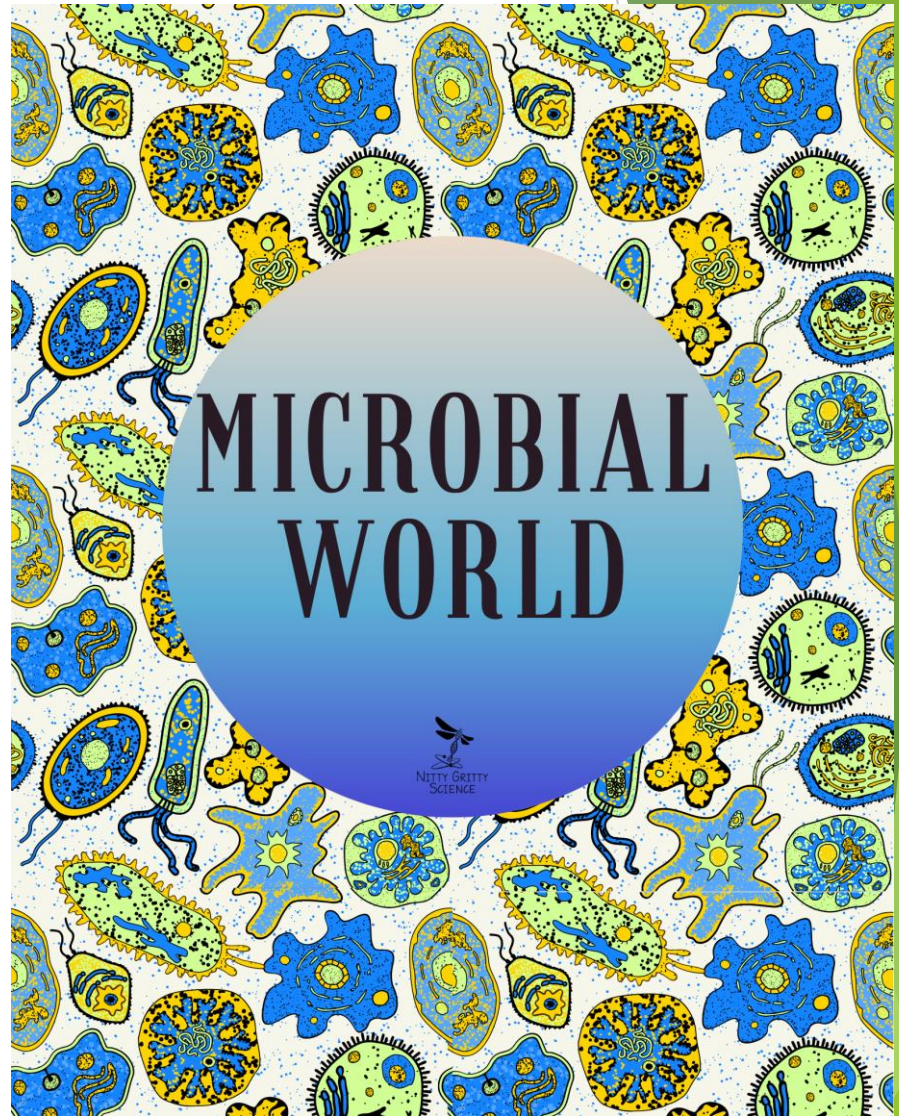


Microbial World



Microbial World Unit includes:

- Print and digital Interactive Notebooks
- Editable Resources including notes, PowerPoints, and test
- Instructional Videos
- Teacher-led Demos & Guided Inquiry Labs
- Task Cards & Digital Task Cards
- Study Guides





Suggested Pacing Guide



The following is a **suggested pacing guide** for my COMPLETE COURSES (Earth, Life or Physical Science) which are based on 50-minute class periods. There are three variations below. Each variation is based on the **number of sections in your SCIENCE INTERACTIVE NOTEBOOK chapter**.

Based on a **4-Section Chapter**

Day	Lesson/Activity	Engage	Explain	Explore	Elaborate	Evaluate
1	• Teacher Demo	x				
	• Section 1 Notes – INB input		x			
	• INB Activity – INB output (homework if not completed in class)			x		
2	• Mini-quiz					x
	• Section 2 Notes – use PowerPoint		x			
	• INB Activity			x		
3	• Mini-quiz					x
	• Guided Inquiry Lab – Student Led			x		
4	• Section 3 Notes – use PowerPoint		x			
	• INB Activity			x		
5	• Mini-quiz					x
	• Section 4 Notes – use PowerPoint		x			
	• INB Activity			x		
6	• Mini quiz					x
	• Science Stations				x	
7	• Science Stations				x	
8	• Final draft and testing for Creation Station (STEM)				x	x
9	• Task Card Review (game-style, full class, partner)				x	
10	• Chapter Test					x
	• Have students complete notes for next chapter*	x				

* **Note-taking option:** Once students are done with chapter test, they get the next set of notes and work quietly on completing them while other students finish up. All notes are to be completed when they return to class. Have students glue each page of notes into the next few pages of their INB (right side only). This way, when you go over the PowerPoint each day, they have already reviewed topic and are ready for class.

5 E Model

Engage – Teacher-led demos foster wonder and classroom discussion and serve as the hook for the lesson. Videos and images of natural phenomena also foster questioning and communication. NGSS phenomena are aligned to middle school NGSS standards.

Explain – PowerPoints, instructional videos, and guided notes (input side of interactive notebooks) provide definitions, explanations, and information through mini-lecture, text, internet, and other resources which encourages students to explain concepts and definitions in their own words.

Explore – Students investigate problems, events, or situations. As a result of their mental and physical involvement in these activities, students question events, observe patterns, identify and test variables, and communicate results.

Elaborate – It is important to involve students in further experiences that apply, extend, or elaborate the concepts, processes, or skill they are learning. Elaborate activities provide time for students to apply their understanding of concepts and skills. They might apply their understanding to similar phenomena or problems.

Evaluate – Use a variety of assessment to gather evidence of student's understanding and provide opportunities for them to assess their own progress.

Student Interactive Notebook



Each concept shares:

- Actual photos of both the INPUT and OUTPUT pages of Science Interactive Notebook
- Instructions on how to create/use/complete activity for OUTPUT side
- Mini-Quizzes for each concept to check students' understanding
- Answer Keys for all mini-quizzes
- Appendix with Teacher Notes for Interactive Notebook in LARGE print.

Section 1: Bacteria

Name That Bacteria

Directions: Cut out the circle Flaps below and fold each on the dotted line table below to identify and write the names of the bacteria inside each Flap completely. glue table and circle Flaps into your Science Interactive Notebook.

Prefix	Meaning	Basic Shape
Tripl-	Twisted chain	Bacilli
Spirilo-	Clindrical	Spirillum
Vibrio	Vibrating	Spirillum

Classification of Bacteria Shape and Number

Prefix	Meaning	Basic Shape
Diplo-	Two	Coccus
Strepto-	Twisted chain	Bacillus
Staphylo-	Clustered	Spirillum
Vibrio	Vibrating	Spirillum

Section 2: Viruses

Our Viruses

Circle the term that completes each sentence.

1. A bacterial is a (prokaryotic, eukaryotic) that lacks a nucleus and ranges in size from 1 to 5 micrometers.
2. Spherical shaped bacteria are identified using the term (spirilla, cocci).
3. When bacteria move genes from one cell to another through a hollow bridge, this is called (binary fission, conjugation).
4. The protein that represents a clustered group of bacteria is (strepto- staphylo-).
5. Some bacteria move with a whip-like tail called (flagella).
6. (Color, Gram) staining is a testing method used to determine what a bacteria's cell wall is composed of.

_____ bacterial cell divides to form two identical cells. This process is called (conjugation, binary fission).

Section 3: Protists

Our Viruses

Indicate the order of the lytic cycle by numbering the steps 1-5

1. _____ DNA from the virus is injected into the cell.
2. _____ Virus takes over and begins synthesizing new virus proteins and DNA.
3. _____ Cell lysis releases new viruses.
4. _____ Virus attaches to cell.
5. _____ Virus proteins and nucleic acids assemble into complete virus particles.

Define the following

6. prophase- _____
7. bacteriophage- _____

Viral Infection

Directions: Cut out three sides (shown by dotted line below) of each step of the diagram and fold back tab. (Blue page into Science Interactive Notebook)

Next, cut out the step descriptions and glue each under the tab in the proper order of either the lytic or lysogenic cycle below.

LYTIC CYCLE

LYSOGENIC CYCLE

Viral Infection - Answer Key

Directions: Cut out the following steps of lytic and lysogenic viral infections and glue in the proper position of the lytic and lysogenic cycles

Bacteriophage proteins and nucleic acids assemble into complete virus particles.	In some cases, cell and prophage are reproduced for many generations.	Bacteriophage DNA (prophage) inserts itself into bacterial chromosome.	Bacteriophage takes over and begins synthesizing new virus proteins and nucleic acids.
Bacteriophage injects DNA into bacterium.	Bacteriophage DNA (prophage) inserts itself into bacterial chromosome.	Prophage is able to exit bacterial chromosome. Prophage enters lytic cycle.	Bacteriophage takes over and begins synthesizing new virus proteins and nucleic acids.
Prophage is able to exit bacterial chromosome. Prophage enters lytic cycle.	Bacteriophage takes over and begins synthesizing new virus proteins and nucleic acids.	Bacteriophage proteins and nucleic acids assemble into complete virus particles.	In some cases, cell and prophage are reproduced for many generations.
Bacteriophage injects DNA into bacterium.	Bacteriophage DNA (prophage) inserts itself into bacterial chromosome.	Bacteriophage takes over and begins synthesizing new virus proteins and nucleic acids.	Prophage is able to exit bacterial chromosome. Prophage enters lytic cycle.

Instructions:

Your linguistic learners are going to have a hoot with this activity I mean, c'mon, who doesn't want to write about paramecium?

My Pet Paramecium is one of those sneaky assignments in the sense that the students will keep looking up the definition of the vocab words to see how to use them in their poem or song and will learn the functions of the paramecium without even realizing it!

Cut-outs of the pocket, paramecium and poem cards are all available for this concept, as well as the mini-quiz.

Have fun and make sure you give students an opportunity to share!

Student Digital Notebook

The student notebook is on Google Drive and ready for you to share with your students. Here's a quick overview of the features:

Set up like a traditional interactive notebook with input and output sides.

Hyperlinked tabs so student can easily move through chapter for review

Students watch video < 6 min to complete notes.

Directions: Use the table to identify the images. Click and drag the names of the bacteria to the correct image.

PREFIX	MEANING	BASIC SHAPE	MEANING
Diplo-	two	Coccus	round
Strepto-	twisted chain	Bacillus	Rod, stick
Staphylo-	clustered	Spirillum	spiral
		Vibrio	S or comma

Bacillus
Diplobacillus
Diplococcus
Spirillum
Staphylococcus
Streptobacillus
Streptococcus
Vibrio

BACTERIA

Prokaryote -

Prokaryotes are identified by characteristics such as _____, the chemical nature of their _____, the way they _____, and the way they obtain _____.

Cell walls -

Movement -

Some _____ can make their own _____ either using sun or _____, while others need to take in food by _____, other organisms or food organisms must. Like many other organisms, most bacteria use _____ to break down food.

Reproduction

Binary fission	
Conjugation	
Endospore	

BACTERIA
VIRUSES
PROTISTS
FUNGI
CLASSROOM LIBRARY

Digital Textbook

For further exploration, click button(s) below:

Bacteria Microbiology Society

Encouraging independent learners. Directions for output side are here along with what they need to complete the activity.

Notes are chunked into manageable sections with large spaces for textboxes

Some pages have links so students can go deeper into the topic if they need.

Demos, Labs, & Science Stations

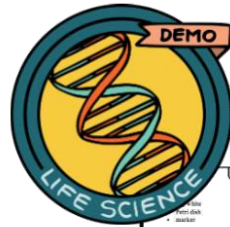
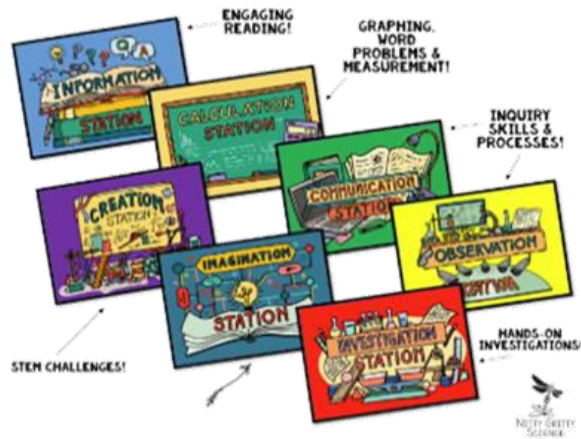


Working in the lab and being engaged in science experiments is the most exciting part of science.

Demo, Labs, and Science Stations Includes:

1. **SCIENCE STATION SIGNAGE** for all 7 stations is provided in color and in black and white (see preview) and all student answer sheets have icons that correspond with each station for ease of use.
2. **DEMONSTRATION** (teacher-led) allows teachers to invite scientific discussions and can help uncover misconceptions and, most importantly, lead to heightened curiosity and interest in the topic being studied.
3. **GUIDED INQUIRY LAB** which is a traditional lab that allows students to perform an investigation in order to solve a problem. Students will hypothesize, collect and analyze data and communicate their results.
4. **TEACHER GUIDES to DEMOS & SCIENCE STATIONS** help get you started and give you background information to make your science lessons engaging.
5. **7 SCIENCE STATIONS** which are designated locations in the classroom with activities that challenge students to extend their knowledge and elaborate on their science skills by working independently of the teacher in small groups or pairs. Stations included are:
 - **INFORMATION STATION** – Group members will read an interesting and relevant science passage then complete a task to help increase science literacy and deepen their understanding of the science concept.
 - **OBSERVATION STATION** – Group members will have images, illustrations, or actual samples at this station that show applications or processes of the science topic. Using what they've learned, they will need to apply their observation skills to complete the questions attached to each.
 - **CALCULATION STATION** – Group members use their math skills to complete the station challenge. Skills may include graphing, analyzing data, using models, measurement, and calculating formulas or word problems.
 - **INVESTIGATION STATION** – Group members will work with one another to explore the concept through hands-on activities so they may practice specific inquiry process skills as they learn.
 - **COMMUNICATION STATION** – There are three different options for this station: interviews, video, group essay. Depending on the option you choose, group members will communicate what they know by answering questions in creative ways.
 - **CREATION STATION** – Group members will work together to solve a STEM (Science, Technology, Engineering, Math) challenge by creating models or designs that demonstrate their understanding of the science topic being taught.
 - **IMAGINATION STATION** – This station makes science concepts relevant for students by asking them to imagine scenarios that will bring about discussion and critical thinking.
6. **INQUIRY PROCESS SKILLS CHECKLIST** is provided with each set to show teachers and administrators the inquiry skills used by students in each activity. These skills include, but are not limited to, communicating, creating models, inferring, classifying, identifying variables, measuring, observing, predicting, gathering and organizing data, comparing and contrasting, interpreting data, and manipulating materials.

SCIENCE STATIONS



Eye Safety

SCIENCE SKILLS AND LAB SAFETY

Name: _____ Date: _____

Procedure:

1. Draw an eye on the underside of the Post-It and display for class using the projector.
2. Cook over the egg and place the egg white only in the front dish.
3. Explain that the proteins in egg whites are similar to those found in the protective layer of the eye.
4. Tell them that someone was not being cautious and had splashed acid into their eye - add drops of acid to the egg white.
5. Ask students to make observations of what is happening to the egg white.
6. Try adding water to reverse the effects. Have students make observations.

What's Happening?

The proteins in the egg white become cloudy when the acid is causing a denaturation of the proteins. This can't be reversed chemically and students need to understand that a chemical can cause serious damage to their eyes or skin if not used properly. Students must be made aware of the safety procedures associated with such as wearing goggles, gloves and aprons. Make sure they are aware of safety equipment - eye wash station, showers, fire blanket, etc.

Discussion:

Q: What happened to the "eye"?

A: The protective layer became cloudy and damaged the eye.

Q: What type of safety equipment must be worn when doing Lab?

A: goggles, apron, hot fire gloves

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Discussion questions and teacher set-up included!

Teacher guide and answer key offered for every lab!

Easy-to-get materials!



Measure with SI Units

SCIENCE SKILLS AND LAB SAFETY

Name: _____ Date: _____

The standard system of measurement used by scientists around the world is known as the International System of Units, which is abbreviated as SI. SI units are easy to use because they are based on multiples of 10. Each unit is ten times larger than the next smallest unit and one-tenth the size of the next largest unit. The following table lists the prefixes used to name the most common SI units.

Prefix	Symbol	Abbreviation
kilo-	k-	1,000
hecto-	h-	100
deca-	da-	10
deci-	d-	0.1
centi-	c-	0.01
milli-	m-	0.001

Materials:

- scattered seeds
- tape
- balance
- postage scale
- capsaicin (very small milk cartons)
- fertilizer solution
- metric ruler
- 10-mL graduated cylinder
- colored pencils

Safety:

Wear goggles and gloves.

USER-FRIENDLY PAGES:

Students easily recognize which answer sheet to use at each station by matching station icons located on each page!!

Drip, Drop, Splat!

How does the density of a liquid and drop height affect the height and shape of droplet splatters?

Materials:

- colored water (graduated cylinder A)
- colored syrup (graduated cylinder B)
- eye dropper
- paper
- metric ruler
- meter stick

Procedure:

1. Make a hypothesis of how density of a liquid will affect splatter size on your lab sheet.
2. Place the piece of paper down on the lab table in order to catch splatters.
3. Measure the heights listed in the data table using a meter stick. Place meter stick with end starting at zero on paper and move up stick when increasing height of drop.
4. Use the eye dropper to drop ONE drop of colored water and ONE drop of colored syrup. Make sure to drop on different places on paper.
5. Measure the size of the splatter in MILLIMETERS. Record in data table on answer sheet.
6. Repeat for each height.
7. Use the collected data to graph the splatter size versus drop height for each liquid.

Analyze and Conclude

1. Was your hypothesis correct? Explain.
2. What are two controls in your experiment that helped you collect the most accurate data possible?

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TEACHERS SAVE TIME:
Laminate station pages and reuse for each class and for years to follow!
Inquiry skills used are timeless!

Name: _____ Date: _____

Hypothesis

Drop Height (cm)

	3	25	50	75	100
Colored Water					
Colored Syrup					

Height of Drop vs. Splatter Size

Number of Drops (mm)

Legend:

- Water
- Syrup

Analyze and Conclude:

1. _____
2. _____

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Instructional Videos

The Intro to Life Science Instructional Videos and Digital Assessments are designed to help teachers move instruction from the group learning space to the individual learning space. Not only does this give students independence in their learning, but it also allows more time for dynamic and interactive learning when teachers meet with students in a group setting.

This resource is perfect for:

- Flipped Classroom
- Absent students
- 1:1 Classrooms
- Sub Plans
- Hybrid Schedules
- Teachers who want more time to guide students as they apply concepts and engage creatively in the subject matter

Features of this resource include:

- Instructional videos which are six minutes or less to keep students focus
- Videos and assessments can be completed independently
- Auto grading and reporting in Google Forms
- Share link with students through educational platforms or email
- Quizzes are editable with 5 – 8 questions per quiz
- Information in video pairs with Nitty Gritty Science Interactive Notebooks

Task Cards & Digital Task Cards

Task cards are a great tool for concept review that can be used in a variety of ways - pairs, small groups, team games, or individually. The reason they are so effective is there is only ONE task per card, allowing students to focus on that single task until they have successfully completed it. Answers sheet and answer key for teachers are included.

The digital, self-checking task cards are hosted at Boom Learning™ and are compatible with Google Classroom. These are perfect for displaying on your interactive whiteboard and leading class games or review sessions.

Print Task Cards

The print task cards are arranged in a grid. Each card has a pink border and a circular icon with a number from 1 to 16. The tasks are as follows:

- Card 1:** **DECIDE**. Which of the following processes brings about an exchange of genetic information between bacterial cells?
a. binary fission c. conjugation
b. replication d. bridging
- Card 2:** **DESCRIBE**. (Text partially obscured)
- Card 3:** **COMPLETE**. (Text partially obscured)
- Card 4:** **DESCRIBE**. Viruses are found in _____.
a. water
b. air
c. soil
d. all of the above
- Card 5:** **IDENTIFY**. Identify the organism in the diagram. (Diagram of a bacterium)
- Card 6:** **IDENTIFY**. (Diagram of a bacterium)
- Card 7:** **COMPLETE**. (Diagram of a bacterium)
- Card 8:** **COMPLETE**. (Diagram of a bacterium)
- Card 9:** **DECIDE**. A protozoan that moves by lashing one or more of its whip like parts is a(n) _____.
a. flagellate c. fungi
b. slime mold d. diatom
- Card 10:** **DECIDE**. (Diagram of a cell wall)
- Card 11:** **COMPLETE**. Animal like protists are commonly called _____. (Text partially obscured)
- Card 12:** **DECIDE**. A ____ is a unicellular algae that has a glass-like cell wall containing silica.
a. flagellate c. fungi
b. slime mold d. diatom
- Card 13:** **COMPLETE**. A ____ is a thick internal wall that forms and encloses a bacteria's DNA to protect it until more favorable growth conditions.
- Card 14:** **COMPLETE**. Fungi that transform complex organic substances into raw materials that other organisms can use are _____.
decomposers
diatoms
autotrophs
parasites
- Card 15:** **COMPLETE**. A ____ consists of a fungus and algae in a mutualistic relationship.
- Card 16:** **IDENTIFY**. Identify the structure of the virus that surrounds the nucleic acid. (Diagram of a virus)

Digital Task Cards

The digital task cards are displayed in a 3D perspective. Each card has a blue header with the title 'The Microbial World' and a colorful border with various microorganisms. The tasks are as follows:

- Card 1:** (Diagram of a bacterium)
- Card 2:** Which of the following processes brings about an exchange of genetic information between bacterial cells?
a. binary fission c. conjugation
b. replication d. bridging
- Card 3:** Fungi that transform complex organic substances into raw materials that other organisms can use are _____.
decomposers
diatoms
autotrophs
parasites (with a mushroom illustration)

Assessments:

Teachers can use a variety of assessments to evaluate student progress throughout the unit. The curriculum provides mini-quizzes for each Interactive Notebook chapter and an online assessments that goes with the instructional videos. The chapter test includes multiple choice, short answer, interpreting diagrams, and an essay.

Name _____ Date _____

Quiz: Fungus

1. _____


2. _____

3. _____

4. _____

5. _____

6. _____



Name _____ Date _____

Quiz: Fungus

1. _____


2. _____

3. _____

4. _____

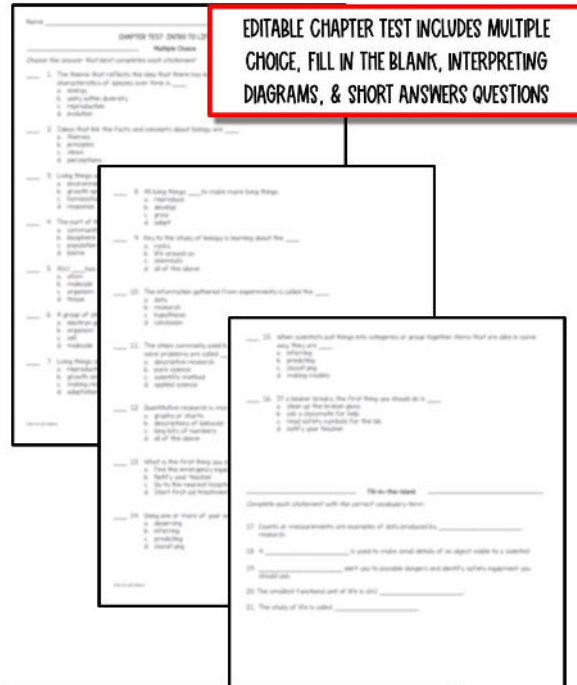
5. _____

6. _____



EDITABLE CHAPTER TEST INCLUDES MULTIPLE CHOICE, FILL IN THE BLANK, INTERPRETING DIAGRAMS, & SHORT ANSWERS QUESTIONS

ANSWER KEY INCLUDED — IMAGES ARE BLURRED FOR COPYRIGHT REASONS



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