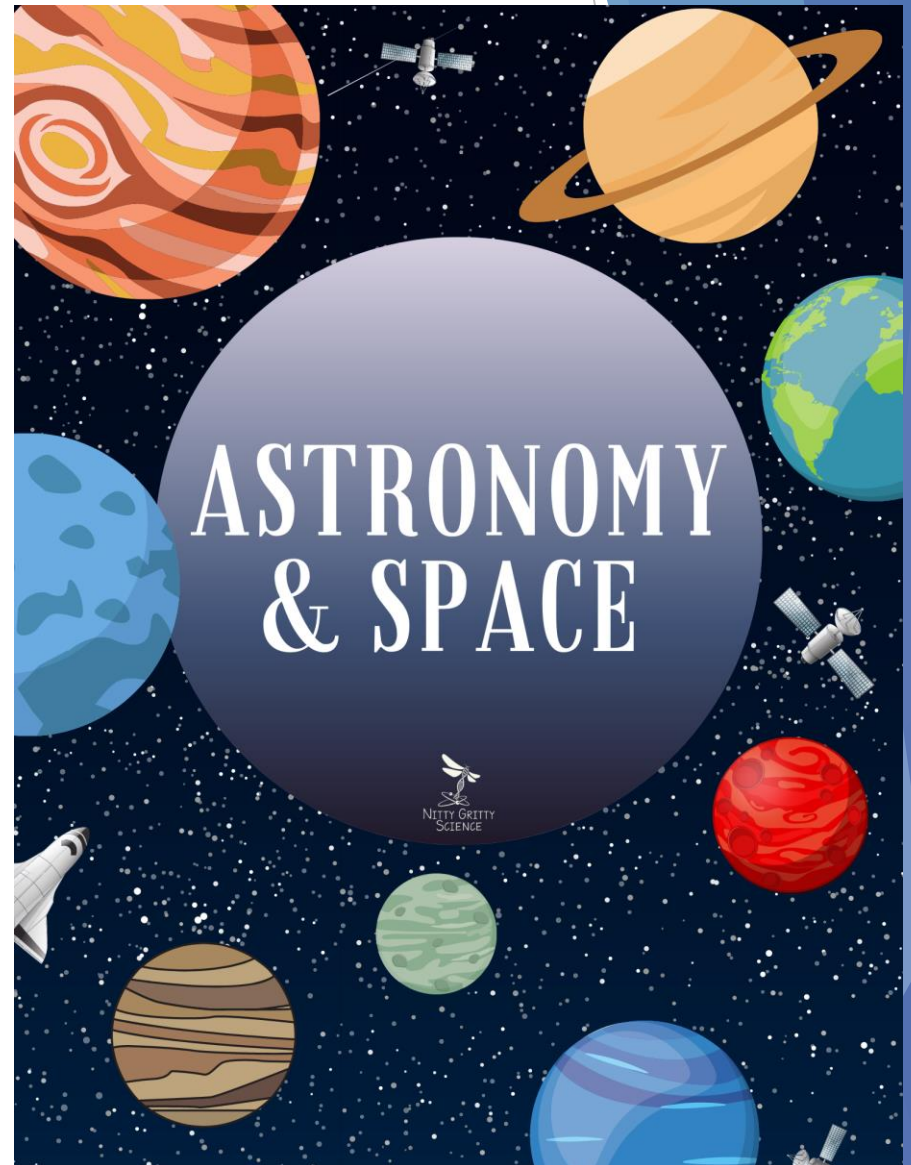


Astronomy & Space

Astronomy & Space 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 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: Astronomy and Space Science | |
|---|--|
| Description | |
| Introduction | |
| Section 1: Earth's Motion | |
| Reason For Season Cut-outs | |
| Reason for Season Printable | |
| Reason For Season Cut-outs (B&W) | |
| Reason for Season Printable (B&W) | |
| Quiz: Earth's Motion | |
| Section 2: The Moon - Earth's Satellite | |
| L | |
| M | |
| H | |
| D | |
| S | |
| Section 1: | |
| F | |
| D | |
| S | |
| C | |
| D | |
| Section 2: | |
| F | |
| S | |
| A | |
| D | |
| S | |
| C | |
| D | |
| L | |
| M | |
| A | |
| G | |
| Section 1: | |
| S | |
| V | |
| A | |
| G | |
| Appendix | |
| Cont | |
| Teach | |

Introduction

If you are new to the idea of using a Science Interactive classroom, stop by my [Nitty Gritty Science shop](#) and my [Science Interactive Notebooks tutorial](#) for FREE! In this tutorial, I explain how to begin with your students, what materials to have on hand, and how to use the interactive notebook.

Section 1: Earth's Motion

Section 1: Earth's Motion

Reason for the

Reason for the

Reason For the Season
(Northern Hemisphere)

Quiz: Earth's Motion

Multiple Choice

1. Earth revolves in (a) _____ around the sun.

a. orbit b. ellipse

2. There are equal hours of daylight and darkness on (a) Earth b. the moon

3. One _____ in Earth's yearly orbit around the sun is called (a) revolution b. season

4. The _____ of Earth's rotation axis, combined with its orbit around the sun, causes (a) seasons to change b. length

5. A(n) _____ occurs when Earth's rotation axis is tilted toward the sun.

a. holiday b. solstice

Section 2: The Moon - Earth's Satellite

Section 2: The Moon - Earth's Satellite

Lunar Cycle Flip Book

Lunar Cycle Flip Book

Quiz: Earth's Motion

Multiple Choice

1. Earth revolves in (a) _____ around the sun.

a. orbit b. ellipse

2. There are equal hours of daylight and darkness on (a) Earth b. the moon

3. One _____ in Earth's yearly orbit around the sun is called (a) revolution b. season

4. The _____ of Earth's rotation axis, combined with its orbit around the sun, causes (a) seasons to change b. length

5. A(n) _____ occurs when Earth's rotation axis is tilted toward the sun.

a. holiday b. solstice

Description:

Students will need to identify, label and unscramble the moon phases to create a Lunar Cycle Flip Book. For this activity, I also included a set where the cards are not mixed up or have already been pre-labeled.

Printables, cut-outs, teacher answer key and a mini-quiz concept.

Directions:

- Using the diagram as a reference guide, correctly identify each phase of the lunar cycle on the following page and label each moon phase card accordingly.
- Once all phases have been properly labeled, cut out each card and paste to the back of cardstock or an index card.
- Put cards in the correct sequence of a lunar cycle, and then staple cards together where indicated. ** Make sure all edges that you "flip" are even with each other to be the most effective.
- Once your Lunar Cycle Flip Book is completed, cut out reference guide and pocket template and glue both into your Science Interactive Notebook.

Lunar Cycle Flip Book

Directions: Cut out cards and put in the proper order of the lunar cycle. In order, label each phase and put cards together to make a Flip book. Place completed Lunar Cycle Flip Book in the pocket of your Science Interactive Notebook.

**LUNAR CYCLE
FLIP BOOK**

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.

The screenshot shows a digital notebook page titled "FORMATION OF THE SOLAR SYSTEM". On the left side, there are four text boxes with instructions and descriptions of the solar system's formation. On the right side, there is a central area with a diagram of the solar system's formation stages and a list of astronomical units (AUs). Below the diagram, there are several text boxes with notes and a video player. The video player is titled "Solar System" and has a play button. Below the video player, there are two buttons: "Digital Textbook" and "How Did Solar System Form?".

Directions: Arrange the descriptions in chronological order. Click and drag each description to the matching image.

Heated material from a contracting cloud triggered nuclear fusion forming the sun.

The solar system began 4.6 billion years ago in a cloud of gas and dust.

Eventually only rock materials could survive close to the sun, so objects that were gaseous and icy successfully clustered further away, forming the solar system we live in today.

Shockwaves from a possible supernova or exploding star caused clouds to compress resulting in a flat, spinning disc of heated material.

Material that was not used to create the sun began to cluster together to form asteroids, comets, planets and moons.

FORMATION OF THE SOLAR SYSTEM

SOLAR SYSTEM

Geocentric (Earth-centered) model -

Heliocentric (sun-centered) model -

Astronomical units (AUs) -

A cloud of

Astronomers believe the solar system began 4.6 billion years ago.

Cloud became

Heated material from

planets -

dwarf planets -

asteroid -

comet -

meteoroids -

ARTS

SCIENCE

THE SOLAR SYSTEM

THE PLANETS

THE STARS

THE SUN

CLASSROOM

Digital Textbook

For further exploration, click button(s) below:

How Did Solar System Form?

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.

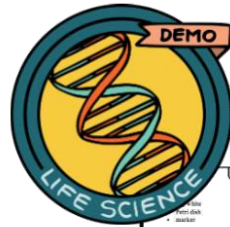
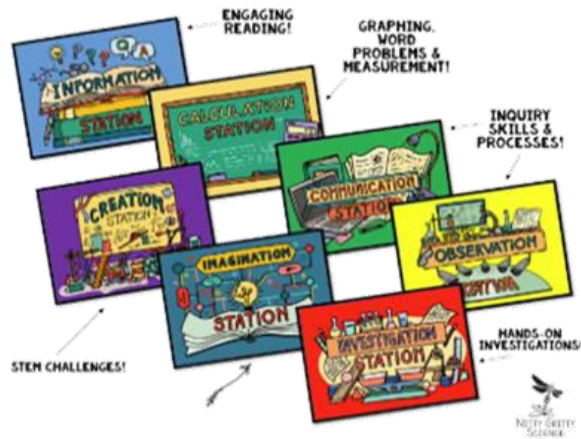
Demos, Labs, & Science Stations

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.

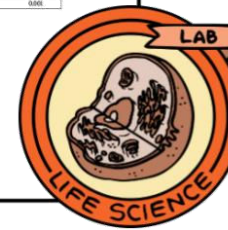
| Prefix | Symbol | Abbreviation |
|--------|--------|--------------|
| kilo- | k | 1,000 |
| hecto- | h | 100 |
| deka- | da | 10 |
| deci- | d | 0.1 |
| centi- | c | 0.01 |
| milli- | m | 0.001 |

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

| | 3 | 25 | 50 | 75 | 100 |
|---------------|---|----|----|----|-----|
| Colored Water | | | | | |
| Colored Syrup | | | | | |

Height of Drop vs. Splatter Size

| Height of Drop (cm) | Water | Syrup |
|---------------------|-------|-------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |
| 21 | | |
| 22 | | |
| 23 | | |
| 24 | | |
| 25 | | |
| 26 | | |
| 27 | | |
| 28 | | |
| 29 | | |
| 30 | | |

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

1 **DECIDE** Astronomy & Space
One complete revolution of Earth around the Sun takes about _____.

2 **DECIDE** Astronomy & Space

3 **DECIDE** Astronomy & Space
A lunar eclipse can occur during the _____ phase of the moon.

4 **IDENTIFY** Astronomy & Space
_____ phase of the moon in the diagram above.

5 **DECIDE** Astronomy & Space

6 **IDENTIFY** Astronomy & Space

7 **DECIDE** Astronomy & Space
Much of the moon's surface is covered with round pits called _____.

8 **EXPLAIN** Astronomy & Space

9 **DECIDE** Astronomy & Space
A _____ is made of gas, dust and ice and moves around the Sun in an oval-shaped orbit.

10 **EXPLAIN** Astronomy & Space
Explain what an Astronomical Unit (AU) measures.

11 **COMPLETE** Astronomy & Space
When the moon is between Earth and Sun it cannot be seen. This is called a _____.

12 **DECIDE** Astronomy & Space

13 **EXPLAIN** Astronomy & Space
Explain what an Astronomical Unit (AU) measures.

14 **EXPLAIN** Astronomy & Space
Explain what an Astronomical Unit (AU) measures.

15 **COMPLETE** Astronomy & Space
The temperature of the moon's surface varies greatly from day to night because the moon has no _____.

16 **IDENTIFY** Astronomy & Space
Identify the phase of the moon in the diagram above.

Digital Task Cards

Astronomy and Space Science
List the inner planets.

Astronomy and Space Science
More than half of all the stars are members of groups of two or more stars called _____.

Astronomy and Space Science
Determine whether each statement is about the Earth, Sun, or Moon.

The complete cycle of its phases takes 29.5 days.

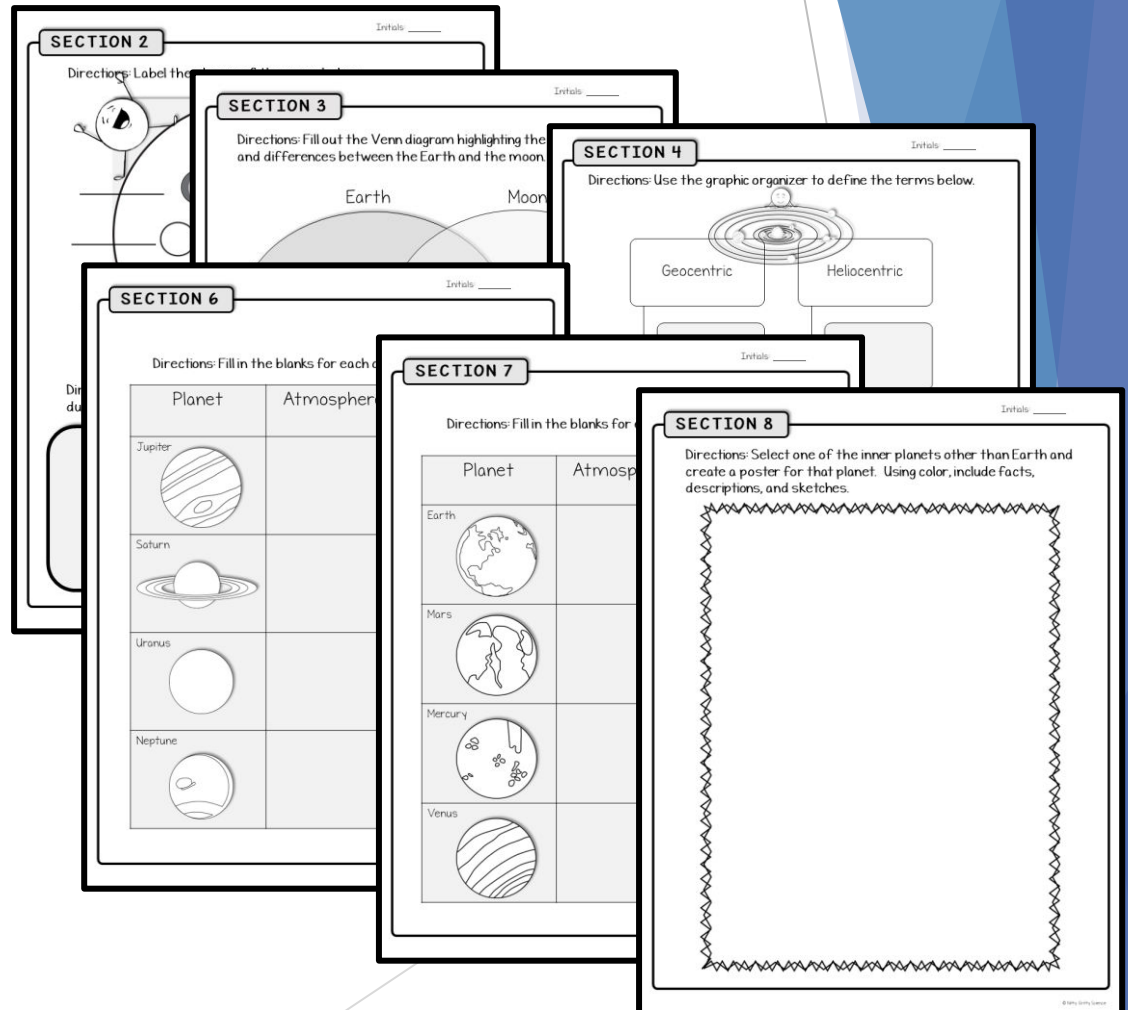
Moon Sun Earth

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



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 educational assessment materials. On the left, two identical 'Quiz: Earth's Motion' forms are shown. Each quiz includes a header for 'Name' and 'Date', followed by the title 'Quiz: Earth's Motion' and the section 'Multiple Choice'. The questions are as follows:

- 1. Earth moves in a(n) _____ around the Sun.
a. circle b. ellipse
- 2. There are equal hours of daylight and night on _____.
a. holiday b. solstice
- 3. One _____ is Earth's yearly orbit around the Sun.
a. revolution b. season
- 4. The _____ of Earth's rotation axis causes the seasons to change.
a. spin b. length
- 5. A(n) _____ occurs when Earth's rotation axis is tilted toward the Sun.
a. holiday b. solstice

In the center, a larger document titled 'EDITABLE CHAPTER TEST INCLUDES MULTIPLE CHOICE, FILL IN THE BLANK, INTERPRETING DIAGRAMS, & SHORT ANSWERS QUESTIONS' is shown. This test includes multiple-choice questions similar to the quiz, as well as sections for 'Fill in the Blank', 'Interpreting Diagrams', and 'Short Answer' questions. At the bottom of this test document, a red-bordered box states: 'ANSWER KEY INCLUDED — IMAGES ARE BLURRED FOR COPYRIGHT REASONS'.

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