

Plate Tectonics

Plate Tectonics 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 | | | |
| 3 | • INB Activity | | | x | | |
| | • Mini-quiz | | | | | x |
| 4 | • Guided Inquiry Lab – Student Led | | | x | | |
| | • Section 3 Notes – use PowerPoint | | x | | | |
| 5 | • INB Activity | | | x | | |
| | • Mini-quiz | | | | | x |
| 6 | • Section 4 Notes – use PowerPoint | | x | | | |
| | • INB Activity | | | x | | |
| 7 | • Mini quiz | | | | | x |
| | • Science Stations | | | | x | |
| 8 | • Science Stations | | | | x | |
| | • Final draft and testing for Creation Station (STEM) | | | | x | x |
| 9 | • Task Card Review (game-style, full class, partner) | | | | x | |
| | • Chapter Test | | | | | x |
| 10 | • 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 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: Click and drag the statements below next to the letter (A-D) that is describing the convection current in the diagram at the corresponding letter. Describe the cause and effects of convection currents in the mantle and the result of these confections.

The force of gravity is causing denser material to fall.

Density of mantle material is less than material above it, so the materials begin to rise.

Core heat causes temperatures to rise, therefore decreasing the density of material.

Rising material hits rigid lithosphere and cannot go any further.

CONVECTION CURRENTS

CONVECTION AND THE MANTLE

| Conduction | Convection | Radiation |
|------------|------------|-----------|
| | | |

Density -

Convection Currents -

What causes convection currents in the earth's mantle?

CONVECTION AND THE MANTLE

Convection Currents

Magnetic Field

Axis of Rotation

Digital Textbook

For further exploration, click button(s) below:

The Mantle

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.

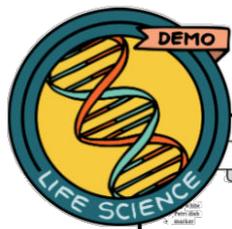
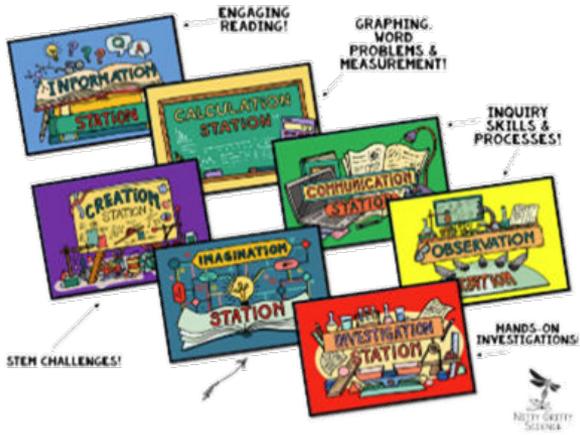
Demos, Labs, & Science Stations

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: _____

Materials:
 • projector
 • lens and (filter)
 • marker
 • eye dropper
 • water

Procedure:

- Place an eye on the underside of the Petri dish and display for class using the projector.
- Each group the opposite glass for the eye view only of the front glass.
- Explain that the proteins in egg whites are similar to those found in the protective layer of the eye.
- Fill glass that someone else has being examined and has splashed with their eye - call group of aid to the egg whites.
- Ask students to make observations of what is happening to the egg whites.
- For ability work to remove the filter. (Have students make observations.)

What's Happening?

(The proteins in the egg whites become cloudy when they start to coagulate in the presence. This is an irreversible chemical reaction and students need to understand that a chemical can cause some damage to their eyes or skin if not used properly. Students must be treated as well if the safety procedure involves like such as wearing goggles, gloves and aprons. Make sure they are aware of safety equipment: eye wash station, showers, fire blanket, etc.)

Discussion:

- What happened to the "eye"?
- The protective layer became cloudy and developed the eyes.
- What type of safety equipment must be worn when doing lab?
- Goggles, aprons, lab coat, gloves.

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Teacher guide and answer key offered for every lab!

Easy-to-get materials!

Measure with SI Units

SCIENCE SKILLS AND LAB SAFETY

Name: _____ Date: _____

Introduction:

The standard system of measurement used by scientists around the world is known as the International System of Units, which is abbreviated as SI. Its units are easy to use because they are based on powers of 10. Each SI unit is called a base unit. Each SI unit has a symbol. Each SI unit has a prefix. Each SI unit has a name. Each SI unit has a symbol. Each SI unit has a name. Each SI unit has a symbol. Each SI unit has a name.

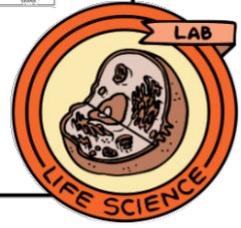
| Prefix | Symbol | Abbreviation |
|--------|--------|--------------|
| kilo- | k- | 1,000 |
| hecto- | h- | 100 |
| deka- | da- | 10 |
| deci- | d- | 0.1 |
| centi- | c- | 0.01 |
| milli- | m- | 0.001 |

Materials:

- graduated cylinder
- tape
- balance
- measuring well
- pipette or syringe (small scale preferred)
- graduated cylinder
- water
- 10 mL graduated cylinder
- colored particles

Safety:

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Discussion questions and teacher set-up included!

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 affect drop height, color, and shape of droplet splatters?

Materials:

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

Procedure:

- Make a hypothesis of how density of a liquid will affect splatter size on your lab sheet.
- Place the piece of paper down on the lab table in order to catch splatters.
- 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.
- 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.
- Measure the size of the splatter in MILLIMETERS. Record in data table on answer sheet.
- Repeat for each height.
- Use the collected data to graph the splatter size versus drop height for each liquid.

Analyze and Conclude

- Was your hypothesis correct? Explain.
- 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

| Color | Drop Height (cm) | | | |
|-------|------------------|----|----|-----|
| | 5 | 25 | 50 | 100 |
| Water | | | | |
| Syrup | | | | |

Height of Drop vs. Splatter Size

Analyze and Conclude:

- _____
- _____

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Instructional Videos

Plate Tectonics 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 NGS Magnified 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

DECIDE 1
How do underwater mountain ranges form?
a. continental drift
b. convection currents
c. strike-slip faults
d. sea floor spreading

DECIDE 2
_____ first proposed the theory of continental drift.

IDENTIFY 6
Identify the layer labeled D.

DECIDE 5
Continental crust consists mainly of rock called _____.
a. granite c. fluorite
b. basalt d. agate

LIST 13
List the three types of heat transfer that occur in Earth's processes.

COMPLETE 9
The supercontinent that began to break apart about 225 million years ago is called _____.

EXPLAIN 16
Explain what is occurring at point D.

IDENTIFY 10
Identify the heat current illustrated above.

COMPLETE 15
_____ is the measure of how much mass there is in a volume of a substance.

Digital Task Cards

Plate Tectonics
Identify the type of plate boundary illustrated above.

Plate Tectonics
The uppermost part of the mantle and the crust is called the _____.
atmosphere
outer core

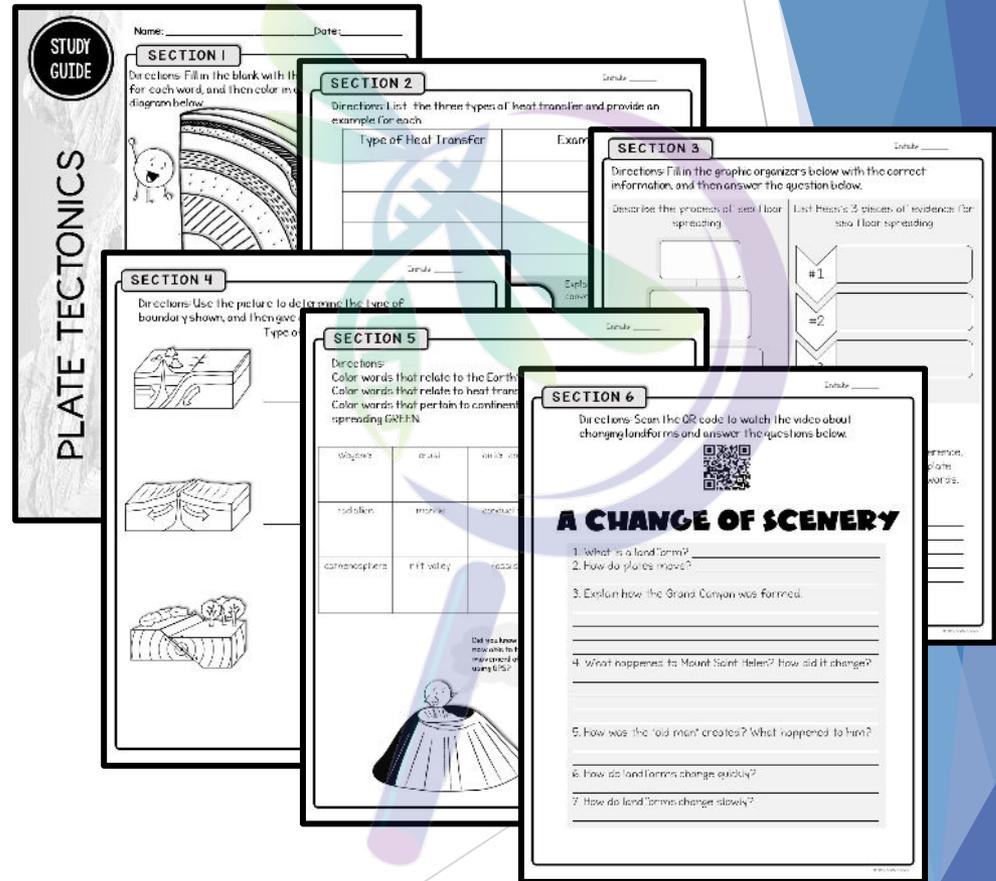
Plate Tectonics
The geological theory of _____ states that pieces of Earth's lithosphere are in constant, slow motion.

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

NGS Magnified Study Guides are directly aligned to the notes and assessments offered by NGS Magnified and include a variety of review strategies that 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



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