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Outline - Coyote Ecology & Resiliency

Center for Urban Resilience

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LESSON #1: Coyote Ecology & Resiliency

OVERVIEW:

The purpose of this lesson is to facilitate student acquisition of background knowledge on topics related to coyote ecology, including geographic distribution, physiology, sociobiology, genetic variation and evolution, among others. Threaded throughout the lessons will be an exploration and discussion of human-impact on coyote geographic distribution, home ranges, physiology, diet, behavior, adaptations, and resiliency. Special focus will be spent on identifying notable behavioral changes that have occurred in urban coyotes over the past century. Students will research and present their findings via a Project Based Learning (PBL) poster.

SUB-QUESTIONS:

- What role have humans played in the evolution of coyotes over time?
- How has habitat loss and fragmentation, urbanization and subsidized feeding, among other factors, changed coyote behavior over time?
- How have coyotes not just survived, but thrived, even amidst a collective and aggressive effort to eradicate them?
- What mitigation strategies can be employed to minimize harm to humans, domestic animals and coyotes, and lead to a more peaceful coexistence?
- What is the impact of coyotes on the local ecology of an area?

WAYS OF KNOWING URBAN ECOLOGY:

Students will...

Understand . Learn and understand the coyote story ... its history and evolution through time.

Talk . Research in sub-groups the topics related to coyote ecology.

Do . Organize material for presentation to a larger audience.

Act . Create a poster and present it to peers.

SAFETY GUIDELINES:

None for this lesson.

PREPARATION:

Time: Four (4) class periods (50 mins ea).

MATERIALS:**Activity 1.1 (1st class; 20 minutes): Lesson Activator – Picture Walk & Group Discussion**

- Option I – physical picture walk, with cards placed on Lab stations or on walls and students visit each picture and fill out the flip chart paper
 - Printed Coyote Picture Cards (suggest 11x17, color, laminated)
 - Lab Stations or wall space
 - Flip chart paper and markers
 - Tape
 - Pencils/Pens
- Option II – if not enough space for a physical picture walk, can project each picture up on a projector screen, and rotate thru the pics via PowerPoint slides provided and students write down observations on a handout
 - Laptop
 - Projector & Screen
 - PowerPoint Slides – Coyote Picture Cards
 - Student Handout (M12_L1_A1.1_SH1)
 - Pencils/Pens

Activity 1.2 (1st class; 10 minutes): Video & PowerPoint – Coyote Myths and Legends

- Laptop
- Projector & Screen

- YouTube video: Meet Coyote, an Aboriginal “Legend”
https://www.youtube.com/watch?v=PJO_WEBnZgs
- Instructional PowerPoint Slides – Introduction to Coyote Ecology & Resilience
- Student Handout for note-taking (M12_L1_A1.1_SH2)

Activity 1.3 (1st class; 20 minutes): Activity – Build a Coyote Poster

- Student laptops or access to computer lab for research
- Poster board – large
- Access to printers for printing all poster materials
- Glue and/or tape
- Construction paper for creative display
- Markers, colored pencils and/or crayons
- Pens/pencils

Activity 1.4 (2nd class; 20-30 minutes): Video & PowerPoint – Building Background Knowledge

- Laptop
- Projector & Screen
- YouTube Video: How Coyotes Conquered North America
<https://www.youtube.com/watch?v=9gBT-JtqhBM&feature=youtu.be>
- Instructional PowerPoint Slides – Introduction to Coyote Ecology & Resilience
- Pencils/Pens

Activity 1.5 (remainder of 2nd class and entire 3rd class): Activity – Build a Coyote Poster

- **Assign Home Groups (6), Expert Groups (6) & Sub-Topics (6)**
- **Begin Student Research & Writing (Expert Groups-6)**
 - Student laptops or access to computer lab for research
 - Pencils/Pens
 - Poster board that students began in previous class period
 - Access to printers for printing all poster materials

- Glue and/or tape
- Construction paper for creative display
- Markers, colored pencils and/or crayons
- Pens/pencils

Activity 1.6 (4th class): Coyote Poster Presentations

- Completed Posters
- Easels for Poster Presentations

Instructional Sequence (4 class periods):**Activity 1.1 (1st class; 20 minutes): Lesson Activator – Picture Walk & Group Discussion**

- Before sharing any information about coyotes, this activity will show what prior knowledge students bring with them into this Lesson.
- **Pre-Lesson: Have all pictures posted on Walls or on Lab Stations and keep all the pictures covered, until the activity begins, so students do not get a sneak preview!**
- **Step 1: Introduction:** Advise students about the overall scope of the project: that they will be researching and learning about coyotes and then creating and presenting posters on their research, as the culminating project.
- **[Option I]** – physical picture walk, with cards placed on Lab stations or on walls & students visit each picture and write their observations on a posted flip chart paper].
 - **Step 2:** Count the students off by the number of walls or lab stations you have; for example, if you have 6 lab stations, count off students 1-6 and have them go to that station as their number is called; if you have 30 students and you counted off by 6, you will have 5 students at each station. (8 pictures have been provided, so could break a large group of 32 into 8 groups of 4.)
 - **Step 3:** Advise students of the ground rules:
 - **1.** At each picture, talk about the picture as a group.
 - **2.** Write down all observations (the animal, its habitat, etc.).
 - **3.** Really look and reflect seriously about what is in each picture.
 - **4.** Make note of physical features, behavioral characteristics, family structure, as well as the habitat

each animal is in; each picture has a wonderful story to tell.

- Allow about 2 mins per picture, rotating clock-wise.
- **[Option II]** – if not enough space for a physical picture walk, can project each picture up on a projector screen, and rotate through the pics via PowerPoint slides provided.
- **Step 2:** Show each picture one at a time, allowing students to take notes for about 2 mins.
- **Step 3:** Advise students of the ground rules:
 - **1.** At each picture, talk about the picture as a group.
 - **2.** Write down all observations (the animal, its habitat, etc.).
 - **3.** Really look and reflect seriously about what is in each picture.
 - **4.** Make note of physical features, behavioral characteristics, family structure, as well as the habitat each animal is in; each picture has a wonderful story to tell.
- **Step 4:** After students are done taking notes about the pictures, have a whole-group discussion. Sample Observations have been provided in the Lesson Resources.
- Allow time for questions and clarify understanding and any misconceptions. What have they learned about coyotes from their observations?

Activity 1.2 (1st class; 10 minutes): Video & PowerPoint – Coyote Myths and Legends

- **Step 1:** Show video to students and present introductory PowerPoint slides to students (first 4 slides). These will introduce students to myths and legends about coyotes and start them thinking about our connections with them throughout North American history.

- Step 2: Have students jot down anything that interests them as they will be using this to start their posters. Allow time for questions and clarify understanding and any misconceptions.
- Step 3: Wrap-Up. Ask students to share their perceptions of coyotes thusfar.

Activity 1.3 (1st class; 20 minutes): Activity – Build a Coyote Poster

- Step 1: Divide students into 6 six-member Home Groups.
- Step 2: Once students are numbered off into their Home Groups, explain to them that they will be creating an informational poster about coyotes, and the first step is to find a coyote myth or legend that conveys how they see the coyote or how the coyote connects to their culture.
- Step 3: Explain to them that you would like to see a visual representation of this story on their poster, either through collage of words, pictures or artwork of the coyote. Remind them to leave lots of room on the poster because they will be adding to it later.
- Step 4:
 - Now students can gather in a section of the room at their laptops/computer stations to begin research/printing out their visual aids.
 - Circulate through the groups and provide assistance as needed.
 - Note: Teacher and students should make note of members of all Home Groups and Expert Groups. A chart posted somewhere in the room is a great strategy for tracking groups.

Activity 1.4 (2nd class; 20-30 minutes): Video & PowerPoint – Building Background Knowledge

- Pre-Lesson

- Teachers are encouraged to read background articles on coyotes, provided in Reading and Reference Materials under Module Resources. In addition, see “Educator Resource – Building Background” on Module 12 Outline.
- Teacher may want to assign selected articles or other coyote reading for homework, to build background knowledge.
- **Main Instruction:**
 - **Step 1:** Show video and remainder of PowerPoint slides to students. These will introduce students to coyotes as the study species and share some important facts about them.
 - **Step 2:** Have students take notes, which they can use during their research for their posters.
 - **Step 3:** Allow time for questions and clarify understanding and any misconceptions.

Activity 1.5 (remainder of 2nd class and entire 3rd class): Activity – Build a Coyote Poster

- **Step 1:**
 - Divide students back into their Home Groups.
 - Each member in the group will assigned a different expert topic. Experts will then join as a group in the Coyote Expert Groups, as follows:
 1. **Background** – Classification, Geographic Distribution, Home Ranges, Habitat
 2. **Physiology** / Morphology (Physical Characteristics), Genetic Variation, Evolution
 3. **Diet** / Predator-Prey / Food Chains / Human Food Subsidies / Changes in Diet over time
 4. **Sociobiology** (Behavioral Characteristics); Changes in behavior over time
 5. **Life Cycle** / Reproduction / Family Dynamics

- 6. Traits and Adaptations / Resiliency** – Traits that allow them to survive in wide range of areas;
Adaptability/Resilience over time
- Note: if students greater or less than 36, adjust Home Group or Expert Group sizes as deemed appropriate, including combining or expanding topics.
 - Students' topics (which will then become their Expert Group) can be chosen in a myriad of ways:
 - Teacher-assigned
 - Pick out of a hat
 - Let the team members decide
 - Step 2:
 - Review expectations of each Expert Group Topic whole group, so everyone understands the topic they are researching. Tell them they will be adding to their posters and will present the information to the class.
 - Allow time for questions and clarify understanding.
 - Step 3:
 - Now students can gather in a section of the room at their laptops/computer stations to begin research in their Expert Groups.
 - Circulate through the groups and provide assistance as needed.
 - Note: Teacher and students should make note of members of all Home Groups and Expert Groups. A chart posted somewhere in the room is a great strategy for tracking groups.
 - Note: The 8 Expert Groups will be conducting research as mini-research teams, with 4 students in each group.
 - Step 4: Once students have had adequate time to finish the research, the 4 Home Groups will re-assemble after the research is complete and work together to create a comprehensive group poster of all topics. Encourage each student to take a section of

the poster, but all should agree on a layout / organization, which should be decided on before beginning to print or glue items on the poster. They should be given almost an entire class period to finish their posters.

Activity 1.6 (4th class): Coyote Poster Presentations

- **Pre-Lesson:** Have the easels and posters set up ahead of time.
- Once posters have been created, the students can share their work!
- Each group should have 10 mins to present their posters, allowing 1-2 minutes for Q&A.
- **Conclusion / Wrap-up / Exit Activity:** Audience Q&A
- **Note:** It is always a nice idea to invite the Campus Administrators (Principal, Asst Principal), so they can see the great work students are doing in science!
- **Note:** It is also a nice idea to take pictures and post them to a classroom blog or the classroom web site to showcase student work.

Summary Notes/Conclusion: By the end of Lesson 1, students will be able to (SWBAT):

- Understand many topics related to coyotes, including how they have evolved and survived as well as the human-impact factor
- Make observations and draw conclusions through picture analysis
- Take notes during video and PowerPoint presentations
- Conduct research on various assigned topics
- Work as a team to successfully complete a project
- Create a research poster about a topic
- Present work to a larger audience