



Lesson Six: How Does A Species Spread?

Grade Level: 5th Grade

Time: Two Days: 45 minutes per day

Essential Question: How can we be stewards of Wyoming's public and private lands to benefit current and future generations?

Objective: Students will:

- Recognize that some plants and animals not native to an area negatively impact the environment and require management.
- Recognize that invasive species affect all of Wyoming's lands and are an ongoing challenge to our state.
- Identify ways citizens and management agencies make stewardship decisions to manage invasive species.

Purpose: Students learn about invasive species, the effect they have on both public and private lands, and the challenges involved with managing them. They also learn there are stewardship jobs where professionals manage invasive species in a variety of ways using science and other considerations to make the best stewardship decisions.

Required Materials/Resources:

- State Designated Noxious Weeds (Source 8)
<https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-weeds/>
- State Designated Noxious Pests (Source 9)
<https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-pests/>

- Video: <https://www.youtube.com/watch?v=NPis228k5cs>
Mudsnails - Work in Wild, Episode 37 (Source 2) Video length: 58 seconds
- Video: <https://www.nps.gov/yell/planyourvisit/boating.htm>
Protect Yellowstone from Aquatic Invasive Species (Source 3) Video length: 1 minute 10 seconds
- Sticky notes
- Basins for water – glass or aluminum baking dishes, or plastic storage tubs (four large basins for the class, or four small basins per group)
- Three different colors of herbs and spices to be the “invasive species”
- Strips of aluminum foil cut/torn into six-inch-pieces (one per student or group)
- Paper or fabric towels
- Copy paper for warning poster
- Margie Fey Story text (one per student and teacher) (Source 1)
- Clearing the Way for Native Species Story text (one per student and teacher) (Sources 4, 5)
- Portraits of Margie Fey and Clear Creek Conservation District for Portrait Gallery
- Highlighters (one per student)
- Evidence Bag exit tickets (one per student printed front-to-back)

Suggested Teacher Preparation:

TEACHER NOTE:

Some herbs or spices that could be used are parsley, cinnamon, and black pepper.

- Review the State Designated Noxious Weeds and State Designated Noxious Pests websites listed in Required Materials and Resources.
- Watch videos on invasive species.
- Choose three herbs and spices of different colors.
- Tear or cut aluminum foil into pieces for boats.
- Decide whether students will complete the invasive species activity in small groups or as individuals.

- Prepare water basins for the activity. Fill each basin with just enough water to float a small foil boat before you begin the lesson. If students will complete the activity individually, prepare four large basins and plan for students to move to each station. If students will complete the activity in groups, prepare four small basins per group.
- Add a different color of herb/spice to each of three basins (one color per basin). The fourth basin should not have any herbs or spices added.
- Prepare copies of the Evidence Bag exit tickets.

TEACHER NOTE: If you do not have a sink in your classroom you may need to bring a bucket of water and a measuring cup to distribute water to the basins.

Standards:

Science: 3-5ETS1-2, 5-ESS3-1 (Explicit)

ELA: 5.RI.1, 5.RI.2, 5.RI.3 (Practiced/Encountered)

CVE: CV.5.3.1 (Practiced/Encountered)

Vocabulary:

- **Invasive** (species) – growing and dispersing easily, usually to the detriment of native species and ecosystems
- **Native** – found originally in a place, not introduced from another place
- **Noxious weeds** – plant that has been introduced, accidentally or intentionally, into an environment and causes or is likely to cause environmental or economic harm; plants that have been declared by a legislative body as worthy of regulation and management

Instructional Procedure/Steps:

Day 1:

1. Say: **“Today we will learn about another group of people who are stewards of our state. These are people who manage invasive species in our waters and on our lands. First, we will learn a little about aquatic invasive species. As we watch these two videos, you will learn the definition of invasive species, and start to notice some ways to prevent**

them from spreading to new places. Write down any key points you hear on your sticky note so you can share when we're done."

2. Play the *Mudsnails – Work in the Wild* and *Protect Yellowstone from Aquatic Invasive Species* videos. When the videos are finished, ask the question below.

- **"How would you define an invasive species?"**

Chart students' ideas on the board or a piece of chart paper.

3. Pass out a piece of foil to each student or team of students. Say: **"Today we are going to find out what happens when boats move from one body of water to the next. Using the foil I just gave you, create a boat that will float in the 'lakes'/basins."** Allow students about five minutes to make a simple boat – it doesn't have to be intricate or fancy, it just needs to float.
4. Say: **"You are a fisherman who loves to travel around the country checking out all the best water holes. You've been to the Great Lakes and are now home and ready to fish in the lakes near your town** (insert any local fishing spots). **You will travel from lake to lake with your boat, taking your time cruising through the water as you troll for fish. The last lake you visit should be the one with no herbs and spices in it."** Allow students time to move around the room, (or between basins if they are in groups) floating their boats in all the "lakes." Their boats should be picking up the "invasive species" in each of the "lakes," and dropping them in the other lakes. By the end of the session, all the lakes, including the clean one, should have a variety of the invasive species in them. Feel free to add more herbs and spices as they float to the bottom of the basin, so the herbs/spices continue to float and attach to the boats.

TEACHER NOTE:
Whip Around strategy: Pose a question to the whole class. Allow think time for students to formulate an answer. Then students quickly share an idea with either their small group or whole class. Students must respond quickly and with a new idea though ideas can be reworded. After every student has responded, share common ideas from the Whip Around as a class.

5.  Have the students set their boats aside and do an observation of all the lakes. Have each group meet and summarize what happened. After groups have finished their discussions, bring the class back together to share out their ideas using a Whip Around.
6. Tell the students, **“The local lake is now infested with an invasive species. You will have to try to clean it up. Would we be able to empty a lake completely to clean it? (They should answer that it wouldn’t be an option in a lake or a river.) Without pouring out the water, you need to try to clean out all the invasive species that have been transferred to the lakes.”**
7. Assign each group to a “lake” where they will attempt to remove the invasive species. They can use their hands as nets or scoopers. Have paper towels close by for drips and clean up. Give students three to five minutes to try and remove all invasive species from their lake. They should find that it is impossible to remove all the herbs/spices from the basin.



In this task, students will be engaged in the higher order thinking skill of analysis by observing and summarizing.

8.  Have the students dry their hands and clean up their basin(s) and work area. After clean-up is finished, ask the students the questions below. Allow students to answer before moving to the next question.
- **“What are some challenges to removing an invasive species?”**
 - **“What do you feel is the best way to keep our bodies of water from being infested by invasive species?”**
 - **“How can we keep our boats from carrying invasive species from one lake to another?”**
 - **“How can you be a good steward when you are using our lakes and rivers?”**



In this task, students will be engaged in the higher order thinking skill of synthesis.

Students should answer with a Clean, Drain and Dry response. Preventing the introduction of an invasive

species is much better than having to remove it afterward, which is almost impossible.

9. Say: **“Now that you’ve had the opportunity to try and remove an invasive species after it has already been introduced, what would you tell someone who doesn’t think it’s important to Clean, Drain and Dry about being a good steward of our waters? You will now create a simple warning poster explaining why it’s important.”**



In this task, students will be engaged in the higher order thinking skills of synthesis and application.

10.   Hand out a piece of blank copy paper to each student. Give students a few minutes to create their posters. Some ideas students may include on their posters could be; how it is impossible to remove invasive species after they have been introduced, suggestions for preventative measures, information about Clean, Drain, Dry.

Day 2:

1.  Draw students’ attention to the Portrait Gallery on the wall. Say: **“Turn and talk with an elbow partner about one thing you remember learning from any of our texts so far.”** When finished, pass out the Margie Fey texts, highlighters, and sticky notes and say: **“We have two more really amazing stories today about people who spend their time and resources on management of invasive species in Wyoming. Follow along as I read about Margie Fey. Listen intently for information about invasive species, and for ways our discoveries from the activity we did yesterday are explained in the article. Were our conclusions correct?”** Read the text aloud to students. Next, have students reread the text with a partner, and compare and contrast information they highlighted about invasive species.

2. When pairs are finished, have students share out their findings with the whole group. Ideas that should be brought forth include the following: *Students should be able to say that invasive species can be carried into an area by people, animals, water, wind, etc. They should also highlight the word native and be able to make the connection that invasive species are not native to an area. Invasive species overtake and choke out native species. People work hard and spend a lot of money to manage invasive species.* Record students' ideas on the board or chart paper, and label them "What we know about the problem." When finished, post Margie Fey's portrait to the Portrait Gallery.

3. Say: **"Our second story is about the Clear Creek Conservation District who is working to remove a large stand of Russian Olive trees near Buffalo High School."** Read the text aloud. Say: **"Now, read the text on your own, making sure to highlight information about invasive species and ways they can be managed."** When finished, have students share out with the whole group their notes, and ask the questions below. Allow students to respond before moving on to the next question:
 - **"How did citizens, government agencies, and private organizations work together to help solve the problem?"** *Working together to develop a plan and carry out tree removal and restoration of the habitat.*
 - **"How did they use science to help them protect/improve the area infested by Russian Olive?"** *Understanding how to remove invasive species and prevent re-growth, re-planting the area, plant identification, share information by creating a learning pathway*



Post Clear Creek Conservation District's portrait to the Portrait Gallery.

Assessment:

For assessment purposes, students will demonstrate understanding of the content in this lesson with an exit ticket called "Evidence Bag." Pass out the Evidence Bag exit tickets. Students write one idea they learned about invasive species and one idea they learned about being stewards on the front of the bag. They write evidence to support their ideas on the back of the bag. Students can use evidence from Margie Fey's text, the Clearing the Way for Native Species text, and foil boat activity to complete this activity. Students demonstrate understanding by noting: *Invasive species are introduced into places they don't belong. An invasive species drives out native species and disrupts the environment. If an invasive species can't be eliminated from the land, it must be managed. They should also note how science and/or constraints can inform stewardship decisions. Stewardship examples should come from lesson ideas.*

Credits/Sources:

1. Crocker, Ruth W. (2017). *People of Yellowstone: Margie Fey*. Mystic, CT: Elm Grove Press.
2. Wyoming Game and Fish. (2018, November 21). *Mudsnails – Work in the Wild – Ep 37*. Retrieved August 15, 2019 from <https://www.youtube.com/watch?v=NPis228k5cs>
3. National Park Service / Jacob. W. Frank. (2017, June 8). Protect Yellowstone from Aquatic Invasive Species. Retrieved August 15, 2019 from <https://www.nps.gov/yell/planyourvisit/boating.htm>
4. Wyoming Agriculture in the Classroom (2019, August 19). *Clearing the Way for Native Species*. Cheyenne, WY: Wyoming Stewardship Project.
5. Zach Bryam, Lake DeSmet Conservation District. (2016). *Buffalo High School Russian Olive Removal: Strategic Management Plan*. Buffalo, WY: Clear Creek Conservation District.

6. Wyoming Weed and Pest. (2018). *State Designated Noxious Weeds*. Retrieved October 14, 2018, from <https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-weeds/>
7. Wyoming Weed and Pest. (2018). *State Designated Noxious Pests*. Retrieved October 14, 2018, from <https://wyoweed.org/noxious-species/listed-species/state-designated-noxious-pests/>