# Trout in the Classroom Learning Sequence for K-5

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## Contents

## Introduction

(These lessons sometimes involve images that you will need to find online, and vocabulary cards that you will need to make. Eventually I plan to include all of these with the lessons. These lessons can be adapted to all grade levels, K-5, and by next year I plan to have more detailed lessons for each grade level. Your feedback will help me design engaging grade-level lessons. Please email me with your ideas and suggestions!)

This series of 10 lessons includes student learning experiences using resources from the Bay Area Classroom Aquarium Education Program website and other sources. The lessons begin with preparations for the arrival of the trout eggs and end with a conservation focused project, after a field trip to release the trout fry into a local lake.

All of the strategies in this lesson sequence are focused on guiding students to build their own conceptual framework and develop their own understanding of rainbow trout. I use concepts like claims and evidence, which will need to be explained to students if they are not already using them.

I suggest books for read alouds that can be found at the library, and books and written materials from the Classroom Aquarium Education Program website. As I gain access to more written materials I will add links within each lesson. If you know of any usable articles or books, please email me. I want to respect copyright.

The lessons make connections to the California Environmental Principles and Concepts. The EP&Cs help students understand human impacts on the environment. Below are the EP&Cs, and a link to a website that explains how they were created.

**CALIFORNIA ENVIRONMENTAL PRINCIPLES AND CONCEPTS - HTTPS://TENSTRANDS.ORG/WORK/EPCS/**

1. People Depend on Natural Systems
2. People Influence Natural Systems
3. Natural Systems Change in Ways that People benefit from and can Influence
4. There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing Between Systems
5. Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors

# Trout in the Classroom Lessons

## LESSON 1

## FOCUS QUESTION: WHAT IS A RAINBOW TROUT?

***Objective:***

Students can use evidence to claim that a rainbow trout is a fish.

***Materials:***

- Video: *Maroon Bells Rainbow Trout Swimming By*, by Guido Senff (1 minute 27 seconds) https://www.youtube.com/watch?v=OJT2STws6UM
  Rainbow trout filmed underwater with a GoPro camera at Maroon Lake in Colorado. Maroon Bells are the neighboring mountain peaks.
- Video: Trout in the Classroom 9 minutes 57 seconds - https://wildlife.ca.gov/CAEP
- Trout Anatomy Poster: Under "Curriculum" on the Classroom Aquarium Education Program page of the California Department of Fish and Wildlife website
- Pictures of local fish: largemouth bass, coho salmon, delta smelt, rainbow trout
- Vocabulary Cards of Fish Body Parts: scales, fin, tail, bones, skeleton, spine, gills, brain, heart
- External trout anatomy worksheet https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=54680&inline
- Chart Paper
- Student Science Notebooks

***Procedure:***

Create a T-chart on chart paper, with "Observations" on one side and "Questions" on the other.

Activate prior knowledge by showing video of trout at Maroon Bells (with minimal introduction – "We're going to watch a video about our next investigation") After the video, the teacher can say, "We are going to learn about this animal, and we want to get ready because we are going to take care of this animal in our classroom – watch the video one more time and think about what you know about this animal." After watching the video the second time, students can turn to a partner and share what they think they know. Call on students to share what they said or what their partner said. As students share, teacher can write responses on T-chart.

Examples: The animal is a fish; fish can breathe underwater; the animal has fins, etc.

Tell students the animal in the video is a rainbow trout and introduce the Trout Anatomy Poster.

Students write the focus question in their notebooks/journals: What is a rainbow trout?

Tell students that we might say a rainbow trout is a fish, because it looks like a fish and acts like a fish, but what is it that makes a rainbow trout a fish? Let's explore the body parts of the rainbow trout and other fishes.

Students look at pictures of 4 fish found in the San Francisco Bay Watershed – largemouth bass, delta smelt, rainbow trout, and coho salmon. Are all of these animals fish? How do you know? Talk with your table partners about the body parts of your fish.

In this exploration, encourage students to use sentence frames like:

- I observe that my fish has _____
- I agree because _____
- I respectfully disagree because _____
- I want to add _____

Call on students to share out one observation. As students observe about any of the 4 fishes, ask if that body part is the same for the rainbow trout. Teacher or students can add sticky notes to the Anatomy Poster – for example, the delta smelt has fins. Does the rainbow trout have fins? Where are they? Teacher can write body parts ahead of time or do it as students share observations. In this part of the *Explain*, students can say any body part, even parts that animals other than fish have, like bones, spine, head, tail, etc. Guide students to make sure they include fins, gills and scales.

For K-2, do a read aloud from a book that focuses on fish body parts, like *Fish Body Parts* by Clare Lewis, or *What's it Like to be a Fish* by Wendy Pfeffer. For older students, provide written material that they can read themselves, about the particular body parts that characterize fish.

Academic Discussion: According to this reading, what are the body parts that an animal needs to have to be a fish? (gills, fins and scales).

**Evaluation:** Give students a picture of a rainbow trout to glue into their notebooks https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=54680&inline . Students label gills, fins and scales on the picture. They can label other parts, if they wish. Under the picture, students will write their claim about the rainbow trout:

I claim that the rainbow trout is a fish. My evidence is _____.

Have students write one sentence of their own about what they now know about rainbow trout, and one question they now have about rainbow trout.

Play video of Trout in the Classroom Program https://www.wildlife.ca.gov/CAEP, and tell students this is what they will be preparing to do.

Check notebooks – do students use vocabulary from the lesson? Did they claim the rainbow trout is a fish because it has fins, scales and gills? Did they write one sentence of their own based on the lesson? Did they ask one question about rainbow trout?

**LESSON 2**
**FOCUS QUESTION: WHAT DO RAINBOW TROUT NEED TO SURVIVE?**

***Objective:***

Students will set up aquarium based on the needs of rainbow trout.

***Materials:***

- Slideshow "A Trout's Habitat," slides 1-11 https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=90867&inline
- Trout Anatomy Poster
- Trout Habitat Poster
- Science Notebooks
- Aquarium and all parts for set-up, including 10 gallons of spring water
- Oh Trout! Game (based on "Oh Deer!" in the old Project WILD Elementary Activity Guide)
- Vocabulary Cards of trout habitat: water, cold, clean, oxygen, gravel, habitat, river, creek, stream

***Procedure:***

Refer to the rainbow trout anatomy poster from the last lesson. Now that we know a rainbow trout is a fish, we are going to prepare for having some rainbow trout in our classroom. The trout will arrive as eggs that will hatch and become baby trout. Introduce Trout Habitat Poster and place it next to the Trout Anatomy Poster. Invite students to share out some things they know trout need – water, food, hiding places, friends are some possible student answers.

Introduce slideshow, *A Trout's Habitat*, and narrate Slides 1-11, focusing on how rainbow trout need cold water, shelter, food and space to survive.

Explain that the Trout Habitat Poster is a picture of a place where trout live in the wild. Students talk to a partner about what they observe in this picture. What is in this picture that trout need? Guide this share-out by pointing out details in the picture and using information on the back of the poster. As students share out, add responses on sticky notes to the poster.

Introduce the aquarium and equipment. The Grizzly Peak Fly Fishers gave us this aquarium and all of the equipment we need to make a habitat for trout in our classroom. When the trout eggs arrive, we will make sure that our rainbow trout have everything they need to survive.

Students write the focus question in their notebooks: What do rainbow trout need to survive?

Introduce each of the parts of the aquarium, setting up the aquarium as each part is described. In their notebooks students draw the parts and write what they do. The teacher can draw the parts very simply on the board or a piece of chart paper, asking students what they think the parts do, and write brief descriptions that students can copy into their notebooks.

- Aquarium – holds the water, allows us to see the trout
- Spring water – has no added chemicals in it, is very similar to the water in the streams where trout live.
- Insulation – keeps the water in the tank cold
- Chiller – keeps the water cold
- Thermometer – tells us the temperature of the water. The water needs to stay at 50 degrees Fahrenheit
- Gravel – similar to the rocks in the streams where trout live
- Controller – sets the temperature for the chiller
- Power head – makes air bubbles in the water to add more oxygen from the air outside the aquarium

Students read “Habitats of Salmon and Trout,” from the “Salmon and Trout Go To School” guides in the Curriculum Aids section of the Classroom Aquarium Education Program website. Students can underline or highlight the things trout need to survive – cold water, hiding places, food, etc. Have students share with their table groups.

Each table group can share out to whole class, so that teacher can pull out three important things trout need to survive – food, shelter, and water.

## PLAY THE "OH TROUT!" GAME

### *Materials:*

- Chart paper and marker
  On the chart paper, make a graph with "Trout" on the *y* axis and "Year" on the *x* axis. Number the trout in 1s or 5s, but leave room for as many students as you have in the class. Number the years by 1s, up to the number of rounds you plan to have (4-6, maximum).

### *Introduction and Directions*

Take your class outside to the playground. Students make two lines, facing each other and about 15 - 20 feet apart. The students in one line are the rainbow trout, and the students in the other line are their environment. Divide the class into thirds, and one third will be trout, to start the game. Two-thirds will be the environment.

Trout live in an environment that provides the resources they need to survive. Ask students what basic things trout and humans need to survive. As they give answers, focus on the three that you will use in the game: water, food and shelter.

Show all students how to make the hand symbols for the three main resources trout need to survive:

- water (cupped hands near face as if drinking from them)
- food (hands folded over stomach)
- shelter (hands folded over top of head)

Have every student, trout and environment, choose one resource to symbolize and make the hand gesture. Then have the lines look at each other carefully. Tell students, "Each resource can only support one trout. Each trout needs to find the resource in the environment that matches their symbol. Do you think that all of the trout will survive?" Ask them to make a prediction and support it with evidence.

Show students the graph, and count the number of trout. Use that number as the trout population for your first year. Add it to the graph.

Tell students who are resources that they will choose one resource to symbolize for each round of the game, and once they've chosen it, they can't change it until the next round. Tell students who are trout that they will choose a resource that they will look for, make that symbol, and search among the resources for that symbol only.

If the trout find their matching resource, they bring that resource back to the trout line and that student becomes a trout. The trout population increases when resources are plentiful.

Trout who can't find a matching resource should stay in the middle until the teacher or a student counts the number of students in the "surviving trout" line at the end of the round, and added that number to the graph. Then the "dead trout" can join the environment line and get ready to symbolize a resource.

***Start the Game:***

Have trout turn and face away from the resources. Tell trout and resources to choose their symbols and not change them. Tell trout to turn back around and find their resource! Each trout can find only one resource at a time.

After the trout have either found their resource or died, count the surviving trout and plot that number on your chart. Then the dead trout can return to the environment.

Pause between rounds and have students think about what happened. Did the trout population increase or decrease? What do they predict will happen in the next round, and why? You can chart the rising and falling trout population after each round and talk about the importance of good habitat. You can also ask students to think about what might cause changes in the availability of resources (drought, pollution, urban development). Four to six rounds are enough to make the point that populations vary based on the amounts of food, water and shelter available. And it can lead to a discussion of how biologists determine whether a declining population is in trouble or whether the fluctuations are part of the normal cycle.

***Evaluate:***

In their notebooks, have students write about what trout need to survive, and how the aquarium will provide those things. It's ok if students include food, even though the trout will probably not be "fed" while they are in the aquarium. At first the trout will absorb their yolk sacs, and that will be their food. They will be released soon after their yolk sacs are used up, so food will still be something they need to survive.

## LESSON 3
## EGGS ARRIVE: HOW CAN WE TAKE CARE OF OUR TROUT EGGS?

***Objective:***

Students will make observations of the rainbow trout eggs and predict when they will begin to hatch, based on temperature data.

***Materials:***

- Trout Life Cycle Poster
- Science Notebooks
- Video: Jim Scherer's Trout Egg Incubation Time Lapse
- "When Will the Eggs Hatch?" worksheet
- Vocabulary Cards of trout eggs: egg, eye, gravel, hatch

***Procedure:***

Students will record in their notebooks the aquarium temperature, the time that the eggs arrived, how many eggs arrived, a description of the eggs, and information from the fish hatchery. They can also record this information on a class chart. Take a picture of the eggs sitting on the cheesecloth before putting them into the aquarium, so they can be counted more easily.

Students can place eggs into the aquarium, watching as they fall down into the gravel near the front.

What questions do students have about the eggs? Students can write their wonderings in their science notebooks. Share out questions and record on a chart. How can we find answers to these questions?

Use the Nature Journal template on page 9 of the Trout in the Classroom Teacher Resources Guide: I notice . . . I wonder . . . This reminds me of . . . for observations of the eggs. Students can glue this template into their notebooks, or you can have them copy the format onto a notebook page.

Show video of *Egg Incubation Time Lapse*. Notice the eyes in the eggs, and how they move. Tell students this is what they will be looking for as the eggs develop.

**I**ntroduce Trout Life Cycle Poster and describe each stage of development. Point out the dead eggs, and tell students they will be looking out for any eggs that turn white.

On the template or on a notebook page, students draw and label a trout egg as the first part of the trout life cycle. Use "When will the Eggs Hatch?" worksheet from the Curriculum Aids section of the website to predict the day that the eggs will begin to hatch.

***Evaluate:***

Is data recorded completely?

**LESSON 4:**
**WHERE DO RAINBOW TROUT LIVE? (WATERSHED)**

***Objective:***

Students will make a paper model of a watershed to show water flow from smaller streams to larger bodies of water and human impacts on streams.

***Materials:***

- Copying paper to crumple for student watersheds
- Water-soluble markers in 3 colors – red, blue, green (two sets for each table group)
- Silt: A Dirty Word materials (straws, rocks, silt, cups)
- Spray bottles – one for each table group

***Procedure:***

Activate student thinking about local lakes, creeks, rivers and San Francisco Bay. What do we already know about these bodies of water?

All of our local bodies of water are part of a watershed. The watershed is all of the land that drains into a specific body of water, so San Francisco Bay, Lake Temescal, and Sausal Creek have their own watersheds.

Students make a model of a watershed by crumpling up a piece of copying paper and then uncrumpling it to form hills, valleys, lakes and streams. They will color the high places (ridges) with a green marker. They will color the places where they think rain water will flow down into rivers, lakes and the bay with blue marker. They will add human impacts like houses, stores and farms with red marker.

When the paper watersheds are sprayed lightly with water to simulate rain, the marker colors will run together to show that part of what is on the land will flow into the creeks, rivers, lakes and bay – whether it's liquid pollutants, solid garbage, lawn or agricultural fertilizer, or soil and sediments.

Trout and other aquatic animals are living in these bodies of water. Pollution and soil erosion entering the creeks, rivers and lakes when it rains can kill fish and eggs by reducing the amount of oxygen in the water.

Silt: A Dirty Word Activity. Page 266 in Aquatic WILD. Use the Sample Observation Chart to record data.

***Evaluate:***

Student Notebook Reflection – How does what happens on the land in a watershed affect what happens in the rivers, creeks, lakes and bay?

## LESSON 5:
## EGGS BEGIN HATCHING: WHAT ARE THE LIFE STAGES OF THE RAINBOW TROUT?

***Objective:***

Students will make observations of the appearance and behavior of the alevin, and predict when they will swim up, based on temperature data.

***Materials:***

- Trout Life Cycle Poster
- Science Notebooks
- Vocabulary Cards of alevin: alevin, yolk sac, hide, predator, redd

***Procedure:***

Observation of aquarium, including temperature – the eggs are hatching! Students take turns viewing the alevin in partner pairs and writing their observations in their notebooks. The rest of the class will begin coloring and cutting out their trout hats (to wear on the field trip to release the fry). Students can look at the pictures of the adult trout on the posters to get an idea of the colors to use and notice that the alevin do not look like small adult rainbow trout.

Teacher refers to Poster of Trout Life Cycle. The eggs have begun to hatch, and now we have the next stage, the alevin. They need food, and the food they are consuming right now is in their yolk sacs. The alevin stay down in the gravel to hide from predators who would eat them. Alevin do not look like adult trout. Some baby animals do not look like their parents, at first.

Students observe the alevin in the aquarium and take notes on what they see. Students can use the Nature Journal template on page 9 of the Tour in the Classroom Teacher Resources Guide for this observation of the alevin.

Students write the focus question in their notebooks: What are the life stages of the rainbow trout? Students read about alevin behavior and their food, the yolk sac. They can read the Trout Life Cycle page from the “Salmon and Trout Go To School” guide. Students share information about alevin behavior based on the reading. Alevin stay in the gravel because _____. The yolk

sac helps alevin because _____. Teacher can point out that the female trout makes a nest in the gravel, called a redd, and the alevin stay in the redd until their yolk sacs are absorbed.

Students draw an alevin in their notebooks/journals and label the yolk sac. Students write one sentence about alevin behavior.

Students write a prediction in their notebooks. What will happen to the alevin? How will they grow and change? After they write their predictions, students can share out in their table groups and then one from each group can share with the class.

***Evaluate:***

Alevin drawing, sentence and prediction.

## LESSON 6:
## WHAT DO RAINBOW TROUT EAT?

***Objective:***

Students will make models of food chains that include the animals shown in the "What Trout Eat" slideshow.

***Materials:***

- Slideshow "What Trout Eat"
- Benthic Macroinvertebrates Poster
- A Trout's Diet Poster

***Procedure:***

Remind students that trout need four things to survive – food, shelter, water and space. Our alevin don't need to hunt for food, because their nourishment comes from their yolk sacs. Soon, when their yolk sacs are completely absorbed, they will need to find other food. That's when we will release them into a lake, so they can learn how to find their own food as they grow.

Introduce slideshow, "What Trout Eat," and narrate slides.

Give students pictures of the animals and plants shown in the "What Trout Eat" slideshow. In table groups, students will create as many food chains as they can, using the information on the cards about what each animal or plant eats and is eaten by.

**(Note to Ethan and Bob: Kate is creating the cards to go with this activity, based on information in the slideshow and in Aquatic WILD.)**

***Evaluate:***

In their notebooks students will draw and label a diagram of one food chain that goes from the sun to a plant to an insect to a trout.

**LESSON 7: HOW DO WE KNOW IF A STREAM IS HEALTHY?**

***Objective:***

Students will identify several aquatic organisms, and assess the relative environmental quality of a stream or pond using indicators of pH, water temperature, and the presence of a diversity of organisms.

***Materials:***

- VideoSomething's Fishy in the River
  - https://vimeo.com/114261936
  - https://www.youtube.com/watch?v=5hw8myL1Skk
- "Water Canaries" lesson on page 63 of Aquatic WILD
- Water samples from a local creek or lake
- Other materials listed in lesson

***Procedure:***

Students will take notes as they watch the video – what misconceptions about garbage do the dogs have at the start of the video? What do the different animals tell them about human impacts on their lives?

1. Salmon
2. River Otter
3. Dragonfly
4. Beaver
5. Crayfish
6. Frog
7. Duck

8. Turtle

"Water Canaries" lesson: This lesson can be done as a field trip to a creek or lake, or in the classroom with water samples. The lesson involves using magnifying glasses and species identification guides to identify aquatic organisms. It includes using water quality testing equipment to test pH, temperature, and dissolved oxygen. If the samples are brought back to the classroom, temperature will need to be measured before the lesson, at the site where the samples are collected.

The purpose of this lesson is to give students a hands-on experience with the factors that indicate the relative health of a creek or lake.

***Evaluate:***

Student Notes about video. Aquatic Conditions Student Worksheets from the "Water Canaries" lesson.

**LESSON 8:**
**AT SWIM UP – FRY AND LIFE CYCLE**

***Objective:***

Students will make observations of the appearance and behavior of the fry, and predict the behaviors that will help them survive in the lake when they are released, based on evidence from their observations.

***Materials:***

- Trout Hats to color (in Curriculum Aids) Need 11 x 17 copying paper
- Sequence Dot Game in
- Return to the Redd Game
- https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=77535&inline
- Science Notebooks

***Procedure:***

Activate student thinking about the rainbow trout life cycle, referring to the life cycle chart. What do the trout look like after they have absorbed their yolk sac? When students observe the trout today, they will focus on how they have changed and write those observations about the trouts' appearance and behavior in their notebooks, along with any questions they have.

With their table groups, students will move through four activities, spending 10 minutes at each one.

Trout Centers

1. Sequence Dot Game
2. Color and cut out Trout Hats
3. Observe fry in aquarium and take notes on their behavior. Include labeled drawings and questions.
4. Play Return to the Redd

***Evaluate:***

Notebooks: Observations and Questions about the fry.

**LESSON 9:**
**RELEASE DAY: IS THE LAKE A GOOD PLACE FOR TROUT TO LIVE?**

***Objective:***

Students will test lake water for pH as evidence to make a claim about the ability of their trout to survive in this environment. Students will clean up garbage around the lake and make connections to the "Something's Fishy in the River" video.

***Materials:***

- Hooks and Ladders game (Lake Trout version)
- Science Notebooks
- Garbage Bags
- Gloves
- Trash Grabbers
- Benthic Macroinvertebrates Poster
- The "Fry Release Field Trip Guide" in the Curriculum Aids section of the CAEP website has important information for field trip preparations, and many more activities to do with students.

***Procedure:***

After arriving at the lake, put the trout bucket into the water while students check the pH of the lake water. Remind students that our trout need a pH of between 6.5 and 7.5

Garbage Collecting Walk Around the Lake – Human impact that negatively affects the lake ecosystem. “Plastic In its Many Forms” Activity from CASEC Plastic Eliminators curriculum.

In your notebook/journal, describe anything you see at the lake that can have a connection to the survival of our trout.

How can humans maintain the lake so that our trout will survive and reproduce? Possible engineering solutions to negative human impacts – focusing on garbage, and transportation to the lake.

***Evaluate:***

Student notebooks/journals – Final Trout Journal and release data worksheet

**LESSON 10:**
**HOW CAN WE PROTECT THE RAINBOW TROUT’S HABITAT? (CITIZEN SCIENCE)**

***Objective:***

Students will research information about California conservation organizations that restore and protect streams, creeks, lakes and rivers. Students will make group presentations about the work of these organizations, and the ways in which students and other citizens can help.

***Materials:***

- Video: “The Way of a Trout”
- Brochures, flyers, articles and websites about 6 local groups that are concerned about watershed conservation:
    1. Friends of Sausal Creek
    2. Fishing in the City
    3. Watershed Project
    4. California Coastal Commission (Coastal Cleanup Day)
    5. Creek to Bay Day and We Lead Ours (Creek Cleanup)
    6. Salmon Protection and Watershed Network

***Procedure:***

Students watch the video and take notes on how humans can have a positive or negative effect on the habitat of the trout.

There are organizations that protect streams, lakes and the bay in our local watershed. What do those organizations do? What can we do, as students, teachers and citizens, to keep our local waterways clean and healthy?

Each group reads and discusses the materials of one of the local organizations. Each group works together to create a poster and make a presentation to the class, based on the work of their conservation organization and ways in which students might be able to participate in that work.

***Evaluate:***

Student presentations

## Connections to NGSS

- Disciplinary Core Ideas (DCI)
- Science and Engineering Practices (SEP)
- Crosscutting Concepts (CCC)
- Performance Expectations (PE)

**LESSON 1**

K – (SEP Analyzing and Interpreting Data): Build on prior experiences and progress to collecting, recording and sharing observations.

1st - (SEP K-2-ETS1 Asking Questions and Defining Problems): Ask questions based on observation to get more information about the natural and/or designed worlds.

2nd – (DCI Life Science LS4.D): There are many different kinds of living things in any area, and they exist in different places on land and in water.

3rd - (CCC LS4 Systems and System Models): A system can be described in terms of its components and their interactions.

4th - (DCI ESS2.E Biogeology): living things affect the physical characteristics of their regions.

5th - (DCI Life Science LS2.A) Interdependent Relationships in Ecosystems

Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life.

**LESSON 2**

K – (Earth Science DCI ESS3.A Natural Resources): Living things need water, air and resources from the land, and they live in places that have the things they need.

1st - (SEP K-2-ETS1 Asking Questions and Defining Problems): Ask questions based on observation to get more information about the natural and/or designed worlds.

2nd – (DCI Life Science LS4.D): There are many different kinds of living things in any area, and they exist in different places on land and in water.

3rd – (DCI Life Science LS2.D): Being part of a group helps animals obtain food, defend themselves, and cope with changes.

4th - (DCI ESS2.E Biogeology): living things affect the physical characteristics of their regions.

5th – (DCI LS1.C Organization for Matter and Energy Flow in Organisms): Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.

**LESSON 3**

K – (SEP Analyzing and Interpreting Data): Build on prior experiences and progress to collecting, recording and sharing observations.

1st – (DCI Life Science LS1.B): Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.

2nd – (CCC 2-LS2 Structure and Function): The shape and stability of structures of natural and designed objects are related to their function (eggs).

3rd – (DCI Life Science LS1.B): Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

4th - (DCI Life Science LS1.A Structure and Function): Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.

5th - (DCI Life Science LS2.A) Interdependent Relationships in Ecosystems

Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life.

**LESSON 4**

K – (SEP Obtaining, Evaluating and Communicating Information): Read grade-appropriate texts to obtain scientific information to describe patterns in the natural world.

1st – (DCI Life Science LS3.A): Young animals are very much, but not exactly like, their parents.

2nd – (SEP 2-LS4 Planning and Carrying Out Investigations): Make observations to collect data that can be used to make comparisons.

3rd - (DCI Life Science LS1.B): Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

4th – (DCI Life Science LS1.A Structure and Function): Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.

5th - (DCI LS1.C Organization for Matter and Energy Flow in Organisms): Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion

**LESSON 5**

K – (DCI Life Science LS1.C): All animals need food in order to live and grow.

1st – (DCI LS1.D): Animals have body parts that capture and convey different kinds of information needed for growth and survival.

2nd – (PE Earth Science 2-ESS2-2): Develop a model that shows the shapes and kinds of land and bodies of water in an area.

3rd – (CCC LS4 Systems and System Models): A system can be described in terms of its components and their interactions.

4th – (DCI ESS2.E Biogeology): living things affect the physical characteristics of their regions.

5th – (DCI Life Science LS2.A) Interdependent Relationships in Ecosystems

Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.

**LESSON 6**

K – (DCI Life Science LS1.C): All animals need food in order to live and grow.

1st – (DCI LS1.D): Animals have body parts that capture and convey different kinds of information needed for growth and survival.

2nd – (PE Earth Science 2-ESS2-2): Develop a model that shows the shapes and kinds of land and bodies of water in an area.

3rd – (CCC LS4 Systems and System Models): A system can be described in terms of its components and their interactions.

4th – (DCI ESS2.E Biogeology): living things affect the physical characteristics of their regions.

5th – (DCI Life Science LS2.A) Interdependent Relationships in Ecosystems

Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.

**LESSON 7**

K – (SEP Analyzing and Interpreting Data): Use observations to describe patterns in the natural world in order to answer scientific questions.

1st – (SEP K-2-ETS1 Asking Questions and Defining Problems): Ask questions based on observation to get more information about the natural and/or designed worlds.

2nd - (CCC 2-LS2 Structure and Function): The shape and stability of structures of natural and designed objects are related to their function (eggs).

3rd - (DCI Life Science LS1.B): Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

4th - (DCI Life Science LS1.A Structure and Function): Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.

5th - (DCI Life Science LS2.A) Interdependent Relationships in Ecosystems

Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life.

**LESSON 8**

K – (Life Science DCI LS1.C): Organization for Matter and Energy Flow in Organisms

All animals need food in order to live and grow.

1st – (DCI Life Science LS3.A) Young animals are very much, but not exactly like, their parents.

2nd - (SEP 2-LS4 Planning and Carrying Out Investigations): Make observations to collect data that can be used to make comparisons.

3rd – (DCI Life Science LS3.B): The environment also affects the traits that an organism develops.

4th – (DCI Life Science LS1.D Information Processing): Animals are able to use their sense perceptions and memories to guide their actions.

5th - (DCI LS1.C Organization for Matter and Energy Flow in Organisms): Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.

## LESSON 9

K – (DCI Earth Science ESS3.C): Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impact on the land, water, air and other living things.

1st – (DCI Engineering ETS1.A) Asking questions, making observations, and gathering information are helpful in thinking about problems.

2nd – (PE Life Science 2-LS4-1): Make observations of plants and animals to compare the diversity of life in different habitats.

3rd - (DCI Life Science LS2.C Ecosystem Dynamics, Functioning, and Resilience): When the environment changes in ways that affect a place's physical characteristics, temperature or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

4th - (DCI Life Science LS1.A Structure and Function): Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.

5th – (DCI Life Science LS2.A) Interdependent Relationships in Ecosystems

A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life.

## LESSON 10

K – (PE Life Science KLS1-1): Use observations to describe patterns of what plants and animals (including humans) need to survive.

1st – (DCI Life Science LS1.A): All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find and take in food, water and air.

2nd - (SEP 2-LS4 Planning and Carrying Out Investigations): Make observations to collect data that can be used to make comparisons.

3rd – (DCI Life Science LS3.A): Many characteristics of organisms are inherited from their parents.

4th – (DCI Life Science LS1.A Structure and Function): Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.

5th – (CCC LS1 Energy and Matter): Matter is transported into, out of, and within systems.