1925-1949 Tri-County Project

lesson plan

Nebraska Department of Education Academic Standards https://www.education.ne.gov/contentareastandards/
Nebraska Department of Education Social Studies and History Standards https://cdn.education.ne.gov/wp-content/uploads/2019/11/Nebraska-Social-Studies-Standards-Final-11-2019.pdf
National Archives http://www.archives.gov/index.html
Library of Congress Learning Page Lesson Plans https://www.loc.gov/search/?in=&q=lesson+plans&new=true&st=

L1

LESSON PLAN
Water Words

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level
4

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Lesson Objective

The student will be able to define words relating to water and its use in Nebraska.

Approximate Length of Unit One week

Materials and Resources

- *Making Discoveries: Groundwater Activities for the Classroom and Community* (published by the Groundwater Foundation, 2000)
- *Every Drop Counts, A Book about Water* by Jill C. Wheeler
- *Water* (True Books, Natural Resources) Rising Moon, Christian Ditchfield, 2003
- *Native Waters: Sharing the Source, Kids Booklet* (Go to https://store.projectwet.org/native-waters-kids-activity-booklet-download.html to order student copies.)
- Various magazines and newspapers

Introduction

Water is important to the people of Nebraska. Life depends on it. It represents about 75% of a person's body weight and covers nearly 75% of the earth. Many communities thrived due to the location of nearby water. It is important for crops, generating electricity and as a source of recreation. Water comes from many sources in Nebraska, including rivers, reservoirs, lakes, groundwater and our greatest natural resource, the Ogallala Aquifer.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

4.5.1

Nebraska State Reading/Writing Standards

LA 4.2.1 Writing Process

L1

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Activity Grade Level
4

Activities

• Teacher will read the book Snail Girl Brings Water to the class in a teacher read-aloud setting. Students will listen to the story, and then with a partner retell the story. Teacher will assess understanding as s/he moves from group to group.

• Have students look for pictures of water or scenes including water. Magazines will beprovided for student use. Whole group will brainstorm words about water. Teacher or studentwill chart this list of words.

• Using a “think aloud” session, students will discuss the importance of water in daily lives andoccupations. Students need to understand that everyone and everything depends on water! Oral or written responses will be utilized.

• Using brainstormed words and module vocabulary (at the end of this lesson), create a class dictionary. Each student will define and illustrate a word that will be compiled into a dictionary for use during class.

Teaching Tips Keep the word lists handy! Students can use the words they found in poetry, writing their own rap, creating word webs or groups, writing stories, etc. The words can also be used to make crosswords or word find puzzles.

Assessment Activity

• Teacher will assess, using speaking rubric from Nebraska Stars Assessment for fourth grade.

• During module instruction, the teacher will be able to observe the correct use and application of vocabulary.

• Teacher will assess accuracy on each dictionary page by using writing assessment rubric for NE standards grade four.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8 for correct use and application of vocabulary. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Vocabulary use and application	Student consistently uses and applies all of the unit vocabulary correctly	Student consistently uses and applies most of the unit vocabulary correctly	Student uses and applies some of the unit vocabulary correctly	Student uses and applies a few of the unit vocabulary correctly

L1

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Activity Grade Level
4

Vocabulary List

The following vocabulary words are used in the lessons in this module

Aquifer	an underground geologic formation able to store and yield water
Condensation	the process in the hydrologic cycle in which vapor becomes liquid
Conservation	preserving from loss, waste or harm
Contaminant	an impurity that causes air, soil or water to be harmful to human health or the environment
Depletion	the loss of water from surface water reservoirs or groundwater aquifers at a rate greater than that of recharge
Drought	an extended period with little or no precipitation; often affects crop production and availability of water supplies
Erosion	the wearing down or washing away of the soil and land surface by the action of water, wind, or ice
Evaporation	the conversion of liquid (water) into a vapor (a gaseous state) usually through the application of heat energy during the hydrologic cycle; the opposite of condensation
Filtration	the process in which water passes through layers of sand, gravel, and charcoal to remove smaller particles
Groundwater	water found in the spaces between soil particles and cracks in rocks underground (located in the saturation zone); a natural resource that is used for drinking, recreation, industry and growing crops
Hydrologic cycle	(also known as the water cycle) the paths water takes through its various states — vapor, liquid, solid — as it moves throughout the ocean, atmosphere, groundwater, streams, etc.
Impermeable layer	a layer of material (clay) in an aquifer through which water does not pass
Irrigation	the controlled application of water to cropland, hayfields and/or pasture to supplement that supplied by nature
Irrigation canal	a constructed waterway (similar to a large ditch)

L1

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This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level: 4

Vocabulary List

The following vocabulary words are used in the lessons in this module

Nonpoint source pollution (NPS)	pollution that cannot be traced to a single point, because it comes from many individual places or a widespread area (e.g., urban and agricultural runoff)
Permeable	capable of transmitting water (porous rock, sediment or soil)
Permeable layer	a layer of porous material (rock, soil, unconsolidated sediment); in an aquifer, the layer through which water freely passes as it moves through the ground
Point source pollution	pollution that can be traced to a single point, such as a pipe or culvert (e.g., industrial and wastewater treatment plant discharges)
Pollution	contaminants in the air, water or soil that cause harm to human health or the environment
Precipitation	the part of the hydrologic cycle when water falls, in a liquid or solid state, from the atmosphere to Earth (rain, snow, sleet)
Recharge	groundwater supplies are replenished, or recharged, when water enters the saturation zone by actions like rain or snow melt
Runoff	precipitation that flows over land to surface streams, rivers and lakes
Surface water	water above the surface of the land, including lakes, rivers, streams, ponds, floodwater and runoff
Transpiration	process by which water in plants is evaporated into the atmosphere
Vapor	the state of water in the hydrologic cycle in which individual molecules are highly energized and move about freely; also known as gas/gaseous
Water	(H2O)
Watershed	the land area from which surface runoff drains into a stream, channel, lake, reservoir or other body of water; also called a drainage basin

L2

LESSON PLAN
Precipitation

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Lesson Objective

At the end of the lesson, students will develop a map of the annual rainfall in Nebraska and use the map to develop explanations of settlement.

Introduction

Early pioneers usually settled where there was plenty of rainfall and river water to meet their needs. Southeastern Nebraska gets about 35 inches of rain annually while western Nebraska gets only about 15 inches each year. Eastern Nebraska was settled sooner and with more people because it had more water available. Settlers lived near rivers and streams that provided water for drinking, washing and irrigating. Trees also need water for growth and settlers needed the trees for lumber to build their homes. Settlers called central and western Nebraska the “Great American Desert.”

Resources

A printable outline map of Nebraska can be found and printed out at
http://www.enchantedlearning.com/geography/outlinemaps/usa.shtml
Water Riches: Cooperative Extension Service

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

4.1.2; 4.5.1 | 8.1.2; 8.7.2

Nebraska State Social Studies Standards

SS 4.3.1; SS 4.3.2

L2

LESSON PLAN
Precipitation

By Bev Grueber, North Bend Central Public School and
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Activity Grade Level: 4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Process

• Students will use either an outline map of Nebraska with the cities below marked or can work with partners using a large sheet of white tissue paper taped over a Nebraska highway map. The second option will expect students to use more map skills. Tape the corners of the highway map on a desk and then tape the white tissue paper on top of it.

• Trace the outline of the state on the tissue paper and locate/mark all of the cities below on the map. Also write the annual rainfall averages.

Arthur	17.2 inches	Tecumseh	30.4 inches
Hastings	24.5 inches	Kimball	16.5 inches
Oakdale	24.7 inches	Santee	23.6 inches
Alliance	16.5 inches	North Platte	18.2 inches
Tekamah	29.3 inches	Stapleton	19.4 inches
Nenzel	19.0 inches	Auburn	34.1 inches
Lodgepole	17.2 inches	Nemaha	36.1 inches
Wisner	31.3 inches	Dubois	34.2 inches
Callaway	22.8 inches	Pawnee City	31.1 inches
Hooper	31.2 inches	Falls City	33.7 inches
Haigler	17.1 inches	Bellevue	30.0 inches
Curtis	22.0 inches	Mitchell	14.0 inches
Beatrice	27.8 inches	Gordon	17.4 inches
Hyannis	16.3 inches	Harrison	18.9 inches
Greeley	22.6 inches	Ord	3.8 inches
Atkinson	20.2 inches	Halsey	20.9 inches

• **Students will "connect the dots" according to the key below:**

Green	33 inches plus
Blue	24.0-32.9 inches
Yellow	18.0-23.9 inches
Red	14.0-17.9 inches

• **Shade in the areas** with green, blue, yellow, and red, creating an annual precipitation map for the state.

Guiding Questions

- Does all of Nebraska get the same amount of precipitation?
- How does this affect life?
- What can farmers do to provide enough moisture for their crops?

Teaching Tips

• Reinforce the difference between climate and daily weather.

• If tissue paper is used, make sure both the tissue and map are taped securely and that students color lightly to avoid tearing the paper.

L2

LESSON PLAN
Precipitation

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level
4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Assessment Activity

• Write a paragraph (or a similar activity) stating how rainfall affected settlement of Nebraska.

• Write a paragraph (or similar activity) identifying and addressing some water challengesfaced in central and western Nebraska and how communities, farmers and ranchers meetthose challenges.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Rainfall's affect on NE settlement	Written response is complete, logical and demonstrates in-depth understanding	Written response demonstrates understanding	Written response demonstrates understanding but may contain minor errors	Written response contains errors affecting understanding or is superficial
Water challenges	Written response is complete, logical and demonstrates in-depth understanding	Written response demonstrates understanding	Written response demonstrates understanding but may contain minor errors	Written response contains errors affecting understanding or is superficial
Meeting the challenges	Written response is complete, logical and demonstrates in-depth understanding	Written response demonstrates understanding	Written response demonstrates understanding but may contain minor errors	Written response contains errors affecting understanding or is superficial

General Notes

Students can use the web to find updated annual rainfall averages for cities above. Do drought years or years with above average rainfall cause the annual average to change significantly? Why or why not?

L3

LESSON PLAN

Well in a Cup (Irrigation)

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level: 4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Lesson Objectives

• By the end of the lesson, students will construct a model of a well to understand anddemonstrate how water is brought to the surface.

•By the end of the lesson, students will identify reasons why people irrigate.

•By the end of the lesson, students will identify effects of pollution on well water.

Resources

• *Making a Bigger Splash: A Collection of Water Education and Festival Activities,* Groundwater Foundation

• *Nebraska Studies,* published by the Nebraska Department of Education, 1983

• Project WET: Council for Environmental Education, 1998, has wonderful resources

• *Stop, Look and Learn About Our Natural World, Volume 3,* Nebraska Natural Resources Commission, Lincoln, NE

Introduction

Groundwater makes up 96% of the world's total fresh water resources. About one-half of the country depends on groundwater for drinking water. The first use of irrigation by settlers occurred along the North and South Platte Rivers and Lodgepole Creek. It was very primitive, usually consisting of ditches dug from these streams to nearby fields. Coloradoans, who had been using irrigation for years, came to Nebraska to show farmers more advanced methods. It was not until the severe drought of the 1890s that Nebraskans became interested in using irrigation on a large scale.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

4.1.2; 4.6.2 | 8.7.2; 8.7.3; 8.7.4

Nebraska State Social Studies Standards

SS 4.3.1; SS 4.3.2

L3

LESSON PLAN

Well in a Cup (Irrigation)

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level: 4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Process

• Have students brainstorm the importance of water and define the word irrigation. Record all theirresponses on a KWL (what we already Know/what we Want to learn/what we Learned) chartabout irrigation. When completed, review the chart and ask students to write in their journal about water and how it is used for irrigation. This may be shared with a partner or in the group.

• Collect the following materials for students or groups to create a well in a cup:

- 1 10 oz. clear, flexible plastic cup
- 1 lid to fit the clear plastic cup
- a pencil
- 1 2x3 inch piece of metal window screen
- pea-sized road gravel
- container of clear water
- container of water dyed blue with food coloring
- 2 syringes with long tips (found at veterinary clinics or farm supply stores) or pumps from hand soap.
- 1 can of powdered drink mix (preferably lime flavored) with a wrapper around the can that says “Fertilizer – Directions: Follow Carefully”

• Students will roll the screen around the pencil to make a long cylinder, starting with the long side of the 2X3 inch rectangle. The screen might be loose on the pencil.

• Fill the cup with gravel, filling around the pencil and screen. Leave about 1 inch of screen sticking above the gravel. Secure the lid on the cup.

• Use the blue water to make it rain on the surface of the gravel in the cup (as the water filters through the gravel, you are recharging the aquifer). Identify the aquifer model in the cup.

• Stick a syringe with a long tip down the well to pump water and identify this as “pumping the well”. As students repeat the pumping, they will get less water. They should identify this as removing water from the “aquifer” but not replacing it.

• Recharge the aquifer by raining more blue water. Review uses of groundwater: personal use, economic use (for factories, industries, businesses), safety (fire hydrants) and recreation. Pump as much water as possible out of the cup.

• Show the students the powdered drink mix with the fertilizer label. Make sure they understand that they realize the can doesn’t really contain fertilizer! Ask students to read the label. Fertilizer manufacturers provide directions on the proper and appropriate use of the product.

The Process *continues* >

L3

LESSON PLAN

Well in a Cup (Irrigation)

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Activity Grade Level: 4 8

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• Sprinkle drink mix on the top of the gravel and tell students that you didn't follow the directionsand used much more than stated in the directions. Make it "rain" on the gravel using clearwater.

• Tell students you'd like to pump the wells for drinking water. What is the difference in the color (the water should be green indicating fertilizer in the groundwater – NOT KOOLAID!)?

• Tell the students that in the "real world" this contamination can be colorless, tasteless and/or odorless. What can be done to clean up the contamination? Students may answer:

- Boil the water (just concentrates contaminate, making the water more dangerous).
- Pump out the water (pumping it dry).
- Make it rain (will gradually dilute the contaminant).
- Drill a new well (try to stick the syringe in a new cup location. Students will see the contaminant has spread through the whole aquifer).
- Move to a new house (people who purchase the contaminated wells will discover the problem when water testing is done).
- Buy bottled water or install a treatment system (a very expensive option).

• Students should come to the understanding that the best way to keep the water clean is to use theresource wisely, following fertilizer directions carefully and using the water wisely.

Teaching Tips

Older students can research water resources and water quality in their area.

Assessment Activities

- Have students write about the past and present usage of water.
- Review the KWL chart and have students respond to initial beliefs about water and irrigation.
- Draw a picture illustrating the cross-section of a well and how water is pumped.

	4 points	3 points	2 points	1 points
Past/present use of water	Student can logically and completely compare/contrast past and present uses of water	compare/contrast past and present uses of water	Student can compare/ contrast past and present uses of water with only a few minor errors	Student can compare/ contrast past and present uses of water contains errors affecting thinking
Response to initial beliefs	Student response shows logical and complete understanding of changes in initial beliefs	Student response shows understanding of changes in initial beliefs	Student response shows understanding of changes in initial beliefs with only a few minor errors	Student response of changes in initial beliefs contains errors affecting thinking
Well cross-section	Student is able to draw a cross-section of a well and can explain completely and logically how water is pumped	Student is able to draw a cross-section of a well and can explain how water is pumped	Student is able to draw a cross-section of a well and can explain how water is pumped with only a few minor errors	Student's well cross-secwon is incomplete; explanation of how water is pumped contains errors affecting thinking

L4

LESSON PLAN
Groundwater

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Lesson Objectives

• By the end of the lesson, students will define groundwater in Nebraska as water found in theempty pore spaces and cracks under the surface of the earth.

• By the end of the lesson, students will differentiate between earth materials that are porousand those that are nonpermeable.

Resources

Nebraska Studies by John Kyle Davis (Nebraska Department of Education, 1983)

This is Nebraska by James Olson and Vera Farrington Olson (University Publishing Co., 1960)

The New Enchantment of America: Nebraska by Allan Carpenter (Children's Press, Chicago, 1978)

NE Department of Environmental Quality http://www.deq.state.ne.us/

Making discoveries: Groundwater Activities for the Classroom and Community (Groundwater Foundation, 2000)

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

4.5.1; 4.7.2 | 8.5.1

Nebraska State Social Studies Standards

SS 4.3.1

L4

LESSON PLAN
Groundwater

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Introduction

The majority of Nebraskans use ground water as their source of drinking water. Omaha and a few towns in east, northeast and northwest Nebraska use surface water (rivers and lakes) as the source of all or part of their public water supply. Almost everyone else – people who live in small towns, large cities and on farms or acreages – gets their drinking water from underground sources.

When rain falls to the ground, the water does not stop moving. Some of it flows along the land surface to streams or lakes, some is used by plants, some evaporates and returns to the air, and some seeps into the ground. This seepage behaves much like a glass of water poured onto a pile of sand. When infiltration saturates the material below the earth's surface, it is generally called ground water.

Ground water is replenished or recharged by infiltration from the surface. (Information compiled by the NE Department of Environmental Quality.)

Nebraska is located on an underground sea of water. If all of it could be brought to the surface, the water would be 40 feet deep! The groundwater supply is more than 18 times the rainfall for an average year. The largest amount of this underground water is found in the Sandhills. It is all moving very slowly in the direction of the general slope of the land from the northwest to the southeast. As the water filters down through the ground, the bottom layer is saturated first. The top of this saturated layer is called the water table. In rainy weather the water table goes up and in drought years the water table goes down. The supply of water is our state's most valuable natural resource!

L4

LESSON PLAN
Groundwater

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Process

• To differentiate between surface water and groundwater, ask the guiding question, “What happens to rainwater when it hits the ground?”

• Review terms porous and permeable.

• Divide students into groups and hand out a clear cup filled to the top with pea or aquarium gravel and half-filled with water. Ask students to describe where the water is fitting in (between the gravel particles). Explain that water found in the ground is groundwater.

• Find the top of the water level and mark it with a permanent marker. This is called the water table.

• Give students a clear cup filled halfway with sand, and a cup filled 1/3 with water. Ask students to describe the characteristics of the sand (particle size, color, texture, etc.).

• Pour the water from the cup into the sand, observing where the water goes (between the sand particles). Mark the water table in the same way.

• Using a finger or pencil point, make a hold in the sand forming a small circle. The top surface of the water in this pool is the water table.

• Feel the sand in the pool. How does it feel? Why? (That sand feels damp or dry because it is above the water table).

• Repeat the activity by packing clay into a cup and pouring water into it. What happens?

Guiding Questions

• What happens to the water that comes down when it rains or snows? (It runs off into lakes or ponds, evaporates into the air, or sinks down into the ground and travels to the water table.)

• What is between the pebble or sand particles if there is no water there? (air)

• Is the sand and gravel porous and permeable or nonporous and nonpermeable? How do youknow? (The sand and gravel are porous and permeable because the water flows through thematerials.)

• Is the clay porous and permeable? How do you know? (The clay is nonporous andnonpermeable because the water doesn’t flow through the material. It just sits on the top.)

Teaching Tips:

Prepare for a possible mess. Watch out for spilled water or earth materials.

L4

LESSON PLAN
Groundwater

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level: 4 8

Assessment Activity

The student should be able to describe what groundwater and the water table are. This could be done as a paragraph or as a drawing that is labeled. Why is it important for Nebraska farmers and community members to understand the importance of our groundwater supply and the water table?

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Describe groundwater	A clear description is either written or drawn; labels indicate correct and complete understanding	A description is either written or drawn containing minor errors that don't negate understanding	A description is either written or drawn containing errors that effect understanding	A description is either written or drawn containing major errors that effect understanding
Describe the water table	A clear description is either written or drawn; labels indicate correct and complete understanding	A description is either written or drawn containing minor errors that don't negate understanding	A description is either written or drawn containing errors that effect understanding	A description is either written or drawn containing major errors that effect understanding
Importance of groundwater and the water table	A complete and logical answer demonstrates in- depth understanding of the importance of groundwater and the water table	A complete and logical answer demonstrates understanding of the importance of groundwater and the water table	Answer demonstrates understanding of the importance of groundwater and the water table although there might be minor flaws in the logic	Answer demonstrates understanding of the importance of groundwater and the water table although there might be major flaws in the logic; answer is superficially unacceptable

L5

LESSON PLAN
Water Cycle

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Lesson Objective

By the end of the lesson, students will construct a working model of the water cycle and will be able to define/describe the terms “evaporation” and “condensation” in relationship to the water cycle.

Resources

- Activity was adapted from Water, Precious Water, Book A (1988 AIMS EducationFoundation)
- Magic School Bus At the Waterworks by Joanna Cole (Scholastic)

Introduction

All water everywhere is connected. Puddles, lakes, streams and oceans are webbed by the water cycle. The processes of evaporation, condensation and precipitation move water from place to place across the face of the earth. The water cycle can be described as a circle, a continuous cycle of evaporation-powered heat from the sun; condensation; precipitation in various forms; and water that runs off into streams, lakes and rivers or water that soaks into the ground. The cycle repeats endlessly. Water can also be absorbed by plants through their roots, becoming part of the water cycle. Transpiration occurs when water is absorbed by plants and evaporated into the atmosphere, primarily through the plant leaves.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

4.5.1; 4.7.2 | 8.5.2

L5

LESSON PLAN
Water Cycle

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Process

Each student or team of students will construct a mini water cycle in a baggie.

• Review the water cycle and any terminology needed.

• Give each student or team the following: a quart-sized zip-lock baggie, a bathroom sized (about3.5 oz) clear plastic cup (a clear medicine cup works well too) and masking tape. Have acontainer of room temperature water, colored with blue food coloring ready.

• Wedge the cup in the bottom corner of the baggie and secure it with tape.

• Students will place about 2 oz. of blue water in the clear cup. Mark the water line on the cupusing permanent marker.

• Seal the baggie and tape it in a warm location, like a window. Tilt the baggie on an angle like adiamond with the cup at the bottom.

• Observe the cup and the water over a period of time.

Discussion questions

• What will happen to the water in the cup?

• Does the location of the baggie affect the results?

• What color is the water outside of the cup in the baggie?

• What would happen if the baggie were left in the same spot for a month?

• Will the water ever completely evaporate?

Teaching Tips

• You may need to tape the cup securely to the inside of the baggie so the cup doesn't tip over.

•Be sure to tape the baggie on an angle, like a diamond, so that the sides will slant down fromthe top allowing the water droplets to slide down and collect in the bottom of the baggie.

•Be prepared to supplement the sun's heat with a lamp if the days are cloudy or the window isshaded.

•If you wish, you may start the activity ahead of time so when you're discussing the water cycle,the students can begin to see results.

L5

LESSON PLAN
Water Cycle

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Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

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Activity Grade Level

4 8

Assessment Activities

Students will sketch their mini water cycle and label/describe the parts of the water cycle: evaporation, condensation, and precipitation.•Be sure to tape the baggie on an angle, like a diamond, so that the sides will slant down fromthe top allowing the water droplets to slide down and collect in the bottom of the baggie.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Label the water cycle	The student can correctly label evaporation, condensation and precipitation on a sketch of the water cycle	The student can correctly label two of the following-- evaporation, condensation or precipitation on a sketch of the water cycle	The student can correctly label one of the following — evaporation, condensation or precipitation on a sketch of the water cycle	The student can complete a sketch of the water cycle but cannot label the parts
Describe the water cycle	The student can correctly describe evaporation, condensation and precipitation on a sketch of the water cycle	The student can correctly describe two of the following — evaporation, condensation or precipitation on a sketch of the watercycle	The student can correctly label one of the following — evaporation, condensation or precipitation on a sketch of the water cycle	The student can recognize a sketch of the water cycle but cannot describe the parts

L5

LESSON PLAN
Water Cycle

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Activity Grade Level

4 8

Extensions

• Students will enjoy making a water cycle bracelet! Use one long chenille stem per student and different colors of pony beads to represent the different parts of the water cycle. Students may brainstorm colors that will make sense to them. Suggestions include:

- Yellow – the sun's light and heat
- Clear – evaporation
- Light Blue – condensation
- White - clouds
- Dark Blue – precipitation
- Green – water runoff or the groundwater

• Build a terrarium in a two-liter soda bottle. The plants in the terrarium will demonstrate the role plants play in the water cycle.

• Students could paint/draw a picture or bring a photograph of their favorite outdoor place.Identify the involvement of the water cycle in their pictures. Point out that if paint was used, the water from the paint evaporated and is back in the water cycle again.

• Draw a picture showing how a drop of water can connect a Kingsley Dam, a western meadowlark and the students' school in Nebraska.

L6

LESSON PLAN

Nebraska Rivers, Lakes, & Reservoirs

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4

Lesson Objectives

• At the end of the lesson students will be able to locate and label important Nebraska rivers, lakes, and reservoirs.

• At the end of the lesson, students will be able to describe the importance of rivers and reservoirs to people.

• At the end of the lesson, students will understand that rivers go beyond political boundaries.

Resources

Maps of this type exist so a study of them would be more efficient than creating one — find map resources to use instead of creating one.

• A printable outline map of Nebraska can be found and printed out at http://www.enchantedlearning.com/geography/outlinemaps/usa.shtml

• The lakes can either be added by the teacher before copying or can be drawn in by the students.

• *This is Nebraska* by James Olson and Vera Farrington Olson (University Publishing Co.,1960)

• *The New Enchantment of America: Nebraska* by Allan Carpenter (Children's Press, Chicago,1978)

• *Nebraska Studies* by John Kyle Davis (NE Department of Education, 1983)

Nebraska Department of Education Content Area Standards

Nebraska State Social Studies Standards

SS 4.3.2

L6

LESSON PLAN

Nebraska Rivers, Lakes, & Reservoirs

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level

4

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Introduction

The largest of the Nebraska rivers is the Missouri forming the eastern border of the state. It was an important highway in the early history of the plains. All of Nebraska's rivers and streams drain directly into the Missouri or into another river that eventually drains into the Missouri.

Nebraska takes its name from a fantastic natural resource, the Platte River. The Omaha Indians called the Platte River Ni'bthaska and the Oto Indians called it Nibrathka. Both of these words mean "flat or shallow water". Explorer John C. Fremont said, "The names given by the Indians are always remarkably appropriate; and certainly none was ever more so than that which they have given to this stream – The Nebraska, or Shallow River!" About three-fourth of Nebraska is drained by the Platte and its tributaries. Sometimes the waters swell and rage due to spring thaws or rains and other times the river channels are almost dry. The Loup River is the largest tributary of the Platte. Others include the Elkhorn, Cedar, Dismal and Calamus.

No major tributaries flow into the Platte from the south. This was one reason that the Oregon Trail was so easy to follow in Nebraska. There was a minimum of water to cross. The trail followed a northwesterly route along the Little Blue River to its beginning, then continued on to Fort Kearney, on the Platte, where it turned west and followed the south bank of the Platte. Altogether, there are about 5,765 miles of flowing water in the state.

In Nebraska there are about 3,350 major lakes. The largest lake is Lake McConaughy, near Ogallala and formed by Kingsley Dam. This lake is 23 miles long behind the dam and is one of the largest earthen dams in the United States. It was named for C.W. McConaughy, a pioneer worker for irrigation and public power in Nebraska. There are 17 other major man-made lakes in Nebraska.

L6

LESSON PLAN

Nebraska Rivers, Lakes, & Reservoirs

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level

4

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Process

Look at the map of Nebraska.

- Notice the river systems and tributaries
- What rivers are important to Nebraska?
- Which direction do Nebraska rivers flow and why?
- How do rivers change as they flow east?
- What are some major reservoirs of Nebraska?
- When and why were they built?
- What is the largest lake near your school and how is it used to serve the needs of the community?
- Name and briefly describe the river that is closest to your community.

Look at a larger map of the Midwest.

- Notice that rivers are not bound by state borders
- Where does the Platte River begin?
- What rivers do we share with other states?
- What states share rivers with Nebraska?

Students should label the following rivers:

Dismal
Calamus
Snake
Niobrara
Platte
Republican
Missouri

Students should label the following lakes and reservoirs:

Lake McConaughy
Harlan County Reservoir
Lewis and Clark Lake

Students will choose one of Nebraska's rivers, lakes or reservoirs for research. They should beable to identify its primary uses. Design a postcard or travel brochure from the area

L6

LESSON PLAN

Nebraska Rivers, Lakes, & Reservoirs

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4

Assessment Activity

On a blank Nebraska outline map, locate and label the major Nebraska rivers, lakes and reservoirs.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
River locations	Correctly locates and labels 90%-100% of the rivers indicated by the teacher	Correctly locates and labels 80%-89% of the rivers indicated by the teache	Correctly locates and labels 70%-79% of the rivers indicated by the teacher	Correctly locates and labels 69% or less of the rivers indicated by the teacher
Lake locations	Correctly locates and labels 90%-100% of the lakes indicated by the teacher	Correctly locates and labels 80%-89% of the lakes indicated by the teacher	Correctly locates and labels 70%-79% of the lakes indicated by the teacher	Correctly locates and labels 69% or less of the lakes indicated by the teacher
Reservoir locations	Correctly locates and labels 90%-100% of the reservoirs indicated by the teacher	Correctly locates and labels 80%-89% of the reservoirs indicated by the teacher	Correctly locates and labels 70%-79% of the reservoirs indicated by the teacher	Correctly locates and labels 69% or less of the reservoirs indicated by the teacher

Extension Activity

Have students look in newspapers or online to find articles about the control of rivers, lakes and reservoirs in Nebraska. Students can write opinions of the articles.

L7

LESSON PLAN
Aquifers

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Lesson Objective

At the end of the lesson students will construct a model of the Ogallala Aquifer and will understand the impact of pollution.

Resources

• Information and a map can be found at the Ogallala Aquifer website: https://www.climate.gov/news-features/featured-images/national-climate-assessment-great-plains%E2%80%99-ogallala-aquifer-drying-out

• Science in Your Watershed U.S. Geological Survey: https://water.usgs.gov/wsc/

• Surf Your Watershed U.S. Environmental Protection Agency: http://www.epa.gov/surf

• Making a Bigger Splash: A Collection of Water Education and Festival Activities published by the Groundwater Foundation

Introduction

The Ogallala Aquifer is one of Nebraska's greatest natural resources. The aquifer, water trapped underground in layers of rock, was formed millions of years ago. The Ogallala Aquifer spans several states, including Wyoming, a small portion of South Dakota, much of Nebraska, Kansas, Colorado, Oklahoma, New Mexico and Texas. The Aquifer is an important water supply for irrigation and allows several rivers to keep from running dry. Depletion and contamination of this underground water system raise concerns.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

SC 4.7.2; SC 4.7.3 | SC 8.7.2

Nebraska State Social Studies Standards

SS 4.3.1; SS 4.3.2

L7

LESSON PLAN
Aquifers

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Process

• Review terms including aquifer, confining layers, contamination, recharge, water table.

• Fill a clear plastic cup one-third full with crushed ice. This represents gravels and soils.

• Add enough clear soda to just cover the ice.

• Add a layer of ice cream to serve as a confining layer over the water-filled aquifer.

• Add crushed ice on top of the confining layer.

• Add colored sugars and sprinkles to represent soils and the porous top layer.

• Use a different color soda (or add food coloring to clear soda) to represent contamination.Pour this on top of the “aquifer”.

• Students will observe the colored soda infiltrate the confining layer (ice cream). Discuss thecontaminant movement and the vulnerability of aquifers to spills upon the surface.

• “Drill a well” into the aquifer by poking a straw in it. Pumping the well (sucking on the straw) demonstrates a decline in the water table.

• Students should notice the contaminants that get sucked into the well area and end up in thegroundwater by leaking through the confining layer.

• The aquifers can be recharged with additional soda “rain”

L7

LESSON PLAN
Aquifers

By Bev Grueber, North Bend Central Public School and
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This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level: 4 8

Assessment Activities

• Have the students draw a sketch of a cross-section of the aquifer. It should include thegravel/ pebbles, the water table and the confining layer.

• Students should be able to write several sentences on how contaminants get into the aquiferand how the contaminants impact the aquifer and those using that water.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Aquifer cross-section	Sketch contains gravel/pebbles, the water table and the confining layer and are all correctly labeled	Sketch contains only two of the components that are correctly labeled	Sketch contains only one component that is correctly labeled	An attempt is made to complete a sketch; components may be present but are not labeled correctly
Contaminants	Sentences are logical and demonstrate in-depth understanding of how contaminants get into the aquifer, how contaminants impact the aquifer, and how contaminants impact those using the aquifer	Sentences demonstrate understanding of how contaminants get into the aquifer, how contaminants impact the aquifer, and how contaminants impact those using the aquifer	Sentences demonstrate understanding of only two of the following: how contaminants get into the aquifer, how contaminants impact the aquifer, and how contaminants impact those using the aquifer	Sentences demonstrate understanding of only one of the following: how contaminants get into the aquifer, how contaminants impact the aquifer, and how contaminants impact those using the aquifer

General Notes

Students can enjoy drinking their soda aquifers.

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

L8

LESSON PLAN

Generating Power at Kingsley Dam

Activity Grade Level: 4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Lesson Objectives

• By the end of the lesson, students will construct a working model of a turbine and will understand how water generates power.

• By the end of the lesson, students will list the effects of Kingsley Dam on people, plants andanimals – both positive and negative.

Resource

A Journey through the Central District: published by the Central Nebraska Public Power and Irrigation District, 1994 California Energy Commission, 2003 (http://www.energyquest.ca.gov/projects)

Introduction

The production of hydroelectric power is a major benefit of the Central Nebraska Public Power and Irrigation District's project. Water from Lake McConaughy is the "fuel" for the Kingsley Hydroplant, which went on-line in 1984. The Central hydroplants have the capacity to produce 113,000 kilowatts of clean, renewable hydroelectric power. This is enough electricity to meet the residential needs of a city with 38,000 homes. Hydroplants have no fuel costs and are typically less costly to maintain than fossil-fuel plants. They can generate electricity upon demand, unlike steam-driven plants, which require several hours to fire up if they have been off-line. Hydropower provides energy without producing waste products or emissions into the air. The fuel – water – is renewable and provides many other benefits such as irrigation and recreation.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

SC 4.6.1; SC 4.6.2; SC 4.7.4 | SC 8.3.3

Nebraska State Social Studies Standards

SS 4.4.1

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

L8

LESSON PLAN

Generating Power at Kingsley Dam

Activity Grade Level

4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Process

Provide students with the background information. Generate an initial discussion with them about some of the possible benefits and negative effects caused by the construction of the Kingsley Dam, considering a variety of perspectives.

Activity Option 1: Have a parent volunteer or adult cut lengthwise slits in a large cork. Small rectangular blades can be cut to fit snugly into the slits. The plastic from lids works well for this. Cut a strip of heavy cardboard. Fold the ends of the cardboard up into a U shape. The sides of the U should be high enough so the cork and blades can fit in between without touching the base. Push straight pins through each end of the upright U and into the cork acting as axles. Students can experiment with directing water at the fins to move the "turbine". Turbines will generally have higher speeds as water hits them at faster speeds. Students can also investigate the speed of the spinning turbine and the number of inserted plastic rectangular blades. To operate efficiently, should a turbine have more or fewer blades (or does it make a difference)?

Activity Option 2: Gather materials needed for students working in small groups: a quart or half-gallon milk carton, string, a nail, water and masking tape. Using the nail, punch a hole in the bottom right corner of each side of the milk carton. Punch another hole exactly in the middle of the top section of the carton. Push the string through the top hole of the carton and tie it securely so the carton will hang from the string. Tape each hole with masking tape. Hang the carton from a low tree branch or another place where the carton can hang freely and you won't mind if the surface underneath gets wet. Fill the carton with water. Pull off the tape on one corner and observe. Pull the tape off of two corners opposite each other and observe differences. Pull the tape off of all the corners and observes changes and differences in the motion. The carton (turbine) turns because the force of the water pouring out of the small hole pushes the carton in the opposite direction. The more holes there are, the faster the carton turns. The turbine in a dam is connected by a shaft to an electrical generator, which makes electricity when it is turned.

Guiding questions

How will wildlife, plants and communities be affected if…

• the water levels in the dam are low?

• the water going over the dam drops a long distance?

• very cold water is taken from the bottom of the dam and released into the river below?

L8

LESSON PLAN

Generating Power at Kingsley Dam

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level: 4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Assessment Activity

At the end of the lesson, the students will name two or more possible benefits to people if a dam was constructed on a river. Name two possible negative effects of having a dam constructed.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Benefits	Can name two benefits of dam construction and gives logical, complete reasoning for both benefits	Can name two benefits of dam construction and gives only one logical, complete reason for a benefit	Can only name one benefit of dam construction and gives one logical, complete reason for that benefit	Can only name one benefit of dam construction and the reason is superficial or incomplete
Negative effects	Can name two negative effects of dam construction and gives logical, complete reasoning for both negative effects	Can name two negative effects of dam construction and gives only one logical, complete reason for a negative effect	Can only name one negative effect of dam construction and gives one logical, complete reason for that negative effect	Can only name one negative effect of dam construction and the reason is superficial or incomplete

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

L9

LESSON PLAN

Saving Nebraska's Water

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Lesson Objectives

• By the end of the lesson, students will construct a device to purify water.

• By the end of the lesson, students will list sources of pollution in Nebraska's water.

Resources

• Groundwater Activities for the Classroom and Community, The GroundwaterFoundation, https://www.groundwater.org/kids/

• Water Precious Water: A collection of Elementary Water Activities, AIMS Education Foundation, 1988

• A River Ran Wild by Lynne Cherry

http://www.lynnecherry.com/a_river_ran_wild_19410.htm

• Help a Fish! Clean up a River! worksheet at the end of this lesson

Introduction

Sources of pollutants that cause water pollution vary. In some cases, pollutants may come from a pipe discharging into a river, from a boat, irrigation ditch, underground storage tank, industry, agriculture, other human activities or other single sources. This is called "point source" and can be dealt with directly. Nonpoint sources problems are difficult to fix. They result when rain runs off into lakes and streams. This runoff may contain oil, fertilizer, antifreeze, pesticides, bacteria and other substances harmful to water quality. Erosion from farmlands, construction sites and stream banks are also examples of nonpoint sources.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

SC 4.4.3; SC 4.7.3 | SC 8.5.1; SC 8.7.2

Nebraska State Social Studies Standards

SS 4.3.2

L9

LESSON PLAN

Saving Nebraska's Water

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

Activity Grade Level

4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Process

• Brainstorm a list of ways that water can become polluted. Guide students to include both point and nonpoint sources of pollution.

• The teacher will move about the room dropping Kleenex as s/he moves. As each Kleenex is dropped, a source of pollution is named (ie: a farmer applying too much chemical; a landfill site, someone throwing hazardous material down a drain, erosion from a construction site or feedlot, etc.). Be sure to drop AT LEAST AS MANY Kleenex as there are students in the class!

• Identify spots in the classroom as water supply sources: steams, groundwater, and so on.

• Line up students on one side of the classroom. They are now raindrops. As the raindrops"fall", they should pick up any pollutants as they head toward a water supply source.

• When enough of the pollutants get into a water supply, they pollute the water and make it dangerous to use. A few particles of the pollutant in a large quantity of water may not beharmful, but as the number of particles increases the potential for creating a dangerous pollution situation also increases. What could have been done to prevent the pollutant from getting into the water supplies? (Possible answers include: use only the amount of chemical needed as fertilizer; NEVER pour hazardous wastes down a drain; build landfills so any runoff does not lead to a surface water supply, etc.)

• Read *A River Ran Wild* to the students. Tell the students: "A river nearby has been polluted. How can we clean the water to make it safe for the fish, wildlife and people who use the river for recreation?"

• Collect the following materials for groups of students to use:
-Activity sheet at the end of this lesson
-2 gallons of muddy water containing dirt, leaves, sticks, sand
-Clear plastic cups (half of the cups should have holes poked in the bottom)
-Graduated cylinders to measure 240 ml of water
-Supply table to include: coffee filters, charcoal, gravel, rocks, soil, cotton, cloth, and
-Other supplies students may want to use

• Show the student the dirty water. Their task is to work in groups to construct a filtration deviceto clean the water. They will build the filtration device in a cup with holes in the bottom andwill nest that cup in a second cup that will catch the water. They may use any supplies on the supply table. They are to be able to collect as much clean, filtered water as possible. Record data on the worksheet at the end of this lesson.

• Have the student measure 240 ml of water and pour it through their filtration system. Collectthe filtered water and measure the amount reclaimed.

• Have each group share the procedures they used for cleaning the water and the amounts of water they reclaimed. Were the amounts the same or different? If so, why or why not?

•Is the water clean to drink? (No; bacteria can pass through the filtering device). What needs to be done to make it safe for drinking?

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

L9

LESSON PLAN

Saving Nebraska's Water

Activity Grade Level: 4 8

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Teaching Tips

This can be organized as an open-ended divergent activity by having students coming up with their own solutions. This might require letting students plan for one class period and then constructing the filtering device in another class period. It can be more teacher-directed by having everyone construct the same filtering device.

Assessment Activity

Write a letter to a newspaper stating at least two ways to keep water from being polluted.

Assessment Rubric

The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Pollution prevention	Writing states two ways to keep water from being polluted; ideas are explained completely and show in-depth understanding	Writing states two ways to keep water from being polluted; ideas are explained and show understanding	Writing states one way to keep water from being polluted; idea is explained and shows understanding	Writing states one way to keep water from being polluted; idea has minor flaws but shows understanding; ideas are unacceptably superficial

Extension Activity

Take a field trip to a local water treatment plant or have students research how their local water supply is treated.

Saving Nebraska's Water

Help a Fish! Clean up the River!

Group Members

Draw a picture of your group's filtration system. Label each item in your system.

List your group's procedure

Amount of water given to clean _____ ml

Amount of water your group cleaned _____ ml

Difference: Amount of water and pollutants trapped in your filter _____ ml

L10

LESSON PLAN
nebraskastudies.org Scavenger Hunt

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level: 4 8

Lesson Objective

By the end of the lesson, students will summarize the Tri-County Project section of the nebraskastudies.org Web site using a scavenger hunt.

Resources

- Nebraska Studies website: nebraskastudies.org. This activity uses the *Tri-County Project* section.
- Scavenger Hunt page and Answer Key at the end of this lesson

Introduction

Water use in Nebraska has been described as the "lifeblood" of the state's economy. We're going to investigate the importance and impact of the Tri-County Project on Nebraska.

Process

Students may work individually or with a partner to investigate the Tri-County Project and complete the scavenger hunt.

Discussion questions

After going over the answers, special attention can be drawn to the primary sources used in this website.

Teaching Tips

This activity will take time. For students to benefit, allow an extended time or several class periods.

Nebraska Department of Education Content Area Standards

Nebraska State Science Standards

SC 4.6.2; SC 4.6.3; 4.7.2; 4.7.3; 4.7.4 | 8.6.2; 8.7.2; 8.7.5

Nebraska State Social Studies Standards

SS 4.2.1; SS 4.3.; SS 4.4.1; SS 4.4.2; SS 4.4.3; SS 4.4.4 | SS 8.1.1; SS 8.4.2; SS 8.4.3; SS 8.4.4

L10

LESSON PLAN

nebraskastudies.org Scavenger Hunt

By Bev Grueber, North Bend Central Public School and
Joan Anthony, Spring Ridge Elementary, Elkhorn Public Schools

This lesson plan was funded in part by the Cooper Foundation, Abel Foundation, and the Nebraska Humanities Council.

Activity Grade Level

4 8

Assessment Rubric

Completion of the scavenger hunt (27 blanks + the option of several bonus or extra points) can be assessed using the school's grading scale or the following rubric. The rubric below can be adapted for use by teachers in grades 4-8. Adjustments will need to be made according to student needs and teacher/grade level expectations. No points are given for incorrect or missing responses.

	4 points	3 points	2 points	1 points
Correct answers (27 possible)	+25, +26, +27 correct (out of 27)	+22, +23, +24 correct (out of 27)	+19, +20, +21 correct (out of 27)	+18 or fewer correct (out of 27)

General Notes

This scavenger hunt can be modified:

- Delete the "headers" showing where the answers can be found.
- Have older students make a scavenger hunt for younger students.

Extension Activities

- Make the activity more open-ended by having students write about the economic impact of the *Tri-County Project*.
- Include a student debate between Nebraska, Wyoming, and Colorado about water rights.

Name_____ Period No._____

Directions: Use the Nebraska Studies website: http://nebraskastudies.org to complete this scavenger hunt. This activity uses the *Tri-County Project* section.

Drought and the Dust Bowl (1 of 15)

1. The Central Nebraska Public Power and Irrigation District was created on July 1, 1933. Commonly known as the _____, it intended to build an irrigation project benefiting south-central Nebraska.

C.W. McConaughy and George P. Kingsley (2 of 15)

2. C.W. McConaughy's suggestions for _____ called for water to be brought to south-central Nebraska via canals. This idea met with many obstacles.

3. George P. Kingsley, _____, dedicated time, energy and talents to bring irrigation to the area.

Trials and Tribulations (3 of 15)

4. A huge dam to be built across the Platte River was designed to create a large water storage reservoir. Hydroelectric plants would be built to generate and sell _____. The dam is now known as _____ and the lake the dam formed is named _____.

George W. Norris and George E. Johnson (4 of 15)

5. The man who helped secure federal approval and funds for the Tri-County Project was _____.

6. The man who helped design and develop the Nebraska Rural Electrification Administration projects that brought electricity to farms and small towns was _____.

Project Construction (5 of 15)

7. The Tri-County Project was completed and in operation by _____. Kingsley Dam was built and Lake McConaughy began to fill with water for use by more than 500 miles of irrigation canals and 3 hydroplants.

Public Power in Nebraska (6 of 15)

8. While people living in cities and towns had access to electrical power, this energy source was rarefor the many people living on _____.

9. In the 1900s electricity was provided by both privately owned and publicly owned companies. By 1949 Nebraska became the only state served entirely by _____, providing reliable electrical service at the lowest possible cost.

Learning to Farm with Irrigation (7 of 15)

10. Irrigating corps was a new and unusual idea. It made the difference between harvesting a good crop or _____. "Irrigation schools" taught farmers how to use the water.

Water Distribution (8 of 15)

11. The main water supply for Central's system comes from the Rocky Mountains in _____ and _____.

Name_____ Period No._____

Directions: Use the Nebraska Studies website: http://nebraskastudies.org to complete this scavenger hunt. This activity uses the *Tri-County Project* section.

Groundwater Recharge (9 of 15)

12. Water from Central's project also soaks into the ground. This _____ the underground water supply, the aquifer.

Water Conservation (10 of 15)

13. _____ are efficient ways of getting water to crops. They can takewater from canals and usually use less water than gated pipes or tubes.

Hydropower (11 of 15)

14. Hydropower provides energy without producing waste products or emissions into the air. The fuel used in hydropower plants is _____.

Recreation (12 of 15)

15. List three recreational activities possible around lakes:

_____

_____

_____

Wildlife Habitat (13 of 15)

16. Lake McConaughy and the surrounding area provide a great habitat for many kinds of animals. List three kinds of birds you might see there:

_____

_____

_____

Wildlife Management at the Jeffrey Island Habitat Area (14 of 15)

17. Central is managing an island in the middle of the Platte River channel as a wildlife habitat.Instead of using chemicals to control the weeds there, _____ are used instead to eat the weeds.

Stewardship (15 of 15)

18. Meeting the need for more and more water is difficult, especially during times of drought. This makes_____,

_____,

and_____ of our natural resource very important for us all.

Explore other sections of the Nebraska Studies Web site. List the section you explored and one thing you learned.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

appendix

Nebraska Department of Education Content Area Standards

Social Studies Standards

4

SS 4.2.1 Describe how scarcity requires the consumer and producer to make choices and indentify costs associated with them.

SS 4.3.1 Explore where (spatial) and why people, places, and environments are organized in the state and around the world.

SS 4.3.2 Compare the characteristics of places and regions and their impact on human decisions.

SS 4.4.1 Investigate patterns of continuity and change over time in Nebraska.

SS 4.4.2 Analyze and explain multiple perspectives of events in Nebraska, including historically marginalized and underrepresented groups.

SS 4.4.3 Analyze past and current events throughout Nebraska history.

SS 4.4.4 Develop historical inquiry and research skills.

8

SS 8.1.1 Investigate and analyze the foundation, structure, and functions of the United States government.

SS 8.4.2 Use multiple perspectives to evaluate the historical, social, and cultural context of past and current events.

SS 8.4.3 Examine historical events from the perspectives of marginalized and underrepresented groups.

SS 8.4.4 Evaluate and interpret sources for perspectives and historical context.

appendix

Nebraska Department of Education Content Area Standards

Language Arts Standards

4

LA 4.2.1 Writing Process: Students will apply the writing process to plan, draft, revise, edit, and publish writing using correct spelling, grammar, punctuation, and other conventions of standard English appropriate for grade-level.

appendix

Nebraska Department of Education Content Area Standards

Science Standards

4

SC 4.1.2 By the end of fourth grade, students will develop an understanding of evidence, models and explanation.

SC 4.4.3 By the end of fourth grade, students will develop an understanding of living things and environments.

SC 4.5.1 By the end of fourth grade, students will develop an understanding of the characteristics of earth materials.

SC 4.6.1 By the end of fourth grade, students will develop an understanding of technological design.

SC 4.6.2 By the end of fourth grade, students will develop an understanding of science and technology.

SC 4.6.3 By the end of fourth grade, students will develop an understanding of the abilities to distinguish between natural objects and objects made by humans.

SC 4.7.2 By the end of fourth grade, students will develop an understanding of the types of resources.

SC 4.7.3 By the end of fourth grade, students will develop an understanding of environmental changes.

SC 4.7.4 By the end of fourth grade, students will develop an understanding of how science and technology helps communities resolve problems.

8

SC 8.1.2 By the end of eighth grade, students will develop an understanding of evidence, models and explanation.

SC 8.3.3 By the end of eighth grade, students will develop an understanding of the forms of energy and how energy is transferred.

SC 8.5.1 By the end of eighth grade students will develop an understand of the structure of the earth.

SC 8.6.2 By the end of eighth grade, students will develop an understanding of science and technology.

SC 8.7.2 By the end of eighth grade, students will develop an understanding of relationships among populations, resources and environments.

SC 8.7.3 By the end of eighth grade, students will develop an understanding of natural hazards.

SC 8.7.4 By the end of eighth grade, students will develop an understanding of risks and benefits.

SC 8.7.5 By the end of eighth grade, students will develop an understanding of science and technology in society.