Title
Water Properties Lab Mini Lesson

Grade Level
Third, Fourth, & Fifth

Student Target
Third Grade Science Benchmarks

SC.3.N.1.1	Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.
SC.3.N.1.2	Compare the observations made by different groups using the same tools and seek reasons to explain the differences across groups.
SC.3.N.1.3	Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.
SC.3.N.1.4	Recognize the importance of communication among scientists.
SC.3.N.1.5	Recognize that scientist question, discuss, and check each others' evidence and explanations.
SC.3.N.1.6	Infer based on observation.
SC.3.N.1.7	Explain that empirical evidence is information, such as observations of measurements, that is used to help validate explanations of natural phenomena.
SC.3.P.8.2	Measure and compare the mass and volume of solids and liquids.
SC.3.P.9.1	Describe the changes water undergoes when it changes state through heating and cooling by using familiar scientific terms such as melting, freezing, boiling, evaporation, and condensation.
SC.3.P.11.1	Investigate, observe, and explain that things give off light often also give off heat.
SC.3.L.15.1	Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, vertebrates and invertebrates, those having live birth and those which lay eggs) according to their physical characteristics and behaviors.
SC.3.L.17.2	Recognize that plants use energy from the Sun, air, and water to make their own food.
SC.3.E.5.2	Identify the Sun as a star that emits energy; some of it in the form of light.

Fourth Grade Science Benchmarks

SC.4.N.1.1	Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.
SC.4.N.1.2	Compare the observations made by different groups using multiple tools and seek reason to explain the differences across groups.
SC.4.N.1.3	Explain that science does not always follow a rigidly defined method ("the scientific method) but that science does involve the use of observations and empirical evidence.
SC.4.N.1.4	Attempt reasonable answers to scientific questions and cite evidence in support.
SC.4.N.1.5	Compare the methods and results of investigations done by other classmates.
SC.4.N.1.7	Recognize and explain that scientists base their explanations on evidence.
SC.4.N.1.8	Recognize that science involves creativity in designing experiments.
SC.4.P.8.1	Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.
SC.4.P.8.2	Identify properties and common uses of water in each of its states.
SC.4.P.9.1	Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.
SC.4.P.10.1	Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.
SC.4.P.10.2	Investigate and describe that energy has the ability to cause motion or create change.

SC.4.P.10.4 Describe how moving water and air are sources of energy and can be used to move things.
SC.4.L.16.4 Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.
SC.4.L.17.1 Compare the seasonal changes in Florida plants and animals to those in other regions of the country.
SC.4.L.17.2 Explain that animals, including humans cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.
SC.4.L.17.3 Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.
SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment.
SC.4.E.6.3 Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.

Fifth Grade Science Benchmarks

SC.5.N.1.1 Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.5.N.1.2 Explain the difference between an experiment and other types of scientific investigation.
SC.5.N.1.3 Recognize and explain the need for repeated experimental trails.
SC.5.N.1.6 Recognize and explain that difference between personal opinion/interpretation and verified observation.
SC.5.N.2.2 Recognize and explain that when scientific investigations are carried out, the evidence produced by those investigations should be replicable by others.
SC.5.E.7.1 Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.
SC.5.E.7.2 Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.
SC.5.E.7.4 Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.
SC.5.P.8.1 Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature.
SC.5.P.10.2 Investigate and explain that energy has the ability to cause motion or create change.
SC.5.L.14.2 Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support -- some with internal skeletons others with exoskeletons -- while some plants have stems for support.
SC.5.L.15.1 Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.
SC.5.L.17.1 Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics

Third Grade Florida Core Standards Language Arts

LAFA.3.L.3
LAFA.3.RI.1
LAFA.3.RI.3
LAFA.3.RL.1
LAFA.3.RL.3
LAFA.3.RF.3
LAFA.3.SL.1

LAFA.3.SL.2
LAFA.3.W.3
LAFA.3.W.4

Third Grade Florida Core Standards Math
MAFS.3.G.1
MAFS.3.MD.1
MAFS.3.MD.2
MAFS.3.NF.1
MAFS.3.OA.1

Fourth Grade Florida Core Standards Language Arts
LAFS.4.L.3
LAFS.4.RI.1
LAFS.4.RI.2
LAFS.4.RI.3
LAFS.4.RL.1
LAFS.4.RL.3
LAFS.4.RF.3
LAFS.4.SL.1
LAFS.4.SL.2
LAFS.4.W.2
LAFS.4.W.3

Fourth Grade Florida Core Standards Math
MAFS.4.MD.1
MAFS.4.MD.2
MAFS.4.NF.2
MAFS.4.OA.3

Fifth Grade Florida Core Standards Language Arts
LAFS.5.L.3
LAFS.5.RI.1
LAFS.5.RI.2
LAFS.5.RI.3
LAFS.5.RL.1
LAFS.5.RL.3
LAFS.5.RF.3
LAFS.5.SL.1
LAFS.5.SL.2
LAFS.5.W.2
LAFS.5.W.3
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Fifth Grade Florida Core Standards Math
MAFS.5.G.1
MAFS.5.G.2
MAFS.5.MD.1
MAFS.5.MD.2
MAFS.5.OA.2

Materials
Teacher
- Water pitcher
- Water

- Salt
- Wooden stirring spoon

Student

- String
- Large glass jar (1 glass jar per 4-5 students)
- Pencils
- Paper clip

Warm-up

- Welcome to the Oceans!!! They're big, they're huge, and they cover more than two-thirds of the earth's surface. They are filled with some of the most incredible, amazing, and fantastic creatures, plants, and geologic formations any human being has seen. The oceans of the world cover nearly 70% of the earth's surface; the oceans contain nearly 97% of the planet's entire water supply.
- Discuss the five major oceans of the world, distinguishing characteristics, and features. Explain the differences between oceans, seas, and gulfs. Teachers will pose the question "Why is the ocean salty?" and ask the students to write down their response based on experiences, observations, the water cycle, and previous knowledge.

Main Lesson

1. The teacher will prepare a salt water solution before the lab begins by filling a pitcher full of water, adding several tablespoons of salt and stir until dissolved. Continue adding salt until no more can dissolved.
2. Groups of 4-5 students will each get a glass jar, sting, a paper clip and a pencil
3. The group will connect the paper clip to the middle of the pencil with their string. The pencil will rest horizontally across the jar allowing the paper clip to be suspended in the jar, but not allowing it to hit the bottom.
4. The salt water solution by be added to the jar and be placed in a sunny spot by a window or outside.
5. Over a week period, the water will evaporate out of the jar and salt will start to collect on the string.

Reflection

- As the water evaporates, the salt in the solution that is dissolved in the water will adhere to the surface of the paper clip and string and return to a solid state. You will be able to see the salt crystals on the bottom of the jar.
- What happened to the water? The salt? Why? You students have witnesses a portion of the water cycle as well as specific properties and phases of water.
- Ocean water has a specific level of salinity that varies according to temperature, location, water currents, dissolved minerals, and other factors.

Assessment

Participation on the activity

Attachments

- Information packet about the Loxahatchee River Center
- Map of the Loxahatchee River Watershed
- Water Properties Lab Regular Lesson

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Materials for Pre & Post Lessons

Teachers

- River Center Packet
- Water Properties Lab Mini Lesson

- Copies of Pre & Post Test and Answer Key

Pre-visit Warm-up Lesson (Completed in classroom before visiting)

1. Review the information in the Loxahatchee River Center packet with your students
2. Complete optional mini lesson provided by River Center education staff upon field trip registration confirmation
3. Administer Pre Test to your students
4. Review the interactive website activity http://loxahatcheeriver.org/rivercenterflash/index.html

Main Lesson (Completed during visit with River Center staff)

1. Welcome, Introduction to the River Center, overview of today's field trip, and safety/rules talk
2. Divide the students into 2 groups to rotate through 3 different activities
    a. Lovin' the Loxahatchee River Tour – focusing on water types, organism adaptations, and habitats
    b. Water Properties Lab: hands-on activity (See below)
    c. Water resources discussion – Where our water comes from, how we use water, where it goes once it's down the drain, water conservation
3. Touch tank demonstration

Water Properties Lab Main Lesson (Complete during visit with River Center staff)

1. Students will be divided into teams of 4 or 5, one group per table with two containers, one filled with salt water and the other with fresh water.
2. Educators will demonstrate the concept of surface area and surface tension both in air and in water, as well as the concepts of buoyancy and density based on the two different water types
3. Students with compare and identify the water in the containers based on experiments with chips, floating vessels, and a variety of items used to sink their boats
4. Students will make connections to salt, fresh, and brackish water in their experiments to the ecosystems in the Loxahatchee River watershed
5. Students will be scientists making hypothesis, performing experiments, exploring, making observations, recording their findings, and sharing their findings with other teams.

Post-visit Reflection Lesson (completed in classroom after visiting)

Write about your experiences at the Loxahatchee River Center

Assessment

Participation in the activity
Administer the post-test to your students

Attachments

- River Center packet

Creating STEM Connections – Water Properties Lab

Science

- See standards above

Technology

-

Engineering

-

Mathematics

- See standards above

Water Properties Lab

(Pre test / Post test)

(You may use the back of this paper or attach additional sheets to answer the questions.)

1. Water kind of water is at the beginning of a river?

    a. Salt water
    b. Fresh water
    c. Brackish water

2. Where do most rivers end?

3. What are the characteristics of water, particularly in a pure form?

4. What are the three states (phases) of water?

5. What types of animals use water? How do they use it?