

Animal Diversity

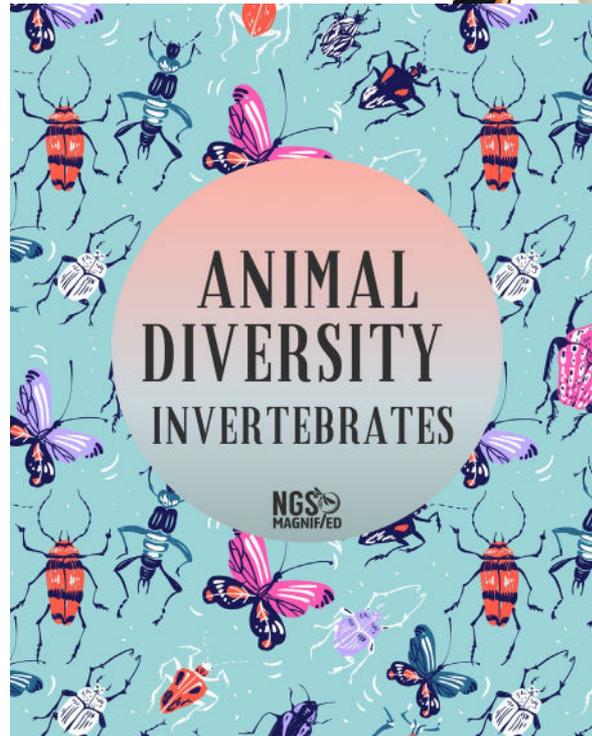
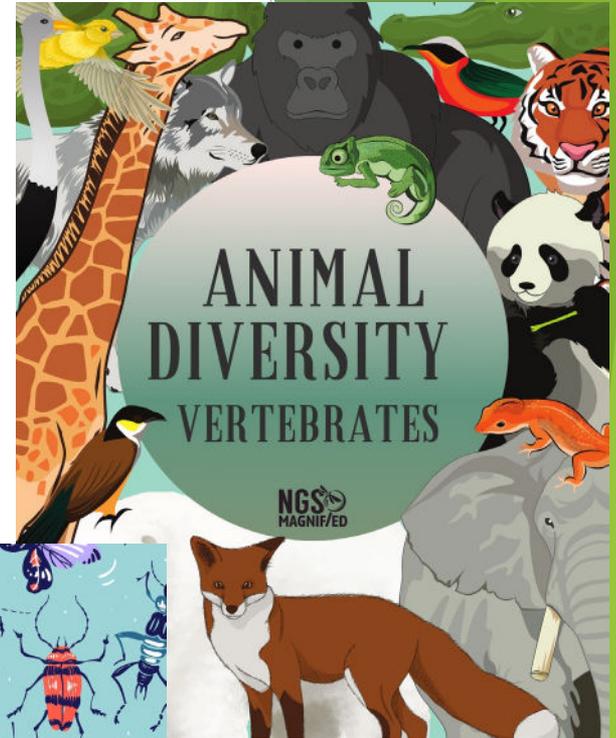


Animal Diversity Unit includes two units –

Animal Diversity: Invertebrates & Animal Diversity: Vertebrates

Each 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.

Section 4: Introduction to Animals

Animal Development – Gastrulation

Introduction: Most animals develop from a fertilized egg cell called a **zygote**, which then undergoes stages of development. In the beginning stages of development, the embryo and cell division to form two cells or **blastomeres** in organisms called **deuterostomes**, this embryo is now referred to as an **embryo**, which is an organism at an early developmental stage.

The embryo will continue to divide from the two cells (blastomeres) to a ball of 16 cells called a **blastula**, which usually takes hours to form.

Part B

Directions: Cut out the diagrams showing the different stages of gastrulation and paste them onto the flow chart below. Analyze completed table and flow chart in your Interactive Notebook.

Section 4: Mollusks, Arthropods & Echinoderms

Mollusk Comparison

Directions: Cut out the mollusk "buttons" on the following page and paste them into the comparison chart below by pasting them into the correct characteristic. More than one button can be used for a characteristic. Paste completed table in your Science Interactive Notebook.

Characteristics	Gastropod
1. Have gills or organs that remove oxygen from the water.	
2. Capture prey using its muscular tentacles.	
3. Have two shells held together by hinges.	
4. Have a mantle that covers its internal organs.	
5. Have most complex nervous system of any invertebrates.	
6. Use a radium in feeding.	
7. Have a free-swimming larval stage called a trochophore.	
8. Have an organ called a foot.	
9. Have no distinct head.	
10. Have a closed circulatory system.	
11. Uses a siphon to bring water in and out of body.	
12. Have an open circulatory system.	

Section 4: Mollusks, Arthropods & Echinoderms

Mollusk Buttons

Cut out and paste on Mollusk Comparison table if this characteristic the mollusk. Not all buttons will be used.

Section 4: Mollusks, Arthropods & Echinoderms

Quiz: Introduction to Animals

Name: _____ Date: _____

Multiple Choice

1. Invertebrates are animals that do not have a backbone.
 - a. True
 - b. False
2. The process of an organism growing and developing is called:
 - a. Metamorphosis
 - b. Growth
 - c. Development
 - d. Differentiation
3. The process of an organism growing and developing is called:
 - a. Metamorphosis
 - b. Growth
 - c. Development
 - d. Differentiation
4. The process of an organism growing and developing is called:
 - a. Metamorphosis
 - b. Growth
 - c. Development
 - d. Differentiation
5. The process of an organism growing and developing is called:
 - a. Metamorphosis
 - b. Growth
 - c. Development
 - d. Differentiation
6. The process of an organism growing and developing is called:
 - a. Metamorphosis
 - b. Growth
 - c. Development
 - d. Differentiation

Section 4: Mollusks, Arthropods & Echinoderms

Quiz: Mollusks, Arthropods and Echinoderms

Name: _____ Date: _____

Multiple Choice

1. Ocean-dwelling mollusk whose foot is adapted to form tentacles are called:
 - a. gastropods
 - b. bivalves
 - c. cephalopods
 - d. arthropods
2. Two mollusks that have an anterior, a posterior, and a ventral side are:
 - a. gastropods
 - b. bivalves
 - c. cephalopods
 - d. arthropods
3. A crayfish is an example of a(n):
 - a. mollusk
 - b. arthropod
 - c. echinoderm
 - d. nematode
4. _____ have a single external shell.
 - a. gastropods
 - b. bivalves
 - c. cephalopods
 - d. arthropods
5. The animal with the most complex nervous system of any invertebrate is:
 - a. arthropod
 - b. echinoderm
 - c. mollusk
 - d. crustacean
6. _____ are invertebrates with no distinct head.
 - a. gastropods
 - b. bivalves
 - c. cephalopods
 - d. arthropods

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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: Label the parts of using the vocabulary words below. Research fish and find answers to questions below.

Spiny & soft dorsal fins
Eye
Operculum
Nares
Tail/caudal fin
Ventral/anal fin
Pectoral fin
Pelvic fin
Lateral line
Anus/vent

LABEL THE FISH

1. If a fish can see bright colors near the surface of the water, what colors of clothes should you wear so the fish cannot see you as easily?
2. How does a fish's sense of smell help a fish find food?
3. How can a fish detect movement in the water?
4. What sensitive body part does a fish's operculum protect?
5. Why are fins on a fish important? What do they do for a fish?

FISH & AMPHIBIANS

Chordates -
Vertebrate -
Ectotherm -
Endotherm -

Fish -

have no jaws or scales with skeletons made of cartilage (lamprey & hagfish)	have jaws and scales as well as skeletons made of cartilage (sharks, rays)	have jaws, scales, a pocket on each side of head that holds gills, and skeleton of hard bones
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Swim bladder - organ that is a gas filled sac that helps fish stay afloat or float deeper

Amphibians _____ vertebrate that spends early life in _____ and adulthood on _____
They have _____ to breathe on land they can also exchange O₂ and CO₂ through their _____
Most amphibians undergo _____ legs and lungs develop for adult life their heart is _____ chambered with _____ and _____

Intro To Vertebrates : Fish & Amphibians

Digital Textbook

For further exploration, click button(s) below:

Fish or Not Fish?

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

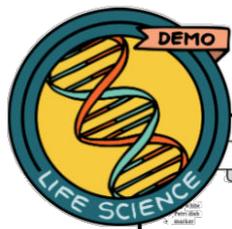
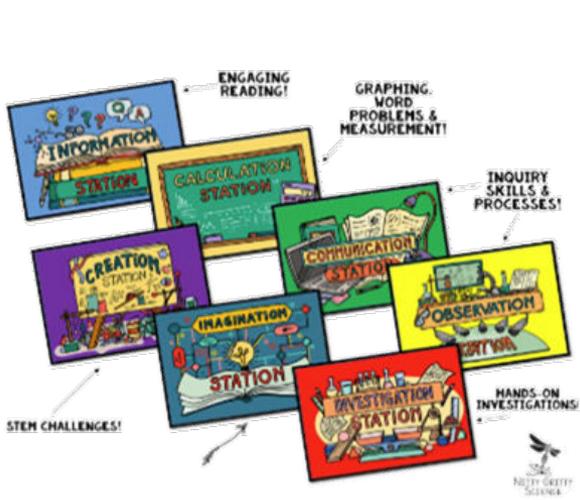


Working in the lab and being engaged in science experiments is the most exciting part of science.

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. yellow and black marker
 3. eye dropper
 4. 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 egg white only for the first 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 into their eye - call group of aid to the egg whites.
- Ask students to make observations of what is happening to the egg whites.
- For adding water to remove the effects. Have students make observations.

What's Happening?

(The proteins in the egg whites become cloudy when they start to separate a denaturation of the proteins. This is an irreversible chemical reaction and students need to understand that a substance 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"?
- Is the protective layer beneath cloudy and developed the eyes.
- What type of safety equipment must be worn when doing lab?
- Explain correct, but not 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 unit is a multiple of the base unit. The following table lists the base units and their symbols.

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
- paper
- balance
- metric ruler
- pipette or syringe (small scale preferred)
- metric ruler
- 10-mL graduated cylinder
- colored particles

Safety:



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:

- 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

	Drop Height (cm)			
	5	25	50	100
Colored Water				
Colored Syrup				

Height of Drop vs. Splatter Size

Analyze and Conclude:

- _____
- _____

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Instructional Videos



Animal Diversity 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 are physical cards with various questions and illustrations. Each card includes a 'Vertebrates' icon and a question number.

- Card 1:** Fishes take in oxygen through _____.
a. fins c. scales
b. mouth d. gills
- Card 2:** Which of the following fishes is classified as a bony fish?
a. goldfish c. shark
b. ray d. hagfish
- Card 3:** Birds have _____ that connect to the lungs and increase the amount of oxygen they can take in.
- Card 4:** Which of the following animals is NOT radially symmetrical?
a. sea star c. spider
b. hydra d. sea urchin
- Card 5:** How do sessile, aquatic animals get ant female monotremes and _____?
- Card 6:** The irregular shape of a sponge's body is an example of _____.
a. bilateral symmetry c. balance
b. radial symmetry d. asymmetry
- Card 7:** You have discovered a new organism. What characteristics must it have in order to be classified as an animal?
- Card 8:** A zygote divides by a process of _____.
a. mitosis c. meiosis
b. binary fission d. budding
- Card 9:** _____ is the process by which a new organism forms from the joining of an egg cell and a sperm cell.
- Card 10:** Identify an organism that has radial symmetry and an organism that has bilateral symmetry.

Digital Task Cards

Digital Task Cards are interactive cards with various questions and illustrations. Each card includes a 'Vertebrates' icon and a question number.

- Card 1:** Animal Diversity Invertebrates. A _____ has the most complex nervous systems of any invertebrate.
bivalve
- Card 2:** Animal Diversity Invertebrates. Web-spinning by a spider is an example of _____.
conditioning
learned behavior
- Card 3:** Animal Diversity Vertebrates. What characteristic is used to classify a mammal as a monotreme, marsupial, or placental mammal?
The way in which its young develop
the structure of its brain
how much fur it has
the environment in which it lives

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

SECTION 2
Directions: Compare and contrast vertebrates below.

Vertebrates	Characteristics	Examples

SECTION 3
Directions: Complete the table below with characteristics of organisms along with an example for each.

Characteristics	Examples
Jawless fish	

SECTION 4
Directions: Complete the table below about reptile adaptations.

Adaptation	Advantage
Slimy skin	
Sneak attack	
Amphibious	

Directions: Describe characteristics of each major group of reptiles below.

SECTION 5
Directions: Answer the questions about birds below.

1. What are two types of feathers and their functions?
2. How does wing shape affect flight?
3. How are birds able to live in such diverse environments?

Direction for each term, write the left line provided.

Column A	Column B
1. _____	a. Provides no water exit
2. _____	b. Protects and provides water
3. _____	c. Stores water
4. _____	d. Fluid-filled and contains air
5. _____	e. Rich in fat, absorbing
6. _____	f. Xanthophyll requires

SECTION 7
Directions: List four characteristics of mammals below.

Directions: Using the pictures, below mammal is pictured. Explain your response.

herbivore	omnivore

SECTION 8
Directions: Answer the questions below about mammals.

1. Describe the body systems of mammals.
2. Compare an animal and explain how it uses camouflage and its body and internal anatomy.
3. Complete the table by describing a characteristic for each group of mammals and give a real example.

Group	Characteristics	Examples
Vertebrate		
Invertebrate		
Fungus		



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 biology assessments:

- Left Document:** A quiz titled "Quiz: Introduction to Animals" with a "Matching" section. It lists terms like radial symmetry, bilateral symmetry, and mesoderm, with corresponding definitions.
- Top-Right Document:** A chapter test titled "CHAPTER TEST: INTRODUCTION TO ANIMALS". A red box highlights the text: "EDITABLE CHAPTER TEST INCLUDES MULTIPLE CHOICE, FILL IN THE BLANK, INTERPRETING DIAGRAM, & SHORT ANSWERS QUESTIONS".
- Bottom-Right Document:** An answer key for the chapter test. A red box highlights the text: "ANSWER KEY INCLUDED — IMAGES ARE BLURRED FOR COPYRIGHT REASONS".

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