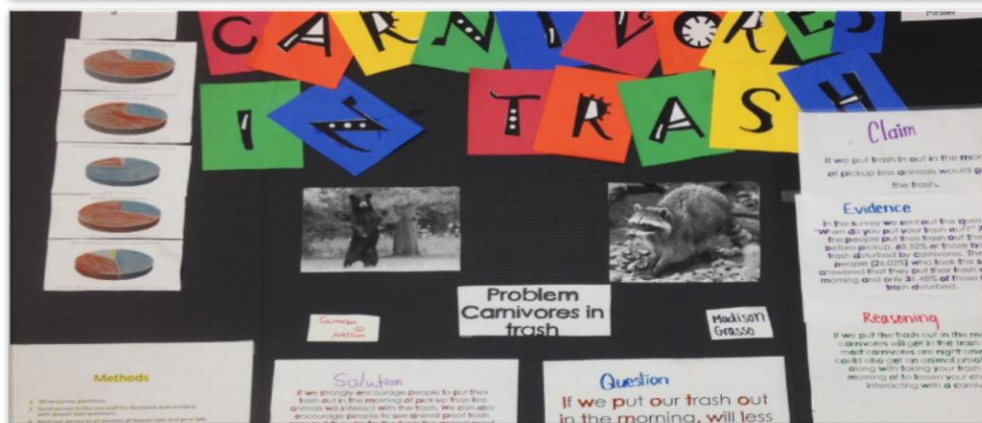




A black bear cub is standing in a yard, looking towards the camera. It is positioned behind a low stone wall. To the left of the cub is a wooden fence. The ground is covered with dark mulch and some green plants are visible in the background.





WILD WISE: COEXISTING WITH CARNIVORES

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- Teacher facilitated only activity.
◇ Activity is co-facilitated by zoo staff and teachers
✓ Activity can be awarded points for completion/participation.
□ Part of this activity can be completed as homework.



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WELCOME TO WILD WISE: COEXISTING WITH CARNIVORES

Woodland Park Zoo (WPZ) is excited to collaborate with Issaquah School District's 6th grade life science teachers for the *Wild Wise: Coexisting with Carnivores* (CWC) program in 2017-2018! The CWC program gives students a chance to develop their science inquiry, civic literacy and leadership skills as they investigate and share solutions for living with the carnivores in their communities.

The 2017-2018 curriculum will engage students in a study of carnivore activity across the landscape. Specifically, students will gain a better understanding of the roles humans play in creating and affecting landscape patterns and processes, including impacts to carnivore distribution and behavior.

Students will focus their investigations on these essential questions:

1. How are carnivores using the natural and human-made resources in our community to meet their needs?
2. How can humans meet their needs while allowing carnivores to meet their needs? (How can humans and carnivores successfully share the landscape?)

During this program, students will practice strategies for developing investigative research questions, planning and carrying out investigations, analyzing and interpreting data, and constructing scientific explanations.

As a culmination of the program, students will have the opportunity to present their research findings and evidence-based recommendations for coexisting with carnivores to their peers during a sharing session facilitated by Woodland Park Zoo staff. Additionally, select groups will be invited to share their investigations at an all-school community event. To celebrate their hard work, each middle school student that participates in the program will receive **four free passes** to Woodland Park Zoo.

The Wild Wise: Coexisting with Carnivores curriculum including the Teacher Guide, Student, Packet, Evaluation Tools Packet, and Camera Trapping and eMammal Teacher Guide are available on our “hidden” CWC website: www.zoo.org/wwwcwc. Please bookmark this site so you can locate it easily.

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Acknowledgements:

This project was made possible in part by the Institute of Museum and Library Services MA-20-17-0480-17. *Este proyecto ha sido posible en parte por el Instituto de Servicios de Museos y Bibliotecas, MA-20-17-0480-17.*

The Wild Wise: Coexisting With Carnivores school program, presented by Carter Subaru, has been supported by the Issaquah Schools Foundation, Tulalip Tribes, Horizons Foundation, Ferguson Foundation and the Association of Zoos & Aquariums Conservation Grants Fund.



PROGRAM OUTCOMES

Student Learning Outcomes

- Increased understanding of carnivore ecology and the role of carnivores in ecosystems.
- Increased understanding that scientific research plays a role in addressing community issues.
- Increased appreciation for local carnivores.
- Increased ability to successfully engage in the practices of scientific inquiry.
- Increased understanding of peaceful coexistence with carnivores.

In addition, we aim to support teachers in facilitating student-driven science investigations that address real-world problems in their communities.

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YOUR PROGRAM TEAM

The following Woodland Park Zoo and Issaquah School District staff are involved in the facilitation and delivery of the CWC program and are available to assist you during the school year:

Name	Title & Organization	Key RSD responsibilities	Phone	Email
Lena Jones	Grade 6-12 Science Curriculum Specialist, Issaquah School District	Overall Issaquah SD program oversight	425.837.7119	JonesL@issaquah.wednet.edu
Alicia Highland	Educator & School Partnerships Coordinator, Woodland Park Zoo	Overall program coordination and logistics	206.548.2592	alicia.highland@zoo.org
Kelly Lindmark	Science & Conservation Education Specialist, Woodland Park Zoo	Program facilitation of zoo-guided elements ("day of" questions)	206.548.2553	kelly.lindmark@zoo.org
Emily Gogerty-Northrip, Rex Walker and Marie Jensen	School Programs Presenters, Woodland Park Zoo	Facilitation of zoo-guided program elements		wild.wise@zoo.org
Katie Remine	Science & Conservation Education Supervisor, Woodland Park Zoo	Program development, funding and evaluation	206.548.2581	katie.remine@zoo.org

- ☐ Teacher facilitated only activity.
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SUPPORTING NGSS

One of the goals of Coexisting with Carnivores is to support science learning. We align our curriculum to relevant NGSS Science and Engineering Practices, Disciplinary Core Ideas and Crosscutting Concepts.

Crosscutting Concepts

Patterns

Patterns can be used to identify cause and effect relationships.

Graphs, charts, and images can be used to identify patterns in data.

Stability and Change

Small changes in one part of a system might cause large changes in another part.

Cause and Effect

Cause and effect relationship may be used to predict phenomena in natural or designed systems.

Disciplinary Core Ideas

ESS3:3C

Human Impacts on Earth Systems

LS2.C

Ecosystem Dynamics, Functioning, and Resilience

LS2.D

Biodiversity and Humans

Science and Engineering Practices

Analyzing and Interpreting Data

Engaging in Argument from Evidence

Planning and Carrying Out Investigations

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- ☐ Part of this activity can be completed as homework.



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PROGRAM TIMELINE

Wild Wise: Coexisting with Carnivores 2017-2018 Program Overview					
Updated January 2018					
January	February	March	April	May	June
Optional Refresher Webinar	E1: Community Mapping	E4: Wild Wise and Zoo Visit	E5: Developing Investigation Questions and Predictions	Continue Data Collection	E11: All School Community Event: June 6th at IMS at 6 p.m.
Teacher Pre-Survey	E2: Mapping Analysis and Discussion	E5: Developing Investigation Questions and Predictions	E6: Developing Research Methods and Collecting Data	E8: Data Analysis and Conclusion Writing	
	E3: Community Interview Homework	E6: Developing Research Methods and Collecting Data	E7: Western Wildlife Outreach Carnivore Trailer	E9: Presentation Building	
		E7: Western Wildlife Outreach Carnivore Trailer		E10: Sharing Findings and Recommendations	

OVERVIEW OF PROGRAM ELEMENTS

Element 1: Carnivore Community Mapping and Pre-Assessment ☐ ☒

Students will use community mapping to learn about the distribution of carnivores in their communities.

Element 2: Carnivore Community Mapping Analysis and Discussion ☐ ☒

Students will use their community map to learn more about the natural and human-made landscape features that carnivores use to meet their needs.

Element 3: Community Interview Homework ☐ ☒

Students will gain an understanding about the experiences people have sharing a landscape with carnivores.

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Element 4: Woodland Park Zoo Field Trip: Wild Wise and Pacific Northwest Carnivores

Programs ◇

During Wild Wise, students will learn about the wildland–urban interface, human-carnivore interactions across the landscape, and methods for researching mammalian carnivores. Zoo staff will also review the essential questions that will drive the students' scientific investigations. During the Pacific Northwest Carnivores Program, students will tour the Northern Trail Exhibit and learn about the life history of carnivores found in the Pacific Northwest, including grizzly bears, black bears and gray wolves. Students will also learn about conservation topics relevant to the carnivores in their communities.

Element 5: Developing Investigative Questions and Predictions ○ ☒

Students will develop an investigative question. Students will also develop a prediction for their research question.

Element 6: Developing Your Research Methods and Collecting Data ◇ ☒

Students will develop research methods that will help them to gather data about the carnivores in their communities. Students will also learn about confounding factors and how to control for them in their study design. Zoo staff will visit classrooms to help students review and revise their methods.

Element 7: Western Wildlife Outreach Bear Trailer Visit ○


Western Wildlife Outreach (WWO) is a local non-profit that works on sharing accurate information about large carnivores in our area and how we can coexist with them. Through a presentation and use of biofacts such as pelts and skulls, students gain further information on bear research and methods for coexistence within their community. Students also will have the opportunity to ask WWO staff questions that are specific to their classroom investigations, information on carnivores, and strategies to engage community members.

Element 8: Data Analysis and Conclusion Writing ○ ☒

Students will transform their raw data into useful information that they will use to answer their research question. They will then develop conclusions to inform others about the results and importance of their research.

Element 9: Presentation Building ○ ☒

Students will develop an informative and visually compelling communication tool. Students will use this communication tool to inform their peers and community members about their research process, including evidence-based recommendations for coexisting with carnivores.

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Element 10: Final Presentations: Sharing Findings and Recommendations and Post-

Assessment ☐ ☒ ☐

Each student group will present their research findings as well as their evidence-based recommendations for coexisting with the carnivores in their communities. Students will give an oral presentation (approximately 5 minutes) to share their communication tool with other classes and WPZ Education staff. WPZ staff will use the *Wild Wise: Coexisting with Carnivores* rubric as a performance-based assessment of program outcomes.

Element 11: Community Event ☐

One to two student groups from each school will be selected to present their projects at an all-school community event. Groups will be selected based on the overall quality of their Sharing Findings & Recommendations presentations. The Community Event will be held at Issaquah Middle School on June 6th from approximately 5:30 p.m. to 8:00 p.m. Additional student groups may display their projects during the event, but will not present to the full audience.

- ☐ Teacher facilitated only activity.
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COEXISTING WITH CARNIVORES ACTIVITY CHECKLIST		
	E= Element, SW= Student Worksheet	
Date	Activities to Complete	
Jan	<input type="checkbox"/>	Review updated Teacher Guide, Student Packet, and Supplemental Materials
	<input type="checkbox"/>	Teacher Refresher Webinar Monday, 2/5/2018 at 3:30 p.m.
Feb	<input type="checkbox"/>	Complete E1: Student Pre-Assessment and Carnivore Community Mapping
	<input type="checkbox"/>	Complete E2: Community Mapping Analysis and Discussion
	<input type="checkbox"/>	Complete SW1: Carnivore Community Mapping Analysis and Discussion
	<input type="checkbox"/>	Complete E3: Community Interview Homework
Mar	<input type="checkbox"/>	Complete E4: Woodland Park Zoo Field Trip
	<input type="checkbox"/>	Start E5: Developing Investigation Questions and Predictions
	<input type="checkbox"/>	Start SW2: Developing Investigation Questions and Predictions
	<input type="checkbox"/>	Start E6: Developing Your Research Methods
	<input type="checkbox"/>	Start SW3: Developing Your Research Methods
Apr	<input type="checkbox"/>	Complete E5: Developing Investigation Questions and Predictions
	<input type="checkbox"/>	Complete SW2: Developing Investigation Questions and Predictions
	<input type="checkbox"/>	Complete E6: Developing Your Research Methods
	<input type="checkbox"/>	Complete SW3: Developing Your Research Methods
	<input type="checkbox"/>	Complete E7: Western Wildlife Outreach Trailer Visit
	<input type="checkbox"/>	Start: Data Collection
May	<input type="checkbox"/>	Complete: Data Collection
	<input type="checkbox"/>	Complete E8: Data Analysis and Conclusion Writing
	<input type="checkbox"/>	Complete SW4: Data Analysis
	<input type="checkbox"/>	Complete SW5: Conclusion Writing
	<input type="checkbox"/>	Complete E9: Presentation Building
	<input type="checkbox"/>	Complete E10: Sharing Findings and Recommendations and Post-Assessment
Jun	<input type="checkbox"/>	E11: Community Event June 6, 2018 at Issaquah Middle School (evening)

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ELEMENTS AND CURRICULUM

Element 1: Pre-Assessment and Carnivore Community Mapping ○ ☒

- In-Class Activity
- Time: 1 class period
- Facilitator: Classroom teacher
- Timeline: Complete 1 month before zoo visit
- Zoo provided materials: Map of community, CWC Intro and Community Mapping PowerPoint
- Other materials: Copies of student pre-assessment (one copy per student), index cards, string or yarn

A. Pre-Assessment ☒

Instructions: Administer *Wild Wise: Coexisting with Carnivores* Pre-Assessment before introducing the community mapping activity. The pre-assessment can be found in the Evaluation Tools Packet.

- This assessment is meant to be low-stakes.
- Students do not need to be prepped before taking the assessment.
- The zoo will use this information for internal program evaluation.
- The pre-assessment can be graded for completion.

B. Carnivore Community Mapping

Objective: Students will explore the spatial and geographic distribution of carnivores in their communities.

Instructions:

1. Use the zoo provided PowerPoint to introduce the Coexisting with Carnivores Program. The PowerPoint can be found on the Wild Wise: Coexisting with Carnivores teacher website, www.zoo.org/wwcwc
2. Explain that students will begin the program by sharing geographic information about where they have seen carnivores in their community.

Focus Question: Where have you seen carnivores in your community?

3. Students will write information about their carnivore sightings on a note card (1 sighting per note card).
4. The notecard should include this information. Incomplete information is still valuable.
 - Student name

- Teacher facilitated only activity.
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- Part of this activity can be completed as homework.



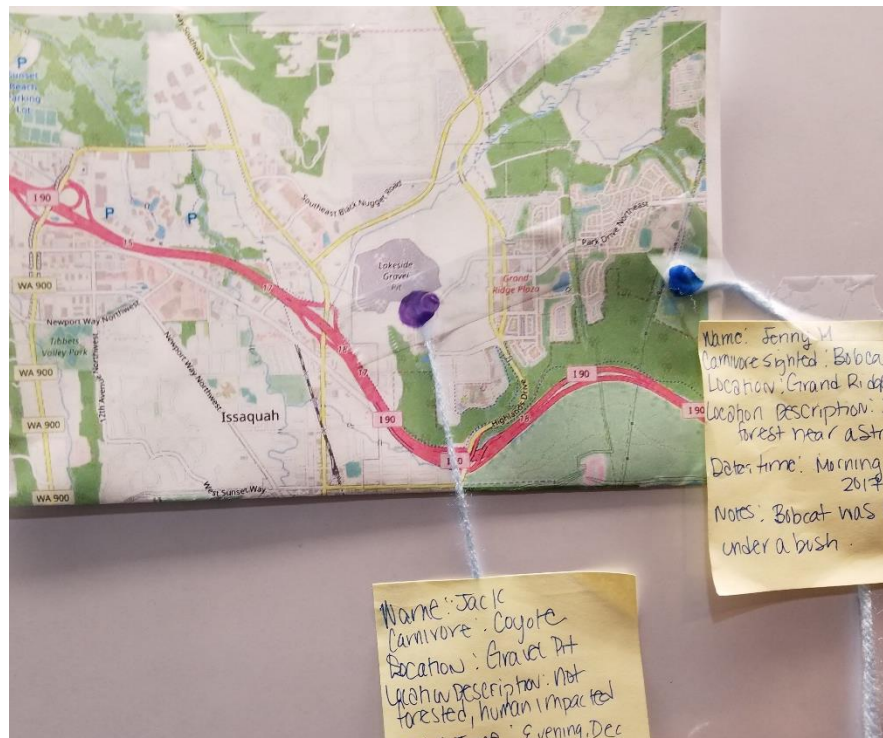
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- Type of carnivore
 - Date and Time
 - Sighting location (for example: “in the garden in my yard” or “hiking trail on Tiger Mountain”)
 - Sighting location description (for example “forested”, “wilderness area” “suburban”, or “rural”)
 - Notes about what was the carnivore doing.
5. Hang the notecard next to the map with a string connecting the notecard to the approximate location on the map.
 6. Repeat this activity with each class period. Data collection can continue until the completion of the program.

Community Map Example



- ☐ Teacher facilitated only activity.
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Element 2: Carnivore Community Mapping Analysis and Discussion ○ ☒

- In-Class Activity
- Time: 1 class period
- Facilitator: Classroom teacher
- Timeline: Complete 2 weeks before zoo visit
- Other materials: Student Worksheet 1: Carnivore Community Mapping Analysis and Discussion (one copy per student)

Objectives: Students will discuss the landscape features that carnivores use to meet their needs. Students will consider how human changes to the landscape alter the distribution of carnivores.

Vocabulary and Concepts

- Animal distribution: The arrangement of animals across the landscape. Distribution is influenced by many factors including climate, season, food, water, shelter and competition from other animals.
- Carnivore needs: Some carnivores, like wolves and mountain lions, need large patches of unchanged natural habitat to survive. Other carnivores, like coyotes or raccoons, can adapt to urban areas. These adaptations include changing their food sources and using different habitat.
- Ecosystem: A community of living (biotic) organisms and non-living/never have lived (abiotic) components of the environment interacting as a system.
- Habitat: The area in an ecosystem where an organism fulfills its basic needs for food, water, shelter and space.
- Landscape: The visible features of an area of land including natural landscape features and human-made features.
- Natural landscape features: Includes mountains, hills, plains, lakes, oceans, streams, soils, forests grasslands.
- Human-made landscape features: Includes agricultural areas, buildings, roads or dams.
- Landscape change: Humans change the landscape by altering the size and shape of natural habitats. These changes affect that ways that carnivores behave. An example of a human caused landscape change is replacing natural vegetation (forests or meadows) with other types of vegetation such as lawns or agriculture.
- Wildland-urban interface: Locations across the landscape where natural areas and expanding human settlements meet.

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- Teacher facilitated only activity.
- ◇ Activity is co-facilitated by zoo staff and teachers
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Analysis and Discussion Instructions

For the following steps, please use Student Worksheet 1: Carnivore Community Mapping Analysis and Discussion. The Carnivore Community Mapping Analysis and Discussion worksheet questions are listed below with examples of possible student answers.

At the end of this activity, students should feel comfortable identifying landscape features on the community map. Students should also have a deeper understanding of how carnivores are using the landscape to meet their needs

1. Where are carnivores seen most often in your community?
 - **Possible student answer:** Carnivores are seen more often in areas with less houses and buildings (rural areas).
2. Describe the natural landscape features in the areas where carnivores are seen most often.
 - **Possible student answer:** Carnivores are most often seen areas with open fields and meadows, rather than in places with lots of trees.
3. Why do you think carnivores are attracted to these natural landscape features? How do you think carnivores might be using these natural landscape features to meet their needs?
 - **Possible student answer:** I think that carnivores are using the open fields to find prey animals like mice that live in fields.
4. Describe the human-made landscape features of the areas where carnivores are seen most often.
 - **Possible student answer:** More carnivores are seen near houses and apartments.
5. Why do you think carnivores are attracted to these human-made landscape features? How do you think carnivores might be using these human-made landscape features to meet their needs?
 - **Possible student answer:** I think this is because there is access to food in garbage cans.
6. What other factors could be attracting carnivores to these areas of your community?
 - **Possible student answer:** Carnivores could be attracted to people's gardens for food
7. What does the distribution of carnivores on the map make you wonder about the carnivores in your community?
 - **Possible student answer:** I wonder what, if any, foods carnivores eat in people's yards.

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Element 3: Community Interview Homework ○ ☒

- Homework
- Time: 10-15 minutes
- Facilitator: Classroom teacher and students
- Timeline: Complete 1 week before zoo visit, turn in to zoo staff during zoo visit
- Other materials: Community Interview Worksheet (one copy per student) in Student Packet

Objective: Students will gather information about the experiences people have sharing a landscape with carnivores.

Instructions

- Hand out the Community Interview Worksheet.
- Explain that students are to administer the interview to an adult in their household.
- Collect Community Interviews and return to zoo staff during the zoo visit.
- This assignment can be graded for completion.

Element 4: Woodland Park Zoo Field Trip: Wild Wise and Pacific Northwest Carnivores Programs ◇

- Time: 1 School Day
- Facilitator: Classroom teacher, chaperones and Woodland Park Zoo staff

Important Note:

- **Return your WPZ CWC registration form** as soon as possible and **at least 6 weeks before your zoo field trip**. Please email wild.wise@zoo.org if you have any questions.
- **Arrange bus transportation at least 6 weeks before your zoo field trip**. The Issaquah Schools Foundation funds your busses. To arrange transportation services, please contact your school's individual bookkeeper.

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Field Trip Details

Before your zoo visit, divide your students into THREE groups (A, B, C). While at the zoo, each group will go through a **rotation of three activities** which will each last approximately **fifty minutes**. Activities details are listed below.

Woodland Park Zoo Field Trip: 2018			
Monday, Tuesday, Thursday, Friday Schedule			
9:30-9:50	Arrive at the Zoo and Check In		
	Group A	Group B	Group C
10:00- 10:50	Wild Wise	Northern Trail Program	Lunch/Zoo Exploration
11:00-11:50	Northern Trail Program	Lunch/Zoo Exploration	Wild Wise
12:00-12:50	Lunch/Zoo Exploration	Wild Wise	Northern Trail Program
1:00	Meet at busses to leave the zoo		
2:00	Arrive at your school		

A. Pacific Northwest Carnivores Program ◇

Objective: Students will learn about the life history of carnivores found in the Pacific Northwest. Students will also explore conservation topics relevant to the carnivores in their communities.

Please have your group meet at the entrance to the Northern Trail exhibit **five minutes before your set start time**. Please do not visit the Northern Trail before your program.

We will be visiting the following exhibits to discuss these topics:

Trail Entrance

- Overview of *Wild Wise: Coexisting with Carnivores* program and student investigation
- Difference between 'carnivore' and 'Carnivora'
- The landscapes represented in the Northern trail biome

Wolves

- Natural history of wolves in Washington state including habitat needs

- Teacher facilitated only activity.
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- 📄 Part of this activity can be completed as homework.



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- The impacts of landscape change on wolf populations in Washington State
- Field methods for studying wolves (radio collars, howling surveys)

Brown Bears

- Natural history of brown bears in Washington state including habitat needs
- Physical and behavioral differences between brown bears and black bears
- The impacts of landscape change on bear populations in Washington State
- The difference between *species recovery* and *species restoration*

Elk

- The positive benefits of carnivores to ecosystems
- Case Study: How Wolves Change Rivers: The reintroduction of gray wolves in Yellowstone National Park: Video available here: <https://voices.nationalgeographic.org/2014/02/16/this-will-shatter-your-view-of-apex-predators-how-wolves-change-rivers/>

Game Station (if time allows)

- “Oh Deer”: This game simulates how animal populations fluctuate dependent on limiting environmental factors such as the availability of food, shelter, water and space. This game also demonstrates how the presence and absence of large apex predators (carnivores) impact population dynamics.

B. Wild Wise Presentation ◇

Presentation Overview

Zoo staff will lead students in an interactive multimedia presentation. Topics discussed include the wildland–urban interface, human-carnivore interactions across the landscape, and methods for researching carnivores, including field sketching, camera traps and surveys. Zoo staff will review the overarching essential questions that will drive student investigations. Those questions are:

1. How are carnivores using the natural and human-made resources in our community to meet their needs?
2. How can humans meet their needs while allowing carnivores to meet their needs? (How can humans and carnivores successfully share the landscape?)

- Teacher facilitated only activity.
- ◇ Activity is co-facilitated by zoo staff and teachers
- ☑ Activity can be awarded points for completion/participation.
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Element 5: Developing Investigation Questions and Predictions ○ ☒

- In-Class Activity
- Time: 2 class periods
- Facilitator: Classroom teacher, Woodland Park Zoo staff can assist
- Timeline: Start this element after your zoo visit and prior to your Methods visit.
- Other materials: Student Worksheet 2: Developing Investigation Questions and Predictions

Objective: Students will develop an investigative question and prediction related to carnivore uses of the surrounding landscape.

Important Note: Prior to this activity, revisit the Student Worksheet 1: Carnivore Community Mapping Analysis and Discussion.

Vocabulary and Concepts

- **Investigative question:** A question that you can answer by making systematic observations and collecting and analyzing the data. Your investigative question will compare how the manipulated variable affects the responding variable
- **Manipulated (independent) variable:** The variable that has naturally occurring different conditions (e.g. a yard with lots of trees vs. a yard with few trees). You make observations of the different conditions of the manipulated variable to see if they effect the responding variable.
- **Prediction:** A prediction is a guess, based on prior observations, that explains what might happen when the outcome is unknown.
- **Responding (dependent) variable:** The variable that you will measure or observe. The responding variable may or may not be affected by the manipulated variable.

Overview

With the assistance of zoo staff, each class will develop a research question **that investigates how carnivores use a natural or human-made landscape feature in their communities**. To reduce repetition, **no more than two classes per teacher** should have the same research question.

For teachers who have previously focused on carnivore interactions with garbage/food waste, this is still an option. However, rather than framing the topic as *carnivores are (or aren't) attracted to trash cans*, you can frame it like this:

Carnivores (are or aren't) attracted to areas in the landscape that have high densities of houses. Areas with high densities of houses also have higher densities of trash cans in comparison to

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- Teacher facilitated only activity.
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other areas in the landscape, like forests. This is important because some carnivores use human food waste as their food source.

Instructions

Please use Student Worksheet 2: Developing Investigation Questions and Predictions to guide this process.

1. **Generate a landscape feature list:** Determine the landscape features students are most curious about.
2. **Brainstorming:** In small groups, have students brainstorm five “wonder” questions. The questions should help the students determine how carnivores are using the landscape features in the community to meet their needs. Encourage students to incorporate information gained during the zoo visit.
3. Students should select their favorite “wonder” question.
4. The class will turn the “wonder” question into an investigative question by identifying a manipulated variable and a responding variable. This question will have a comparative format:

How does the (manipulated variable) affect the (responding variable)?

Below are some examples of landscape-carnivore related investigative questions. You do not have to use these questions.

- How does the density of houses (high, medium, low) affect the likelihood of seeing a carnivore in our community?
- How does presence or absence of trashcans affect the likelihood of seeing carnivore sign in our community?
- How does proximity to forests (close, far away) affect the likelihood of seeing a carnivore in our community?
- How does proximity to water (close, far away) affect the likelihood of seeing carnivore sign in our community?
- How does amount of vegetable gardens (no gardens, some gardens, lots of gardens) affect the likelihood of seeing a carnivore in our community?

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- ☐ Part of this activity can be completed as homework.



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Important Note: For this investigation, **you cannot alter the manipulated variable like you would in a laboratory experiment. You need to examine existing conditions.** For example, you can compare whether houses that do have gardens attract more carnivores than houses that do not have gardens. However, you cannot build a garden to see if it attracts carnivores.

1. **Make Predictions:** As a class, generate a prediction for your selected investigative question.
 - **Example:** If there are more homes in the area, then there will be more carnivores because some carnivores get food from garbage cans.
2. **Send your question and prediction to zoo staff for feedback:** After your class has generated a question and prediction, please send them to zoo staff for feedback using the wild.wise@zoo.org email. Once you receive confirmation that zoo staff has reviewed your question, you can begin to develop your methods.

Element 6: Developing Your Research Methods and Collecting Data ◇ ✓

- In-Class Activity
- Time: 2 class periods (1 led by teacher, 1 led by zoo staff); 3 weeks of data collection
- Facilitator: Classroom teacher and Woodland Park Zoo staff
- Timeline: Submit Student Worksheet 3: Developing Your Research Methods to zoo staff **at least three days** before their visit.
- Zoo and district provided materials: Access to the following data collection tools:
 - Access to survey creation and distribution website
 - Camera trap kit (one per teacher): 5 camera traps, batteries, memory cards, cables, locks and other accessories (see *CWC Teacher Guide Supplement on Camera Trapping and eMammal* for a kit inventory and further instructions)
 - Printed maps
 - Access to online mapping services (Google Maps) and online camera trap database (eMammal)
- Other materials: Student Worksheet 3: Developing Your Research Methods (one per student)

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Objective: Students will develop research methods that will help them to gather evidence that will be used to answer their prediction.

Vocabulary and Concepts

- Confounding factor: An outside variable that changes the effect of the responding and manipulated variables.
- Research method: The process used to collect information. This process produces new knowledge or deepens understanding of a topic or issue.

Overview

Research methods describe the steps that students will take to find an answer to their investigative question. Their methods should be clear, easy to follow and replicable by other scientists.

Zoo staff will help students to develop their methods. However, teachers will have the final say in which method the students use. Please take into consideration that some methods are more time-intensive than others. Details about different data collection tools are listed below (Data Collection Tools)

Instructions

1. Complete the Student Worksheet 3: Developing Your Research Methods during this activity.
2. Submit your worksheet to zoo staff **at least three days** before their visit.
3. Student's methods do not have to be perfect right away! Zoo staff will help them finalize their methods when they come to visit.

Data Collection Tools

The selected method should help students to answer questions about carnivore relationships to the landscape. **Zoo staff will introduce and suggest students choose from these methods:**

1. **Camera Traps:** A camera trap is a remotely activated camera that is equipped with a motion sensor or an infrared sensor. Camera trapping is a method for capturing photographs of wild animals when researchers are not present.
 - This method collects evidence about where carnivores travel and spend their time. It can also provide evidence about the ways carnivores interact with natural or human-made features of the landscape.

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- This method is time-intensive for teachers and students, but it is very exciting for the students.
 - It requires training on camera traps, camera trap deployment coordination by teachers, as well as permission from parents and guardians to have camera traps on their property. Please see the *CWC Teacher Guide Supplement on Camera Trapping and eMammal*
 - It requires that students (or teachers) sort, record data on and upload the photos.
 - As part of this program, classes have the opportunity to include their photos in an international wildlife camera trap photo database, eMammal. eMammal provides a platform for tagging what species of animals are in camera trap photos, uploading photos, and retrieving data from the database. Please see the *CWC Teacher Guide Supplement on Camera Trapping and eMammal* for details on recording data about camera trap photos and using eMammal to upload photos. The eMammal page for this project can be viewed at: <https://emammal.si.edu/woodland-park-zoo-coexisting-carnivores>
 - If this method is used, we recommend that it is used in combination with another method, given the shorter time frame for data collection.
2. **Online Surveys:** An online survey is a questionnaire that the target audience can complete over the Internet. Online surveys automatically store responses.
- Students can collect data about individuals' observations of carnivores, individuals' observations of carnivore sign, information about people's interactions with carnivores, and information about home and yard practices that affect carnivore activity
 - This method is the least time-intensive and can provide a lot of data in a short period of time.
 - This method may not be engaging for all students.
 - Class surveys will be combined with other classes/schools to maximize responses.
 - Zoo staff will assist in the creation and finalization of survey questions.
3. **Person-to-Person Surveys:** For a person-to-person survey, the interviewer is physically present to ask the survey questions.
- Students can collect data about individuals' observations of carnivores, individuals' observations of carnivore sign, information about people's interactions with carnivores, and information about home/yard practices that affect carnivore activity.
 - This option is time-intensive for students.

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- This can be done in small groups with each group surveying a separate area of the study area (neighborhood, park, etc.).
- It requires students to coordinate times to complete surveys, preferably with an adult or guardian.
- Zoo staff will assist in the creation and finalization of survey questions.

Sample Survey Questions: These are examples of the types of survey questions that you can generate with your students. You may need to ask different questions in order to answer your research question. Zoo staff will assist in the creation and finalization of survey questions.

- Do you know what the term “carnivore” means?
- Have you seen a wild carnivore in your community in the last year?
- What type of carnivore did you see?
- Where did you see this carnivore in your community?
- Describe the landscape features of the place where you saw the carnivore.

4. **Walking Surveys:** Walking surveys are systematic observations made on foot that can help you better understand either the community in general or a specific condition or aspect of it.
- Students can collect observational data such as the presence or absence of carnivores, presence or absence of carnivore sign or the presence or absence of carnivore deterrents or attractants.
 - Students can also use these surveys to ground-truth (verify) digital maps or get more detailed information about human-made and natural landscape features.
 - This method is time-intensive for students, but can be very fun!
 - It requires students to coordinate times to complete surveys, preferably with an adult or guardian.
 - This can be done in small groups with each group surveying a separate area of the study area (neighborhood, park, etc.).
 - It is useful when looking for animal sign (any evidence left by the passing or activity of an animal including tracks, scat, scratches, fur, or food remnants).

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Element 7: Western Wildlife Outreach Bear Education Trailer Visit ○

- In-Class Activity
- Time: 1 class period
- Facilitator: Western Wildlife Outreach (WWO) Staff. WWO will arrive at your school and set up their bear education trailer in an outdoor location (often in a parking lot).

Western Wildlife Outreach (WWO) is a local non-profit that works on sharing accurate information about large carnivores in our area and how communities can coexist with them. Through a presentation and use of biofacts such as pelts and skulls, students gain further information on carnivore taxonomy and ecology. Students will also have the opportunity to ask WWO staff questions that are specific to their classroom investigations, information on carnivores, and strategies to engage community members.

The exact schedule and programming is based on the schedule and needs of the participating teachers. Please be prepared to both take student groups out to visit the trailer and have a space for WWO staff to present to students in the classroom.



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Element 8: Data Analysis and Conclusion Writing ☐ ☒

- In-Class Activity
- Time: 2+ class periods
- Facilitator: Classroom teacher
- Timeline: Complete 2 weeks before Sharing Findings
- Other materials: Student Worksheet 4: Data Analysis-optional (one copy per student); Student Worksheet 5: Conclusion writing (one copy per student)

Objectives: Students will transform their raw data into useful information they will use to answer their research question. They will then develop conclusions to inform others about the results and importance of their research.

Important Note: Heavy duty statistical analysis is not necessary for your survey data. However, you can use percentages and measures of central tendency (mean/average, median, mode) to quantify and summarize your data.

Your students will visually represent their data using bar graphs, pie charts or line graphs.

Data Analysis Instructions

1. Optional- use Student Worksheet 4 to complete this activity.

Conclusion Writing Instructions

1. Optional- use Student Worksheet 5 to complete this activity.

Element 9: Presentation Building ☐ ☒

- In-Class Activity
- Time: 2+ class periods
- Facilitator: Classroom teacher
- Timeline: Complete 1 week before Sharing Findings and Recommendations
- Other materials: Woodland Park Zoo Rubric and Student Checklist in Evaluation Tools Packet

Objectives: Students will develop an informative and visually compelling communication tool such as an infographic, a tri-fold, PowerPoint, or public service announcement. Students will use this

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communication tool to inform their peers and community members about their research process, including evidence-based recommendations for coexisting with carnivores.

Overview

As a culmination of this program, students will present their research findings and recommendations for coexisting with carnivores with the broader community. To prepare, students will create an informative and visually appealing communication tool.

The format for this tool is variable, and we have listed some suggestions below (**Ideas for Communication Tools**). However, the goal is to align the content of the tool to the expectations stated on the Student Checklist and Rubric which can be found in the Evaluation Tools Packet.

Instructions

1. Use the Coexisting with Carnivores Rubric and Student Checklist to complete this activity.
2. The expectation is that **students will be able to give a 5-minute presentation** about their research experience.
3. To increase student engagement, have students create communication tools in small groups. The content of the tools may overlap.
4. Each class may create up to six separate tools (six student groups). However, not each student group will present at the final community event.
5. If time and resources allow, encourage groups to use more than one format.

Ideas for Communication Tools

1. **Trifold poster:** Use a trifold poster to display the project elements
2. **Public Service Announcement (PSA):** A PSA is designed to reach a specific group with a message that will change the group's behavior. A PSA is designed to reach a specific group with a message that will change the group's behavior.
 - For an PSA lesson plan, including a template and rubric, visit:
<http://www.scholastic.com/browse/lessonplan.jsp?id=1504>
3. **Infographic:** An Infographic is a visual image such as a chart or diagram used to represent information or data. Infographics make complex information eye catching, shareable and easily digestible.
 - An simple to use Infographic creator: <https://piktochart.com/>

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4. **PowerPoint Presentation:** Use a PowerPoint to display the project elements.
 - Prezi is a free and interactive online presentation platform. To try Prezi, visit: <https://prezi.com/start/>
 - Students can work collaboratively from different locations using Google Slides: To try Google Slides, visit: <https://www.google.com/slides/about/>
 - For PowerPoint best practices, visit: <https://learning.linkedin.com/blog/design-tips/5-best-practices-for-making-awesome-powerpoint-slides>
5. **Blog Post:** Blogs are an effective way to engage students in writing, and giving and receiving feedback.
 - To see a 6th grade teacher's experience with blogging in her classroom, visit: <https://www.teachingchannel.org/videos/teach-blogging>
 - Student blogging platform: <https://kidblog.org/home/>
6. **YouTube Video:** To learn more about creating YouTube videos in your classroom, visit: <https://www.campussuite.com/create-youtube-channel-for-your-school/>

Element 10: Sharing Findings and Recommendations and Post-Assessment

- In-Class Activity
- Time: 1 class period
- Facilitator: Woodland Park Zoo staff
- Timeline: May
- Other materials: Woodland Park Zoo Rubric and Student Checklist in Evaluation Tools Packet

Overview: During their final presentations, each student group will share their research findings and their evidence-based recommendations for coexisting with the carnivores in their communities. Students will share an oral presentation (approximately 5 minutes). Their communication tool supports their presentation. WPZ staff will use the Wild Wise: Coexisting with Carnivores Rubric as a performance-based assessment of program outcomes.

Sharing Findings and Recommendations Instructions:

1. Prior to Sharing Findings, review your students' presentations to see if they align with the expectations stated on the rubric. The rubric is meant to be a WPZ staff/teacher tool.
2. Have students self-review their work using the student checklist.

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3. Determine with your teaching team the format for your school's Sharing Findings and Recommendations sessions. Format options:
 - **Option 1:** Each class presents individually to zoo staff during the normally designated class period. This option is available only if **no more than 3 classes** occur simultaneously during one period. For this option, there can be **no more than 5** student groups per class.
 - **Option 2:** Science fair with **no more than 2 classes per period**. If there are multiple student groups per class, not all students will have their projects evaluated by zoo staff.

Post-Assessment Instructions:

1. Administer Wild Wise: Coexisting with Carnivores Post-Assessment found in the Evaluation Tools Packet.
 - This assessment is meant to be low-stakes.
 - Students do not need to be prepped before taking the assessment.
 - The zoo will use information this for internal program evaluation.
 - The post-assessment can be graded for completion.

Element 11: Community Event ◇

One to two groups of students from each school will be selected to present their Findings and Recommendations at an all-school community event. Groups will be selected based on the overall quality of their Sharing Findings and Recommendations presentations.

- The Community Event will be held at Issaquah Middle School on June 6th from approximately 5:30 p.m. to 8 p.m.
- Additional student groups may display their presentations during the event, but will not present to the full audience.
- Further details will be provided by the program coordinator in advance of the Community Event

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- ☐ Part of this activity can be completed as homework.