





# 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<br>• INB Activity – INB output (homework if not completed in class) |        | x       |         |           |          |
| 2   | • Mini-quiz   |        |         |         |           | x        |
|     | • Section 2 Notes – use PowerPoint<br>• INB Activity  |        | x       |         |           |          |
| 3   | • Mini-quiz   |        |         |         |           | x        |
|     | • Guided Inquiry Lab – Student Led  |        |         | x       |           |          |
| 4   | • Section 3 Notes – use PowerPoint<br>• INB Activity  |        | x       |         |           |          |
|     | • Mini-quiz   |        |         | x       |           | x        |
| 5   | • Section 4 Notes – use PowerPoint<br>• INB Activity  |        | x       |         |           |          |
|     | • Mini quiz   |        |         | x       |           | x        |
| 6   | • Science Stations  |        |         |         | x         |          |
|     | • 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.

**Table of Contents**  
A Trip Through Earth's Past

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| Section 1: Fossils                  |
| Fossil Cards Set 1 - Color          |
| Fossil Cards Set 2 - Color          |
| Fossil Cards Set 1 - B&W            |
| Fossil Cards Set 1 - B&W            |
| Answer Key                          |
| Quiz Fossils                        |
| Section 2: Determining Age of Rocks |
| Index Fossils                       |
| Map Printable                       |
| Answer Key                          |
| Quiz Determining Age of Rocks       |

**Introduction**

If you are new to the idea of using a Science Interactive Notebook in classroom, stop by my [Nitty Gritty Science shop](#) and download my [Science Interactive Notebooks tutorial](#) for FREE! In here you will find how to begin with your students, what materials to have on hand and importantly, how it will enhance your students' learning through their creativity.

**Focused Lessons with Differentiated Instruction**

The lessons shared on the following pages cover National Science Standards students' needs. I have given you the notes that I would give students (Right Side - Input Side of Notebook) so you can understand more on their creative assignment. Focuses on a Question of each "Input" page with "Input" page.

**Fossils**

**Introduction:**  
When organisms die, they are usually buried by sediment that slowly hardens over time, preserving the shape of the organism. Fossils found in rock include molds, casts, petrified carbon films and trace fossils. Some remains of organisms are preserved if they happen to be trapped by amber, tar or ice. This activity has you observing and classifying fossils using information you have learned.

**Directions:**

1. Cut out all the images on the following pages along with the pocket template and label.
2. Use the pocket template to make six different pockets and label each one with labels. Under each label, write the definition of each type of fossil. Paste each pocket into your Interactive Notebook.
3. Classify each image as either mold, cast, petrified fossil, carbon film, trace fossil or remains and place them in the proper pocket.
4. Take it Step Further! Research fossils online and find an example of each type of fossil. Paste it into your notebook. Remember to cite your source on the back of the image.

**Section 2: Determining Age of Rocks**

**Index Fossils**

Index fossils are useful because they tell the relative ages of the rocks in which they occur. To be useful as an index fossil, the fossil must be widely distributed, and it must have only existed for a brief period of time.

**Directions:**

1. Cut out the strips below and fold each one fan style along the dashed line. Each square represents a rock layer that was uncovered at an excavation site.
2. Paste the bottom tab of each strip to the matching "site" location on the map.
3. Use the rock layers, index fossils and the fossil key to help you answer the questions on the following page.
4. Paste completed map and questions in your Science Interactive Notebook.

**Description:**

Students will understand the geologists using index fossils to determine the age of layers of rock. They will be given 'sites' of excavation and will need to use the key and layers of rock to help them answer the questions.

Student printable is offered along with an answer key and mini-quiz.

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4. Paste completed map and questions in your Science Interactive Notebook.

| Fossil Key | Mammal | Fish | Dinosaur | Bird | Insect | Plant | Amphibian | Reptile | Vertebrate |
|------------|--------|------|----------|------|--------|-------|-----------|---------|------------|
| 1          |        |      |          |      |        |       |           |         |            |

1. Which layer is the oldest rock layer? Explain.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Section 2: Determining Age of Rocks**

**Mini-Quiz:**

1. relative age
2. absolute age
3. law of superposition
4. extrusions
5. intrusions
6. index fossils
7. unconformity
8. radiocarbon dating

a. span in geocultural record where some have been lost due to erosion  
b. rock ages compared with ages of other fossils used to determine the absolute rock by determining its amount of abundance it contains  
c. widely distributed and numerous in comparison that existed briefly  
d. original layer of rock is of fine-grained sedimentary rock layers  
e. number of years since the rock formation occurred and combine with used the surface  
f. less than 1000 years on the surface

Name: \_\_\_\_\_ Date: \_\_\_\_\_

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**Section 4: Earth's Eras**

**Description:**

The final activity for this chapter is helping students break down the different eras and periods after the Precambrian Era. Students will also enjoy adding cutouts to their Football Field analogy of the geological time scale to represent the Age of Fishes, Age of Reptiles and Age of Mammals.

A table of dates, student cut-outs (color and black and white), a teacher answer key and a mini-quiz are included for this concept.

# 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.

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.

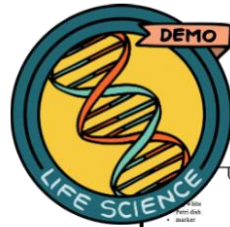
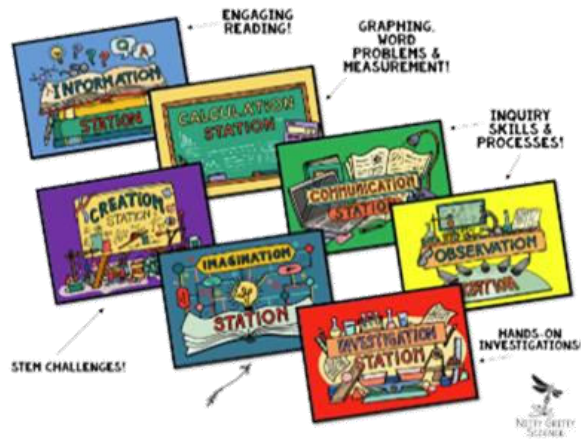
# Demos, Labs, & Science Stations

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 has 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 (other reactions and systems used to understand that a chemical can cause severe 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, shower, 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 tin 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.

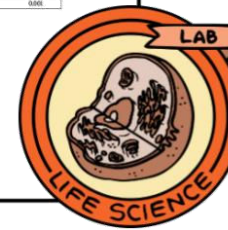
| Prefix | Symbol | Abbreviation |
|--------|--------|--------------|
| kilo-  | k      | 1,000        |
| hecto- | h      | 100          |
| deka-  | da     | 10           |
| deci-  | d      | 0.1          |
| centi- | c      | 0.01         |
| milli- | m      | 0.001        |

Materials:

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

Safety:

•



## 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 size 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)

|  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

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

**Earth's History 21**  
**DECIDE**  
On the geological time scale, eras are divided into \_\_\_\_\_.  
a. ages                      c. indexes  
b. periods                    d. seconds

**Earth's History 22**  
**COMPLETE**

**Earth's History 23**  
**DECIDE**  
Mammals first appeared during the \_\_\_\_\_ period.  
a. Quaternary              c. Permian  
b. Triassic                    d. Carboniferous

**Earth's History 24**  
**DESCRIBE**  
Describe how Earth's climate changed in the Quaternary Period.

**Earth's History 25**  
**EXPLAIN**  
Explain why only the hard-shelled organisms leave fossils.

**Earth's History 26**  
**EXPLAIN**  
Explain what two criteria are needed to determine if a fossil is authentic.

**Earth's History 27**  
**DECIDE**  
The \_\_\_\_\_ were the first vertebrates.  
a. snakes                    c. sharks  
b. worms                    d. jawless fishes

**Earth's History 28**  
**EXPLAIN**  
Explain why there are very few fossils from the Precambrian time.

**Earth's History 29**  
**COMPLETE**  
During the Permian Period, continents moved together to form a great landmass, or supercontinent, called \_\_\_\_\_.

**Earth's History 30**  
**COMPLETE**  
The era before the Mesozoic Era is the \_\_\_\_\_.

**Earth's History 31**  
**IDENTIFY**  
Identify the four major subdivisions of the geological time scale.

Digital Task Cards

**A Trip Through Earth's History 37**  
Identify the fossil shown in the image.

**A Trip Through Earth's History 38**  
The Law of \_\_\_\_\_ states that the oldest layer of rock is on the bottom and each layer is younger than the layer above it.

**A Trip Through Earth's History 39**  
Which of the following could contribute to a mass-extinction event?  
 a very humid summer  
 earthquake  
 volcanic eruption  
 cyclone

**A Trip Through Earth's History 40**



# Study Guides: Includes **print** or **digital** options

Nitty Gritty Science Study Guides are directly aligned to the notes and assessments offered by Nitty Gritty Science and include a variety of review strategies which meet the needs of your learners for independent study and indirect instruction.

Each study guide provides a combination of strategies which may include:

- Graphic organizers
- Vocabulary building
- Compare and contrast
- Problem solving
- Concept mapping
- Interpreting data
- Critical thinking
- Theme connection
- Matching
- Fill-in-the-blank
- Short answer
- Real world application
- QR videos with accompanying questions

The collage shows six overlapping study guide pages for the topic 'ROUGH PAST'. Each page has a 'Name: \_\_\_\_\_ Date: \_\_\_\_\_' header and a 'STUDY GUIDE' logo. The pages are:

- SECTION 1:** Directions: Explain how fossils are formed using the picture below. Includes a diagram of a fossil being formed in a rock.
- SECTION 2:** Directions: Read each sentence and then label each statement that is true with a T and false with an F. Includes a list of 7 statements about paleontology.
- SECTION 3:** Dr. Dot is a geologist, a scientist who studies all things related to the earth. Use the word bank below to help determine the age of rocks. Includes a word bank with terms like 'index fossil', 'relative age', 'law of superposition', 'intrusion', 'absolute age', 'element', 'unconformity', 'radioactive decay', and 'half life'. Also includes a diagram of a cliff face with various geological features.
- SECTION 4:** Directions: Using the diagram for reference, fill out the table about the Earth's eras below. Includes a vertical geological time scale diagram and a table with columns for 'Time Period' and 'Geological Time Scale'.
- SECTION 5:** Directions: Define each time period and label each aspect of early Earth. Includes a table for defining time periods and a diagram of 'Early Earth' with boxes for 'Atmosphere' and 'Oceans'.
- SECTION 6:** Directions: Scan the QR code to watch the video. After watching the video, describe the job of a paleontologist, including the materials they use, what kinds of things they've found and what you've learned as a result of those findings. Includes a QR code and a 'DIGGING IN' section with lined writing space. At the bottom, a cartoon character asks: 'Did you know the name Volcanic means spewy fluid?'.

# 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.

The image displays a collection of assessment materials for a geology unit. On the left, two identical worksheets titled "Quiz: Determining Age of Rocks" are shown. Each worksheet includes a "Name" and "Date" line, followed by a "Matching" section with eight numbered items on the left and eight lettered options (a-h) on the right. The items are: 1. relative age, 2. absolute age, 3. law of superposition, 4. extrusions, 5. intrusions, 6. index fossils, 7. unconformity, and 8. radioactive dating. The options are: a. gap in geological have been lost, b. rock age compo, c. method used to rock by determ, d. widely distribute element if conti, e. organism that e, f. number of year, g. magma cools on the surface, and h. lava that harden.

In the center, a larger "CHAPTER TEST" page is shown. It features a flowchart diagram with a central box containing the text: "EDITABLE CHAPTER TEST INCLUDES MULTIPLE CHOICE, FILL IN THE BLANK, INTERPRETING DIAGRAMS, & SHORT ANSWERS QUESTIONS". Below the flowchart, there are several multiple-choice questions. At the bottom of the test page, a red box states: "ANSWER KEY INCLUDED - IMAGES ARE BLURRED FOR COPYRIGHT REASONS".

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<https://www.teacherspayteachers.com/Store/Nitty-Gritty-Science-Jr>

