

# GRADE 5

## FINICKY FISH FINISH LAST!

### POST-VISIT LESSONS

**Getting the Word Out: Visually**

**Getting the Word Out: Interviews and Podcasts**

# FINICKY FISH FINISH...LAST!

## Post-Visit Overview

The razorback sucker is a native fish species that was once plentiful in the Colorado River system. This rugged fish is adapted to life in flowing waters, including the ever-changing cycles of drought and turbulent flooding that once characterized the Colorado. However, the Colorado River has been altered in ways that now make it hard for the razorback sucker to survive. Today, the razorback sucker is endangered, and as such is a concern of Lake Mead National Recreation Area, the Nevada Department of Wildlife, the U.S. Fish and Wildlife Service, and others. Together, these agencies are working to protect this Colorado River native from extinction.

In “Finicky Fish Finish...Last!” students use the Forever Earth vessel to explore what has happened to the Colorado River and the reasons why it is so difficult for the razorback sucker to thrive in a changed environment. Working as ichthyologists (fish biologists) at Lake Mead, students collect water quality data such as temperature, pH, and clarity—to determine whether current habitat conditions are sufficient for survival of young razorback suckers. Students observe and identify non-native fish in Lake Mead as they learn how the razorback sucker interacts with these neighbors. Students assess whether Lake Mead is still a good habitat for razorback suckers. Using the knowledge they’ve gained, students design ideal refuges for the razorback sucker, including ideas to get the word out about this endangered native fish.

The following post-visit activities are designed to synthesize and expand the knowledge students have gained in their Forever Earth experience. Students use their knowledge to spread the word about threatened and endangered species either visually by creating a wayside exhibit or by using podcast technology.

## OPTION 1 Getting the Word Out: Visually

### THEME

Species with specialized adaptations and narrow ranges of tolerance become vulnerable to extinction when their habitats undergo change.

### KEY QUESTIONS

What threatens or endangers a species? What is an organism's "range of tolerance" for survival?

What are the questions associated with reestablishing a threatened or endangered species into an altered ecosystem?

## GOALS

Students will demonstrate an understanding of:

- what happens to an ecosystem that contributes to the endangerment of a species; and
- what factors need to be considered for survival of an organism and a species.

## OBJECTIVES

Students will:

- describe what is meant by “endangered species” and “threatened species;”
- delineate what the major environmental factors are in an aquatic environment;
- explain how organisms interact within their ecosystems;
- research what factors must be considered to ensure that a species “range of tolerance” is met;
- demonstrate their understanding that science involves asking and answering questions and comparing the answers to what scientists already know about the world;
- summarize visually what they have learned about razorback suckers aboard Forever Earth by planning and creating artwork for an interpretive wayside exhibit; and
- incorporate stewardship messages in the public information exercise.

## NEVADA STATE STANDARDS CORRELATION

**N.5.B.2.** Students know technologies impact society, both positively and negatively.

**N.5.B.3.** Students know the benefits of working with a team and sharing findings.

**L.5.A.2.** Students know reproduction is an essential characteristic for the continuation of every species.

**L.5.C.1.** Students know the organization of simple food webs.

**L.5.C.2.** Students know organisms interact with each other and with the non-living parts of their ecosystem.

**L.5.C.3.** Students know changes to an environment can be beneficial or detrimental to different organisms.

**L.5.C.4.** Students know all organisms, including humans, can cause changes in their environments.

**L.5.C.5.** Students know plants and animals have adaptations allowing them to survive in specific ecosystems.

## CLARK COUNTY SCHOOL DISTRICT CURRICULUM ESSENTIALS FRAMEWORK (CEF)

Students will:

- investigate and describe how plants and animals require food, water, air, and space;
- explain that living things get what they need from their environments;
- investigate and describe the interrelationships and interdependence of organisms with each other and with the non-living parts of their habitats;
- investigate and describe how some environmental conditions are more favorable than others to living things;

- investigate and describe how organisms, including humans, can cause changes in their environments;
- investigate and describe how, for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all; and
- investigate and describe how environmental changes allow some plants and animals to survive and reproduce, but others may die.

## PREREQUISITE EXPERIENCE

- Pre-visit classroom lessons
- Forever Earth field trip
- If creating interpretive panels digitally, experience with and access to graphics software is required.

## VOCABULARY

- |                      |                      |                        |
|----------------------|----------------------|------------------------|
| • endangered species | • range of tolerance | • topic                |
| • extinction         | • reestablishment    | • threatened species   |
| • habitat            | • reintroduction     | • visual communication |
| • interpretation     | • target audience    | • wayside exhibit      |
| • organism           | • theme              |                        |

## Getting the Word Out: Visually

### Part 1 ▶ Introduction

The teacher asks students: *Is it important to educate the public about endangered species? Why?*

Students are introduced to the idea of interpretive wayside exhibits; they discuss the differences between a sign (such as an advertisement poster or billboards) and interpretive wayside exhibits.

Note for teacher:

*An interpretive wayside exhibit is an outdoor display for an audience of visitors to a natural area or place of historical significance. Generally, it is a poster that is embedded in acrylic and attached to a metal or wooden stand. The wayside exhibit is installed, usually, near the location where visitors can see or experience something of the concept being interpreted.*

Students examine sample interpretive panels (see **Teacher Reference: Sample Interpretive Wayside Exhibits**) of actual wayside (and some indoor) exhibits. Students list the general

**TIME** 20-25 minutes

### MATERIALS

**Teacher Reference:  
Sample Interpretive Wayside Exhibits**

components of the interpretive panels: title, diagrams, maps, photos, photo legends, illustrations, blocks of copy, color, backgrounds, organization.

The teacher facilitates discussion: *What is eye-catching in the samples? What is the role of each component?* The teacher charts responses.

It's not important for the students to read every word on the sample exhibits. For many of the samples, it is not possible to read the copy due to the size of the photos. The idea is to expose students to the major components of interpretive panels and have them decide what is eye-catching and what is not. It is important to make the observation that the panels are meant to be read from a short distance (vs. reading a brochure or paper, which one holds).

## Part 2 ▶ Planning and Creating the Interpretive Panels

The class discusses the challenges of creating media for broad target audiences. *What do visitors to a lake have in common and how are they different from each other? What are ways to keep media interesting and accessible to everybody?*

The teacher introduces “topics” and “themes” (**Student Reference: Planning an Interpretive Panel**). For example:

Sample Topic: “Birds”

Possible themes for the topic “Birds”

- Birds are an amazing group of animals because of their special adaptations for flight.
- Native birds in this country are rapidly disappearing because of habitat loss.
- Reestablishment of trumpeter swans is challenging because they lose important survival skills when they are raised in captivity.

Students work in groups to brainstorm themes for their interpretive wayside exhibits. Possible themes could elaborate on “Pre-lesson:

Endangered Species” Poster Presentation Topics:

- Distinguishing features of the habitat and the role the razorback sucker plays in the ecosystem.
- Reasons for endangerment or decline in a population using

Computer connected to the Internet  
Projector  
Chart paper/board

**TIME** 40-50 minutes

### **MATERIALS**

Photos taken on the Forever Earth field trip, and/or other downloaded and printed images

Scrap paper

**Student Reference:**  
**Planning an Interpretive Panel**

the razorback sucker as an example.

- Current scientific investigations, such as razorback sucker recovery on the Lower Colorado River (AZ Game and Fish): [www.gf.state.az.us/w\\_c/research\\_razorback.shtml](http://www.gf.state.az.us/w_c/research_razorback.shtml)
- What environmental factors are being monitored in terms of reintroduction of threatened and endangered species?

Students gather and review the materials they have already collected on the razorback sucker. Next, they discuss what visitors should know, feel, and do after viewing an interpretive wayside exhibit on razorback suckers. For example:

- 1) Visitors will be able to describe the habitat requirements of razorback suckers.
- 2) Visitors will feel good about the preservation work being done (with their tax dollars) to help the species.
- 3) Visitors will want to see a razorback sucker exhibit in the Nature Center.
- 4) Visitors will consider contributing to an imaginary "Preserve the Razorback Sucker" fund.

Ask students to work with a partner to select a theme from the brainstorm activity above, decide on objectives, plan, write copy to develop the theme, select photos, create artwork and diagrams to illustrate the text, and assemble into a poster that could serve as an interpretive panel for a wayside exhibit on razorback suckers.

For Paper Version:

Large pieces of paper (e.g., 36" x 24")

Art supplies

Prints of photos and digital images.

For Digital Version:

Computers and graphics software

(set art board to 36" x 24")

## EXTENSIONS

- Students create an audio recording (may also include enhancing music/sound effects) to accompany the interpretive wayside exhibit.
- Students design a brochure that visitors can take home that accompanies the wayside exhibit.
- Students create a bilingual interpretive panel for the wayside exhibit.
- Students plan an interactive exhibit or program.
- Students draw up a story board and text for an online, virtual exhibit or interpretive activity.

View online interpretation at:

[www.nps.gov/webrangers/](http://www.nps.gov/webrangers/)

## RESOURCES

### ONLINE RESOURCES FOR INTERPRETIVE WAYSIDE EXHIBIT DEVELOPMENT

#### Events Tasmania

“Developing Interpretive Themes” by Sam Ham, Ph.D. and Betty Weller  
[www.eventstasmania.com/theme%20development%20handout.pdf](http://www.eventstasmania.com/theme%20development%20handout.pdf)

#### The Montana Lewis & Clark Bicentennial Commission

“Graphic Guidelines Appendix for Lewis and Clark Wayside Exhibits”  
[www.montanalewisandclark.org/resources/experts/AppendixV.pdf](http://www.montanalewisandclark.org/resources/experts/AppendixV.pdf)

#### National Park Service

“Harpers Ferry Center Wayside Exhibit Design”  
<http://nps.gov/hfc/products/waysides/way-process-design.htm>

“Interpretive Themes” by David L. Larson,  
National Park Service, Interpretive Development Program  
[www.nps.gov/idp/interp/101/themes.pdf](http://www.nps.gov/idp/interp/101/themes.pdf)

#### John Veverka & Associates

“Interpretive Planning & Interpretive Training”  
[www.heritageinterp.com/developing\\_theme\\_and\\_objectives.htm](http://www.heritageinterp.com/developing_theme_and_objectives.htm)

**Note: Students and teachers should also refer to pre-visit references and materials on the razorback sucker.**

## ADAPTATIONS FOR DIVERSE LEARNERS

- Use samples of finished interviews as models.
- Allow peer readers/writers.
- Keep your directions clear, precise, and succinct.
- Create graphic organizers for each step of the process in planning and creating the interpretive exhibit.
- Assign preferential seating.
- Pre-teach critical vocabulary.
- Establish and teach rules that communicate expectations.

## ASSESSMENT

- Students can evaluate their own work through reflective journal entries.

- Conduct a classroom peer review session (i.e., after students share their interpretive panels, pose questions: *What do you know and feel? What will you do? Does the feedback match the original intent for the panel?*).
- Create a teacher or teacher/student rubric. Peers give interpretive wayside exhibit panels one recommendation and one commendation.

## OPTION 2 Getting the Word Out: Interviews and Podcasts

### THEME

Species with specialized adaptations and narrow ranges of tolerance become vulnerable to extinction when their habitats undergo change.

### KEY QUESTIONS

What threatens or endangers a species? What is an organism's "range of tolerance" for survival?

What are the questions associated with reestablishing a threatened or endangered species into an altered ecosystem?

### GOALS

Students will demonstrate an understanding of:

- what happens to an ecosystem that contributes to the endangerment of a species; and
- what factors need to be considered for survival of an organism and a species.

### OBJECTIVES

Students will:

- describe what is meant by "endangered species" and "threatened species;"
- delineate what the major environmental factors are in an aquatic environment;
- explain how organisms interact within their ecosystems;
- research what factors must be considered to ensure that a species "range of tolerance" is met;
- demonstrate their understanding that science involves asking and answering questions and comparing the answers to what scientists already know about the world;
- write interview questions for a threatened or endangered species; and
- create a podcast of an interview with a threatened or endangered species.

### NEVADA STATE STANDARDS CORRELATION

**N.5.B.2.** Students know technologies impact society, both positively and negatively.

**N.5.B.3.** Students know the benefits of working with a team and sharing findings.

**L.5.A.2.** Students know reproduction is an essential characteristic for the continuation of every species.

- L.5.C.1. Students know the organization of simple food webs.
- L.5.C.2. Students know organisms interact with each other and with the non-living parts of their ecosystem.
- L.5.C.3. Students know changes to an environment can be beneficial or detrimental to different organisms.
- L.5.C.4. Students know all organisms, including humans, can cause changes in their environments.
- L.5.C.5. Students know plants and animals have adaptations allowing them to survive in specific ecosystems.

## CLARK COUNTY SCHOOL DISTRICT CURRICULUM ESSENTIALS FRAMEWORK (CEF)

Students will:

- investigate and describe how plants and animals require food, water, air, and space;
- explain that living things get what they need from their environments;
- investigate and describe the interrelationships and interdependence of organisms with each other and with the non-living parts of their habitats;
- investigate and describe how some environmental conditions are more favorable than others to living things;
- investigate and describe how organisms, including humans, can cause changes in their environments;
- investigate and describe how, for any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all; and
- investigate and describe how environmental changes allow some plants and animals to survive and reproduce, but others may die.

### PREREQUISITE EXPERIENCE

- Pre-visit classroom lessons
- Forever Earth field trip

### VOCABULARY

- |                      |                      |                      |
|----------------------|----------------------|----------------------|
| • endangered species | • organism           | • statutes           |
| • extinction         | • podcast            | • threatened species |
| • habitat            | • range of tolerance |                      |
| • hosting service    | • reintroduction     |                      |

#### Part 1 ▶ Introduction

The teacher asks students: *Why do we need laws to protect threatened or endangered species?* The teacher discusses Nevada statutes protecting native species from extinction (**Teacher Reference: Nevada Statutes**).

**TIME** 20-25 minutes

#### **MATERIALS**

**Teacher Reference: Nevada Statutes**

Students are made aware that there are differences between state and federal statutes protecting native species from extinction (**Teacher Reference: Threatened and Endangered Species in Nevada**).

Students review the definitions of “threatened species” and “endangered species.” Students examine the lists of threatened and endangered species in Nevada and in Clark County (**Student Reference: Threatened Species in Nevada; Student Reference: Endangered Species in Nevada**).

**Part 2 ▶ Interview and Podcasts**

Student brainstorm answers to the following: *What do you know about interviews? What do you know about podcasts?* The teacher charts responses.

The teacher discusses the definition of a podcast (a recorded “show” similar to a radio show that can be downloaded to an iPod, MP3 player, or computer) and presents examples of podcast interviews. The Education Podcast Network—The Landmark Project Internet site has a collection of podcasts recorded by elementary, middle, and secondary students. Examples are available at: <http://epnweb.org/index.php?openpod=16#16>

The class discusses special techniques used in the examples of podcasts, e.g., sound effects, music, or songs. The teacher emphasizes the importance of using techniques that match the concept and purpose of the communication.

The class discusses characteristics of the sample podcast voices such as volume (not too loud or too soft), rate (not too fast or too slow), pitch (not too high or too deep), clarity (easily understood), and pronunciation of words. *Do the voices convey emotion? Do the speakers emphasize key words or phrases?*

The class discusses the quality of the sample podcast interview questions. Are they interesting, to the point, controversial, etc.?

**Part 3 ▶ Concept Development**

Students are divided into pairs. Each pair is assigned a threatened or endangered species (**Student Reference: Threatened Species in**

**Teacher Reference: Threatened and Endangered Species in Nevada**

**Student Reference: Threatened Species in Nevada**

**Student Reference: Endangered Species in Nevada**

**TIME** 50-60 minutes

**MATERIALS**

Chart paper/board

Computer with speakers and Internet connection  
 (or pre-save some sample podcasts onto the computer)

**TIME** 60 minutes

**MATERIALS**

**Student Reference:**

**Nevada and Student Reference: Endangered Species in Nevada)** to research. Findings are recorded on **Student Worksheet: Background Notes for the Interview**).

Students review **Student Reference: Writing Interview Questions**.

Student pairs write interview questions for their threatened or endangered species. Then they write responses to the questions from the viewpoint of the species.

One student plays the part of the interviewer and the other plays the part of the species. Partners practice reading their interview scripts with each other and in front of the class. Students read their parts naturally and with expression. Students may revise their scripts based upon feedback they receive from the class.

**Part 4 ▶ Presentation of Findings**

The teacher reviews **Teacher Reference: Creating A Podcast**; teachers may also contact the education computer specialist in the school district. Students review **Student Reference: Creating A Podcast**. Students record and publish their podcasts on an online hosting service.

Additional options for presentation:

- Advertise podcasts to environmental federal and state agencies and organizations.
- Share podcasts with the project manager of Forever Earth.
- Share podcasts with the Division of Interpretation at Lake Mead National Recreation Area.

**EXTENSIONS**

Students create a storyboard for a video podcast interview. On one side, include the interview script, sound effects/music; on the other side include the corresponding visual image. Students record and publish the video podcast on an online hosting service.

**RESOURCES**

**FEDERAL LISTING OF THREATENED AND ENDANGERED SPECIES IN NEVADA**

**Nevada Natural Heritage Program, Department of Conservation and Natural Resources**

**Threatened Species in Nevada and Student Reference: Endangered Species in Nevada Student Worksheet: Background Notes for the Interview Student Reference: Writing Interview Questions**

**TIME** 1-2 class periods or homework

**MATERIALS**

**Teacher Reference: Creating A Podcast**

**Student Reference: Creating A Podcast**

Computer

Microphone

Podcast software programs

Threatened: <http://heritage.nv.gov/threatnd.htm>

Endangered: <http://heritage.nv.gov/endanged.htm>

### NEVADA STATUTES FOR THREATENED AND ENDANGERED SPECIES

Animal Legal and Historical Center

[http://www.animallaw.info/statutes/stusnv503\\_584.htm](http://www.animallaw.info/statutes/stusnv503_584.htm)

### PRINT RESOURCES ON THREATENED AND ENDANGERED SPECIES

Geary, F. (2003, June 23) *Tortoise Shelter: Facility Aids Hundreds of Displaced Animals Yearly*. Las Vegas Review Journal.

[www.reviewjournal.com/lvrj\\_home/2003/Jun-23-Mon-2003/news/21585742.html](http://www.reviewjournal.com/lvrj_home/2003/Jun-23-Mon-2003/news/21585742.html)

Bohrer, B. (2006, April 3). *Yellowstone grizzlies divide scientists: Experts disagree whether bear population has grown enough to lift protections*. Las Vegas Review Journal, p. 3B.

Rake, L. (2006, March 23). *Endangered list input sought*. Las Vegas Sun, p. 3.

Rake, L. (2006, March 18). *The world and devils hole: Scientists fear that the fate of the tiny pupfish could signal problems for all of Earth's species*. Las Vegas Sun, p. 1.

Rake, L. (2005, November 27). *Conservation plan includes protections for 78 plant and animal species*. Las Vegas Sun, p. 9.

### PODCASTING

**The Official Guide to Podcasting EBook**

[www.thepodcastingebook.com/](http://www.thepodcastingebook.com/)

**Podsafe Music Network**

<http://music.podshow.com/>

### ADAPTATIONS FOR DIVERSE LEARNERS

- Use samples of finished interviews as models.
- Allow peer readers/writers.
- Keep your directions clear, precise, and succinct.
- Assign preferential seating.
- Pre-teach critical vocabulary.
- Establish and teach rules that communicate expectations.

## ASSESSMENT

- Brainstorm the qualities of a good interview with the students; discuss quality standards; assist the students in the creation of a rubric.
- Brainstorm the qualities of a good podcast with the students; discuss quality standards; assist the students in the creation of a rubric.
- Students can evaluate their own work through reflective journal entries.
- Conduct a peer review in class. After students share their podcasts, peers give them one commendation and one recommendation.