

Classification of Living Things
STEM Learning Module

PISA Team:

Name	Grade	School
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Strand(s): Classification

Grade(s): 4-5

Key Science Terms: **4th Grade** Terms: energy, climate, oxygen, food, shelter, food chain, producer, consumer, decomposers, habitat, herbivore, carnivore, omnivore, water, environment, non-living, living animals. **5th Grade** Terms: invertebrates, pores, stinging cell, tentacles, parasite, flatworm, roundworm, segmented worm, regeneration, mollusk, mantle, echinoderm, tube foot, arthropod, exoskeleton, molt, thorax, abdomen.

Key Science Concepts: **4th Grade** Key Concepts: Organisms and objects can be categorized as living and non-living. All living things have basic needs and depend on each other (food chain). All living things have life cycles. All living things fit into certain classifications. All **5th Grade** Key Concepts: Compare vertebrates and invertebrates. Infer why scientists classify organisms, especially invertebrates. Describe the physical traits that make up animals in the categories of sponges, stinging-celled animals, worms, mollusks, spiny-skinned animals, and arthropods. Explore the importance and function of a bee.

NJCCC Standards:

5.1 A Habits of Mind

1. Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation.
2. Keep records that describe observations, carefully distinguish actual observations from ideas and speculations, and are understandable weeks and months later.
4. Know that when solving a problem it is important to plan and get ideas and help from other people.

5.1B Inquiry and Problem Solving

1. Develop strategies and skills for information-gathering and problem solving, using appropriate tools and technologies
2. Identify the evidence used in an explanation

5.5 A Matter, Energy, and Organization in Living Systems

1. Identify the roles that organisms may serve in a food chain
2. Differentiate between the needs of plants and those of animals.
3. Recognize that plants and animals are composed of different parts performing different functions and working together for the well being of the organism

B Diversity and Biological Evolution

1. Develop a simple classification scheme for grouping organisms
2. Recognize that individuals vary within every species, including humans.

C. Reproduction and Heredity

1. Identify different stages in the lives of various organisms.

5E's	Procedure	Assessment Attach all assessment s	Materials/Handouts Attach all handouts
<p>Engage</p> <p>Days/Hours: 4th Grade Day1-2 90mins</p> <hr/> <p>Day 1/ 40 min. 5th Grade</p>	<p>4th Grade</p> <p>Key Questions:</p> <ul style="list-style-type: none"> How can we categorize all living things? <p>Key Concepts:</p> <ul style="list-style-type: none"> All living things fit into certain classifications <p>Procedure:</p> <ol style="list-style-type: none"> Pass out 12 images to students in class. Ask students, "What makes something alive? (list their thoughts on a chart on board) "What is a non-living thing? (list their thoughts on a chart on board) 4 Explain to students that children that have images of living things will line up on one side of room and children with images of non-living will line upon opposite side. 5. Discuss with class if what they see is acceptable. Modify if necessary. 6. Create a class chart on butcher 	<p>4th Grade</p> <p>Pre-assessment KWHL Classifying Living and Non Living things Chart</p> <p>5th Grade</p> <p>Pre-assessment Anticipation Guide</p>	<p>4th Grade</p> <p>Print out images of 4 non-living objects and 8 living organisms</p> <p>Examples of images, Ant Grass Pigeon Slug Rat Sunflower Cigarette butt Dandelion Bee Squirrel Mouse Tree Leaf Worm Can</p>

paper of living and non-living things (put away until all pre-assessments are complete).

7. Pass out [KWLH](#) sheets and work as a class to complete KWH parts (class model on butcher paper)

8. Pass out scissors and glue for [Classifying Living and Non Living things Chart](#) pre-assessment activity

5th Grade

Key Questions:

- What is the difference between a vertebrate and an invertebrate?

Key Concepts:

- Animals can be classified as vertebrate or invertebrate.

Procedure:

1. Students will be asked to hypothesize the meaning of vertebrate and invertebrate.
 2. Students will be guided to feel their backs and describe what they feel.
 3. Teacher will guide students on the process of understanding how vertebrates and invertebrates are comprised.
 4. Students will be directed to look at the chart on the board as well as their Chart Worksheets. Students
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will be asked to cut and paste photos of different animals into the appropriate category.

5. Students will share answers and explain why they placed that animal into that category. Students will also be taking an anticipation guide assessment where they will have to decide if a statement is true or false on the left hand side of the paper.
6. All papers will be collected and saved for the final assessment at the end of the unit.

Day 3/
1 hr.
Grade 5

(The following activity would be used right after the square of Life activity outside. Comparisons to other schools and writing activity will follow after.)

Key Questions:

- What objects did the groups find?
- Can they classify them?

Key Concepts:

- There are many different types of invertebrates and vertebrates in our environment.

Procedure:

1. Students will examine their findings from the Square of Life activity and list what they found in a chart labeled Vertebrate, Invertebrate, and Other. Students will work on this [worksheet](#) in

5th Grade
[Worksheet](#)

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- cooperative groups.
2. All results and questions will be reviewed and explained.

Explore

Days/Hours:

4th Grade

Days 3-5

2-3hours

Day 3/

1 hr.

5th Grade

4th Grade/5th Grade

Key Questions:

- How can we categorize all living things?

Key Concepts:

- All living things fit into certain classifications

.Procedure:

1. Students will have a [field trip](#) to their Square of Life
2. Assigned groups will categorize found objects/organisms and create *bar graphs* using graph paper.

5th Grade added key questions

Key Questions:

- Are all invertebrates and vertebrates similar around the country or even world?

Key Concepts:

- Some invertebrates and vertebrates are found everywhere while some are not.

Procedure:

1. Students will share their

Square of Life

[Reference Materials](#)

[field trip](#)

Day 3/
45 mins.
5th Grade

- results which will be posted on the board.
2. Students will then classify all of their findings into a chart similar to their extension worksheet.
3. Students will explore the Square of Life website.
4. As a class, a comparison school will be selected.
5. Class will compare and contrast findings from their own search to those at another school.
6. Students will write their observations in groups and share with the whole class.
7. Our observations will build our writing assignment on the Square of Life website.

5th Grade

Cross Curricular Extension (Math)

Key Questions:

- What is a percentage?
- How do I calculate percentage?
- How can I show my data in a graph using percentages?

Key Concepts:

- Students will be able to calculate percentages and be able show their
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5th Grade

[pie chart design sheet](#)

findings in a graphic source-pie chart.

Procedure:

1. Students will be asked get into their groups from the Square of Life activity.
2. They will be directed to look at their Chart Worksheet and count how many invertebrates, vertebrates, and others they found in their Square of Life.
3. Teacher will guide them in the skill of calculating percents.
4. Students will design their own pie charts for the information they found in their groups on the [pie chart design sheet](#).

Day 4/
45 mins.
5th Grade

Continuation of the Cross Curricular Extension (Math)

1. Students will have time to refer back to our class wide chart of findings and find the percentages for each category. This will assess if the students have learned the process of calculating percentages.
 2. In order to assess if learning has been achieved, groups will post their results of the class wide chart on the board.
 3. The teacher will then announce what groups received the right answers and the class will construct a pie chart to post as part of their observations on the Square of Life website.
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Explain**4th Grade**

Days/Hours:
4th Grade
Days 6-8
(2-3hours)

Key Questions:

- How can we categorize all living things?
- What are the basic needs of animals?
- How do the basic needs of animals differ from that of plants?
- Where do most living things get their energy?

Key Concepts:

- All living things fit into certain classifications

Procedure:

1. Students will list organisms and objects found in square of life on Square of Life website
http://www.k12science.org/curriculum/squareproj/prep_list.htm
 2. Students will identify the basic needs of all animals using their prior knowledge and *Harcourt Science* in a class chart
 3. . Draw a picture and write how humans meet each of their needs. ([Needs Chart](#))
 4. Research facts and information about ants and other organisms.
 5. Create an [illustrated poster](#) that represents an ant and another organism and illustrates the life cycle of each organism and its place in the food chain
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4th Grade

- *Harcourt Science* Unit A Chapter 2 ppA36-A36
- [Needs Chart](#)
- Ant Encyclopedia http://ant.edb.miyakyo-u.ac.jp/INTRODUCTION/Gakken79E/Page_02.htm
- Interesting Ant Facts
- <http://home.att.net/~b-p.TRUSCIO/STRANGER.h>
- [illustrated poster](#)

Days 4-7/
45 minutes
each

5th Grade

5th Grade

Key Questions:

- What are the different types of invertebrates?
- What are their traits?
- What special things do they do to eat or protect them?

Key Concepts:

- *Lesson 2:* Sponges do not move from place to place.

They filter water for their food.

Stinging-cell animals contain a poisonous thread located in the tentacles that stuns their prey. The tentacles sting the food and bring it to the mouth. Some stinging cell animals have threads poisonous enough to kill only small animals while others have strong stinging cells that can harm or even kill humans.

- *Lesson 3:* The three groups of worms are round, flat, and segmented. The traits of a flat worm include a flattened body with only one body opening – mouth- where they consume food and emit waste. Planarians are also known for regenerating. The traits of round worms include a round body with two body openings- the mouth and anus. The traits of segmented worms include a segmented body. As the worm grows, new segments
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5th Grade

- [Powerpoint Pres. On Taxonomy Challenge](#)
- [Worksheet for Taxonomy Challenge](#)
- Dichotomous Key Handout

attached to the tail end. These worms are known for their ability to grow back parts that have been cut or torn off. All worms are parasites who eat off of other things in order to live.

- *Lesson 4:* Mollusks are an invertebrate that has a soft body. Most mollusks have three parts: head, foot, and body mass. The sense organs are in the head. The foot is for crawling, swimming, and digging. The body mass contains the organs and is protected by the mantle. Spiny-skinned animals are also known as echinoderms because they live in the ocean. The outer bodies are made up of hard plates covered by a thin skin. Echinoderms move from place to place on tube feet. These tube feet are also used for hunting prey.
- *Lesson 5:* Arthropods are invertebrates with jointed legs, a segmented body, and a hard outer shell called the exoskeleton. Arthropods have sensing organs called antenna. There are arthropods with two body sections and others with three body sections.

Procedure:

1. Students and teacher will review over sections 2-5 in Science Horizons
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(copyright 1993) and answer all review questions. All lessons deal with the physical characteristic of sponges, stinging-celled animals, worms, mollusks, spiny-skinned animals, and arthropods.

2. Students will then partake in an activity called *Taxonomy Challenge*. This activity reviews basic concepts already taught and allows the children time to classify different animals as vertebrate or invertebrate and classify the type of animal through a simple dichotomous key.

Key Questions:

- Why are bees important? What kind of impact would a reduced population have on an agricultural society?
- Imagine and describe a bee-less earth.
- What are some ways bees communicate? What kinds of things would they need to communicate with each other and with other species?
- Describe the social structure of a beehive. Why is this successful? How does it compare to human societies?

Key Concepts:

Day 8/
1 hr.
5th Grade

5th Grade

- [Science Friday](#)
 - [Bee Podcast Worksheet](#)
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- Bees have many important functions in our environment.
 - Without bees, our environment would be very different.
 - Bees communicate in various ways.
 - Bees have a special and organized structure in which they live.

Procedure:

1. Students will go in depth on the importance and function of bees by listening to *Bees*- a podcast from [Science Friday](#).
2. While students are listening to this podcast, they will have a comprehension sheet to fill out concerning the purpose of the lesson on the [Bee Podcast Worksheet](#).

Cross-Curricular Extension (Reading)

Key Questions:

- Besides pollination, what is another function of the bee?
- What are the specialized physical parts of the bee?
- What is the social structure like in a hive?

Key Concepts:

- Hives are important places for bees that involve a special social structure.
 - Some bees play big roles like the queen bee and smaller yet busy roles like the drones.
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Day 9-10/
1 hr. each
5th Grade

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- Physical traits of the bees help it to protect itself and do specific jobs.

Procedure:

1. Read From "Bees to Honey" in the Scott-Foresman Reading Textbook.
2. Review the different parts of the bee and their uses.
3. This will lead to the EiE activity "The Best of Bugs" Lesson 4: Engineering Hand Pollinators.

Elaborate 4th Grade

Days/Hours:
4th Grade
Days9-11
2-3 hours

Key Questions:

- What are the basic needs of animals?
- What is a life cycle?

Key Concepts:

- All living things have basic needs and depend on each other (food chain)
- All living things have life cycles

Procedure:

1. Pose question to students, " What type of temporary home can we make for ants so we can be able to observe and study them?"
2. Students will use the Engineering Design Process to create an [Ant Day Care Center](#) .

4TH Grade:

[Ant Day Care Center](#)

5th Grade
Key Questions:
Days 11-13/
40 mins.
Each
5th Grade

- If we lived in a bee-less world, how would plants and flowers be pollinated?

Key Concepts:

- Hand pollinators can be used and created to pollinate flowers if there's a decrease in bees.

Procedure:
1. Ask students, "What are some ways we can pollinate flowers if bees aren't pollinating?"
2. Students will use the Engineering Design Process to build their own Hand Pollinator from EiE.

Evaluate

Days/Hours:
4th Grade
Days 12-13
90 minutes

4th Grade

Procedure:
1. Pass out students' [KWHL](#) sheets partially completed in Explain part of module and work independently on Learned section.
2. Pass out scissors and glue for [Classifying Living and Non Living things Chart](#) post-assessment activity.
3. Complete [post-assessment test](#) for module.

4th Grade:

[KWHL](#)
[Classifying Living and Non Living things Chart](#)
[post-assessment](#)

5th Grade

Day 14/
40 mins.

Procedure:
1. Hand back pre-assessment Anticipation Guide and have students

[Post-Assessment Test](#)

5th Grade

write the answers to the questions on the right hand side of the paper.
2. Papers will be switched among students and the class will review answers together.
3. Students will then complete a Semantic Feature Analysis individually concerning the physical traits of different invertebrates studied in class. This will be collected for assessment.

5th Grade

Anticipation
Guide

Semantic
Feature
Analysis

5th Grade

- Formal Test from Science Horizons (copyright 1993)

5th Grade

Procedure:

1. Students will take the assessment test from the Science Horizons Text (copyright 1993).

Day 15/
40 mins.

5th Grade

Timeline: Create a timeline for this project.

4th Grade about 2 weeks

5th Grade 15 class periods
