WETLAND EXPLORERS CURRICULUM GUIDE

“The best classroom and the richest cupboard is roofed only by the sky.”
~ Margaret McMillan, 1925

This curriculum is brought to you with funds from a No Child Left Inside Grant through the WA State Recreation and Conservation Office.
Access this curriculum guide with live links and other online resources

https://www.spokanecounty.org/5360/Doris-Morrison-Learning-Center-DMLC

or scan the QR code with your smartphone’s camera.
TABLE OF CONTENTS

Curriculum Goals, Vision & NGSS ............. 03

Classroom Pre-Lessons ................. 05
   Sketch Like a Scientist
   Watershed Wonder
   Connecting the Spheres
   What in the World is a Wetland?

Field Experiences at Saltese Flats .......... 18
   Guided Observations of 4 Spheres
   Water Quality with Macroinvertebrates
   Ecosystems in Action
   Pond Reflections

Classroom Post-Lessons & Ideas .......... 26
   Shrinking Ecosystem
   Murky Situations
   Project Ideas

Acknowledgements ..................... 32
GOALS AND VISION

- Place based learning aimed to connect students to the land’s history through multiple perspectives and the multi-faceted nature of land use, care and restoration.

- NGSS-aligned science lessons with high engagement and high impact activities both in and out of the classroom.

- Provide cross-curricular connections, opportunities for sense-making and developing an appreciation for natural spaces and the importance of conservation.

- Balance scaffolded and open-ended tasks for students to self-differentiate.

- Engage the whole student with Social Emotional Learning (SEL) in pre-lessons and at the field site.

- Progressive Science Notebook to guide and capture student learning throughout the unit. Intended to maximize thorough scientific and creative expression, model Science & Engineering Practices (SEP) and provide an artifact teachers may use to assess student learning.

- Pre-lessons that are rich, interesting and easy for teachers to deliver in the classroom to build schema and prepare students for field science.

- Emphasis on authentic field science to maximize the outdoor experience at the newly restored Saltese Flats Wetland.

- Introduce career opportunities within science and engineering.

- Post lessons customized by classroom teachers to follow student curiosity and apply academic learning via inquiry or, problem-based human impact projects, interactive, cross-curricular lessons or revisiting prior work with increased depth of study.
Wetland Explorers curriculum was created with NGSS in mind. Every lesson connects in some way to the following standards:

**Science & Engineering Practices**
1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using math and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating and communicating information

**Disciplinary Core Ideas**
- PS1: Matter and its interactions
- PS3: Energy
- LS1: From molecules to organisms: structures & processes
- LS2: Ecosystems: interactions, energy & dynamics
- LS4: Biological evolution: unity & diversity
- ESS2: Earth’s systems
- ESS3: Earth & human activity
- ETS1: Engineering design
- ETS2: Links among engineering, technology, science & society

**Crosscutting Concepts**
1. Patterns
2. Cause & effect
3. Scale, proportion, quantity
4. Systems & models
5. Energy & matter: flows, cycles and conservation
6. Structure & function
7. Stability & change
CLASSROOM PRE-LESSONS

1. Sketch Like A Scientist
2. Watershed Wonder
3. Connecting the 4 Spheres
4. What in the World is a Wetland?
SKETCH LIKE A SCIENTIST

BIG IDEA: Students will make a close observation and diagram guided by what they notice, wonder, or connect to prior knowledge. They’ll use pictures, words and numbers to capture what they observe and an ABCDE framework to make their scientific diagrams complete (accurate, big enough to see details, colorful, detailed and explained). Lesson will start with a large group collaborative observation and scientific diagram and an invitation to independently pursue their own curiosity-led close observation.

RESOURCES:

MATERIALS:
Pencils
Colored pencils
Access to the outdoors so students can choose a sit spot or retrieve an item to sketch
Student Science Notebooks
Magnifying glasses (optional)

ACTIVITY:

LARGE GROUP COLLABORATION / TEACHER MODELING

1. This Moment in Time is Unique! Model How to Communicate It.
Explain that you are about to capture a particular and singular moment in time. Many variables combine to make up this moment and the scientist’s job is to capture as many of those details as possible so that they can be quantified, categorized, understood and communicated with others. Emphasize the importance of being SPECIFIC and together isolate some variables to include in your observation: DATE, TIME, PLACE, WEATHER, YOUR ATTITUDE (yes, this changes how you experience and interpret the world around you!) Your students may think of more.

2. Communicate the Moment Using Words, Numbers, and Pictures
**Teacher Tip: Quantifying the moment may be unfamiliar to your students. Take time to think of what they might want to count: numbers for date, time, weather measurements, scale, proportion, quantity measurements, etc. Quantifying attitude and feelings is a little tricky at first but can be done with % focused, pie chart of all their feelings at this moment, tracking time intervals before or after transitions (arrival, lunch, recess, dismissal, etc.)
3. Take a Close Look and Decide How to Narrow or Broaden Your Focus
Observe and draw the object or phenomenon. You may choose to observe an object from nature or preview the Saltease site via a photograph. You may zoom in on a particular detail or zoom out to show context for your object of study.

This photo can be found online at
No Child Left Inside (NCLI) Curriculum | Spokane County, WA

Or by scanning this QR Code:

3A. Model the I NOTICE, I WONDER, IT REMINDS ME Sentence Stems

This activates curiosity and frames student thinking. Feel free to organize these headers any way that makes sense to you, the scientist: columnar list, mind map, etc. Emphasize the use of NUMBERS, PICTURES and WORDS.

3B: DIAGRAM IT!
It may be helpful to avoid the term drawing as students may not identify as “good artists” but anyone can observe and be a scientist who draws diagrams to communicate what they notice.

3C: Assess and Improve Your Work Using the ABCDE Rubric.

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it ACCURATE?</td>
<td>Does it resemble what you’re studying reasonably well?</td>
</tr>
<tr>
<td>Is it BIG enough</td>
<td>so you can see important details?</td>
</tr>
<tr>
<td>Is it COLORFUL?</td>
<td>Add colors if colors are important.</td>
</tr>
<tr>
<td>Is it DETAILED?</td>
<td>Are the most important details included?</td>
</tr>
<tr>
<td>Did you EXPLAIN</td>
<td>your details with labels, words, pictures, and numbers?</td>
</tr>
</tbody>
</table>

4. Explain that you will continue to add to and improve your scientific diagram until it feels like you adequately captured it but now it’s the students’ turn to be scientists.
INDEPENDENT STUDENT WORK TIME

1. **Students perform the above steps independently with their own nature artifact on page 1 of their Science Notebooks.**

   **Teacher Tip!** To maximize outdoor time you may do this part outdoors in a special spot of the student’s choosing or bring an item indoors. To allow maximum engagement have students collect their own natural item or allow them to choose an item from your collection. You could also have multiple students study and diagram the same item to demonstrate the many perspectives and methods of expression. It’s preferable to have an item from nature but they could also use their hand or an inanimate object. The big idea here is more about HOW to be a close observer and communicate detailed information, and less about WHAT they’re studying.

2. **Collaboration: TEAM - Together Everyone Achieves More!**

   Provide encouragement and feedback to help students go deeper with the content or allow students to peer review: positively and constructively using existing class expectations or sentence frame: “I like… May I suggest…”

3. **Revisit Goals and Purpose of Lesson**

   Specific and detailed observations and recordings of knowledge are a huge part of how scientists collect, process, communicate and share data to understand what they are studying and collaborate with others. We will use this framework in future lessons in this unit.

4. **Reflection and Metacognition**

   Allow students to share their experience with this process. Was it different than what you expected? What felt easy? What felt hard? What value can they see in using techniques like this when they are out in nature?

EXTEND THE LESSON:

Print, cut and fold Free Download! Your Quick Start Guide to Nature Journaling — Wild Wonder Foundation Practice different techniques for close observations.
CalAcademy.org lesson plan for scientific sketching:
https://www.calacademy.org/educators/lesson-plans/introduction-to-scientific-sketching

Mystery Science walk through lesson on close observation and diagram of student’s hand: How do scientists know so much? (mysteryscience.com)

SCIENCE NOTEBOOK:

Page 1: Students will use pictures, numbers and words to draw an ABCDE diagram of a natural item of their choice. They’ll use the sentence stems structure of “I notice…I wonder… and It reminds me…” to forge connections to existing knowledge and spark deeper thinking.
**WATERSHED WONDER: What is a Watershed?**

**BIG IDEA:** Students will create a model watershed to understand how water moves, interacts with land, and why that is important. They will further explore how human pollution is introduced and affects the natural system and water cycle.

**ACTIVITY:**
Activate knowledge about watersheds. Tell the students that scientists make models to explain phenomena. Students will make a model watershed.

**MATERIALS:**
Pencil
1 piece of copy paper
1 piece of card stock (blue is nice for the aquifer)
Markers (washable or vis a vis water soluble markers work best)
Student Science Notebooks

1. First label the blue cardstock **GROUNDWATER - AQUIFER.** Ask kids what they know or wonder about the aquifer. Label the white copy paper **TOPOGRAPHY - LAND.**

2. Have the students **gently** crumple the white paper land. Carefully un-crumple and tape the corners to their colored paper without stretching the paper flat, maintaining the mountain shape. A **WATERSHED** is the area where water drains to a particular collection point. Ours is the Spokane River Watershed within the Columbia River Watershed within the Pacific Ocean Watershed. Have students give their watershed a name and write it on the edge of their white paper.

3. Ask kids to identify the landforms in their watershed: **mountains, hills, valleys, canyons, plains, coasts, island, peninsula, etc.** A **RIDGE** follows the highest line of a mountain. Trace your major ridges with a blue marker.

4. Think about the water in your watershed. Where does it originate? (**PRECIPITATION, SNOWMELT**) What makes it move? (**SUN, GRAVITY**) Where does it go? (**RUNOFF, RIVER, STREAM, CREEK**) and where does it collect (**VALLEY, OCEAN, LAKE, POND, PUDDLE, GROUNDWATER etc.**) You may label these in pencil and define as needed to build academic vocabulary. Ask students to predict where the water might go when it rains on their model.
5. After getting to know their watershed, have them draw where they would want to build their HOME and explain why.

6. Have each student use the spray bottle to “rain” on their model and make observations of the movement and collection of water and how it affects the land. Ask them to draw conclusions about their results.

7. Brainstorm variables that could affect their paper watershed and introduce POLLUTION: trash, farms/animal manure, graveyards, roads, vehicles, people, etc. Use different color marker to draw some of these things on the model and spray more “rain.” Discuss their observations about pollution. How does it enter the watershed? Where did it move or collect? What could we do to prevent or fix the problem? What could be the effect on our aquifer where all the water eventually collects and is used as our sole source of drinking water? How does it affect the land as it infiltrates?

**SCIENCE NOTEBOOK:**

Complete investigative questions on page 2.

What can you teach others about how water moves over landforms? How might the water change your land over time?

How does the model expand your understanding of the water cycle? What makes the water move?

What are the limitations of a model like this? How could we change our model to make it better? Could we model the watershed a different way?

What geographic terms could you use to describe the landforms in your model? What terms could you give the bodies of moving or collected water?

Draw or describe the path of a single drop from the atmosphere to the aquifer. How might it return to the atmosphere? What makes that happen?

How does pollution affect our watershed? What makes it move?

What do you still wonder about watersheds? How could you figure that out?
EXTEND THE LESSON:

- Tour and map your school or neighborhood watershed. Identify the ridges and valleys, particularly on a rainy day. Where does the water come from? Where does it go? What parts are unseen? Explore the USGS Watershed Map or River Runner. How does your neighborhood fit within the Spokane River watershed? Who else would be affected by Spokane’s water or land pollution? Did anything surprise you? How does this expand your thinking about your local watershed?
- Engineering Design Challenge: Plan a way to protect your watershed from pollution. Crumple another watershed and test it out.
- Learn more about landforms and erosion with this Mystery Science Lesson What's Strong Enough to Make a Canyon?
CLASSROOM PRE-LESSON 3

CONNECTING THE SPHERES: Four Spheres of Interactions

BIG IDEA: Students will learn what makes up the **BIOSPHERE**, **GEOSPHERE**, **HYDROSPHERE** and **ATMOSPHERE** and how the spheres interact.

ACTIVITY:

Videos will introduce the spheres and invite kids to come up with their own examples within each sphere. Students will explore interactions among spheres both collaboratively in class discussions and creatively in Science Notebooks.

MATERIALS:

Science Notebooks

- Watch these videos, pausing to ask questions, clarify vocabulary (**geosphere**, **landform**, **biosphere**, **biome**, **hydro**, **hydrosphere**, **lake**, **river**, **glacier**, **atmosphere**, **troposphere**, **stratosphere**, **mesosphere**, **thermosphere**, **exosphere**), highlight important knowledge, write examples in Science Notebooks and keep students engaged. TIP! You may want to slow down the playback speed!
  - CCK Geosphere & Biosphere [https://www.youtube.com/watch?v=VMxjzWHbyFM](https://www.youtube.com/watch?v=VMxjzWHbyFM)
  - CCK Hydrosphere & Atmosphere [https://www.youtube.com/watch?v=UXh_7wbnS3A](https://www.youtube.com/watch?v=UXh_7wbnS3A)

- Now they have identified the spheres and examples in their Science Notebook, transition their thinking to identify interactions between spheres. Here’s a video to guide their thinking:
  - CCK 4 Spheres Interactions [What On Earth](https://www.youtube.com/watch?v=UXh_7wbnS3A)

- Invite the students to write and/or draw examples in the circles and list at least one interaction in the connecting rectangles on page 3-4 of their Science Notebook.

SCIENCE NOTEBOOK:

Pages 3-4: Students will complete guided notes/vocabulary, identify elements from each sphere and spherical interactions.

EXTEND THE LESSON:

Explore More Interactions with Crash Course Kids:
- CCK Hydro/Geo Interaction: [Weathering & Erosion](https://www.youtube.com/watch?v=VMxjzWHbyFM)
- CCK Hydro/Atmo interaction: Water Cycle [Great Aqua Adventure](https://www.youtube.com/watch?v=UXh_7wbnS3A)
- CCK Hydro/Bio Interaction: [Water Water Everywhere](https://www.youtube.com/watch?v=UXh_7wbnS3A)
- CCK [Earth Science Videos](https://www.youtube.com/watch?v=UXh_7wbnS3A) Playlist on SchoolTube
Go Deeper with SEPs and CCCs!
As class, small groups or partners have students think, list and share ways the spheres interact.
Model Claim, Evidence, Reasoning framework to add sophistication to their thinking with NGSS: SEP: Engaging in Argument from Evidence and CCCs: Systems and Energy and Matter.

<table>
<thead>
<tr>
<th>CLAIM “I think…”</th>
<th>EVIDENCE “because…”</th>
<th>REASONING “which proves…”</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEATHER is an example of 2 spheres interacting.</td>
<td>Warm air in the atmosphere changes water from liquid to a gas. Cold air changes water from gas to liquid or liquid to solid.</td>
<td>The atmosphere and hydrosphere interact with each other to make weather.</td>
</tr>
</tbody>
</table>

Challenge kids to choose 2 spheres to research deeper, make a short presentation, video or model and teach to someone (classmates, another class or grade level…)

Interactions: Have a friendly competition, the group that can think of the most sphere-interactions wins a PBIS reward.

Sphere art project: Make posters demonstrating understanding of each sphere or Venn diagrams demonstrating interactions.

Engineering Opportunity: Create models that demonstrate interactions among 2, 3 or all spheres.
WHAT IN THE WORLD IS A WETLAND?

BIG IDEA: Students work in groups to build a model to understand how wetlands function within a watershed to naturally filter water and support plant, water and wildlife ecosystems.

RESOURCES:
Make a Model Video: https://youtu.be/Es89upEYYn8 (CA State Parks)

MATERIALS:
Paint Tray  Spray Bottle  2 Sponges  1 c. Soil  1 T. Oats (trash, surface pollution)
1 t. Kool-Aid Powder (chemical pollution)  Animal Figures & Natural Materials (optional)

ACTIVITY:

1. Use the video to build a wetland model. Pause the video at 2:14. Students will build their model with their group and draw it in their science notebook, page 6. (Remind them to use words, pictures and numbers in their ABCDE diagrams) *Teacher Tip: put paper towels in dark colored paint trays first to see the pollution colors clearly.

2. Resume the video as they spray water “rain” all over the paint tray and observe the water and pollution as it travels to the lowland. Students will do the same with their model and add their results to their science notebook.

3. You can use the model to create scenarios such as wetlands being removed or restored to collect/allow more pollution through the model. You can also drive ecosystem conversations by asking what impact the wetland has on the animals in the model.

4. Guide a class or small group discussion about the questions in the science notebook page 7:
   a. Why is the wetland important to our watershed? (natural water filtration)
   b. How is surface water and groundwater affected by the wetland? (Surface pollution stays at the surface, wetland absorbs/filters chemical pollution to protect groundwater)
   c. How are the other spheres affected? Geosphere (land), biosphere (life), atmosphere (air)? Answers vary, challenge kids to argue from evidence / observations.
   d. Why do you think people may not want wetlands? (discuss swamps, the inability to use wet land, the quality of the soil/peat for farming or other purposes, etc.)

a. Discuss why the county purchased the land (wastewater filtration) and what it is currently used for (habitat for native plants, birds and other life, teaching and learning about water resources, recreation, etc.)

6. Share that this will be the site of your field experience. Generate enthusiasm and curiosity about what they might learn here. Set field experience expectations now and/or right before their field experience day. (see Notebook page 9).

**SCIENCE NOTEBOOK:**

**Page 6:** Draw their Wetland Model and “rain” observations

**Page 7:** Complete What in the World is a Wetland Questions

**Page 8:** What Will You See at Saltese? Students predict and draw all 4 spheres and habitats.

**Page 9:** Preview and prepare for field experience

**EXTEND THE LESSON:**

- Invite students to make predictions about what they might see during the field experience at Saltese Flats and what habitat would be needed to support the living beings. They can add details to the Draw a Wetland page 8 of their notebooks. Remind them to include elements from all four spheres.

- Visit ebirds website and look at what specific birds have recently been spotted here. Talk about migration and how the population is always changing.

*Teacher Tip: The Student Science Notebook has a page called Teacher’s Corner on page 5. It’s available for you to use for any lesson extensions to help keep all student work in one place if this is important to you. Another option is to fold and affix additional student pages.*
BIG IDEA: Students will build on classroom pre-lessons by engaging with hands-on field Science experiences at the Restored Saltese Wetland and Doris Morrison Learning Center.

GETTING READY:

What to Wear

-Dress in long pants and layers prepared for the temperature
-Dress for mess with appropriate outdoor clothing
-Rain or Water gear if possible (jacket, boots, waders etc.)
-Prepare for spring ticks with bug spray or clothing, teach about ticks ahead of time

*** Spokane County will provide some gear as needed for activities

What to Bring

-Bin with Student Ziploc Kits: Science Notebooks with completed pre-lesson work, 2 sharpened pencils
-Nametags for all adults and students
-Student lunches (pack it in, pack it out protocol)
-Enthusiasm to help teach collaboratively with Spokane County educators and community volunteers.

What to Expect

Welcome activity and rotation among 3 instructional blocks based on NGS Standards including:
- Guided Observations of Earth’s 4 Spheres
- Weather and Water Quality with Macroinvertebrates
- Ecosystems in Action with Audubon Bird Walk Volunteers

Adequate staffing of the DMLC and at each rotation comprised of Spokane County educators, district support staff, Saltese community and Audubon Society volunteers in addition to YOU and chaperones you provide.
Guided Observations of the 4 Spheres
Weather and Water Quality with Macroinvertebrates
Ecosystems in Action
Pond Reflections
FIELD EXPERIENCE SCHEDULE

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Arrival at Doris Morrison Learning Center, 1330 S. Henry Rd., Greenacres</td>
</tr>
<tr>
<td>9:30-10</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>10-11:00</td>
<td>Instructional Block / Rotation 1</td>
</tr>
<tr>
<td>11-12:00</td>
<td>Instructional Block / Rotation 2</td>
</tr>
<tr>
<td>12-12:30</td>
<td>Lunch</td>
</tr>
<tr>
<td>12:30-1:30</td>
<td>Instructional Block / Rotation 3</td>
</tr>
<tr>
<td>1:35</td>
<td>Load Bus and Return to School</td>
</tr>
</tbody>
</table>

WELCOME ACTIVITY:

Greet students in the Doris Morrison Learning Center introduce the facility, share indigenous acknowledgements and complete the Capture the Moment! page in their notebook page 10. Go over behavior expectations and schedule for the day. Share learning goals and break into class groups.

Teacher Tip: Each leader will keep time and blow whistle to indicate a 5-minute warning and when time is up. Student materials will go back in their Ziploc for travel to the next station.
SALTESE WETLAND / DORIS MORRISON LEARNING CENTER MAP

(Student Science Notebook p.11)
FIELD EXPERIENCE BLOCK: Guided Observations of Earth’s 4 Spheres

BIG IDEA: Students will apply knowledge of spheres and interactions live in the field by making detailed observations of the geosphere, hydrosphere, atmosphere and biosphere. They’ll combine these in their journal and as watercolor art on the cover of their Science Notebook.

SITE: Northwest shore of Graham Pond

RESOURCES:
STREAM Girls - Trout Unlimited Curriculum
Soil Profiling (Color): https://youtu.be/2cmJa8dQ5_I (K State)
Soil Ribbon Test: Testing Soil Texture by Hand – The Soil Ribbon Test – GrowIt BuildIT

MATERIALS

<table>
<thead>
<tr>
<th>Science Notebooks</th>
<th>Pencils</th>
<th>Watercolor Pencils</th>
<th>Water Brushes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Testing Supplies:</td>
<td>Thermometer</td>
<td>Depth Gauge</td>
<td></td>
</tr>
<tr>
<td>Soil Testing Supplies:</td>
<td>Munsell Soil Chart</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ACTIVITY:
1. Establish sense of PLACE by sharing history as we know it. See QR Code on page 12.

2. GEOSPHERE: Invite students to study a handful of wetland soil. Make close observations of its color, composition, smell, saturation, etc. Compare to the Munsell Soil chart. Point out landscape/geography around us. Identify the highest and lowest points and how the water flows between them. Map watershed names on Science Notebook page 12.

3. HYDROSPHERE: Make and record observations of the water characteristics on Science Notebook page 13. Help students connect how the water and land interact: erosion, wetland composition, chemical processes between hydro, geo and bio to create healthy soil, shape of mountains, etc,

4. BIOSPHERE: Observe and identify what lives here, consider both seen and unseen life.
   **Teacher Tip!** This is a quick look and will be done in detail at ECOSYSTEM block. QR Code-linked field guides are on page 14 if technology is available.

5. ATMOSPHERE: Check the weather: Sky, Temperature, Precipitation, Wind
   **Teacher Tip!** This is a quick look and will be done in detail at other Field Experience blocks, page 14-15 of Science Notebook.
6. Pull together your observations of all 4 Spheres to draw an ABCDE diagram of the Saltese Flats on the COVER of your Science Notebook using pencil and watercolor pencils. Add water or soil for artistic effect as time allows.

<table>
<thead>
<tr>
<th>SCIENCE NOTEBOOK:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Page 12:</strong> Identify geography of the Saltese Flats Watershed</td>
</tr>
<tr>
<td><strong>Page 13:</strong> Capture water observations</td>
</tr>
<tr>
<td><strong>Cover:</strong> Draw an ABCDE diagram of the Saltese Flats including all 4 spheres with watercolor pencils, water and soil (optional)</td>
</tr>
</tbody>
</table>
FIELD EXPERIENCE BLOCK: Weather & Water Quality with Macroinvertebrates

BIG IDEA: Students will take in-depth weather observations, draw samples of the water and sediment to study macroinvertebrates. They will use their data to draw conclusions about water quality.

SITE: North shore of Graham Pond in front of DMLC

MATERIALS:
<table>
<thead>
<tr>
<th>Science Notebooks</th>
<th>Pencils</th>
<th>Rain Boots / Waders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather Supplies: Thermometer</td>
<td>Barometer</td>
<td>Bubbles</td>
</tr>
<tr>
<td>Macro Supplies: Dichotomous Key (QR in SN p. 14)</td>
<td>Nets</td>
<td>Bins</td>
</tr>
<tr>
<td>Ice Cube Trays</td>
<td>Spoons</td>
<td>Tweezers</td>
</tr>
<tr>
<td>Spray Bottles</td>
<td>Pipettes</td>
<td>Small containers for holding specimens to study</td>
</tr>
</tbody>
</table>

ACTIVITY:
1. Record close observation of the WEATHER in Science Notebook page 14
   a. SKY: How sunny or cloudy is it? What types of clouds? Be specific!
   b. TEMPERATURE: How warm or cold? Is there variance at the site?
   c. PRECIPITATION: Is there any active precipitation? Humidity? Clouds or temperature that predict precipitation?
   d. WIND: use bubbles to “see” the wind direction, intensity, etc.
2. Activate curiosity about water quality:
   a. Have students brainstorm ways to test water quality.
   b. How might water quality affect the living things in this place?
   c. Could we biologically test the water by studying what lives here?
3. Introduce the Macroinvertebrate KEY to test water quality.
4. Allow students to study pre-collected samples of water and sediment and identify what they find. Demonstrate and encourage them to collect their own samples from the wetland. Encourage thoughtfulness about environmental impact and consider variables that might affect what they find. For example, shady vs. sunny spots, vegetation, depth of sample, temp of water, etc.
5. Allow time to share their findings about the water and life in this place.

SCIENCE NOTEBOOK:
Page 14: Record weather and macroinvertebrate observations
FIELD EXPERIENCE BLOCK: Ecosystems in Action/Audubon Biology Census

BIG IDEA: Students will be given an opportunity to take a hike around the wetland with a bird expert and use binoculars and field guides to identify and take a census of birds and other animals in the Wetland habitat. They will consider habitat variables that affect which animals are here (or not!) and connect their observations to the larger ecosystem, animal needs, and possible food web interactions.

SITE: Elevated trail by stream/trees, open waterside, meadow, brush habitat.

MATERIALS
Science Notebook  Pencil  Binoculars  Field Guides (QR and/or Laminated)
Optional: Tablet with Birding Apps: Merlin, Birdseye (ebirds) Sibley, etc.

ACTIVITY:
1. Introduce the different types of birds that have been seen here: raptors, waterfowl, shorebirds, songbirds.
2. Invite students to predict where each type may be found and why. Relate habitat concept of basic need for food, water, shelter and space.
4. Demonstrate proper use of binoculars and respectful use and sharing of spotting scope.
5. Share expectations for hiking:
   a. Stay between the adults assigned as the front and back of the group
   b. Walk with purpose but don’t run
   c. Leave No Trace, stay on the trail, respect the outdoor space as your home
6. Adults will spread out and monitor different “stop spots” where kids can settle in to make observations or move to and from varied spots between adults assigned to front and back of group.
7. At the end, encourage kids to share what they noticed, what it reminded them of, what they wonder and how they could study it further. Ask which birds they were NOT able to find and consider why or why not.
8. Collect all binoculars and prepare for the next group.

SCIENCE NOTEBOOK:
Page 15: Bird Census
Explorer’s Choice Optional Extension Page 16: Food Chain
Explorer’s Choice Optional Extension Page 17: Scavenger Hunt
Explorer’s Choice Optional Extension Page 18: Let Your Work Flow
FIELD EXPERIENCE: Pond Reflections Closure Activity

**BIG IDEA:** Provide an opportunity for a final SEL check-in and time to share their experiences at the Saltese Flats wetland

**SITE:** Doris Morrison Learning Center, Bus or Back at School

**MATERIALS**
Science Notebooks

**ACTIVITY:**
Reflect on their experiences at the wetland. Complete page 19 of the Science Notebook. Compare this “moment” with the other moments they captured in their notebooks. How did they learn or grow through this experience?
POST-LESSON OPTIONS

• Interactive Shrinking Ecosystems Simulation
• Murky Situations
• Lesson Extensions
• Project Ideas
POST-LESSON: Shrinking Ecosystem

BIG IDEA: Students learn the importance of conservation as they run a simulation of an ecosystem that starts with plentiful food, water, shelter, and space. Leader reads storylines that reduce resources, resulting in ecosystem change that gives students an opportunity to think critically about their role in restoring (or maintaining) wild spaces.

SITE: Outdoor or classroom space. Four square courts work well or make your own 2x2 grid of space.

MATERIALS
Simulation Space Resource Cards (28 each of food, water, shelter)

ACTIVITY
1. Define your simulation space: use a four-square court or make your own 2x2 grid inside using tape or string. Spread students around the outside of the square.

2. Sprinkle resources randomly in the entire grid space.

3. SCENARIO 1: Pretend you are an animal you saw at the wetland. Your job is to collect 1 food, water and shelter card then return to your home base.

4. THINK: How easy or hard was your job? Why? Did everyone get what they needed? Why or why not? What can we summarize of this ecosystem? Reset resources

5. SCENARIO 2: New Neighbors! One quadrant of land was purchased. The new owner is dozing the plant materials down to the dirt and pumping water out to dry the land so they can build a house. Take all the food, water and habitat resources from one quadrant and hold them. They are no longer available to your animal. Have students once again go find 1 food, water and shelter card and return to home base. Have every student who didn’t get one of each material sit down.

6. THINK: Count how many couldn’t meet their needs in this place. Talk about how easy or hard this was? Why? What could this mean for your animal? Does it find another place? How could it survive? How did humans impact your animal? What could humans do to prevent this from happening? Could we compromise with the new homeowner? Reset resource(s) for each idea. (protecting native vegetation, planting trees to shelter and increase space for birds, etc)
7. **SCENARIO 3:** Turn students into a particular animal that eats a native plant. Explain that the Reed Canary Grass is out of control! It’s crowding out your food source! Remove half or 3/4 of your food sources from all grids EXCEPT the property grid! Yay! The homeowner is taking the kids’ advice and protecting the native vegetation on their land. Run simulation again.

8. **THINK:** How did it go? How many got what they needed (or not?) What effect did it have on the homeowner with all that plentiful food? Would this be good or bad for the homeowner? How could we humans help with this problem? Reset resources.

9. **SCENARIO 4:** Turn students into Raptors! Good news! A local boy scout has installed seven osprey poles so you can roost and hunt. Choose 7 students and invite them to “hunt” 1 water, 1 shelter and as many foods as they like.

10. **THINK:** What happened when we had fewer animals competing for a particular resource? Apply this to Saltese Flats. How could it improve or diminish the ecosystem? Potentially talk about hunting or other means of controlling populations.

11. **SCENARIO 5:** Great news! Spokane County just expanded the property to include more space! Bad news, it’s overgrown and needs restoration to support all the animals’ varied needs. What can we humans do to provide more food, water, shelter? Students share what their animal needs and how the County should continue to restore their habitat.

12. Continue the game by inviting kids to think of scenarios and their effect on the ecosystem’s resources. More food, less water, more space, less shelter etc. Act out the simulations as you wish.

| **WRAP IT UP:** All the choices we make or do not make affect our ecosystems. All resources should be in balance so the ecosystem may thrive. We make a difference for better or for worse. What impact will you make? |
**POST-LESSON: Murky Situations**

**BIG IDEA:** Student Notebook pages 20-21 presents some controversial scenarios to help students learn how to see a particular situation from multiple perspectives. They can research the topic and create arguments from evidence. To demonstrate their critical thinking and communication skills they can write and/or act out these controversial conversations.

### Murky Situations

**Land like the Saltse Wetlands has been used and enjoyed in many different ways. Sometimes those ways are at odds with each other. Read over these situations, think, and then respond how you would navigate the “murk”.

A farmer owns a portion of land that is right up against the Saltse Wetlands. One day, she finds a corner of her property flooded with water coming from the wetland.

A conservation group has been working to restore the wetlands and in doing so, they have diverted a small stream which has caused water to pool in the farmer’s land. Diverting the stream allows more water to fill up Graham Pond and keep consistent water levels in the warmer months. The farmer wants the conservation group to provide an answer to her flooded property. The conservation group says they are not able to keep water levels in the pond high enough for healthy fish populations if the stream is not diverted.

**What would be your solution to this murky situation?**

An Audubon Club bird watcher has been keeping careful tabs on a flock of quail nesting next to a mountain bike path circling the Saltse Wetlands. Bikers have created a shortcut by going off the path which has trampled vegetation, and the new route is very close to the quail nesting area. The bird watcher wants the bike path to be removed since the bikers are not respecting the path anyway. The bikers say the path is meant for them to use and they can’t be responsible for the few bad riders who have created this short cut and are not staying on the path.

**What would be your solution to this murky situation?**
Native peoples have lived in the Saltese Wetlands area since time immemorial. They traded, harvested, hunted, and gathered on the land in a way that didn’t permanently change the land’s structure. They did not see the land as something that could be owned or possessed but more saw themselves as equal partners with the land, the same as river, tree, bear, or bird.

Settlers came with a very different idea about land and how it was used and lived on. Land could be purchased, sold and traded, drained to turn into farmland or cleared for orchards. The land was often permanently changed to accommodate the livelihoods of those who bought the land.

Take some time to ponder the pros and cons of each way of seeing the land. Could both ways exist at the same time?

The area around the Saltese Wetlands has had an increase in housing development in recent years. More and more of the land has been bought up and turned into new housing neighborhoods. A wildland protection group is worried that the land and waterways could become polluted and that there is less land which can remain as vital habitat for plants and animals. The housing developers say they are just meeting the needs of a growing population and providing people a place to live.

What would be your solution to this murky situation?

Hey, You!
Be inspired! What can you do to contribute to solutions for these murky situations? What will you do today to make the Saltese Wetlands a better place?
POST-LESSON IDEAS: Making the Most of the Field Science Experience

**BIG IDEA:** By this time, students have been provided some authentic and solid educational experiences in and outside of the classroom. It is our hope that you are inspired, as they will be inspired, to extend the learning experience by providing an opportunity for deeper thinking and applying content in meaningful ways.

**Teachers!** You know your students best, so we invite you to work with your school teams to create your own meaningful post-lessons to best fit your kids and your classroom learning goals. Here are some lesson ideas to modify or inspire your own planning.

- Play Shrinking Ecosystem as a class

- Investigate the Murky Situations and practice perspective-taking and the art of respectful argument. Have students choose a side to research and write or act out the issue and potential solutions or compromises.

- Revisit your favorite pre-lesson and do extension activity(ies), engineering challenge(s), model(s), simulation(s) etc.

- Allow students to complete their Science Notebooks and present them at a research fair or visits to other classrooms, maybe 4th grades who will have an opportunity to participate next year?

- Engage the whole family with student-led experiences and QR field guides. Assign a Scavenger Hunt or Bird Census as homework at the Saltese Flats or other outdoor space

- Wetland research project and/or presentation

- Create a 3D wetland model that includes Earth’s 4 spheres

- Student group presentation on the 4 spheres using their choice of media

- Allow students to “be the teacher” and teach other classes or make instructional videos for how to perform science observations or other skills learned during the field trip

- Conservation Project: Choose a human behavior that results in eco-damage and create solutions within your school or community

- Your own ideas…..
ACKNOWLEDGEMENTS

The Wetland Explorers curriculum is intended to be a launch curriculum set on empowering teachers to lead future outdoor adventures with their students at the Doris Morrison Learning Center and Saltese Flats wetland. It is written by the Education Team of Spokane County Water Resources. Thank you to the Spokane County Water Resources restoration team for ongoing projects to maintain the wetland classroom.

WA STATE RECREATION & CONSERVATION OFFICE

Funding has been generously provided by a No Child Left Inside Grant through the Washington State Recreation and Conservation Office.

CENTRAL VALLEY AND EAST VALLEY SCHOOL DISTRICT ADMINISTRATORS

Eric Hoglund, Doug Edmonson, & Korbie Yeoman

Thanks to you, every 5th grader is given an opportunity to connect with and learn in this outdoor classroom to become the future generation to treasure and protect our natural spaces.

TEACHER LEADERS AND EDUCATION PARTNERS

PJ Jarvis, Jami Ostby-Marsh & Amy Dawley et. al.

Thank you to the teacher-leaders and consulting partners who provided invaluable insights and support throughout the planning and implementation process and worked to represent their teacher teams. Also, to all the 5th grade teachers who stepped up to learn a new curriculum and bring it into their classrooms for their students. Further, Amy Dawley at Pacific Education Institute for connecting to OSPI for clock hours, registration and teacher stipends.

COEUR D’ALENE TRIBE OF INDIANS (schitu’umsh)

LoVina Louie, Jeannie Louie, Jade Mokry, Aiyana James and Dixie Stensgar

For helping document the history of this place and its importance to the tribal people who have called it home since time immemorial, for sharing your personal and tribal stories and partnering in youth education for conservation and stewardship, thank you.
NCLI GRANT: TEACHER STIPEND INFORMATION

Your time, energy and resources are valuable so you’ll have the opportunity to earn $250 Implementation Stipend from the No Child Left Inside grant for your full participation in the Wetland Explorers Curriculum.

- Teacher Training Reflection Survey

- Pre-Lessons Implementation:
  Present 3 ready-to-go lessons and 1 lab to your students in preparation for the field experience. Capture student work in their Science Notebooks and Spokane County Staff will document it on Field Trip Day. No need for extra work or documentation!

- Post-Lesson Plan:
  Participate in school team planning at the Teacher Training Day and turn in your finished plan to Spokane County before your Field Trip. You may submit one school team plan indicating all teacher names or individual class plans via paper or electronic means to RaeAnn Nolander, RNolander@spokanecounty.org

- Post-Lesson(s) Implementation:
  Obtain parent permission and share student work artifacts or photographs of post-lesson activities with Spokane County Water Resources.
# POST-LESSON PLANNING PAGE

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AFTER THE FIELD EXPERIENCE OUR TEAM PLANS TO IMPLEMENT THESE POST-LESSON ACTIVITIES:

TO SHOW IMPLEMENTATION OF OUR POST-LESSON PLAN WE WILL SHARE:

☐ I/We certify that our families have given us permission to share student work and/or photos with these exceptions:

Submit this plan to RaeAnn Nolander RNolander@spokanecounty.org toward your $250 implementation stipend.