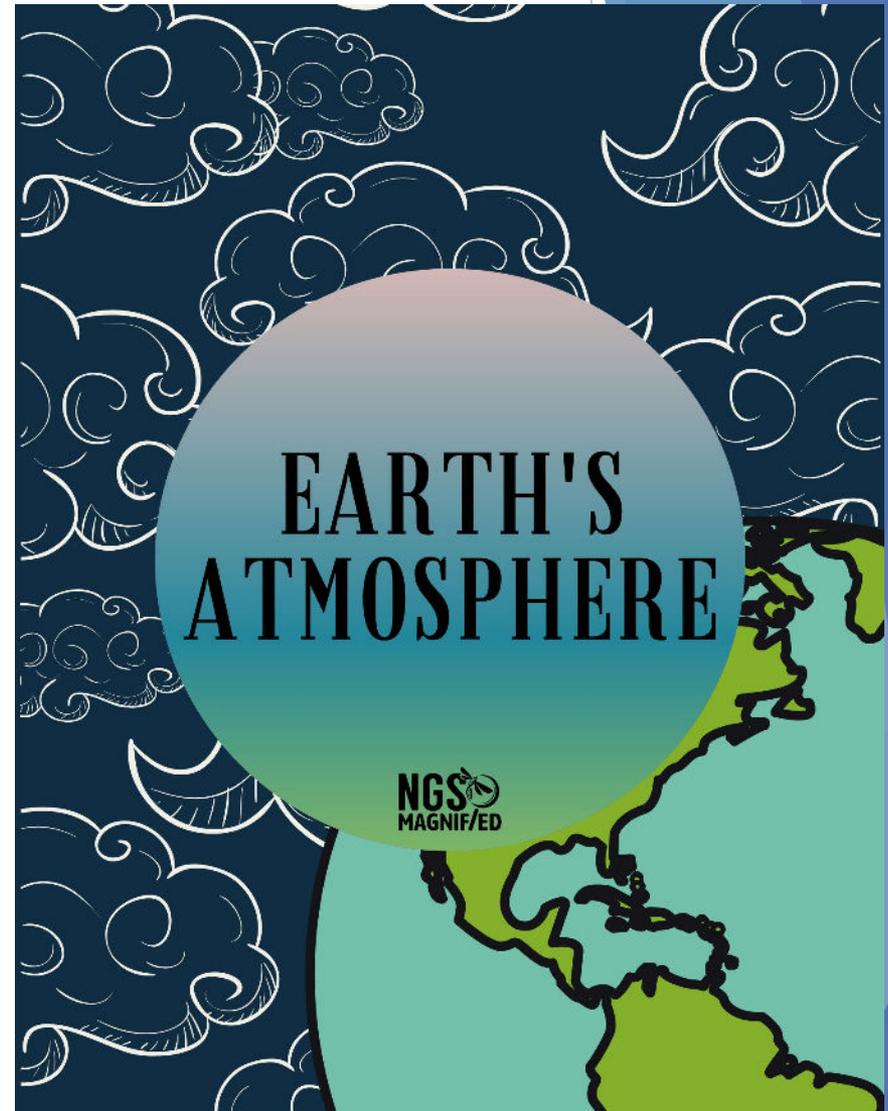




Earth's Atmosphere

Earth's Atmosphere 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.

Table of Contents: Earth's Atmosphere

Introduction

Section 1: Earth's Atmosphere

Layers of the Atmosphere - Version A

Cut-outs Page 1

Cut-outs Page 2

Layers of the Atmosphere - Version B

Cut-outs

Section 2: Air

Energy Transfer

Section 3: Winds & Water

Section 4: Air Quality

Answer Key

Concept cards

Teacher Notes

Introduction

If you are new to the idea of using a Science Interactive Notebook, stop by my Nifty Grifty Science Shop and download Science Interactive Notebooks Tutorial For FREE! In there, you will learn how to begin with your students, what materials to have on hand, and how to use the notebook to maximize your students' learning time.

Section 1: Earth's Atmosphere

Layers of the Atmosphere

Directions:

1. Cut out the diagrams and names of two atmospheric layers on the following page.
2. Place the name-cards in order from smallest to largest. The smallest card represents the layer of the atmosphere closest to Earth's surface; the largest represents the layer furthest from Earth's surface. Label the names of the atmospheric layers on the appropriate name-card.
3. Write a description of the atmospheric layers on each cut-out.
4. Determine and paste the images (clouds, hot air balloon, space shuttle, parachute) in the atmospheric layer in which they are found.
5. In your Science Interactive Notebook, find and paste the atmospheric layer diagram starting with the image of the Earth closest to you.

Section 3: Winds & Water

Types of Clouds

Introduction: Meteorologists classify clouds into three categories: cumulus, stratus, and cirrus. Clouds are further classified by their altitude. Complete the following activity by coloring and pasting the correct description with each cloud diagram.

Directions:

1. Label each cloud by its name on the following pages.
2. Cut out the "flaps" using the dotted lines being careful not to tear the paper.
3. Use your knowledge of cloud types to correctly show proper altitude.
4. Color and paste completed diagram into your Science Interactive Notebook.

Types of Clouds

clouds that are low to the ground and often form in layers

clouds that are high in the sky and often form in wispy shapes

clouds that are in the middle of the sky and often form in large, puffy shapes

clouds that are high in the sky and often form in long, thin shapes

TYPES OF CLOUDS

Quiz: Winds and Water

Compare and contrast the following:

1. Local winds and global winds.
2. Trade winds and prevailing westerlies.
3. Cirrus clouds and cumulus clouds.

1. Sleet and snow

Quiz: Winds and Water

Compare and contrast the following:

1. Local winds and global winds.
2. Trade winds and prevailing westerlies.
3. Cirrus clouds and cumulus clouds.

1. Sleet and snow

Section 4: Air Quality

Description:

Students will learn about the Air Quality Index (AQI) that the Environmental Protection Agency (EPA) uses to report national air quality. They will record the data of three cities and conclude the source of air pollution using their graph and the AQI.

Please use this source as a reference for you and your students: http://www.epa.gov/air/aqi/aqi_brochure_02_14.pdf

Printables with two versions are included - one has AQI scale completed, the other has missing information that the students need to fill in using online resources, along with a mnemonic.

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 "LAYERS OF THE ATMOSPHERE" and "EARTH'S ATMOSPHERE". On the left, there is a diagram of the atmosphere layers over a globe, with labels for EXOSPHERE, STRATOSPHERE, THERMOSPHERE, MESOSPHERE, and TROPOSPHERE. To the right of the diagram is a table with the following content:

EARTH'S ATMOSPHERE	
Atmosphere -	
• Water vapor -	
• Ozone -	
Earth's atmospheres are divided into the following layers:	
Troposphere	
Stratosphere	
Mesosphere	
Thermosphere	Ionosphere -
	Excosphere -

Below the table, there is a text box with the following text:

Altitude or _____ is the distance above sea level. As altitude increases air pressure _____ which also decreases _____. Low density of air can make it difficult to breathe with less oxygen.

Air pressure -

On the right side of the notebook page, there are several tabs: "Introduction", "Atmosphere", "Layers of the Atmosphere", "Air Pressure", and "Air Density". A red arrow points to the "Layers of the Atmosphere" tab. Below the tabs, there is a video player with a play button and the text "Earth's Atmosphere". Below the video player, there is a "Digital Textbook" button and a "For further exploration, click button(s) below:" section with a button labeled "Earth's Atmospheric layers".

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.

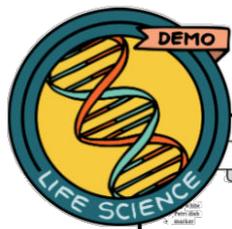
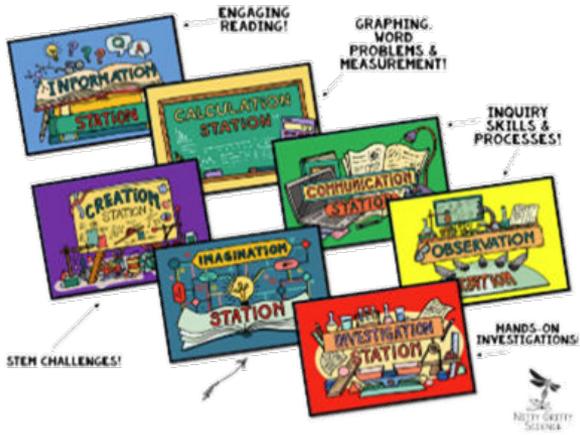
Demos, Labs, & Science Stations

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:
 1. projector
 2. lens and (filter)
 3. marker
 4. eye dropper
 5. 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 close only to 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 want to remove the filter. Have students make observations.

What's Happening?

(The proteins in the egg whites become cloudy when they start to coagulate or denature. If the proteins that are responsible for vision and students need to understand that a substance can cause severe damage to their eyes or skin if not used properly. Students must be made aware of the safety procedures connected with 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 a unit that is used to measure length, mass, time, temperature, and amount of substance. The following table lists the prefixes used to name the base units in SI.

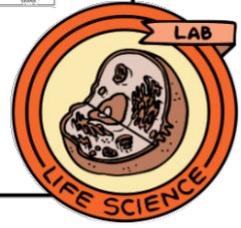
Prefix	Symbol	Abbreviation
kilo-	k-	1,000
hecto-	h-	100
deka-	da-	10
deci-	d-	0.1
centi-	c-	0.01
milli-	m-	0.001

Materials:

- 1. graduated cylinder
- 2. tape
- 3. balance
- 4. measuring well
- 5. pipette or syringe (small scale preferred)
- 6. graduated cylinder
- 7. measuring cylinder
- 8. 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 and drop height affect the height and shape of droplet splatters?

Materials:

- 1. colored water (graduated cylinder A)
- 2. colored syrup (graduated cylinder B)
- 3. eye dropper
- 4. paper
- 5. metric ruler
- 6. 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

Earth's Atmosphere 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

Print Task Cards

1. **DECIDE**
Air pressure is measured with a _____.
a. barometer c. aneroid
b. pressure gauge d. thermometer

2. **DECIDE**
As you rise upwards in the atmosphere, air pressure _____.
a. increases c. doesn't exist
b. decreases d. stays the same

3. **LIST**
List the four most common gases in dry air.

4. **DECIDE**
_____ is the transfer of energy by electromagnetic waves.
a. Convection c. Stratification
b. Radiation d. Insulation

5. **DECIDE**
Heat transfer between two substances that are in contact is called _____.
a. conduction c. convection
b. radiation d. absorption

6. **IDENTIFY**
Identify the cloud in the diagram above.

7. **COMPLETE**
The ozone layer protects living things on Earth from _____.

8. **COMPLETE**
The transfer of energy by movement of particles is _____.
a. conduction c. radiation
b. convection d. absorption

9. **COMPLETE**
The ozone layer protects living things on Earth from _____.

10. **COMPLETE**
The ozone layer protects living things on Earth from _____.

11. **COMPLETE**
The ozone layer protects living things on Earth from _____.

12. **COMPLETE**
The ozone layer protects living things on Earth from _____.

13. **COMPLETE**
The ozone layer protects living things on Earth from _____.

14. **COMPLETE**
The ozone layer protects living things on Earth from _____.

15. **COMPLETE**
The ozone layer protects living things on Earth from _____.

16. **DESCRIBE**
Describe temperature inversion.

Digital Task Cards

Digital Task Cards

Earth's Atmosphere

Air pressure is measured with a _____.

Earth's Atmosphere

_____ are high winds near the top of the troposphere that are able to influence the weather.

Earth's Atmosphere

Rain, snow, storms, and most clouds occur in which sphere?

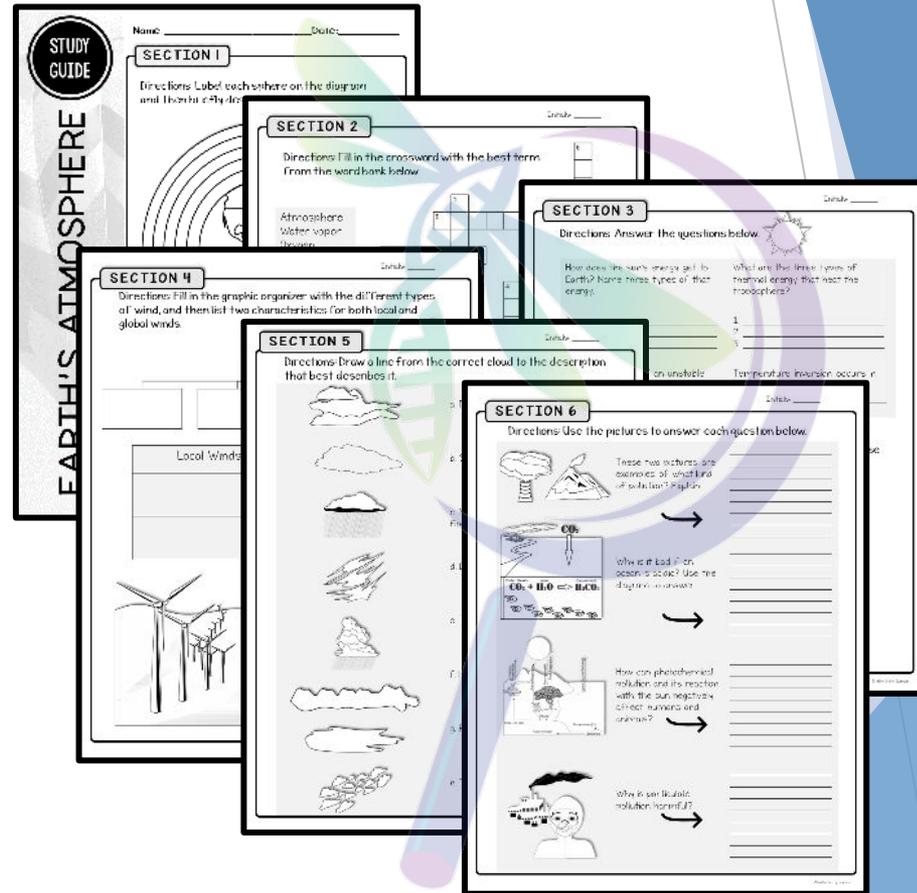
Exosphere
Thermosphere
Mesosphere
Stratosphere
Troposphere

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



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 three overlapping documents related to weather and climate assessments. The leftmost document is a quiz titled "Quiz: Winds and Water" with questions about local winds, trade winds, and cloud types. The middle document is a chapter test with multiple-choice and short-answer questions. The rightmost document is an answer key for the chapter test. Two red-bordered boxes highlight key features: "EDITABLE CHAPTER TEST INCLUDES MULTIPLE CHOICE, FILL IN THE BLANK, INTERPRETING DIAGRAMS, & SHORT ANSWERS QUESTIONS" and "ANSWER KEY INCLUDED — IMAGES ARE BLURRED FOR COPYRIGHT REASONS".

Name _____ Date _____

Quiz: Winds and Water

Compare and contrast the following:

1. Local winds and global winds: _____
2. Trade winds and prevailing westerlies: _____
3. Cirrus clouds and cumulus clouds: _____
4. Sleet and snow: _____

Name _____

Quiz: Winds and Water

Compare and contrast the following:

1. Local winds and global winds: _____
2. Trade winds and prevailing westerlies: _____
3. Cirrus clouds and cumulus clouds: _____
4. Sleet and snow: _____

Name _____ Date _____

CHAPTER TEST: WEATHER AND CLIMATE

Answer the question. Mark each complete with a letter.

1. The winds that circulate the air that flows from the equator to the poles are called _____.
a. trade winds
b. local winds
c. prevailing westerlies
d. global winds
2. Winds that blow from the south and northeast about 30°N are called _____.
a. trade winds
b. prevailing westerlies
c. local winds
d. global winds
3. Which of the following is NOT a type of cloud?
a. cirrus
b. cumulus
c. stratus
d. sleet
4. The part of the atmosphere that contains most of the water vapor is the _____.
a. troposphere
b. stratosphere
c. mesosphere
d. thermosphere
5. Which of the following is NOT a type of precipitation?
a. rain
b. sleet
c. snow
d. hail
6. A group of clouds that form in a row and are associated with a low-pressure system are called _____.
a. trade winds
b. prevailing westerlies
c. local winds
d. global winds
7. Using the diagram, which of the following is NOT a type of wind?
a. trade winds
b. prevailing westerlies
c. local winds
d. global winds
8. Which of the following is NOT a type of cloud?
a. cirrus
b. cumulus
c. stratus
d. sleet
9. The part of the atmosphere that contains most of the water vapor is the _____.
a. troposphere
b. stratosphere
c. mesosphere
d. thermosphere
10. Which of the following is NOT a type of precipitation?
a. rain
b. sleet
c. snow
d. hail
11. What is the first step in the process of condensation?
a. water vapor cools
b. water vapor condenses
c. water vapor evaporates
d. water vapor sublimates
12. Which of the following is NOT a type of cloud?
a. cirrus
b. cumulus
c. stratus
d. sleet
13. Which of the following is NOT a type of wind?
a. trade winds
b. prevailing westerlies
c. local winds
d. global winds
14. Which of the following is NOT a type of precipitation?
a. rain
b. sleet
c. snow
d. hail
15. Which of the following is NOT a type of cloud?
a. cirrus
b. cumulus
c. stratus
d. sleet

Fill in the blank.

Complete each statement with the correct word or term.

17. _____ is the process of water vapor changing from a gas to a liquid.
18. _____ is the process of water vapor changing from a liquid to a gas.
19. _____ is the process of water vapor changing from a gas to a solid.
20. _____ is the process of water vapor changing from a solid to a gas.

Write an answer to each question.

21. Explain how the atmosphere is heated by the sun.
22. Explain how the atmosphere is heated by the ground.
23. Explain how the atmosphere is heated by the water.
24. Explain how the atmosphere is heated by the clouds.

ANSWER KEY INCLUDED — IMAGES ARE BLURRED FOR COPYRIGHT REASONS

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