

Map and Track Biomes and Animals

TEACHER'S GUIDE

Exploring biomes and the species that thrive there can help students understand the life around them and become more environmentally aware. *Map and Track Biomes and Animals* is an engaging series that examines a variety of biomes and their interconnected elements, using maps as supplementary tools to support understanding of how different species survive there. The books encourage readers to see the big picture of each biome on Earth, and consider the human impact on each biome and their individual species.

The *Map and Track Biomes and Animals* Teacher's Guide includes inquiry-based lessons that develop the critical-thinking skills students need to understand the parts of a biome and how they support life—and how these parts are changing or threatened. Students will study different biomes and species, as well as the animal adaptations and migrations that allow them to survive in each area. They will also explore how maps can help support and extend our understanding of where species live, feed, and breed, and migrate. By taking part in these lessons, students will learn how to be activists who consider how biomes work, how they can be affected by change, and what they can do to protect these fragile systems.

These lessons in this guide are aimed at grades 3 to 6. They focus on allowing students to explore groups of separate parts within the biomes that work together for a purpose, while critically considering the threats to species that live in different biomes. Although each lesson plan in this guide can be taught on its own, the lessons follow a sequential order that works to scaffold understanding. Reproducible worksheets and assessment tools accompany each lesson plan. The titles in *Map and Track Biomes and Animals* include:

Map and Track Deserts

Map and Track Grasslands

Map and Trade Mountains

Map and Track Oceans

Map and Track Rainforests

Map and Track Wetlands



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PACING CHART AND VOCABULARY

Lesson Plan Title	Pacing	Vocabulary
Getting to Know Biomes and their Species	2 class periods*	biome climate ecosystem habitat species survive
Getting to Know Maps	2 class periods	body of water compass rose endangered equator key label latitude longitude physical map scale thematic map
Endangered Species Awareness	2-3 class periods	action plan endangered species International Union for the Conservation of Nature (IUCN) human impact vulnerable

* 1 class period = 40-60 minutes

ACCOMMODATION STRATEGIES

Accommodations provide equal access to learning and equal opportunity to demonstrate what is learned. Accommodations allow a student access to the subject or course without any changes to the knowledge and skills the student is expected to demonstrate.

Educators are encouraged to adapt the instructional approach, activities, and assessments included in this guide to best meet the diverse interests, needs, and abilities of their students. Possible accommodations may include:

Instructional Strategies

- Break tasks into parts with accompanying time lines
- Provide extra time for processing of oral information.
- Pair oral instructions with visual ones (writing or symbols)
- Pre-teach new vocabulary and regularly review previously taught vocabulary
- Provide model of completed work
- Frequently check with the student to get him/her started
- Provide oral and visual instructions and examples
- Provide a checklist of tasks for the student

Environmental Strategies

- Proximity to teacher
- Strategic seating
- Flexible or mixed-ability grouping
- Provide an alternative setting for learning that is free from visual and auditory distractions.

Assessment Strategies

- Build in extra time to allow student to process questions asked and answers given
- Provide written instructions and rubrics for assignments
- Offer a choice of assessment activities so that the student can choose one suited to their strengths
- Space out or extend assignments to prevent student feeling overwhelmed
- Reduce the number of tasks used to assess skill or concept
- Allow students to use assistive devices or technology

LESSON 1

Getting to Know Biomes and their Species

Curriculum Correlations

Ontario Science and Technology

Grade 4: Understanding Life Systems: Habitats and Communities

3.1, 3.3

Next Generation Science Standards

3-LS4-3.

C3 Framework

D2.Geo.2.3-5.

Materials

- *Map and Track Biomes and Animals* series
- *Exploring a Biome Worksheet*
- *Species Card*
- *Species Card Checklist*
- Chart paper and markers
- White board or chalk board and markers or chalk

Objectives

Students will be able to:

- Define and give examples of habitats, biomes, and climates.
- Identify species that live in different biomes and explain how they meet their needs in their habitats.
- Use physical maps to identify biomes found on different continents around the world.

Setting the Stage

Facilitate class discussion about what students know about different habitats, biomes, and climate. Teacher may choose to read and review one book from each of the groupings listed above (pages 4, 6 and 7) for context.

Use “Think, Pair, Share” method to have students come up with answers to the following questions:

- What is a habitat?
- What is a biome?
- What is climate or climate change?

Extend discussion with prompts such as:

- ▶ What is a habitat? What conditions would allow certain animals to live there?
- ▶ How can we differentiate between an animal’s habitat and the biome in which they live?
- ▶ How can the climate affect the environment, such as soil, plant life, and water supply, of biomes?

Ask students to think about the animal species that live in different biomes and habitats within biomes. Discuss using the following prompts:

- Habitat
 - ▶ Why would certain plants and animals have common characteristics for the environment in which they exist?
 - ▶ What may cause certain animals to be at risk of becoming endangered?
- Biomes
 - ▶ What species or organisms might live in certain habitats?
 - ▶ Where can biomes be found?
- Physical characteristics
 - ▶ What physical factors (soil, moisture, temperature, climate, etc.) would allow for certain species to live in a particular biome?

Share answers and create a class definition of a habitat, biomes and climate to be sure students understand the difference. Write definitions on anchor chart for future reference. Example definitions:

- **Habitat:** The specific place (home) where an animal lives, within a biome
- **Biome:** Even bigger than an ecosystem, it is a large geographical area that contains distinct plant and animal groups, which are adapted to live in that environment
- **Climate:** Usual weather conditions in a region

Take-away concepts:

- ▶ Students should be able to identify different biomes around the world and the animals and plants that adapt to that biome’s particular environment.
- ▶ Students should be able to identify the characteristics of the biome that allow species to survive.

Activity

Split students in groups and have each group examine one book from the *Map and Track Biomes and Animals* series. Teacher can pre-assign groups and books, or have students rank books in order of interest and create groups based on student preference.

Each group will read the book and pull out significant information about the biome. Each group fills out the *Exploring a Biome Worksheet*. They will identify the characteristics of the biome that allow species to survive, name some species that live there, and identify some endangered species that can be found there.

When students are finished with their worksheet, have a short class discussion in which each group shares the characteristics, species, and endangered species that can be found in the biome they studied. If desired, teacher can create a large anchor chart with a table that compares the main characteristics and species found in each biome.

Have each student choose a species that lives in the biome they studied. Each student needs to choose a different species. They will fill out a *Species Card* identifying what the species looked like, where it lives, and how it meets its needs in its habitat.

Display a large world map on a wall in the classroom. Invite students to tape their finished cards on the map, in the place on Earth where their species can be found. Or, if a map is not available, display the cards on a class bulletin board. Place species from the same places on Earth together.

Extensions

- Invite students to conduct their own research to find specific examples of species that may live in a biome or specific habitat
- Have students look into how the changing climate affects different biomes around the world and present their findings to the class
- Allow students to categorize the similarities and differences between the species after having observed this information on the map or bulletin board where their species are placed. After categorizing the information, have students answer the following questions: What do you notice? What do you wonder?
- Students can critically think about the similarities and differences between the different biomes. Why are certain characteristics found within certain biomes? Because a biome contains several habitats, how do these species work to co-exist?

Wrap-Up

Have a class discussion about the main concepts in this lesson. Ask them:

- Can you define biome, habitat, and climate? How do each of these things relate to each other?
- How does your animal species survive in its biome? What does it eat? How does it find water? What does it use for shelter?
- What's an interesting fact you learned about your species?

Then, give students five to ten minutes to examine the map on the wall. Tell them to examine the other species in their biome, or other species that are found in the same place on Earth. They should observe similarities and differences between the species.

When students are finished, have them meet back in their groups and share their observations with each other. Have each group talk about similarities and differences between their species. How do animals that live in the same biome relate? How are they similar and different?

Have a full class discussion about what students observed. Then ask students what all of the species have in common. Prompt them:

- What do all animals need to survive?
- What do all biomes contain?

Add this information to the class anchor chart.

Assessment

Assess student understanding during lesson using observational notes. Review definitions to clarify misunderstandings as needed. Use the *Species Card Checklist* to assess the species card.

Name: _____ Date: _____

Exploring a Biome Worksheet

Circle the biome you have studied.

Desert

Grassland

Mountain

Rainforest

Ocean

Wetland

Where on Earth can your biome be found? _____

Climate is the usual weather conditions in a place. What climate(s) are found in your biome?

Describe the soil and/or vegetation that can be found in your biome. _____

What are the other major physical characteristics of your biome? _____

Name: _____ Date: _____

List 10 species that live in the type of biome. Identify where on Earth each species can be found.

Species	Where on Earth?

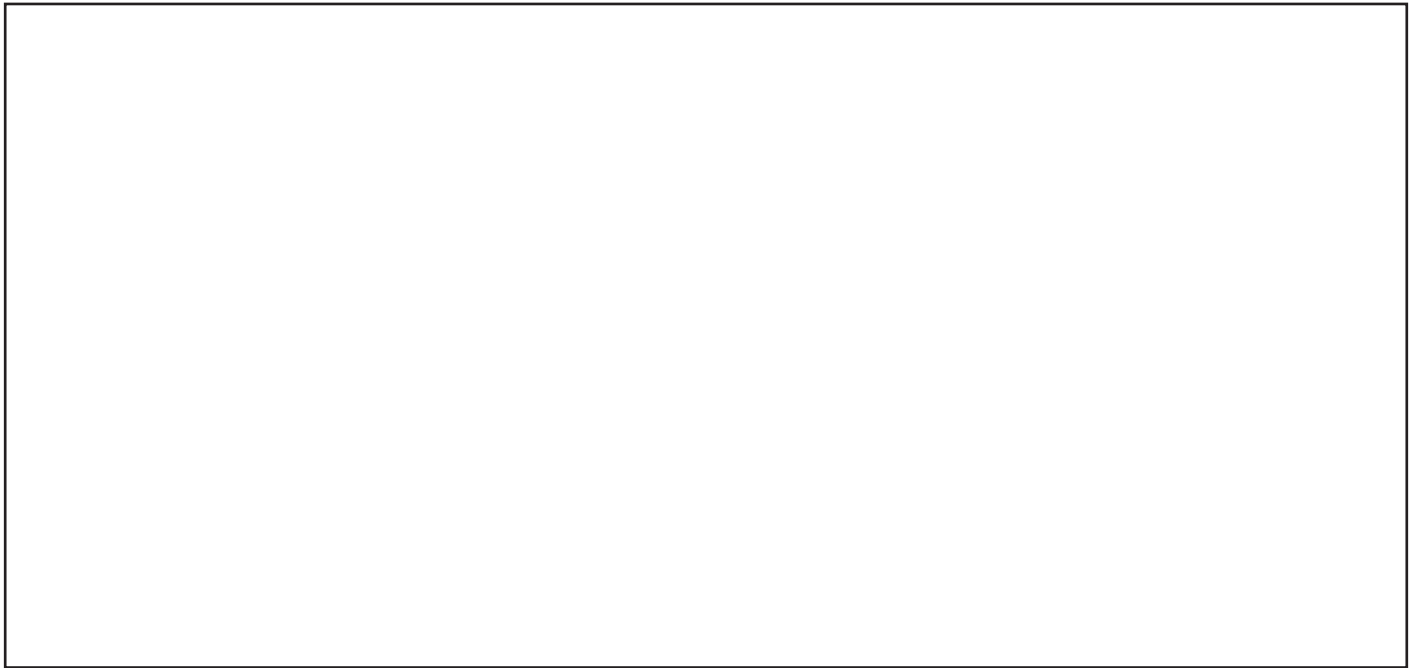
Identify three endangered species that are found in the biome.

Summarize, from the book, the threats the species faces.

Species	Where on Earth?	Threats Faced

Species Card

1. In the large box, sketch a picture of the species in its habitat. Write the name of your species at the top of the box.
2. Identify major features of the biome in which the species lives, and where on Earth it is found.
3. On the lines, write 2-4 sentences explaining how your species survives.
How does it meet its needs for food, water, and shelter in its biome?
4. Cut out the card, and write your name on the back.



Biome	Location	Features

_____ survives in the _____ by:

Student name: _____ Date: _____

Species Card Checklist

Criteria	Met	Somewhat Met	Not Met
Drawing properly depicts the chosen species and the habitat in which it lives			
Correctly identifies biome, its location, and its major features (climate, soil, water, light, physical land, plants, and animals)			
Accurate, detailed explanation of how species finds and/or consumes food to survive			
Accurate detailed explanation of how species finds and/or consumes water to survive			
Accurate, detailed explanation of how species builds, finds, and/or inhabits a shelter in its biome			

Comments: _____

LESSON 2

Getting to Know Maps

Curriculum Correlations

Ontario Science and Technology

Grade 4: People and Environments: Political and Physical Regions of Canada

B2.3

C3 Framework

D2.Geo.2.3-5.

D2.Geo.3.3-5.

Materials

- *Map and Track Biomes and Animals* series
- Map from a book in the series (p. 6-7)
- A thematic map of teacher's choosing, such as "Snow Goose distribution in North and Middle America"
<https://birdsna.org/Species-Account/bna/species/snogoo/introduction>
- *Getting to Know Maps Worksheet*
- *Getting to Know Maps Checklist*

Objectives

Students will be able to:

- Identify the features of a map.
- Use maps to support extend knowledge about a species.
- Using a map as a starting point, ask questions, research and analyze information, and draw conclusions.

Setting the Stage

Show students two maps: one from a *Map and Track Biomes and Animals* book on page 6-7, and another type of map, such as "Snow Goose distribution in North and Middle America" (link found in materials). Print and hand them out, or display them at the front of the classroom.

Have students answer the following questions to prompt discussion:

- What do you notice?
- What do you wonder?
- How are the maps similar? How are they different?
- What is each map telling us? What information is given to allow you to draw conclusions about each map?
- What conclusions can you draw for each of these maps?
- What information is still needed to allow the reader to draw even more conclusions?

Prompt students to identify the following features of a map:

- Title, Key, Scale, Compass Rose, Longitude/Latitude, Equator, Labels for significant areas, such as countries, biomes, bodies of water

Have a discussion about the maps displayed. Discuss the map features that they see on the maps, and discuss their importance. Ask if the maps are missing any of the above features and discuss whether they would give us more information or help us draw more conclusions. Discuss whether students have seen the features on other maps in the past.

Review with students that there are many types of maps. Ask them to popcorn some of the maps they already know. Write responses on white board and review what they already know about the types of maps.

Direct attention back to the two maps shown in class, at the beginning of the lesson. The maps on pages 6-7 of the *Map and Track Biomes and Animals* books are physical maps, because they show the locations of landforms or landform regions on Earth. The snow goose map is a thematic map, because it displays information about a specific theme (snow goose breeding and migration grounds). Define both types of maps together, in student-centered language. Definitions could include:

- **Thematic map**—a map that shows a specific theme or idea within a geographical location
- **Physical map**—a map that shows the locations of landforms or landform regions

Takeaways:

- The features on a map help us get different kinds of information from a map.
- Different maps can have different purposes or display different information, but most maps have similar features that help us understand them.

Activity

Explain to students that they will use what they have learned to examine and analyze a map from the *Map and Track Biomes and Animals* series.

Hand each student a *Getting to Know Maps Worksheet*. They will complete individually, for assessment.

Remind students that maps help us learn about a topic by showing information visually. We can get a lot of information from maps. But often, maps are a starting point to learn more. Explain that students will analyze the map as it appears on their worksheet, then think about bigger ideas that they want to learn more about.

Have students complete the worksheets. At the end of the worksheet, they are asked to write at least one question they still have about the map and the bigger ideas about which the map can help us learn. Invite students to share their questions. Students can popcorn questions for teacher to record on the whiteboard, or give students markers and invite them to come up to the white board and write a question themselves.

When you have a range of questions on the whiteboard, read some out loud. Notice repeated questions and themes. Narrow down to three or four questions that speak to realistic, bigger themes and would allow for some further research. Teacher may also need to prompt students to come up with some meaningful questions. Questions might include:

- Why are most leatherback turtles found near coasts?
- Why are the nesting sites in such varied locations on Earth?
- Do leatherback turtles migrate?
- What is the best habitat for leatherback turtles?
- What types of ocean species do leatherback turtles eat?
- Can leatherback turtles survive in different water temperatures? In what kind of ocean do they survive best?

Have students vote on the question that they are most interested in. Tally the answers.

Together as a class, research the question with the most votes and find out more information. Can conduct research on a Smart Board or projected screen. As a class, draw two conclusions from the research you conducted. The conclusions should help answer the question.

Extensions

- Have students research a map of their favorite biome and find pictures to represent the different characteristics of that biome. Have them include these photos in a media presentation, describing why each of the components included in the presentation were important to that biome

Wrap-Up

Review how maps support understanding of a topic and can act as a starting point for us to ask questions and learn more.

Discuss findings from the research done as a class on the question of choice. Review the features of a map [Title, Key, Scale, Compass Rose, Longitude/Latitude, Equator, Labels].

Continue to ask students to consider how maps can help support our understanding on a topic. To conclude, ask them:

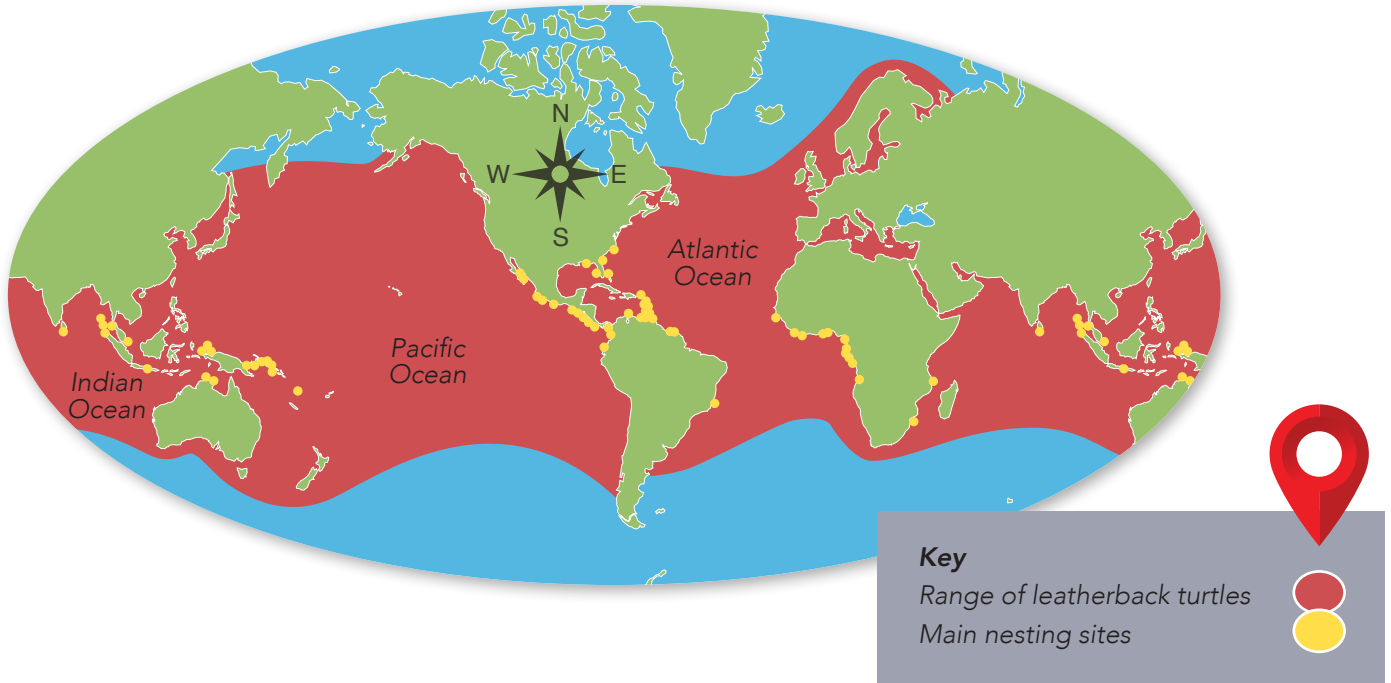
- Do you find some features more useful than others? Why or why not?

Assessment

Using the *Getting to Know Maps Checklist*, assess student understanding of concepts. Students should be able to develop their answers about the usefulness of different features of maps, and justify their answers. They should also connect their knowledge of how reading maps can help draw conclusions and set the stage for further learning.

Name: _____ Date: _____

Getting to Know Maps Worksheet



1. Name three features this map includes:

- _____
- _____
- _____

2. Choose one of the three features, and explain how it helps you understand the map.

3. What conclusions can you make about leatherback turtles, based on the map as it appears now?

4. Name two features you would add to the map that will allow you to draw more conclusions.
How will each new feature help you draw a new conclusion?

Feature	How would this feature help you draw a new conclusion?

What questions do you have after reading and analyzing this map? For example, what other concepts could you learn more about? Is there any information that the map suggests, but does not tell us outright? Please write at least one question.

Student name: _____ Date: _____

Getting to Know Maps Checklist

Criteria	YES	NO
Correctly identifies 3 features of a map		
Clearly explains how the chosen feature helps someone read or better analyze the map		
Effectively draws and explains conclusions pulled from reading the provided map		
Correctly identifies 2 more features the map should have		
Rationalizes how each new feature will help draw conclusions		
Question(s) is/are well-thought out and allow(s) for further research		

Comments: _____

LESSON 3

Endangered Species Awareness

Curriculum Correlations

Next Generation Science Standards

3-LS4-4

C3 Framework

D2.Geo.1.3-5.

D2.Geo.2.3-5.

D2.Geo.3.3-5.

Ontario Social Studies Standards

Grade 4: People and Environments:

Political and Physical Regions of Canada

B2.3

Grade 5: People and Environments:

The Role of Government and Responsible Citizenship

B2.3

Ontario Science and Technology Standards

Grade 4: Understanding Life Systems: Habitats and Communities

1.1, 1.2, 2.3, 2.5, 2.6, 3.3

Materials

- *Map and Track Biomes and Animals* series
- Printed examples of the “Map and Track” box features in each book (one for each student)
 - ▶ For example, “Lowland Gorillas” box on page 27 of *Map and Track Wetlands*
- Devices with Internet access
- *Important Information Worksheet*
- *Book Page Worksheet* (with 2D map)
 - ▶ It is recommended that the teacher photocopy this worksheet on an 11x17 page
- *Book Page and Presentation Rubric*
- *Listening Worksheet*

Objectives

Students will be able to:

- Construct a map that shows the range of the species and includes key map features.
- Research and gather information about an IUCN Red List species.
- Write a book page identifying key information about the Red List species.
- Use critical thinking to examine the human impact on the Red List species, and identify actions that can be taken to protect the species in the future.

Setting the Stage

Prepare for the lesson by taping two pieces of chart paper at the front of the classroom: one titled “Text” and the other titled “Map.”

Start with a class discussion about endangered species and their protection. Ask students to think about the type of information they would need to know about an endangered species, in order to take steps to protect it.

As students share their ideas, write down their answers on the “Text” anchor chart. Ensure that final list includes the following key information. Teacher can decide to add information based on student ideas, if desired.

- Name and type of species
- Where on Earth it can be found
- How it meets its needs for food, shelter, and water
- How it is threatened (Include natural threats such as predators, and human threats)

Complete the same process for the “Map” chart. Ask students to think back on the previous lesson in which they learned about the features of a map. Ask them to share the features of a map that would show them information about an endangered species. Ensure that the list includes the following key information. Add information based on student ideas, if desired

- Map title identifying its subject
- Compass rose to help orient the reader of the map
- Labels showing locations on Earth
- Key that uses symbols, words, and colors to show specific information about the species

In partners, students will work together to examine the important information found in one “Map and Track” box feature. (The example uses “Lowland Gorillas” on page 27 of *Map and Track Wetlands*.) Using the *Important Information Worksheet*, students will retrieve the facts from the text and the map that allow them to better understand the species they are examining.

- Students should be prompted to retrieve only the key ideas included in the final lists on the anchor charts.

Before students begin, remind them to think back to the last lesson in which they learned about the key features of a map and the information they can gather from it.

When students are finished their worksheets, have a class discussion about the information that they highlighted about their paragraphs and maps. Ask students if there is anything that they wish the box feature would have taught them about the endangered species.

Lead students to think about the protection of the species and conservation of its habitat. Activate prior knowledge by having them “popcorn” ideas about steps humans can take to protect endangered species. Explain that thinking about conservation and protection is an important part of learning about any endangered species.

Activity

Show students page 29 of any of the *Map and Track Biomes and Animals* books. Read the box “The IUCN” to students. Explain that all of the endangered species in each book are on the IUCN Red List. Review the definition of the Red List on page 29 and explain that it is a list of all species and their health status. Explain that the list is important because it shows us which species are at risk. This helps people to know the steps they need to take to help protect that species.

Revisit the discussion ideas on how and why it is important to protect endangered species. Students will use their devices to choose an endangered species from the IUCN website: www.iucnredlist.org

Each student will create his or her own book page about an endangered species from the IUCN Red List. The teacher may choose to give a list of examples from the IUCN Red List to help guide students in choosing the endangered animal they will research and write about on their spread.

Review the criteria for the book page with students. Hand them the *Book Page Worksheet* so that they can follow along.

- Students should title their book page with the name of the endangered species.
- In the top section of the page, students will identify key information about the endangered species. They should use the IUCN website among other reliable sites, such as National Geographic or government websites, to find their information.
 - ▶ Their information should include: species name/type, where it is found, how it meets its needs for food, shelter, and water, and how it is threatened
- In the middle section of the page, students will think critically to identify specific human impacts on the species, and steps that we can take to help protect the species.
- In the bottom section of the page, students will fill in a map that shows the range of their species. They should add in the essential map features and use a key with colors to shade in the range. Tell students that they need to include at least 4 map features to achieve a Level 4 on this portion.
 - ▶ Students will use IUCN maps as the source for their range information. Direct students to look at the maps found for each species on the IUCN website. Each map shows the range of a species. Tell students to recreate this range on their maps. They will use a key for their range to identify what the colors mean.

Extensions

- Write a letter to the IUCN and let them know that you are willing to help protect an endangered species in your area, and the steps you will take to help them. Assess for procedural writing.
- Have students answer a journal entry prompt about why it is important to think about the protection and conservation of all species.
- Ask students to create an infographic or poster representing the different ways countries, larger companies, or small communities help in protecting endangered species.

Wrap-Up

Have students present their Book Pages to the class. They will be assessed on their presentation as well as how they listen to their peers.

Students in the audience will receive a *Listening Worksheet* on which they will take notes for two more species that are presented by their peers. They will also ask those presenters a question, which they will write down on their worksheet, and include the presenters response.

Put all of the book pages together in a class book so others can read the information you have found on your endangered species, and build awareness about the protection of endangered species around the world.

Assessment

Use *Book Page and Presentation Rubric* to assess the book page and the presentation. Have students hand in the *Listening Worksheet* to assess how they listened and responded to their peers.

Name: _____ Date: _____

Important Information Worksheet

TEXT	MAP

Name: _____

Date: _____

Important information about the species:

The human impact on the species:

What is your action plan to protect the species?
Identify two or more strategies we can take to help them.



Student Name: _____

Date: _____

Book Page and Presentation Rubric

CONTENT				
	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding	Identifies 2 or less key pieces of information about the species.	Identifies 3 key pieces of information about the species.	Identifies 4 key pieces of information about the species.	Identifies 5 or more key pieces of information about the species.
Thinking	Assesses human impact with limited detail.	Assesses human impact on species using some detail.	Assesses human impact on species using good detail.	Assesses human impact in great detail.
Application	Shows limited application of knowledge about species. Plan of action includes no clear strategies that would help protect species.	Shows some application of knowledge about species to create an action plan with one strategy to help protect species.	Applies knowledge about species to create an action plan with at least two strategies to help protect species.	Thoroughly applies knowledge about species to create an effective action plan with two or more strategies to help protect species.
Communication	Presents information about the species range with limited clarity. Map includes 1 or no key map features.	Presents information about the species range with some clarity. Map includes 2 key map features.	Presents information about the species range on a map that includes 3 to 4 key map features.	Clearly presents information about the species range on a map that includes 4 key map features.

ORAL COMMUNICATION				
	Level 1	Level 2	Level 3	Level 4
Delivery	Holds no eye contact with audience, as entire report is read from notes. Speaks in low volume/or monotonous tone, which causes audience to disengage.	Displays minimal eye contact with audience, while reading mostly from the notes. Speaks in uneven volume with little or no inflection.	Consistent use of direct eye contact with audience, but still returns to notes. Speaks with satisfactory variation of volume and inflection.	Holds attention of entire audience with the use of direct eye contact, seldom looking at notes. Speaks with good variation of volume and inflection.
Content/Organization	Does not clearly define subject and purpose; provides weak or no support of subject; gives insufficient support for ideas or conclusions.	Attempts to define purpose and subject; provides weak examples, facts, and/or statistics, which do not adequately support the subject; includes very thin data or evidence.	Has somewhat clear purpose and subject; some examples, facts, and/or statistics that support the subject; includes some data or evidence that supports conclusions.	Provides clear purpose and subject; pertinent examples, facts, and/or statistics; supports conclusions/ideas with evidence.
Clarity and confidence	Speaks and responds with limited clarity and confidence.	Speaks and responds with some clarity and confidence.	Speaks and responds with considerable clarity and confidence.	Speaks and responds with a high degree of clarity and confidence.
Listening and responding to questions	Listens and responds with limited knowledge of subject and never uses complete sentences.	Listens and responds with some knowledge of subject and rarely speaks in complete sentences.	Listens and responds with considerable knowledge of subject and sometimes responds in full sentences.	Listens and responds with a thorough knowledge of subject in full sentences.

Name: _____ Date: _____

Listening Worksheet

Presenter 1:	Presenter 2:
Species: _____ Biome: _____ Habitat: _____ Food source: _____ Map features included: _____ _____ Human impact: _____ Protection: _____	Species: _____ Biome: _____ Habitat: _____ Food source: _____ Map features included: _____ _____ Human impact: _____ Protection: _____
Question: _____ _____ _____ _____ Answer: _____ _____ _____ _____ _____ _____	Question: _____ _____ _____ _____ Answer: _____ _____ _____ _____ _____ _____