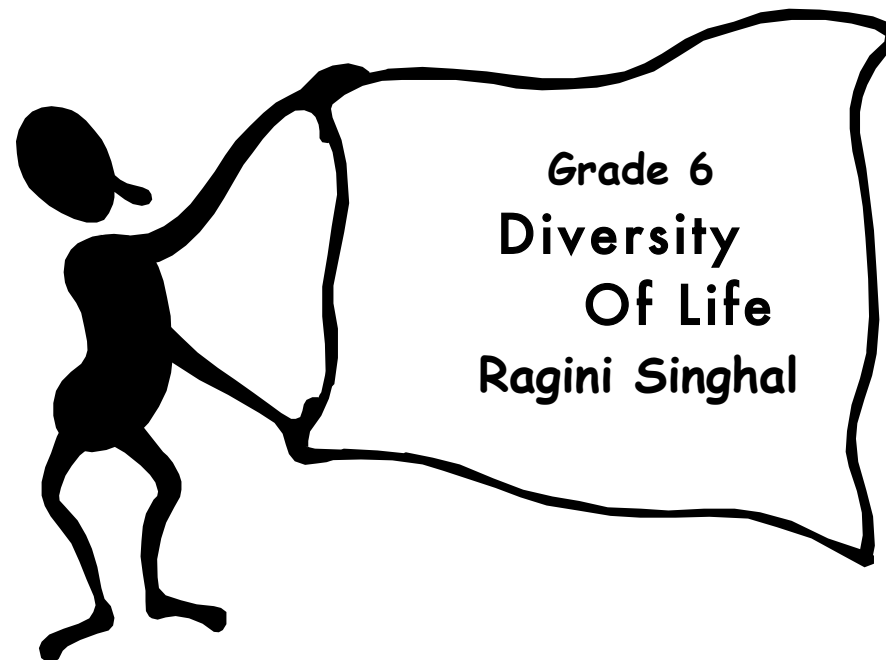


**New York City Department of Education  
Robert Van Wyck MS 217**



**Essential Question: Why care about earthworms?**

**Suggested Time Frame: Approximately 4-5 weeks**

**Theme: Survival & Sustainability**

**Graphic Overview of Unit**  
**Suggested Time Frame: 4-5 weeks**

**Essential Question: Why care about earthworms?**

**Unit name:** Diversity of Life

**Mini-unit name**  
Characteristics of living things

**Mini-unit name**  
cells

**Mini-unit name**  
Classification of living things: 6  
kingdoms of organisms

**Mini-unit name**  
Interactions of living things

**Mini-Units**  
\* It is recommended that each mini-unit end with a standardized test that reflects the state / city assessment

**Unit's Culminating Project: (briefly explain in 2-3 sentences):**

Students will plan and make a labeled diagram or 3-d model of an organic garden and a planting guide for the garden. They will write a report on strategies that will be used to organically fertilize the garden and control pests.

## Stage 1- Desired Results

### **Standards-Based Learning Goals:**

Standard 4: 1.1a, 1.1b, 1.1c, 1.1d, 1.1h.

Standard 6: 1a, 1b, 1c

Standard 7: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 2d

## Concepts

### **Big Ideas for this Unit**

Diversity

Interdependence

Sustainability

### **Magnet School Theme:**

Green Magnet School for Career Exploration & Technology

### **How does the Big Idea in your unit connect to your theme?**

Students will understand how each and every organism is interdependent, and essential to the sustainability of an ecosystem.

### **Enduring Understandings**

1. The diversity of organisms extend from the simplest bacteria to the most complex of big mammals
2. For an ecosystem to maintain balance, there should be the existence of the most simple (unicellular) to the most complex (multi-cellular) organisms.

### **Overarching Essential Question: (this question should connect to your school theme)**

Why is it important to maintain and foster diversity of life in our environment?

3. Harm or damage even to the most simple organism will affect the balance of life in an ecosystem.

**Content and Skills**

**Content****Students will know...**

The characteristics of living things;  
The cell is a basic unit of structure and function of living things;  
Structure of the cell, functions of the organelles of the cells, prokaryotic and eukaryotic cells;  
Six kingdoms of living things: Archaea, Bacteria, Protists, Fungi, Plants, Animals;  
Differences in structure of cells of the different kingdoms,  
How animals, plants, fungi and bacteria are interdependent, how they work together to preserve the balance of the ecosystem;  
Flow of energy in an ecosystem.

**Skills****Students will be able to...**

Identify the 6 kingdoms of organisms

Classify the organisms according to an established scheme and a student-generated scheme

Do research & conduct experiments

Analyze data they have collected from experiments and draw inferences

Write lab reports

Create a collaborative presentation on google docs

Create and maintain aquariums, terrariums, and a worm bin and maintain a log on their progress

Use their knowledge of organism interactions to create and maintain an organic garden

## Stage 2- Summative Assessment Evidence

**If students understand, know and are able to do the items in Stage 1, they should be able to show their understanding by completing an authentic task found in the world beyond the classroom.**

➤ **Design the Culminating/Summative Task:**

- **Please note: The Essential Question and the Grasp are interconnected. The GRASP is a way for students to demonstrate their knowledge and understanding unit by answer of the Essential Question. Or you can say, they are answering the essential question through their GRASP.**

G- (goal) To educate the local citizens about planning and maintaining a sustainable organic vegetable garden

R- (role) Ecologist/ gardener who represents an environmental organization

A- (audience) Local inhabitants

S- (situation) The government is populating a former superfund site. It has invited your environmental organization to educate the people about organic methods of farming to avoid a repeat of the earlier debacle of environmental pollutants through overuse of fertilizers and pesticides.

P- (purpose and product) Educate the people about the importance of all organisms in the local environment and how they can be used to improve the fertility of the soil and control pests by creating a plan and planting guide for an organic vegetable/flower garden.

S- (standards for performance)

Research report/ presentation

Planting guide/plan for the organic garden that includes;

1. What plants will you plant in the garden as source for food?
2. How will you plant to minimize nutrient depletion of the soil?
3. How, when and where in the garden will you plant to maximize production?
4. How will you control loss due to pests?
5. What organisms will you cultivate to maintain the health of your organic garden?

## **Student Task**

**In the space below, write the task exactly as students will see it.**

**You should give this task to them on the first day of the unit. This way they know where they are going.**

You are an ecologist who has been hired by the government to persuade local citizens about the benefits of organic farming. The citizens live on a former superfund site and the colony is relatively new. In order to avoid another superfund situation, the government wants to educate the inhabitants about ways to maintain soil fertility and pest control with minimal use of fertilizers and pesticides.

It is your job to create a model organic vegetable garden, and make a presentation that will make the inhabitants of the colony realize that in order to improve their quality of life and sustain their environment they must understand the importance of each and every organism that lives in their surroundings. You must teach people the following:

1. What to plant in the garden as source for food,
2. How, when and where in the garden to plant to maximize production,
3. How to plant to minimize nutrient depletion of the soil,
4. How to use natural methods to control loss due to pests,
5. What organisms to cultivate to maintain the health of your organic garden.

You will work in groups to:

1. Research in order to collect relevant information;
2. Create an online presentation using googledocs;
3. Create a model of an organic garden. This could be in the form of a detailed labeled drawing of your garden layout; or a 3-d model with labels.
4. Make a planting guide for your garden to accompany your model/sketch. Planting guide must include:
  - Names of the plants you recommend for planting in the area
  - When and where in the garden should these be planted
  - What plants should be planted together to facilitate pest control
  - Plants that will help fertilize the soil
  - Plants that will attract beneficial organisms
  - How these strategies help the environment
  - Should include illustrations
5. Present your project to the class and try to persuade them why your plan is the best!

Individually: Write a 1 page reflective essay on which model the citizens should adopt and why.

### Rubric For Culminating Project

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

Project Component	1	2	3	4
<b>Research 30 points</b>	<b>Irrelevant and inaccurate research, no suggested strategies OR Research missing</b>	<b>Some irrelevant research Includes only one strategy for organic farming methods</b>	<b>Well researched with relevant information. Includes strategies for two or more organic farming methods and pest control</b>	<b>Thoroughly researched, accurate, relevant and complete information Multiple strategies for organic farming methods and pest control included</b>
<b>Online presentation 10 points</b>	<b>Missing Presentation, Or Not the required # of slides, too many graphics and inaccurate information Multiple spelling and grammatical errors</b>	<b>Not the requisite number of slides Some spelling errors, some inaccurate information Too many graphics and too little information</b>	<b>Contains required number of slides, no grammatical and spelling errors in content, accurate and relevant information. Slides are sufficiently visible but may contain some irrelevant and distracting graphics</b>	<b>Contains required # of slides, no grammatical and spelling errors in content, Accurate &amp; relevant information Slides are clearly visible without any distracting graphics</b>

<p><b>Garden Plan 25 points</b></p>	<p><b>Model/drawing not labeled OR Model missing Incomplete or missing planting guide.</b></p>	<p><b>Model/drawing is incompletely labeled and confusing Planting guide is missing information.</b></p>	<p><b>Model/drawing is labeled. Clearly explained and accurate planting guide</b></p>	<p><b>Model/drawing is clear and labeled. Finished product can be used to create the garden Planting guide for the garden is detailed and contains illustrations and accurate relevant information</b></p>
<p><b>Presentation 20 points</b></p>	<p><b>Presenters do not face the audience, do not know the content of the presentation, Frequently play around and are unable to answer any question OR Unprepared on due date</b></p>	<p><b>Presenters frequently face away from the audience. Some members are unable to answer questions</b></p>	<p><b>Presenters face the audience at all times. Members are knowledgeable about the content of the presentation And are able to answer most of the questions put by the audience.</b></p>	<p><b>Presenters face the audience at all times, all members are knowledgeable about the content of the presentation and are able to answer all questions put by the audience</b></p>
<p><b>Reflection 15 points</b></p>	<p><b>Missing</b></p>	<p><b>Does not reflect the writer's feelings about the challenges. Only a narrative of the timeline of the project</b></p>	<p><b>Reflects the writer's feelings about the challenges of the project. Includes lessons learned from the project during the construction of the project, and team work</b></p>	<p><b>Clearly reflects the writer's feelings about the challenges of the project and the steps taken to overcome them. Also includes the lessons learned from the completion of the project.</b></p>

## Backwards Design Unit Planning

### Unit's Essential Question:

<b>Mini-Unit Title</b> (each mini-unit is approx 1 week long)	<b>Big ideas of the mini-unit / concept statement (macro)</b> What is the big idea of this mini-unit?	<b>Key Content /Knowledge (Important Content to Know about, vocabulary, the specifics) (Micro)</b>	<b>Skills</b> What should the students be able to do? (rule of thumb - skills are verbs – knowledge is a noun)	<b>List of Topical / Content Based Questions</b> (make sure to amend the essential question so that it becomes topical for this mini-unit)	<b>Mini-Unit Assessment</b> (must be aligned to the NYS / NYC exams. It can be a test or a quiz - i.e.: DBQ Essay; 10 multiple choice questions; or 3 constructed response questions)	<b>Scaffolding towards the culminating project</b> (what can be done during this mini-unit to develop the stage 2 culminating assessment (grasp))
Characteristics of living things	What makes something alive	Differences between living and non-living things: Respiration, Nutrition, Reproduction, Cells, Response to external stimuli, Homeostasis	*Compare and contrast objects and organisms *Analyze given matter to identify it as living or non-living	How do you know something is alive? What are the different methods that organisms use to survive in their environment?	10 multiple choice questions	Research local climate: temp, precipitation, locally grown vegetables and flowers in the area
Cells	The cell is a basic unit of structure and function of living things	Cell theory, Parts of the cell; cell membrane, nucleus, cytoplasm, mitochondria, vacuole, cell wall, ribosomes, chloroplast, endoplasmic reticulum. Differences	*Make wet mount slides *Manipulate a compound light microscope to animal and plant cells *Create a collaborative presentation on googledocs about cell theory	How do cells reflect the evolution of organisms over time in response to their external environment?	2 constructed responses, 5 matching questions. Sketch and label the plant and animal cells. List the differences between them. Match organelle to its function	Research - Companion planting for pest control and soil remediation

## Backwards Design Unit Planning

		between plant and animal cells	*Design and present a 3-d model of a cell that shows the different parts *Identify the differences between animal and plant cells			
Classification of living things	The diversity of organisms extend from the simplest bacteria to the most complex of big mammals	Archaea, bacteria, protists, fungi, plants, animals. What makes these kingdoms different from each other?	*Classify organisms based on self generated and accepted scheme *Make a concept map clearly showing the differences between the 6 kingdoms based on cell structure	How did organisms diversify in response to their environment?	5 multiple choice, 2 constructed response questions	Planning & more research: Make a list of plants you will plant in the garden. Justify the rationale for you decision. List some measures you will take to control pests in the garden.  Work on making the planting guide.
Interactions of living things	For an ecosystem to maintain balance, there should be the	Ecosystem, Biotic and abiotic factors of an ecosystem, producers, consumers,	*Show the flow of energy in a given ecosystem by making a food web	How do the biotic elements of an ecosystem inter-depend in order to survive?	Unit exam: 20 multiple choice, 3 constructed response questions.	Create sketch/model of your garden.  Presentation of

### **Backwards Design Unit Planning**

	<p>existence of the most simple (unicellular) to the most complex (multi-cellular) organisms. Harm or damage even to the most simple organism will affect the balance of life in an ecosystem.</p>	<p>decomposers, flow of energy in the ecosystem, food chain, food web</p>	<p>*Justify planting flowers in the vegetable garden in a letter to the Queens Botanical garden.</p>			<p>your project.</p> <p>Complete reflection that includes: Which model will you use if you were to plant your own garden, and why? Both positive and negative experiences about working with members of your team.</p>
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## Backwards Design Unit Planning

### Week 1

Monday	Tuesday	Wednesday	Thursday	Friday
<p><b>Content Focus:</b> Distinguish between living &amp; non-living things</p> <p><b>Hook:</b> Students observe and record the differences between a plant and a rock</p> <p><b>Daily Assessment:</b> Exit ticket: how are living different from non-living</p>	<p><b>Content Focus:</b> Characteristics of living things</p> <p><b>Hook:</b> Students observe and compare and contrast a plant and an animal</p> <p><b>Daily Assessment:</b> Exit ticket: What makes animals and plants similar?</p>	<p><b>Content Focus:</b> Needs of living things</p> <p><b>Hook:</b> Venn diagram comparing and contrasting the needs of plants and animals</p> <p><b>Daily Assessment:</b> <b>Exit ticket:</b> What do plants and animals both need?</p>	<p><b>Content Focus:</b> Adaptation</p> <p><b>Hook:</b> Video segment: Living things can respond to their surroundings</p> <p><b>Daily Assessment:</b> <b>Exit ticket:</b> What are some ways in which organisms adapt?</p>	<p><b>Content Focus:</b> Homeostasis</p> <p><b>Hook:</b> Video segment: Characteristics of living things</p> <p><b>Daily Assessment:</b> <b>Exit ticket:</b> List 5 characteristics of living things</p>
<p><b>Weekly Assessment (must be aligned to the NYS / NYC exams):</b> 10 question unit test</p> <p><b>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit's culminating assessment is a newspaper - perhaps the students have written an article)</b> Research local climate: temp, precipitation, locally grown vegetables and flowers in the area</p>				

## Backwards Design Unit Planning

### Week 2-

Monday	Tuesday	Wednesday	Thursday	Friday
<p><b>Content Focus:</b> All living things are made up of cells</p> <p><b>Hook:</b> Students will observe prepared slides of animal and plant cells using the compound light microscope.</p> <p><b>Daily Assessment:</b> Exit ticket; Labeled Sketch of the slides</p>	<p><b>Content Focus:</b> Cell theory</p> <p><b>Hook:</b> Video segment: cell theory</p> <p><b>Daily Assessment:</b> Exit ticket: what are the three parts of the cell theory</p>	<p><b>Content Focus:</b> Microscope Parts &amp; use</p> <p><b>Hook:</b> Students will identify the parts of the microscope</p> <p><b>Daily Assessment:</b> Worksheet: Label the parts of a microscope</p>	<p><b>Content Focus:</b> Using the microscope</p> <p><b>Hook:</b> Lab: Making a wet mount slide of the letter 'e'</p> <p><b>Daily Assessment:</b> Neatly made slide without bubbles</p>	<p><b>Content Focus:</b> Parts of the cell</p> <p><b>Hook:</b> Use microscope to observe onion skin slide .</p> <p><b>Daily Assessment:</b> Exit ticket: Sketch and label the three main parts of the cell</p>

**Weekly Assessment (must be aligned to the NYS / NYC exams):** Performance assessment: Prepare a slide of the given material. Sketch and label the parts of the cell that you see.

**What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)**

Research companion planting for pest control and soil remediation  
Work on planting guide

## Backwards Design Unit Planning

### Week 3

Monday	Tuesday	Wednesday	Thursday	Friday
<p><b>Content Focus:</b> Three main parts of the cell</p> <p><b>Hook:</b> Activity: students will make a model showing the cell membrane, nucleus and cytoplasm</p> <p><b>Daily Assessment:</b> Exit ticket: Functions of the cell membrane, nucleus and the cytoplasm</p>	<p><b>Content Focus:</b> Other organelles of the animal cell</p> <p><b>Hook:</b> Video segment showing the parts of the cell and the function of the parts</p> <p><b>Daily Assessment:</b> Worksheet: match part of the cell to</p>	<p><b>Content Focus:</b> Parts of the plant cell</p> <p><b>Hook:</b> Video segment about plant cell</p> <p><b>Daily Assessment:</b> Labeled drawing of the plant cell</p>	<p><b>Content Focus:</b> Differences between plant and animal cells</p> <p><b>Hook:</b> Students work in groups to make edible models of plant and animal cells</p> <p><b>Daily Assessment:</b> Exit ticket: List the differences between plant and</p>	<p><b>Content Focus:</b> Prokaryotic and Eukaryotic cells</p> <p><b>Hook:</b> Compare and contrast bacterial and animal cells as seen in projected diagrams.</p> <p><b>Daily Assessment:</b> Exit ticket: Differences between prokaryotic and eukaryotic cells</p>

## Backwards Design Unit Planning

**Weekly Assessment: (must be aligned to the NYS / NYC exams):**

2 constructed response, 5 matching questions. Sketch and label the plant and animal cells. List the differences between them. Match organelle to its function

**What have the students produced that scaffolds towards the units culminating assessment?**

**(for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)** Planting guide for your organic garden

### Week 4:

Monday	Tuesday	Wednesday	Thursday	Friday
<p><b>Content Focus:</b> Classification of organisms</p> <p><b>Hook:</b> Students classify given materials according to their own scheme</p> <p><b>Daily Assessment:</b> Journal response: Explain the reason for your classification of given material</p>	<p><b>Content Focus:</b> Introduction to taxonomy</p> <p><b>Hook:</b> Poster of established method of classification.</p> <p><b>Daily Assessment:</b> Exit ticket: Write your own mnemonic for remembering the order of classification?</p>	<p><b>Content Focus:</b> 2 main categories of organisms: with nuclear membrane, and without nuclear membrane</p> <p><b>Hook:</b> Sandwich bag models of prokaryotic and eukaryotic cells made with teacher guidance</p> <p><b>Daily Assessment:</b> Shared class activity: Classify organisms into prokaryotes and eukaryotes</p>	<p><b>Content Focus:</b> Differences between bacteria, archaea, fungi, plants and animals</p> <p><b>Hook:</b> Video: Kingdoms of living things</p> <p><b>Daily Assessment:</b> Exit ticket: List the 6 kingdoms of organisms.</p>	<p><b>Content Focus:</b> Continued from previous day</p> <p><b>Hook:</b> Review of video</p> <p><b>Daily Assessment:</b> Complete worksheet : Kingdoms of living things</p>

**Weekly Assessment: (must be aligned to the NYS / NYC exams):**

Test: 3 constructed responses, 15 multiple choice questions

## Backwards Design Unit Planning

### Week 5

Monday	Tuesday	Wednesday	Thursday	Friday
<p><b>Content Focus:</b> What is an ecosystem.</p> <p><b>Hook:</b> Students make aquariums and terrariums with given materials</p> <p><b>Daily Assessment:</b> journal entry: Component of the aquarium/terrarium</p>	<p><b>Content Focus:</b> Abiotic factors</p> <p><b>Hook:</b> Socratic seminar on The components of An ecosystem.</p> <p><b>Daily Assessment:</b> Exit ticket: what are the abiotic factors in a saltwater</p>	<p><b>Content Focus:</b> Biotic factors</p> <p><b>Hook:</b> Identify the living parts of the aquarium/terrarium.</p> <p><b>Daily Assessment:</b> Exit ticket: Identify the kingdoms of the biotic components of your terrarium/aquarium.</p>	<p><b>Content Focus:</b> Energy flow in the ecosystem</p> <p><b>Hook:</b> Discussion: Can organisms live without non living things?</p> <p><b>Daily Assessment:</b> Exit slip: What is the source of energy in the ecosystem?</p>	<p><b>Content Focus:</b> Interactions of biotic and abiotic factors</p> <p><b>Hook:</b> A trip to the school pollinator's garden/ Worm bin</p> <p><b>Daily Assessment:</b> Labeled drawing of the energy flow in the garden/ worm bin</p>

### **Backwards Design Unit Planning**

	aquarium?			indicating producers, consumers and decomposers.
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**Weekly Assessment (must be aligned to the NYS / NYC exams):**

Unit exam: 50 multiple choice, 3 constructed response questions that include all material covered in this unit.

**What have the students produced that scaffolds towards the units culminating assessment?  
(for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)**

Complete sketch/model of your garden.

    Presentation of your project.

Complete reflection that includes:

Which model will you use if you were to plant your own garden, and why? Both positive and negative experiences about working with members of your team.

### **Unit Resources**

## **Backwards Design Unit Planning**

### **Books:**

Textbook: Glencoe : New York Science Grade 6

### **Websites:**

<http://attra.ncat.org/organic.html>

comprehensive resource for organic farming!

<http://www.nysaes.cornell.edu/ent/biocontrol/>

biological control of pests

[http://en.wikipedia.org/wiki/Organic\\_farming\\_methods](http://en.wikipedia.org/wiki/Organic_farming_methods)

[http://en.wikipedia.org/wiki/Organic\\_farming#Methods](http://en.wikipedia.org/wiki/Organic_farming#Methods)

<http://www.epa.gov/oecaagct/torg.html>

<http://www.standardprocess.com/display/organicfarmingmethods.spl>

<http://www.buzzle.com/articles/organic-farming-methods.html>

<http://www.kidsgardening.com/growingideas/projects/mar03/pg1.html> - very useful

<http://www.ext.nodak.edu/county/cass/horticulture/vegetables/companion.htm>

<http://attra.ncat.org/organic.html>

<http://www.hort.uconn.edu/lpm/greenhs/htms/organicghsetomatoes.htm> - very useful

<http://www.epa.gov/opp00001/factsheets/ipm.htm>

<http://www.epa.gov/pesticides/biopesticides/>

<http://ipmworld.umn.edu/>

<http://nysipm.cornell.edu/elements/default.asp>

<http://nysipm.cornell.edu/publications/default.asp>

<http://www.nysaes.cornell.edu/recommends/>

<http://www.landscape-america.com/lawns/lawncare/ipm.html>

<http://www.jason.org/public/whatis/start.aspx>

**Teacher Materials:** Worksheet : parts of the microscope,  
Mnemonic for classification  
Quizzes,

**Other:** Microscope, slides, onion, tweezers, videos, pictures of organisms, poster of classification, worm bin,

## **Backwards Design Unit Planning**

Materials for making aquariums and terrariums