3: *Water on a Slope*, Materials and Getting Ready pp. 19-20

– Teacher Guide Science Stories folio, p. 5

Investigation/Activity

– Investigation 1: *Water Observations*
Part 3: *Water on a Slope, # 13-15* ***OR*** *# 13-14, 12, 15*

– Teacher Guide, pages 21-23

– Investigation Duplication Master: Student Sheet No. 4-5

– Assessment Duplication Master No. 1:
Assessment Chart for Investigation 1, Part 3 – Response Sheet

– *FOSS Science Stories: Which Way Does It Go?*, page 4

Homework/Extra Practice

WEEK 2 (continued)

Lesson 7 (45 min)

Objective(s):

- Water is absorbed by some materials.
- Water beads up on some materials.
- Surface tension makes a drop of water form beads and domes with a skinlike surface.
- The speed at which a bead of water flows on a smooth surface depends on the slope of the surface and the size of the water bead.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, 3.2c

Advanced Planning/ Notes to Teachers

– Teacher Guide, Benchmark Assessment Folio, pp. 26-31, 54

– Plan Assessment Review time with class after teacher assessment coding.

Investigation/Activity

Benchmark Assessment Packet, Investigation 1, I-Check, pages 1-3

Homework/Extra Practice

Lesson 8 (45 min)

Objective(s):

- Water expands when heat is added.
- Water contracts when heat is taken away.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, pp. 1-7

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, Part 1: Build a Thermometer, Materials and Getting Ready pp. 8-10

– www.fossweb.com/NYC Check website for interactive simulations, to write questions to a scientist, for teaching tips, and other websites to support teaching Water.

– **Plan for hot water and ice water for next lesson.**

Investigation/Activity

– Investigation 2: *Hot Water, Cold Water* Part 1: *Build a Thermometer, # 1-16*

– Teacher Guide, pages 11-13

– Investigation Duplication Master: Student Sheet No. 6

– Assessment Duplication Master No. 2: Assessment Chart for Investigation 2, Part 1 – Teacher Observation

Homework/Extra Practice

Home/School Connection, Student Sheet No. 28

WEEK 3

Lesson 9 (45 min)

Objective(s):

- Warm water is less dense than room-temperature water.
- Cold water is denser than room-temperature water.
- Cold water is denser than warm water.
- A material that floats in water in less dense than the water; a material that sinks is denser.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, 3.2a, b, c

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, pp. 1-7

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, Part 2: *Sinking and Floating in Water*, Materials and Getting Ready, pp. 14-15

Investigation/Activity

– Investigation 2: *Hot Water, Cold Water* Part 2: *Sinking and Floating in Water, # 1-11*

– Teacher Guide, pages 16-18

– Investigation Duplication Master: Student Sheet No. 7

– Assessment Duplication Master No. 2: Assessment Chart for Investigation 2, Part 2 – Student Sheet, Sinking & Floating Water, operational definition of density

Homework/Extra Practice

Lesson 10 (45 min)

Objective(s):

- Warm water is less dense than room-temperature water.
- Cold water is denser than room-temperature water.
- Cold water is denser than warm water.
- A material that floats in water in less dense than the water; a material that sinks is denser.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, 3.2a, b, c

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, pp. 1-7

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, Part 2: *Sinking and Floating in Water*, Materials and Getting Ready, pp. 14-15

– Teacher Guide Science Stories folio, pp. 6-7

– **Make BLUE ICE CUBES for Lesson 12 (see p. 20).**

Investigation/Activity

– Investigation 2: *Hot Water, Cold Water* Part 2: *Sinking and Floating in Water, # 12-14*

– Teacher Guide, page 18

– Investigation Duplication Master: Student Sheet No. 7

– F*OSS Science Stories: The Pond*, pages 5-7

Homework/Extra Practice

'Waterproof' means water will bead up and flow off. Make a list of waterproof materials that we use in our daily lives.

WEEK 3 (continued)

Lesson 11 (45 min)

Objective(s):

- Water begins to expand when its temperature reaches 4°C.
- Water is densest at 4°C.
- Ice is less dense than liquid water.
- A solid has a definite volume and shape; a liquid has only definite volume.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, pp. 1-7

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, Part 3: *Water as Ice*, Materials and Getting Ready, pp. 19-20.

– Teacher Guide Science Stories folio, pp. 8-9

Investigation/Activity

– Investigation 2: *Hot Water, Cold Water* Part 3: *Water as Ice*, # 1-5

– Teacher Guide, pages 21-22

– Investigation Duplication Master: Student Sheet No. 8

– Assessment Duplication Master No. 2: Assessment Chart for Investigation 2, Part 2 – Student Sheet, *Sinking & Floating Water*, operational definition of density

Homework/Extra Practice

Lesson 12 (45 min)

Objective(s):

- Water begins to expand when its temperature reaches 4°C.
- Water is densest at 4°C.
- Ice is less dense than liquid water.
- A solid has a definite volume and shape; a liquid has only definite volume.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, pp. 1-7

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, Part 3: *Water as Ice*, Materials and Getting Ready, pp. 19-20.

– Teacher Guide Science Stories folio, pp. 8-9

Investigation/Activity

– Investigation 2: *Hot Water, Cold Water* Part 3: *Water as Ice*, # 6-16

– Teacher Guide, pages 22-24

– Investigation Duplication Master: Student Sheet No. 8-9

– Assessment Duplication Master No. 2: Assessment Chart for Investigation 2, Part 3 – Response Sheet – *Hot Water, Cold Water*

Homework/Extra Practice

Math Extension, Student Sheet No. 24

WEEK 4

Lesson 13 (45 min)

Objective(s):

- Water begins to expand when its temperature reaches 4°C.
- Water is densest at 4°C.
- Ice is less dense than liquid water.
- A solid has a definite volume and shape; a liquid has only definite volume.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, pp. 1-7

– Teacher Guide Inv. 2: *Hot Water, Cold Water*, Part 3: *Water as Ice*, Materials and Getting Ready, pp. 19-20

– Teacher Guide Science Stories folio, pp. 8-9

Investigation/Activity

– Investigation 2: *Hot Water, Cold Water* Part 3: *Water as Ice, # 17-19*

– Teacher Guide, pages 24

– Investigation Duplication Master: Student Sheet No. 8-9

– Assessment Duplication Master No. 2: Assessment Chart for Investigation 2, Teacher Observation Notes

– *FOSS Science Stories: Ice Is Everywhere and Ice History?*, pages 8-11

Homework/Extra Practice

How long does it take 3 drops of food coloring to mix in a glass of COLD water (without stirring!)? How long does it take in WARM water? Make a chart to show your results.

Lesson 14 (45 min)

Objective(s):

- Water may exist as a solid, liquid or gas, depending on its temperature.
- Changing the temperature of water may change its properties.
- Cold water is denser than warm water.
- Liquid water becomes solid (ice) when it cools to 0°C.
- Warming ice to a temperature above 0°C causes it to melt into liquid water.

Alignment with NYS Core Curriculum:

PS 3.1a, b, c, d, e, 3.2a, b, c

Advanced Planning/ Notes to Teachers

– Teacher Guide, Benchmark Assessment Folio, pp. 32-39, 54

– Plan Assessment Review time with class after teacher assessment coding.

– **Note: Lessons 15 & 16 should be scheduled on CONSECUTIVE days.**

Investigation/Activity

Benchmark Assessment Packet, Investigation 2, I-Check, pages 1-4

Homework/Extra Practice

Grade 4

WEEK 4 (continued)

Lesson 15 (45 min)

Objective(s):

Evaporation is the process by which liquid water changes into water vapor, a gas.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7
- Teacher Guide Inv. 3: *Water Vapor*, Part 1: *Evaporation*, Materials and Getting Ready, pp. 8-9
- www.fossweb.com/NYC Check website for interactive simulations, to write questions to a scientist, for teaching tips, and other websites to support teaching Water.

Investigation/Activity

- Investigation 3: *Water Vapor* Part 1: *Evaporation, # 1-3*
- Teacher Guide, page 10
- Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Part 1 – Teacher Observation

Homework/Extra Practice

Lesson 16 (45 min)

Objective(s):

Evaporation is the process by which liquid water changes into water vapor, a gas.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7
- Teacher Guide Inv. 3: *Water Vapor*, Part 1: *Evaporation*, Materials and Getting Ready, pp. 8-9
- Teacher Guide Science Stories folio, pp. 10-11

Investigation/Activity

- Investigation 3: *Water Vapor* Part 1: *Evaporation, # 4-8*
- Teacher Guide, page 11
- Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Part 1 – Teacher Observation
- *FOSS Science Stories: Wet and Dry Places*, page 12

Homework/Extra Practice

Home/School Connection, Student Sheet No. 29

WEEK 5

Lesson 17 (45 min)

Objective(s):

Temperature affects the rate of evaporation.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 3: Water Vapor, pp. 1-7
- Teacher Guide Inv. 3: Water Vapor, Part 1: *Evaporation Locations*, Materials and Getting Ready, pp. 12-13
- **NOTE: Use shoeboxes or dishpans to hold the cups in Part 2: Evaporation Locations if you plan to use the FOSS trays to start Part 3: Surface Area in Lesson 18.**

Investigation/Activity

- Investigation 3: *Water Vapor* Part 2: *Evaporation Locations, # 1-7*
- Teacher Guide, pages 14 - 15
- Investigation Duplication Master: Student Sheet No. 10–11 (used on day 4 – see Lesson 20
- Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Part 2 – Response Sheet – *Water Vapor*

Homework/Extra Practice

Fill a glass to the brim with water. How many paperclips can you add until the water spills onto the table? Try again, but also add dishwashing liquid to the water. Predict what will happen. Record your results in a table.

Lesson 18 (45 min)

Objective(s):

- Temperature affects the rate of evaporation.

AND

- The surface area of a volume of water affects the rate of evaporation.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

AND

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7
- Teacher Guide Inv. 3: *Water Vapor*, Part 2: *Evaporation Locations*, Materials and Getting Ready, pp. 12-13
- Teacher Guide Inv. 3: *Water Vapor*, Part 3: *Surface Area*, Materials and Getting Ready, pp. 17-18

Investigation/Activity

- Investigation 3: *Water Vapor* Part 2: *Evaporation Locations, # 7 – DAY 2 Temperature Readings*
- Teacher Guide, pages 15

AND CONSIDER SET UP OF

- Investigation 3: Water Vapor Part 3: *Surface Area, # 1-2*
- Investigation Duplication Master: Student Sheet No. 12-13
- Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Teacher Observations

2- TO 4-DAY EVAPORATION TIME REQUIRED FOR PART 3

Homework/Extra Practice

WEEK 5 (continued)

Lesson 19 (45 min)

Objective(s):

- Temperature affects the rate of evaporation.

AND

- The surface area of a volume of water affects the rate of evaporation.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

AND

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7

– Teacher Guide Inv. 3: *Water Vapor*, Part 2: *Evaporation Locations*, Materials and Getting Ready, pp. 12-13

– Teacher Guide Inv. 3: Water Vapor, Part 3: *Surface Area*, Materials and Getting Ready, pp. 17-18

Investigation/Activity

– Investigation 3: *Water Vapor* Part 2: *Evaporation Locations, # 7 – DAY 3 Temperature Readings*

– Teacher Guide, pages 15

AND CONSIDER SET UP OF

– Investigation 3: *Water Vapor* Part 3: *Surface Area, # 1-2*

– Investigation Duplication Master: Student Sheet No. 12-13

– Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Teacher Observations

2- TO 4-DAY EVAPORATION TIME REQUIRED FOR PART 3

Homework/Extra Practice

Make a list of how many ways you use water in a day.

Lesson 20 (45 min)

Objective(s):

- Temperature affects the rate of evaporation.

AND

- The surface area of a volume of water affects the rate of evaporation.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

AND

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7

– Teacher Guide Inv. 3: *Water Vapor*, Part 2: *Evaporation Locations*, Materials and Getting Ready, pp. 12-13

– Teacher Guide Inv. 3: *Water Vapor*, Part 3: *Surface Area*, Materials and Getting Ready pp. 17-18

– **Prepare for ICE in Lesson 22.**

Investigation/Activity

– Investigation 3: *Water Vapor* Part 2: *Evaporation Locations, # 7 – DAY 4 Temperature Readings AND # 8-17*

– Teacher Guide, pages 15-16

– Investigation Duplication Master: Student Sheet No. 10–11

AND CONSIDER SET UP OF

– Investigation 3: *Water Vapor* Part 3: *Surface Area, # 1-2*

– Investigation Duplication Master: Student Sheet No. 12-13

– Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Teacher Observations

2- TO 4-DAY EVAPORATION TIME REQUIRED FOR PART 3

Homework/Extra Practice

WEEK 6

Lesson 21 (45 min)

Objective(s):

The surface area of a volume of water affects the rate of evaporation.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7
- Teacher Guide Inv. 3: *Water Vapor*, Part 3: *Surface Area*, Materials and Getting Ready, pp. 17-18
- Teacher Guide Science Stories folio, pp. 12-13
- **Prepare for ICE in Lesson 22.**

Investigation/Activity

- Investigation 3: *Water Vapor* Part 3: *Surface Area, # 3-11*
- Investigation Duplication Master: Student Sheet No. 12-13
- Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Teacher Observations
- *FOSS Science Stories: Evaporation and Condensation*, page 13

Homework/Extra Practice

Math Connection, Student Sheet No. 25

Lesson 22 (45 min)

Objective(s):

- Condensation occurs when water vapor touches a cool surface and changes into a liquid.
- Evaporation and condensation contribute to the movement of water through the water cycle.

Alignment with NYS Core Curriculum:

LE 6.2c; PS 2.1c, 3.1a, b, c, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7
- Teacher Guide Inv. 3: *Water Vapor*, Part 4: *Condensation*, Materials and Getting Ready, pp. 21-22
- Teacher Guide Science Stories folio, pp. 14-15

Investigation/Activity

- Investigation 3: *Water Vapor* Part 4: *Condensation, # 1-8*
- Investigation Duplication Master: Student Sheet No. 14
- Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Part 4, Student Sheet – Condensation Observations

Homework/Extra Practice

WEEK 6 (continued)

Lesson 23 (45 min)

Objective(s):

- Condensation occurs when water vapor touches a cool surface and changes into a liquid.
- Evaporation and condensation contribute to the movement of water through the water cycle.

Alignment with NYS Core Curriculum:

LE 6.2c; PS 2.1c, 3.1a, b, c, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 3: *Water Vapor*, pp. 1-7

– Teacher Guide Inv. 3: *Water Vapor*, Part 4: *Condensation*, Materials and Getting Ready, pp. 21-22

– Teacher Guide Science Stories folio, pp. 14-15

Investigation/Activity

– Investigation 3: *Water Vapor* Part 4: *Condensation, # 9-15*

– Investigation Duplication Master: Student Sheet No. 14

– Assessment Duplication Master No. 3: Assessment Chart for Investigation 3, Part 4, Student Sheet – Condensation Observations

– *FOSS Science Stories: The Water Cycle, page 14-16*

Homework/Extra Practice

Lesson 24 (45 min)

Objective(s):

- Evaporation is the process by which liquid water changes into water vapor.
- Temperature affects the rate of evaporation.
- The surface area of a liquid affects the rate of evaporation.
- Condensation occurs when water vapor contacts a cool surface and changes into a liquid.
- Evaporation and condensation contribute to the movement of water through the water cycle.

Alignment with NYS Core Curriculum:

LE 6.2c; PS 2.1c, 3.1a, b, c, d, e, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide, Benchmark Assessment Folio, pp. 40-47, 54

– Plan Assessment Review time with class after teacher assessment coding.

Investigation/Activity

Benchmark Assessment Packet, Investigation 3, I-Check, pages 1-4

Homework/Extra Practice

Why is it important to conserve water? Make a list of 8 reasons. Plan a way that you and your family can conserve water. Write a description of your plan.

WEEK 7

Lesson 25 (45 min)

Objective(s):

- Some earth materials, like soils, absorb more water than other earth materials do.
- Water flows more easily through some earth materials than through others.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, c

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
- Teacher Guide Inv. 4: *Waterworks*, Part 1: *Water in Earth Materials*, Materials and Getting Ready, pp. 8-9
- Teacher Guide Science Stories folio, pp. 16-17
- www.fossweb.com/NYC Check website for interactive simulations, to write questions to a scientist, for teaching tips, and other websites to support teaching Water.

Investigation/Activity

- Investigation 4: *Waterworks*
  Part 1: *Water in Earth Materials, # 1-8*
- Teacher Guide pages, 10-12
- Investigation Duplication Master: Student Sheet No. 15-16
- Assessment Duplication Master No. 4:
  Assessment Chart for Investigation 4, Part 1 – Response Sheet – Waterworks

Homework/Extra Practice

Lesson 26 (45 min)

Objective(s):

- Some earth materials, like soils, absorb more water than other earth materials do.
- Water flows more easily through some earth materials than through others.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, 3.2a, c

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
- Teacher Guide Inv. 4: *Waterworks*, Part 1: *Water in Earth Materials*, Materials and Getting Ready, pp. 8-9
- Teacher Guide Science Stories folio, pp. 16-17
- **Note: Inv. 4, Part 3 Water from Home is three 15–20 min. sessions. See NOTE at Week 8 to plan the final investigations for this unit.**

Investigation/Activity

- Investigation 4: *Waterworks*
  Part 1: *Water in Earth Materials, # 9-13*
- Teacher Guide pages 12-13
- Investigation Duplication Master: Student Sheet No. 15-16
- Assessment Duplication Master No. 4:
  Assessment Chart for Investigation 4, Part 1 – Response Sheet – Waterworks
- *FOSS Science Stories: Water, A Vital Resource*, pages 17-21

Homework/ Extra Practice

Do some research. What are 'locks' and 'dams' on rivers and how are they used?

WEEK 7 (continued)

Lesson 27 (45 min)

Objective(s):

- Flowing water can be used to do work.
- Waterwheels are a kind of machine powered by flowing water.

Alignment with NYS Core Curriculum:

PS 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
– Teacher Guide Inv. 4: *Waterworks*, Part 2: *Waterwheels*, Materials and Getting Ready pp. 14-15
– Teacher Guide Science Stories folio, pp. 18-19

Investigation/Activity

– Investigation 4: *Waterworks* Part 2: *Waterwheels, # 1-8*
– Teacher Guide, pages 16-17
– Investigation Duplication Master: Student Sheet No. 17
– Assessment Duplication Master No. 4: Assessment Chart for Investigation 4, Part 2 – Teacher Observations

Homework/Extra Practice

Lesson 28 (45 min)

Objective(s):

- Flowing water can be used to do work.
- Waterwheels are a kind of machine powered by flowing water.

Alignment with NYS Core Curriculum:

PS 2.1c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
– Teacher Guide Inv. 4: *Waterworks*, Part 2: *Waterwheels*, Materials and Getting Ready, pp. 14-15
– Teacher Guide Science Stories folio, pp. 18-19

Investigation/Activity

– Investigation 4: *Waterworks* Part 2: *Waterwheels*, # 9-13
– Teacher Guide, pages 17-18
– Investigation Duplication Master: Student Sheet No. 17
– Assessment Duplication Master No. 4: Assessment Chart for Investigation 4, Part 2 – Teacher Observations
– FOSS Science Stories: The Power of Water, pages 22-23

Homework/Extra Practice

How does a water wheel work? Have you seen water wheels? Where? Draw pictures or write a description to explain?

NOTE: FOSS® encourages the use of student projects in Choosing Your Own Investigation. Students develop investigation plans, do systematic work to complete investigations and support conclusions with evidence. While it may not be possible to complete projects in every FOSS® unit, creative management and interdisciplinary opportunities will allow students to gain experience in manageable independent projects. Examine the Project Ideas (Student Sheet No. 19) for ideas for individual, group or class projects. Interdisciplinary Extensions are also appropriate research projects.

In FOSS® *Water* FOUR LESSONS (Lesson 30, 31, 33, 34) include work to complete Investigation 4: Waterworks, Part 4: Choosing Your Own Investigation.

If time is not available to complete the student project, omit references to Investigation 4, Part 4 in Lessons 30 and 31 and omit Lessons 33 and 34. Lessons 32, 35, 36 are not altered by these decisions.

WEEK 8

Lesson 29 (45 min)

Objective(s):

- Water contains different materials that affect its quality.
- Evaporation can be used to detect materials dissolved in water.

Alignment with NYS Core Curriculum:

PS 3.1b, c, d, e, f, 3.2c

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
– Teacher Guide Inv. 4: *Waterworks*, Part 3: *Water from Home*, Materials and Getting Ready, pp. 19-20
– Teacher Guide Science Stories folio, pp. 20-21

Investigation/Activity

– Investigation 4: *Waterworks*
Part 3: *Water from Home*, # 1-3 AND 14
– Teacher Guide, page 21
– Investigation Duplication Master: Student Sheet No. 18
– FOSS Science Stories: *Ellen Swallow Richards: An Early Ecologist*, pages 24-26

Note: Science Story for Inv. 4, Part 3 *Water from Home*, will be read "early" in lesson to accommodate the beginning of Inv. 4, Part 4: *Choosing Your Own Investigation*

Homework/ Extra Practice

Grade 4

WEEK 8 (continued)

Lesson 30 (45 min)

Objective(s):

- Water contains different materials that affect its quality.
- Evaporation can be used to detect materials dissolved in water.

AND

- Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 3.1b, c, d, e, f, 3.2c

AND MAY INCLUDE

LE 6.2c; PS 2.1c, 3.1a, b, c, d, e, f, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 4: *Waterworks*, pp. 1-7

– Teacher Guide Inv. 4: *Waterworks*, Part 3: *Water from Home*, Materials and Getting Ready, pp. 19-20

– Teacher Guide Inv. 4: *Waterworks*, Part 4: *Choosing Your Own Investigation*, Materials and Getting Ready, pp. 24-26

Investigation/Activity

– Investigation 4: *Waterworks*
Part 3: *Water from Home, # 4-8*

– Teacher Guide, page 22

– Investigation Duplication Master: Student Sheet No. 18

AND

– Investigation 4: *Waterworks*
Part 4: *Choosing Your Own Investigation, # 1-4*

– Teacher Guide page 27

– Investigation Duplication Master: Student Sheet No. 19, 20, 21

Homework/Extra Practice

Math Connection, Student Sheet No. 26

Grade 4

WEEK 8 (continued)

Lesson 31 (45 min)

Objective(s):

- Water contains different materials that affect its quality.
- Evaporation can be used to detect materials dissolved in water.

AND

- Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 3.1b, c, d, e, f, 3.2c

AND MAY INCLUDE

LE 6.2c; PS 2.1c, 3.1a, b, c, d, e, f, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

– Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
– Teacher Guide Inv. 4: Waterworks, Part 3: *Water from Home*, Materials and Getting Ready, pp. 19-20
– (Teacher Guide Science Stories folio, pp. 20-21, if not done in Lesson 29)
– Teacher Guide Inv. 4: *Waterworks*, Part 4: *Choosing Your Own Investigation*, Materials and Getting Ready, pp. 24-26

Investigation/Activity

– Investigation 4: *Waterworks* Part 3: *Water from Home, # 9-14*
– Teacher Guide, page 23
– Investigation Duplication Master: Student Sheet No. 18
– *(FOSS Science Stories: Ellen Swallow Richards: An Early Ecologist*, pages 24-26, if not done in Lesson 29)

AND

– Investigation 4: *Waterworks* Part 4: *Choosing Your Own Investigation, # 1-4*
– Teacher Guide, page 27
– Investigation Duplication Master: Student Sheet No. 19, 20, 21

Homework/Extra Practice

Home/School Connection,
Student Sheet No. 21 (Presentation Guidelines)

WEEK 8 (continued)

Lesson 32 (45 min)

Objective(s):

- Some earth materials absorb more water than other earth materials do.
- Water flows more easily through some earth materials than through others.
- Flowing water can be used to do work.
- Water contains different materials that affect its quality.
- Evaporation can be used to detect materials that may be dissolved in water.

AND

- Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1b, c

AND MAY INCLUDE

LE 6.2c; **PS** 2.1c, 3.1a, b, c, d, e, f, 3.2a, b, c, 4.1d

Advanced Planning/ Notes to Teachers

- Teacher Guide, Benchmark Assessment Folio, pp. 48-53, 54
- Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
- Teacher Guide Inv. 4: *Waterworks*, Part 4: *Choosing Your Own Investigation*, Materials and Getting Ready, pp. 24-26
- Teacher Guide Science Stories folio, pp. 22-23
- Plan Assessment Review time with class after teacher assessment coding.

Investigation/Activity

- Benchmark Assessment Packet, Investigation 4, I-Check, pages 1-3
- Investigation 4: *Waterworks* Part 4: *Choosing Your Own Investigation, # 7*
- Teacher Guide, page 28
- *FOSS Science Stories: Moon Dreams,* pages 27-29

Note: Science Story will be read "early" in lesson to accommodate the completion of Part 4: Choosing Your Own Investigation.

Homework/Extra Practice

WEEK 9

Lesson 33 (optional) (45 min)

Objective(s):

Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, f, 3.2a, b, c, 4.1d; **LE** 6.2c

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
- Teacher Guide Inv. 4: *Waterworks*, Part 4: *Choosing Your Own Investigation*, Materials and Getting Ready, pp. 24-26

Investigation/Activity

- Investigation 4: *Waterworks* Part 4: *Choosing Your Own Investigation, # 4-5*
- Teacher Guide, page 28
- Investigation Duplication Master: Student Sheet No. 19, 20, 21

Homework/Extra Practice

Lesson 34 (optional) (45 min)

Objective(s):

Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1a, b, c, d, e, f, 3.2a, b, c, 4.1d; **LE** 6.2c

Advanced Planning/ Notes to Teachers

- Teacher Guide Inv. 4: *Waterworks*, pp. 1-7
- Teacher Guide Inv. 4: *Waterworks*, Part 4: *Choosing Your Own Investigation*, Materials and Getting Ready, pp. 24-26

Investigation/Activity

- Investigation 4: *Waterworks* Part 4: *Choosing Your Own Investigation, # 5-6*
- Teacher Guide, page 28
- Investigation Duplication Master: Student Sheet No. 19, 20, 21

Homework/Extra Practice

WEEK 9 (continued)

Lesson 35 (REQUIRED) (45 min)

Objective(s):

Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1c, d, e, 3.2b, c, 4.1d; **LE** 6.2c

Advanced Planning/ Notes to Teachers

- Teacher Guide, Benchmark Assessment Folio, pp. 1-25, 54
- Download optional tool: Benchmark and I-Check Assessment coding sheets at www.fossweb.com/NYC

Investigation/Activity

Benchmark Assessment Packet, Survey/Post-test, pages 1-7

Homework/Extra Practice

Lesson 36 (REQUIRED) (45 min)

Objective(s):

Apply concepts developed concerning water, its properties and its uses.

Alignment with NYS Core Curriculum:

PS 2.1c, 3.1c, d, e, 3.2b, c, 4.1d; **LE** 6.2c

Advanced Planning/ Notes to Teachers

- Teacher Guide, Benchmark Assessment Folio, pp. 1-25, 54

Investigation/Activity

Benchmark Assessment Review (selected items)

Homework/Extra Practice