



# Science Odyssey

VOLUME 2



## Dear Reader,

Embark upon an epic *Science Odyssey* through the realms of knowledge, where each chapter unfolds like a superhero's saga, and every lesson is a daring adventure waiting to be conquered! In this heroic quest, *Science Odyssey Grade 7* awaits, armed with 18 mighty chapters.

Prepare yourself as each chapter unveils its secrets, starting with an Introduction—a beacon lighting the way to the wonders within.

Within the cosmic structure of each lesson, discover your mission and delve into the comprehensive structure:

### 1. Lesson Components:

- **Objectives:** Clearly outlined goals for the lesson.
- **Key Vocabulary:** Important terms you'll encounter during the lesson.
- **NGSS Standards:** The lesson aligns with Next Generation Science Standards, ensuring a comprehensive educational experience.

### 2. Lesson Flow:

- **Engage Questions:** Thought-provoking queries to spark your interest and set the tone.
- **Explore:** Dive into the core concepts through engaging activities.
- **Investigate (Lab Work - STEM):** Hands-on exploration and experimentation in the realm of Science, Technology, Engineering, and Mathematics.
- **Evaluate (Lesson Self-Check):** Assess your understanding through identification, explanation, comparison, contrast, description, summarization, and prediction.

In addition to this structured approach, each lesson follows a holistic educational philosophy:

- **5E Approach:** Embracing the Engagement, Exploration, Explanation, Elaboration, and Evaluation stages to ensure a comprehensive learning experience.
- **Bloom's Taxonomy:** Fostering cognitive skills by encouraging activities that span the cognitive domains—remembering, understanding, applying, analyzing, evaluating, and creating.
- **STEM and STEAM Integration:** Emphasizing Science, Technology, Engineering, and Mathematics (STEM), and seamlessly incorporating the Arts (STEAM) for a well-rounded and interdisciplinary educational journey.



But that's not all! Each lesson in the *Textbook* corresponds with a parallel lesson in the *Activity Book*. In this supplementary resource, you'll find:

- **Explain and Elaborate:** Delve deeper into the subject matter with projects that integrate Science, Technology, Engineering, Arts, and Mathematics (STEAM).
- **Activity Worksheets:** Practical sheets to reinforce your learning and apply the knowledge gained.

And to further solidify your grasp of the material, each chapter concludes with a rigorous **Standardized Practice Test**, featuring three essential components:

- **Multiple Choice Questions:** Test your understanding with a variety of options.
- **Short Answer Questions:** Demonstrate your knowledge concisely and precisely.
- **Long Essay Questions:** Engage in in-depth analysis and expression of your understanding.

So, don your cape, wield your intellectual sword, and embark upon this superheroic odyssey through *Science Odyssey Grade 7*. May your mind be as unyielding as a damantium, and your journey as legendary as the heroes of old. Onward, noble reader, to the stars of knowledge!



With heroic regards,  
**Regal Education**



# Chapter Odyssey

Lesson Objectives

Key Vocabulary

NGSS Standards

Engage

Explore

Investigate. Lab Work. STEM.

Evaluate. Self-check

Revision.

Activity book

Explain and Elaborate.  
Project. STEAM.

Activity Worksheets.





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# Biodiversity

Welcome to an immersive exploration of life's vibrant tapestry on our planet! This chapter marks the beginning of our Biodiversity Bonanza and Conservation Quest, where we venture into the extraordinary wonders of nature and the tireless dedication of those committed to preserving them.

**Lesson 1: Biodiversity.** Nature's Marvels Delve into the intricate web of life as we uncover the mysteries of biodiversity. Explore the myriad species coexisting, each playing a unique role in the grand symphony of the natural world.

**Lesson 2-3: Heroes for Endangered Species. Conservation Crusaders.** Meet the unsung heroes safeguarding those on the brink of extinction. Learn about their endeavors to protect and preserve endangered species, ensuring a future where these creatures continue to thrive. Step into the shoes of conservation crusaders, individuals dedicating their lives to the protection of our planet. Explore the challenges they face and the triumphs stemming from an unwavering commitment to environmental preservation.

**Lesson 4: Ecosystems in Danger.** Uncover the threats looming over our ecosystems and delve

into the delicate balance that sustains life. Examine the impact of human activities on various ecosystems and discover strategies to mitigate and reverse the damage.

**Lesson 5-6: Guardians of the Environment. Green Heroes Unite!** Join the ranks of the Guardians of the Environment—individuals and organizations working together to safeguard our planet's natural treasures. Explore initiatives and innovations aimed at creating a sustainable future. In our final lesson, witness the power of collective action as Green Heroes Unite! Communities, organizations, and individuals band together for a common cause—preserving the environment. Discover how small acts can lead to significant positive change.



Embark on this educational and inspirational journey as we celebrate the richness of biodiversity and delve into the world of conservation. Together, let's embrace the role of stewards of the Earth, ensuring a legacy of prosperity for generations to come.

# LESSON 1

## Elements - The Heroes of Chemistry



### LESSON OBJECTIVES

#### 1. Understanding Biodiversity Levels

■ Students will be able to define and differentiate between the three main levels of biodiversity—genetic diversity, species diversity, and ecosystem diversity. They will understand how each level contributes to the overall variety of life on Earth.

#### 2. Recognizing the Importance of Biodiversity

■ Students will develop an awareness of the significance of biodiversity by exploring its role in maintaining ecological balance and providing essential services to ecosystems. They will grasp the interconnectedness of various species and their impact on the health of the planet.

#### 3. Identifying Human Impact on Biodiversity

■ Students will analyze and recognize the impact of human activities on biodiversity. They will explore the challenges posed by resource use, habitat destruction, and other factors, gaining an understanding of the delicate balance required for sustainable coexistence.

#### 4. Promoting Stewardship and Responsible Actions

■ Students will internalize the concept of stewardship and its role in preserving biodiversity. They will explore practical ways to be good stewards of the environment, including reducing waste, supporting native plants, and spreading awareness. Students will be encouraged to see themselves as active contributors to the protection of Earth's diverse ecosystems.



### KEY VOCABULARY



#### 1. Biodiversity:

- **Explanation:** The variety of life on Earth, including the different species, their genetic makeup, and the ecosystems in which they live.
- **Synonyms:** Biological diversity, ecological diversity, variety of life.

#### 2. Genetic Diversity:

- **Explanation:** The variety of genes within a species, contributing to the unique traits and characteristics of individual organisms.
- **Synonyms:** Genetic variation, gene diversity, genetic variability.

#### 3. Species Diversity:

- **Explanation:** The multitude of different plant and animal species within a specific habitat or ecosystem.
- **Synonyms:** Species richness, variety of species, biodiversity at the species level.

#### 4. Ecosystem Diversity:

- **Explanation:** The variety of ecosystems, including different types of habitats such as deserts, coral reefs, and tropical forests.

- **Synonyms:** Ecological diversity, habitat diversity, diversity of ecosystems.

#### 5. Ecological Niche:

- **Explanation:** The role and position that a species has in its environment, including its interactions with other species and its use of resources.
- **Synonyms:** Habitat role, ecological role, species function.

#### 6. Resilience:

- **Explanation:** The ability of an ecosystem to recover from disturbances or changes, maintaining its stability and functionality.
- **Synonyms:** Adaptability, robustness, capacity to recover.







## KEY VOCABULARY



### 7. Stewardship:

- **Explanation:** Responsible and sustainable management and care of the environment, including the protection and preservation of biodiversity.
- **Synonyms:** Conservation, guardianship, environmental responsibility.

### 8. Balancing Act:

- **Explanation:** The challenge of managing and maintaining a harmonious relationship between human needs and the need to protect and preserve biodiversity.
- **Synonyms:** Delicate equilibrium, careful balancing, maintaining a balance.

## NGSS STANDARDS

### 1. MS-LS1-5 (Life Science - From Molecules to Organisms: Structures and Processes)

- **Description:** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- **Alignment:** The lesson covers genetic diversity and how environmental factors influence the growth and survival of organisms.

### 2. MS-ESS3-3 (Earth and Space Science - Earth and Human Activity)

- **Description:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- **Alignment:** The lesson touches on human impact on biodiversity and introduces stewardship as a method for minimizing this impact.

### 3. MS-ESS3-4 (Earth and Space Science - Earth and Human Activity)

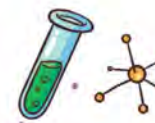
- **Description:** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- **Alignment:** The lesson indirectly addresses this standard by discussing the challenges of balancing human needs with the need to protect and preserve biodiversity.

### 4. MS-ESS3-5 (Earth and Space Science - Earth and Human Activity)

- **Description:** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
- **Alignment:** While the lesson doesn't explicitly address global temperatures, it does introduce the concept of climate and habitat size correlating with biodiversity levels.

### 5. MS-ESS3-1 (Earth and Space Science - Earth and Human Activity)

- **Description:** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
- **Alignment:** The lesson doesn't directly address the uneven distributions of resources, but it does discuss the importance of biodiversity and the need to protect habitats.



1. What does the term 'Biodiversity' mean?

2. Why is Biodiversity important for Earth?

ENGAGE

## EXPLORE

Let's revel in the magnificence of biodiversity! Biodiversity refers to the incredible variety of life across ecosystems, from abundant ant colonies to rare zebras and microscopic extremophiles. Earth's biodiversity results from over 3.5 billion years of evolutionary diversification. Learning to protect this natural heritage ensures thriving, healthy habitats.

Scientists categorize biodiversity into three main levels. Genetic diversity refers to variation within a species - no two members are quite alike. Chilean flamingos exhibit genetic diversity in their range of pink plumage. Secondly, species diversity quantifies the incredible multitude of unique plant and animal species, each filling an ecological niche. Estimates suggest 8-10 million different species inhabit the planet currently. Finally, ecosystem diversity encompasses the mosaic of habitats like deserts, coral reefs, and tropical forests that support diverse organisms.

### Diversity levels on Earth

#### Genetic Diversity

Variation within a species, represented by unique traits in individuals.



#### Species Diversity

Multitude of unique plant and animal species, each occupying a specific ecological niche.



#### Ecosystem Diversity

The variety of ecosystems, each supporting a range of organisms, from deserts to coral reefs.



Mapping global biodiversity has revealed fascinating patterns. Biodiversity greatly increases near the equator, especially in tropical rainforests. Meanwhile, colder polar regions sustain less diversity overall. Climate and habitat size strongly correlate with biodiversity levels. And biodiversity positively affects ecological stability, as network complexity provides more resilience.

Earth's astounding biodiversity represents millions of years of evolutionary tinkering. Our responsibility is protecting this biological heritage while sustaining needed resources - no easy balancing act! But valuing diversity is the first step to good stewardship. Let's cherish biodiversity!



# Cherishing Biodiversity: A Balancing Act

Earth is a bustling planet, teeming with millions of unique species. This incredible array of life is the result of billions of years of evolution - nature's grand experiment. Each species, from the smallest microorganism to the largest whale, plays a crucial role in the ecosystem.

## What is Biodiversity?

Biodiversity is the variety of life on Earth. It includes all the different species, their genetic makeup, and the natural communities in which they live. It's like nature's library, filled with countless volumes of life's story written over millions of years.

## Why is Biodiversity Important?

Biodiversity is the backbone of all life on Earth. It provides the "services" that allow ecosystems to function. From pollination of plants by bees to water purification by wetlands, biodiversity plays a vital part in maintaining the health of our planet.

But it's not just about the environment. Biodiversity also provides us with many resources. Medicines, food, and even the air we breathe are all gifts from biodiversity.

## The Balancing Act

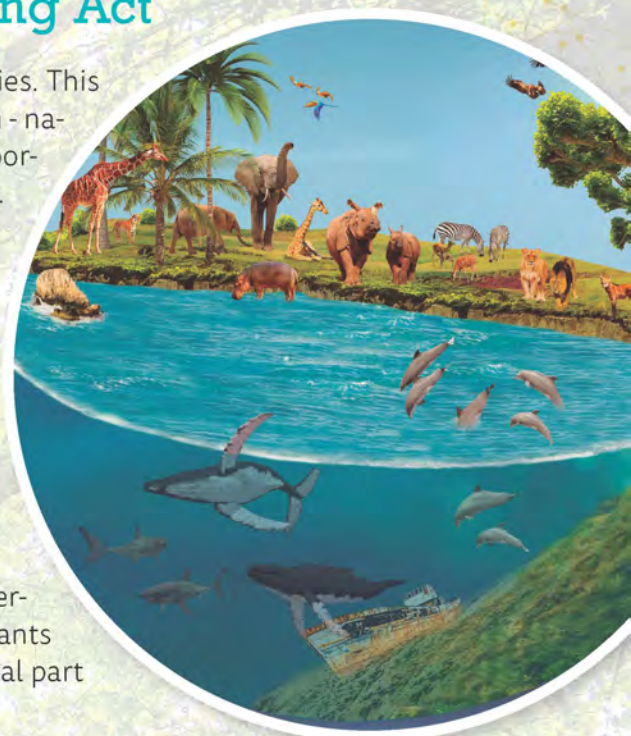
Here's where it gets tricky. While we rely on biodiversity for our survival, we also need to use some resources for our needs. This is like a balancing act. On one side of the scale, we have our need for resources like food, water, and materials. On the other side, we have the need to protect and preserve biodiversity.



## The Value of Diversity

The first step in this balancing act is to value diversity. Just like a library is enriched by having many different types of books, Earth is enriched by its biodiversity. Every species has a role to play, and losing one can disrupt the whole ecosystem.

Imagine if all the bees disappeared. Without bees to pollinate, many plants wouldn't be able to reproduce. This could lead to a decline in the plants that we rely on for food. So, by protecting bees, we're also protecting our food supply.



## Stewardship: Our Responsibility

As humans, we have a responsibility to be good stewards of the Earth. This means taking care of our planet and its biodiversity. We can do this by using resources wisely, reducing pollution, and protecting habitats.

### HERE ARE SOME WAYS WE CAN BE GOOD STEWARDS:

- **Reduce, Reuse, and Recycle:** By reducing waste, reusing items, and recycling, we can lessen our impact on the environment.
- **Plant Native Plants:** Native plants provide food and shelter for local wildlife. By planting them in our yards, we can help support local biodiversity.
- **Learn and Teach:** The more we know about biodiversity, the better we can protect it. We can also spread the word to others about the importance of biodiversity.

Our planet's astounding biodiversity is a treasure trove of life. As we continue to explore and understand this rich tapestry, let's remember to value each thread. By balancing our needs with the needs of the planet, we can ensure that this beautiful diversity is preserved for future generations.

Remember, every action counts. So, let's cherish biodiversity and be good stewards of our planet. After all, there's no place like home, and Earth is our only home!





## LAB WORK 1.

## Native Plant Garden

**Objective:** Teach students about native plant species and their role in local biodiversity.

**Steps:**

1. Research native plants in your area and pick a few that you're interested in.
2. With the help of a guardian, plant these species in your backyard or school garden.
3. Over time, observe what insects, birds, or other animals are attracted to these plants.
4. Document your findings and present them to the class, explaining how native plants support biodiversity.



## LAB WORK 2.

## Biodiversity Awareness Campaign

**Objective:** Enhance students' understanding of biodiversity by creating an engaging educational campaign.

**Steps:**

1. Research about a specific aspect of biodiversity that interests you.
2. Create an informational poster or digital presentation about it. Make sure to include why it's important and how it can be protected.
3. Share your campaign with the class or wider school community.
4. Discuss how increasing awareness can lead to better protection of our planet's biodiversity.





# Evaluate Lesson 1. Self-check.

## Review Test

**Instructions:** Answer the following questions to check your understanding of the lesson on biodiversity. Choose the best response for each question.

### 1. Identify:

- **Question:** What is the term used to describe the variety of life on Earth, including different species, their genetic makeup, and the ecosystems they inhabit?

a. Variety

c. Multitude

b. Biodiversity

d. Species Range

- **Answer:** \_\_\_\_\_



### 2. Explain:

- **Question:** Briefly explain the concept of genetic diversity and provide an example to illustrate this concept.

a. Genetic diversity is the variety of ecosystems.

c. Genetic diversity is the number of different species in an ecosystem.

b. Genetic diversity refers to the differences in traits within a species, such as the various colors of a flower.

d. Genetic diversity is the same as species diversity.

- **Answer:** \_\_\_\_\_

### 3. Compare and Contrast:

- **Question:** Compare and contrast species diversity and genetic diversity. How are they similar, and what makes them distinct?

a. They are the same concept.

c. Genetic diversity is about the number of species, while species diversity is about traits within a species.

b. Species diversity is about the variety of ecosystems, while genetic diversity is about differences within a species.

d. They both refer to the variety of traits within a species.

- **Answer:** \_\_\_\_\_

# Evaluate

## Lesson 1. Self-check.



### 4. Describe:

● **Question:** Use descriptive language to explain the role of an ecological niche. What does it involve, and why is it important in an ecosystem?

- a. An ecological niche is a specific role or job that a species has in its environment, and it's important because it defines the habitat of a species.
- b. An ecological niche is the number of species in a habitat, and it's important for the balance of nature.
- c. An ecological niche is the same as biodiversity, and it's important for the health of eco systems.
- d. An ecological niche is the variety of ecosystems in a specific area, and it's important for supporting diverse life.

● **Answer:** \_\_\_\_\_

### 5. Summarize:

● **Question:** In a sentence or two, summarize the main idea of why biodiversity is considered a balancing act, as discussed in the lesson.

● **Answer:** \_\_\_\_\_

### 6. Predict:

● **Question:** Based on what you've learned about the impact of human activities on biodiversity, make a prediction about what might happen if humans continue to disregard the need to protect and preserve biodiversity.

● **Answer:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# LESSONS 2-3

## Heroes for Endangered Species. Conservation Crusaders!



### LESSON OBJECTIVES

- 1. Understand the Importance of Endangered Species:** Students will grasp the significance of endangered species in maintaining ecological balance and the interconnectedness of all species in an ecosystem.
- 2. Identify Threats to Biodiversity:** Students will recognize and analyze various threats to biodiversity, including habitat loss, climate change, overhunting, and invasive species.
- 3. Promote Conservation Practices:** Students will explore and advocate for conservation practices such as

habitat protection, sustainable forestry, and responsible resource usage to mitigate the impact of human activities on ecosystems.

- 4. Empower Students as Conservation Crusaders:** Students will develop a sense of responsibility and empowerment to contribute as conservation crusaders by taking actionable steps, whether through education, advocacy, or sustainable choices, to protect endangered species and preserve habitats.

### KEY VOCABULARY



#### 1. Endangered Species:

- **Explanation:** Species at risk of extinction due to various threats like habitat loss, climate change, and hunting.
- **Synonyms:** Threatened species, at-risk species, vulnerable species.

#### 2. Biodiversity:

- **Explanation:** The variety of life in a particular habitat or on Earth, including the variety of species, genetic diversity, and ecosystems.
- **Synonyms:** Biological diversity, ecological diversity, species diversity.

#### 3. Conservation:

- **Explanation:** The sustainable management and protection of natural resources, including the preservation of habitats and species.
- **Synonyms:** Preservation, protection, environmental stewardship.

#### 4. Habitat Conservation:

- **Explanation:** The protection and management of natural environments to ensure the survival of species and maintain ecological balance.

- **Synonyms:** Ecosystem preservation, habitat protection, environmental conservation.

#### 5. Sustainable Practices:

- **Explanation:** Actions that meet the needs of the present without compromising the ability of future generations to meet their own needs.
- **Synonyms:** Eco-friendly practices, environmentally sustainable actions, green initiatives.

#### 6. Ecosystem:

- **Explanation:** A biological community of interacting organisms and their physical environment.
- **Synonyms:** Ecological system, natural community, living environment.

#### 7. Global Warming:

- **Explanation:** A gradual increase in Earth's overall temperature due to human activities, primarily the release of greenhouse gases.
- **Synonyms:** Climate change, temperature rise, global heating







**1. MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

- The lesson discusses the impact of human activities on ecosystems, emphasizing the importance of protecting habitats to prevent population decline.

**2. MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

- The lesson encourages students to take actions like supporting conservation efforts, sustainable practices, and advocating for policies to protect endangered species and their habitats.

**3. MS-ESS3-4:** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

- The lesson touches on the impact of human activities on resource distribution, particularly in the context of unsustainable practices like deforestation and resource overuse.

**4. MS-ESS3-5:** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

- While not explicitly discussing global temperatures, the lesson addresses human-induced climate change as a threat to endangered species and ecosystems.

**5. MS-ESS3-6:** Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

- The lesson indirectly addresses the relationship between human activities (such as habitat destruction and climate change) and their impact on Earth systems.

**6. MS-LS2-5:** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

- The lesson promotes various solutions for maintaining biodiversity, such as supporting national parks, wildlife refuges, and sustainable practices.

**7. MS-ESS3-1:** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

- The lesson discusses the importance of responsible resource usage, aligning with the idea of sustainable practices.



**ENGAGE**

**1.** What does the term "endangered species" mean to you, and why do you think it's crucial for us to pay attention to the conservation of these species?

**2.** Can you think of any specific examples of endangered species, and what factors or threats do you believe contribute to their endangered status?



# Space Explorers and Cosmic Adventures

Welcome to Chapter 14 - Space Explorers and Cosmic Adventures. Buckle up as we embark on an odyssey that transcends the bounds of our world. Here's a sneak peek into the lessons that await:ð

### Lesson 1: Space Odyssey Kickoff

Launch into the cosmos with the Space Odyssey Kickoff. Explore the foundations of space exploration, from the early pioneers to the cutting-edge missions that propel us into the great unknown.

### Lesson 2: Telescopes and Cosmic Voyages

Peer through the lenses of discovery as we delve into the realm of telescopes. Join cosmic voyages that unveil the secrets of distant galaxies and bring the universe into sharper focus.

### Lesson 3: The Sun and Starstruck Tales

Bask in the brilliance of The Sun and immerse yourself in starstruck tales that weave through the cosmic tapestry. Discover the celestial dance that lights up our skies.

### Lesson 4: Galaxy Quest

Embark on a Galaxy Quest that transcends the boundaries of our Milky Way. Traverse through the vastness of space, encountering nebulae,

black holes, and the captivating wonders that define distant galaxies.

### Lesson 5: The Search for Alien Life

Peer into the cosmic expanse in The Search for Alien Life. Unravel the mysteries of extraterrestrial existence and ponder the possibilities that lie beyond our Earthly home.

### Lesson 6: Future Space Explorers

In this final lesson, gaze into the horizon of Future Space Explorers. Explore the technologies, aspirations, and dreams that beckon the next generation to venture further into the cosmos.



Prepare for a cosmic adventure that will leave you starry-eyed and inspired by the wonders of the universe.

# LESSON 1

## Space Odyssey Kickoff



### LESSON OBJECTIVES

#### 1. Identify Celestial Bodies and Systems

■ Students will be able to differentiate between various celestial bodies and systems, including stars, planets, galaxies, and exoplanets.

#### 2. Explain the Significance of Our Solar System

■ Students will develop an understanding of the key components of our Solar System and explain their significance in shaping our cosmic neighborhood.

#### 3. Explore Space Exploration Concepts

■ Students will delve into fundamental concepts related to space exploration, including spacecraft development challenges, interstellar travel potential, and the search for habitable exoplanets.

#### 4. Engage in Hands-on Experiments

■ Students will actively participate in hands-on experiments, such as creating models of comets and spinning galaxies, to gain practical insights into scientific principles related to space and astronomy.

### KEY VOCABULARY



#### 1. Galaxy:

- **Explanation:** A galaxy is a vast system of stars, stellar remnants, interstellar gas, dust, and dark matter, all bound together by gravity.
- **Synonyms:** Stellar system, star cluster, celestial city.

#### 2. Exoplanets:

- **Explanation:** Exoplanets are planets that orbit stars outside our Solar System.
- **Synonyms:** Extrasolar planets, alien worlds, distant planets.

#### 3. Constellations:

- **Explanation:** Constellations are patterns of stars in the night sky that form recognizable shapes or figures.
- **Synonyms:** Star patterns, star formations, celestial configurations.

#### 4. Aerospace:

- **Explanation:** Aerospace pertains to the design, development, and production of aircraft and spacecraft.
- **Synonyms:** Aeronautics, astronautics, space technology.

#### 5. Atmospheric Conditions:

- **Explanation:** Atmospheric conditions refer to the state of Earth's atmosphere, encompassing factors like temperature, pressure, humidity, and wind.
- **Synonyms:** Weather conditions, atmospheric state, climatic factors.

#### 6. Generation Ships:

- **Explanation:** Generation ships are hypothetical spacecraft designed for long-term space travel, where multiple generations live and die during the journey.
- **Synonyms:** Interstellar arks, multi-generational vessels, space colonization ships.

#### 7. Cosmic Horizon:

- **Explanation:** The cosmic horizon is the limit of what can be observed or known about the universe.
- **Synonyms:** Celestial boundary, universal limit, cosmic edge.





**MS-ESS1-1:** Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

**MS-ESS1-2:** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

**MS-ESS1-3:** Construct a scientific explanation based on evidence for how the non-uniform, compositionally diverse structure of Earth and other rocky planets provides the conditions for life.

**MS-ESS2-2:** Construct an argument supported by evidence for how forces responsible for plate motion cause changes to the Earth's surface.

**MS-ESS2-4:** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

**MS-ESS3-2:** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

**MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

**MS-ESS3-4:** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.



**1.** If you had the chance to be the architect of life on another planet, what key features would you give to the inhabitants to ensure their survival? Consider the planet's environment, climate, and resources in your design.

**ENGAGE**

## EXPLORE

**B**last off on an epic odyssey of space discovery! Gazing into the night sky ignites the endless human passion to understand our universe. From ancient astronomers charting constellations to pioneering space flyers floating weightlessly above Earth, exploring worlds beyond our own shapes history and imagination. Let your space odyssey kickoff here - a universe of adventure awaits!

Our solar system provides the ideal training ground for future spacefarers. Eight unique planets orbit our local star, the Sun, along with millions of asteroids, comets, and other objects. Over 150 moons circle the major planets as their natural satellites, with atmospheric conditions and geology ranging from scorching to subzero. Developing spacecraft to study these worlds previews challenges ahead.

Voyaging across the sea of stars, our galaxy contains billions of other suns, many surrounded by exoplanet worlds. Our Milky Way swirls as one of hundreds of billions of galaxies observable in the known universe. With so much left undiscovered, the cosmic horizon beckons pioneers seeking knowledge and community with life among the stars.

From hunting for exoplanets where biology may blossom, to seeking traces of past life on Mars, Europa, or Enceladus' icy plumes, space remains the greatest mystery. Can humans one day voyage between the stars themselves on generation ships? Will wormholes offer passage through warped spacetime? Let no limit constrain scientific imagination, for our destiny dances among the cosmos.

The adventure of space exploration begins here and now - in starry night contemplation, in pursuing aerospace education, in designing your future among the stars. With boundless determination, the universe awaits discovery by intrepid explorers like you!

### Our Cosmic Journey Begins!

Welcome, young explorers, to our grand journey across the cosmos! We're about to embark on a thrilling expedition, so buckle up and let's set sail on the sea of stars, exploring the mysteries of our universe. First stop, our very own cosmic neighborhood - the Solar System!

### The Solar System

Our Solar System is like a bustling city, bustling with activity and full of fascinating neighbors. At the heart of this cosmic city is our local star, the Sun, a gigantic ball of hot, glowing gasses. The Sun's light and heat make life on Earth possible. But did you know that it's just one of billions of stars in the Milky Way galaxy?

Orbiting the Sun, we find eight unique planets, each with its own story. Closest to the Sun are the rocky planets - Mercury, Venus, Earth, and Mars. These planets are small and have solid ground, just like Earth. Further away are the gas giants - Jupiter, Saturn, Uranus, and Neptune. These planets are much larger and made mostly of gasses. They also have many moons. Jupiter, for example, has a whopping 79 moons!

Speaking of moons, did you know that our Moon isn't the only one in the Solar System? Over 150 moons orbit the major planets, each with unique environments.



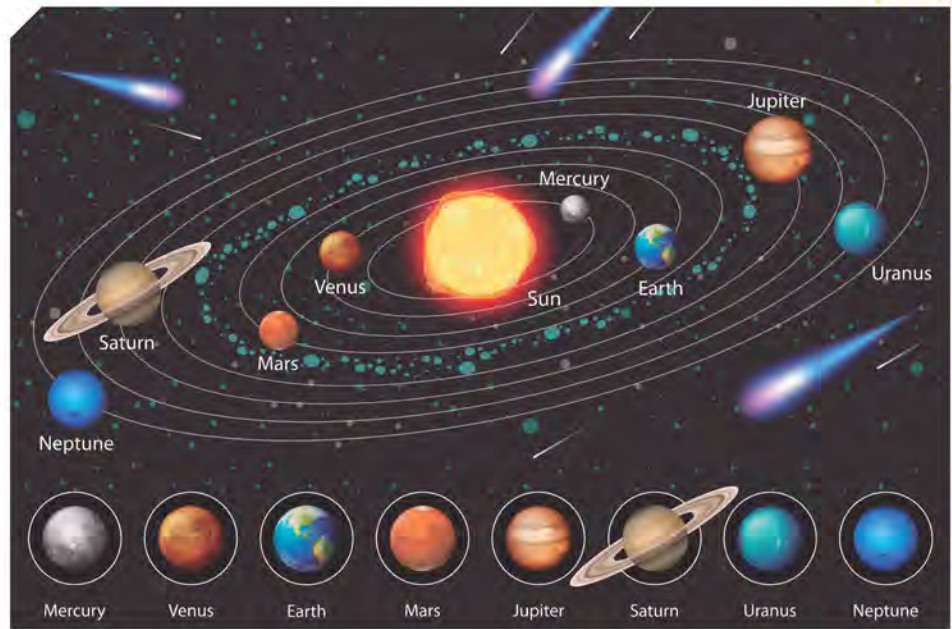
Some, like Jupiter's moon Europa, may even have oceans under their icy surfaces!

And let's not forget the countless asteroids, comets, and other objects whizzing around our Solar System. These space rocks can teach us a lot about the early days of our Solar System.

## Beyond the Solar System

Now, let's zoom out and look beyond our Solar System. Welcome to the Milky Way galaxy! Our galaxy is a

sprawling city of stars, with our Sun being just one of the billions. Imagine the number of planets that could be orbiting these stars! These planets outside our Solar System are known as exoplanets. Some of these exoplanets might even be similar to Earth. Who knows, there could be alien life out there!



## The Universe

But wait, there's more! Our Milky Way galaxy is just one of hundreds of billions of galaxies in the observable universe. Each galaxy is a grand collection of stars, planets, and other cosmic objects, all bound together by gravity. The universe is so vast that even light, which travels at a mind-boggling speed, takes billions of years to travel across it.

## The Future of Space Exploration

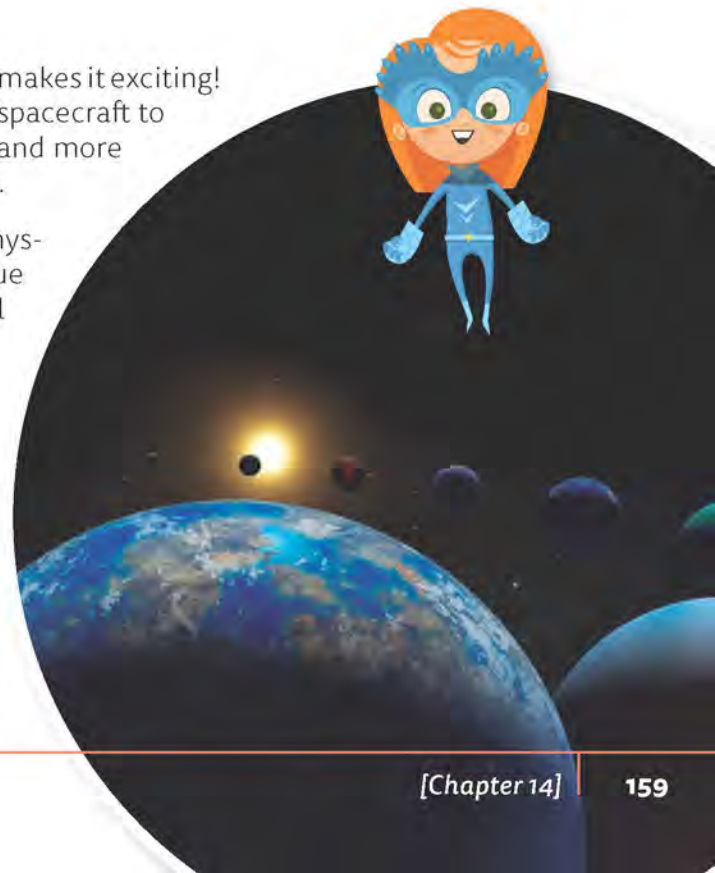
Exploring these distant worlds is not easy, but that's what makes it exciting! Scientists and engineers are constantly developing new spacecraft to travel further into space. Each mission helps us understand more about our universe and prepares us for future challenges.

So, get ready, future spacefarers! The universe is a vast, mysterious place, full of wonder and discovery. As we continue to explore, who knows what we might find? Perhaps we'll discover new planets, find signs of alien life, or even find a new home for humanity. The possibilities are as endless as the universe itself.

Remember, every great journey starts with a single step.

Your space odyssey has just begun. The cosmic horizon beckons you, pioneers of the future.

So, let's reach for the stars and explore the mysteries of the universe together!





# INVESTIGATE

## Lab Work



### LAB WORK 1.

#### Comet Kitchen

Who said you can't mix cooking and space exploration? Let's create a comet right in our kitchen!

#### Steps

1. Gather the ingredients: water, sand or dirt, corn syrup, vinegar, and dry ice. These represent the elements found in comets.
2. In a large bowl, mix a cup of water, a cup of sand or dirt, a tablespoon of corn syrup, and a tablespoon of vinegar.
3. Put on your gloves (dry ice can be dangerous to touch directly), take a chunk of dry ice, and crush it into a powder.

4. Add the crushed dry ice to the rest of the ingredients and stir well.

Voilà! You've just created a model of a comet!



### LAB WORK 2.

#### Spinning Galaxy

In this experiment, we'll create a spinning galaxy in a jar to understand how galaxies rotate due to gravity.

#### Steps

1. Gather a clear jar, water, glitter, food coloring, and a spoon.
2. Fill the jar three-quarters full with water.
3. Add a drop of food coloring and stir until it's evenly distributed.
4. Add a handful of glitter to represent stars and other celestial bodies.
5. Tightly close the jar and give it a good swirl.

Voilà! You've just created a spinning galaxy. Observe how the glitter (stars) move in a spiral, similar to how galaxies rotate!



# Evaluate

## Lesson 1. Self-check.



**Instructions:** Answer the following questions by choosing the most appropriate option or providing a short response.

### 1. Identify:

- What is the main focus of the lesson?
  - a. Marine life
  - b. The Solar System
  - c. Ancient civilizations
  - d. Rainforest exploration

### 2. Explain:

- Briefly explain the significance of our Sun in the Solar System.

### 3. Compare and Contrast:

- Compare the characteristics of rocky planets with gas giants in our Solar System.

### 4. Describe:

- Use three adjectives to describe the Milky Way galaxy.

### 5. Summarize:

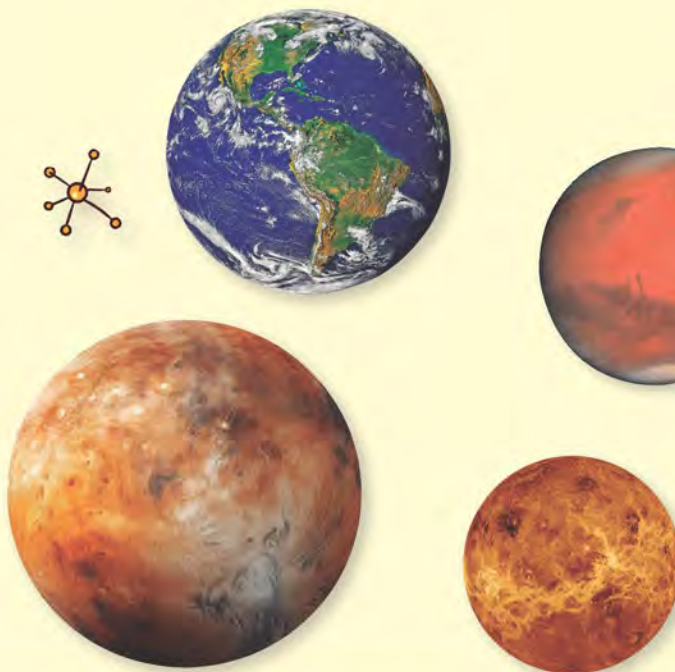
- Summarize the main points about exoplanets mentioned in the lesson.

### 6. Predict:

- What do you think might be the next big discovery in space exploration based on the information provided?

### Bonus Question: Critical Thinking

- How does the exploration of space connect to the idea of human destiny and imagination?





# LESSON 2

## Telescopes and Cosmic Voyages



### LESSON OBJECTIVES

#### 1. Understand the Functionality of Telescopes

- Grasp the principles behind telescopes, distinguishing between refracting and reflecting types. Explore how telescopes capture and focus light to reveal celestial secrets.

#### 2. Explore the Electromagnetic Spectrum in Astronomy

- Delve into the electromagnetic spectrum, understanding how telescopes extend human perception across various wavelengths. Learn about the role of radio telescopes and space telescopes in unveiling cosmic phenomena.

#### 3. Analyze the Impact of Technological Advances on Astronomy

- Examine how technological advancements, such as adaptive optics and the combination of telescopes in arrays, enhance the capabilities of telescopes. Understand how these innovations contribute to sharper and clearer astronomical observations.

#### 4. Connect Historical and Modern Space Telescopes

- Draw connections between historical telescopes, like Galileo's refracting telescope, and modern space telescopes, including the Hubble Space Telescope and latest projects like the James Webb Space Telescope. Explore the evolution of observational tools and their impact on our understanding of the cosmos.

### KEY VOCABULARY



#### 1. Telescope:

- **Explanation:** An optical instrument that gathers and magnifies light to observe distant objects, especially in the sky.
- **Synonyms:** Optical instrument, spyglass, binoculars, observatory.

#### 2. Refraction:

- **Explanation:** The bending of light as it passes through a medium with a different optical density, such as glass or water.
- **Synonyms:** Bending, deflection, bending of light.

#### 3. Cosmic:

- **Explanation:** Relating to the universe, especially as an orderly system; vast and infinite in extent.
- **Synonyms:** Celestial, extraterrestrial, infinite.

#### 4. Infrared:

- **Explanation:** Beyond the red end of the visible light spectrum, having longer wavelengths than those of visible light.
- **Synonyms:** IR, thermal, heat.

#### 5. Observatory:

- **Explanation:** A location or structure equipped for observing astronomical events or celestial objects.
- **Synonyms:** Astronomical center, stargazing station, celestial observatory.





**MS-PS2-4:** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

- This standard is addressed in the lesson when discussing how telescopes use mirrors and lenses to gather and focus light, emphasizing the role of gravitational interactions in celestial bodies.

**MS-ESS1-3:** Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

- While this standard is not explicitly covered, the lesson provides a broader understanding of space and celestial bodies, contributing to students' overall Earth and space science knowledge.

**MS-ESS1-4:** Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

- The lesson touches upon the age of the Universe, mentioning Hubble's observation of galaxies billions of light-years away, aligning with the concept of geological time scales.

**MS-ESS1-2:** Construct a scientific explanation based on evidence for how forces responsible for plate motion cause changes to the Earth's surface.

- While not the primary focus, the lesson indirectly introduces the idea of forces at play in space, such as gravitational interactions and their impact on the formation and movement of celestial bodies.



1. Why do astronomers use different types of telescopes, such as refracting and reflecting telescopes, and how does each type contribute to our understanding of the universe?
2. Imagine you're an astronomer with access to the James Webb Space Telescope. What specific celestial phenomena or mysteries would you be eager to explore using its infrared capabilities, and why do you think this would deepen our understanding of the cosmos?

**ENGAGE**

## EXPLORE

**G**rab your cosmic passport as we explore how telescopes launch voyages across the universe from right here on Earth! Telescopes capture light from celestial bodies, revealing galactic secrets. Spanning the electromagnetic spectrum from radio waves to gamma rays and growing ever larger, telescopes extend human perception to frontiers once unfathomable. Let's traverse the cosmos through telescopic time and space!

Refracting telescopes use convex lenses to gather and focus beams of visible light into sharper images. Galileo's early designs verified moons orbiting Jupiter. Reflecting telescopes employ mirrors instead, gaining larger light collection with minimal distortion. Advances like adaptive optics sharpen images by correcting atmospheric blurring in real time.

Meanwhile, radio telescopes detect longer electromagnetic waves that penetrate obscuring dust clouds. Arrays like ALMA in Chile link multiple radio dishes to achieve ultra-high resolution. The Event Horizon Telescope even imaged the shadow of a black hole in 2019 by combining telescopes worldwide into one virtual dish the size of Earth!

Space telescopes like Hubble orbit high above light-absorbing atmospheric interference that limits ground observation. Hubble peered back billions of years to glimpse early star formation and galaxies merging after the Big Bang. Its deep field images boggle minds. Soon the infrared-scanning James Webb telescope will uncover more cosmological mysteries!

Ever-larger observatories continue construction like the Extremely Large Telescope with 39-meter mirrors. More collector area means more faint light gathered from distant realms. Humanity's eagerness to understand propels telescopes to seemingly infinite technological frontiers. Where will our cosmic quest lead? The sky await!

### Our Cosmic Quest: A Journey Through the Universe!

How exciting it is to embark on a journey through the Universe! We've been exploring the cosmos from our tiny planet for centuries. First, we used our eyes, then we invented telescopes, and now we have incredible machines that orbit our planet, capturing images of stars, galaxies, and nebulae that are billions of years old.

Let's continue our cosmic quest!

#### The Hubble Space Telescope: Our Eye in the Sky

Remember the Hubble Space Telescope we mentioned earlier? Launched in 1990, it has been an incredibly useful tool for astronomers. Orbiting high above Earth's atmosphere, Hubble has been able to observe the Universe without the light-absorbing interference we have on the ground. This has allowed it to capture some of the most detailed images of our Universe ever seen.



ALMA observatory in Chile

One of the most mind-boggling achievements of Hubble is its deep field images. These are long-exposure images of a small area in the sky, revealing thousands of galaxies that are billions of light-years away. By looking at these images, we're seeing galaxies as they were billions of years ago, giving us a glimpse into the early Universe and how galaxies formed and merged after the Big Bang.

## The James Webb Space Telescope: Our Next Step

NASA's James Webb Space Telescope, the agency's successor to the famous Hubble telescope, launched on Dec. 25, 2021, and took our cosmic quest to the next level. This telescope is scanning the Universe in infrared light, which is a type of light that is invisible to our eyes. Why infrared, you ask? Well, this allows the telescope to see through dust clouds in space, uncovering hidden stars and galaxies. It also helps us study planets outside our solar system, known as exoplanets, in more detail than ever before.

## The Extremely Large Telescope: Size Matters

Back on Earth, construction continues on the Extremely Large Telescope. With a 39-meter mirror, this telescope will have more collector area than any other telescope. This means it will be able to gather more faint light from distant realms of the Universe, allowing us to see further and in more detail than ever before.

## Where Will Our Cosmic Quest Lead?

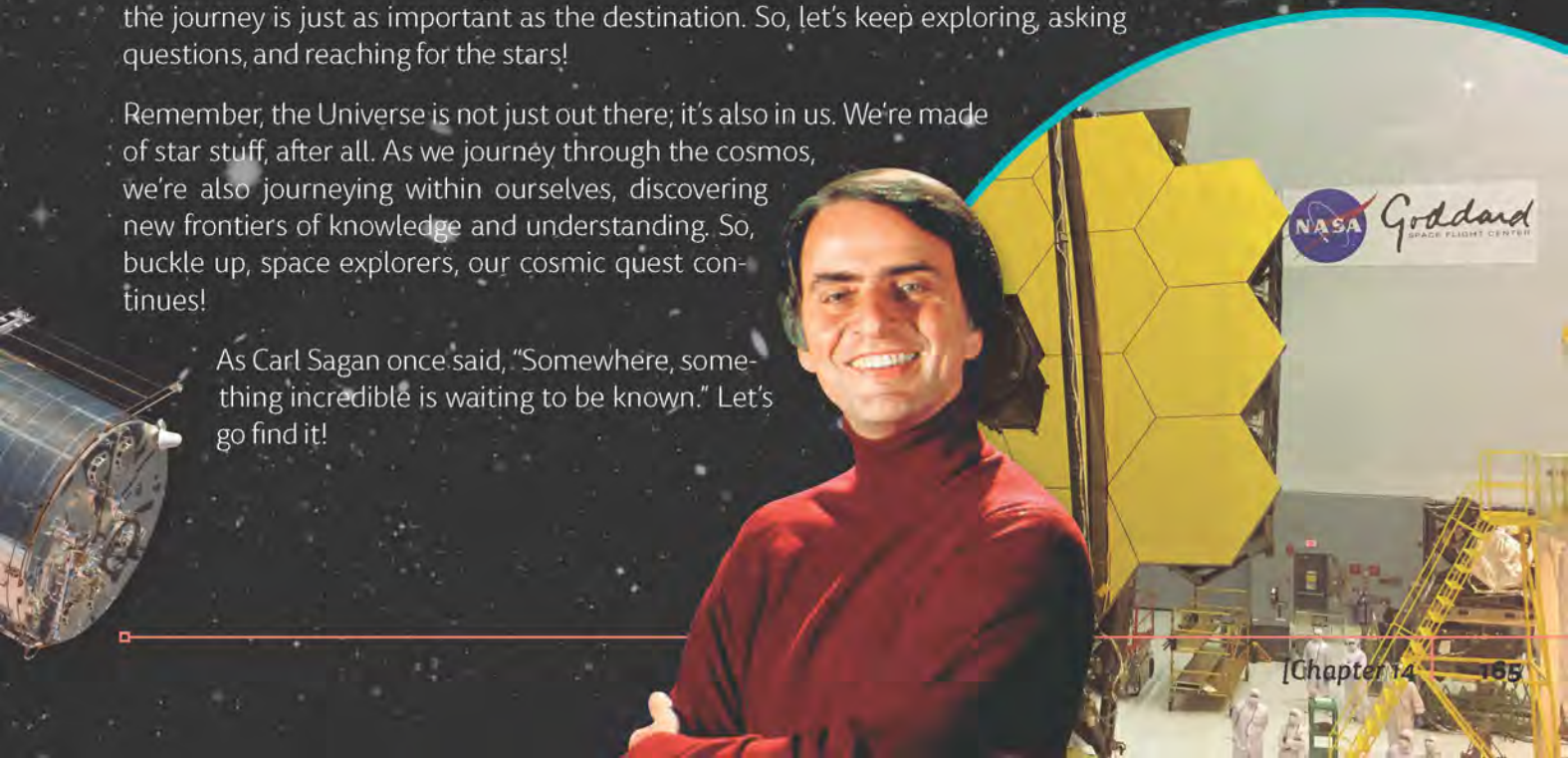
The Universe is a big place, and there's still so much we don't know. But with every new telescope and every new discovery, we're getting closer to understanding our place in the cosmos.

Who knows what we'll discover next? Perhaps we'll find evidence of life on other planets, or we'll discover a new type of star. Maybe we'll even figure out what dark matter is, a mysterious substance that makes up about 27% of the Universe, but that we know very little about.

The heavens indeed await, and our cosmic quest is far from over. As we continue to push the boundaries of our knowledge and technology, who knows what we'll discover next? One thing's for sure: the journey is just as important as the destination. So, let's keep exploring, asking questions, and reaching for the stars!

Remember, the Universe is not just out there; it's also in us. We're made of star stuff, after all. As we journey through the cosmos, we're also journeying within ourselves, discovering new frontiers of knowledge and understanding. So, buckle up, space explorers, our cosmic quest continues!

As Carl Sagan once said, "Somewhere, something incredible is waiting to be known." Let's go find it!





# Health Detectives Solving the Mysteries of Wellness

Welcome to Chapter 17: Health Detectives – Solving the Mysteries of Wellness. In this captivating journey, we're about to embark on a quest to unravel the secrets of well-being and explore the fascinating world of health.

### Lesson 1: The Scientific Approach to Health

Get ready to put on your investigator hats! In this lesson, we'll delve into the scientific side of health, understanding how researchers and health detectives use evidence and data to unlock the mysteries behind our well-being. It's time to become health detectives armed with the power of science!

### Lesson 2: Nutritional Wizards and Dietary Detectives

Ever wondered what makes a meal truly magical for your body? Join us as we uncover the secrets of nutrition and become wizards of the dietary world. From exploring the wonders of vitamins to understanding the magic of balanced meals, get ready to don your nutritional capes and embark on a culinary adventure!

### Lesson 3: Preventative Health Heroes

It's time to become heroes of prevention! In this lesson, we'll learn how small actions can have big impacts on our health. Discover the superpowers of preventative measures and become health heroes in your own right. Remember, an ounce of prevention is worth a pound of cure!

### Lesson 4: Mind-Body Explorers

Our minds and bodies are interconnected in mysterious ways. In this final lesson, we'll become explorers of the mind-body connection. From mindfulness practices to understanding the role of emotions in health, get ready to unlock the secrets of a balanced and harmonious life.



So, Grade 7, are you ready to embark on this exciting journey as health detectives? Let's unravel the mysteries of wellness together!

# LESSON 1

## The Scientific Approach to Health



### LESSON OBJECTIVES

#### 1. STEM Objective 1: Scientific Understanding of Health Choices

■ **Goal:** Students will develop a STEM-based understanding of the scientific principles underpinning a healthy lifestyle, exploring the connections between physical, mental, social, and emotional well-being.

■ **Objectives:**

- Apply STEM concepts to identify and explain the scientific basis for maintaining physical health through regular exercise, balanced nutrition, and sufficient sleep.
- Investigate the STEM-related impact of mental and emotional health on overall well-being, applying science-backed strategies for stress relief and mental resilience.
- Explore the interconnectedness of various aspects of health using STEM principles and understand how lifestyle choices contribute to a balanced and healthy life.

#### 2. STEM Objective 2: Practical Application of Scientific Knowledge

■ **Goal:** Students will engage in STEM-based applications of their scientific knowledge to make informed choices about their health and well-being, actively participating in activities that promote a holistic and balanced lifestyle.

■ **Objectives:**

- Apply STEM analysis to personal habits and choices related to nutrition, exercise, and sleep through the maintenance of a food diary and reflection on lifestyle patterns.
- Demonstrate an understanding of the STEM principles behind the importance of small, daily steps in improving overall well-being by creating and sharing a tutorial video on a chosen well-being practice.
- Collaborate with classmates in a STEM-infused well-being challenge, incorporating a chosen well-being step into their routines and documenting the experience to foster a STEM-focused culture of health in the classroom.

### KEY VOCABULARY



#### 1. Well-being:

■ **Explanation:** Well-being refers to the overall state of being comfortable, healthy, and happy, encompassing physical, mental, social, and emotional dimensions.

■ **Synonyms:** Wellness, health, prosperity, contentment.

#### 2. Interconnectedness:

■ **Explanation:** Interconnectedness describes the state of being connected or linked together, emphasizing the relationships and interactions between different elements.

■ **Synonyms:** Interrelation, interdependence, connectivity, linkage.

#### 3. Resilience:

■ **Explanation:** Resilience is the ability to bounce back or recover quickly from challenges, setbacks, or stress, demonstrating adaptability and strength.

■ **Synonyms:** Toughness, flexibility, durability, strength.





**Disciplinary Core Ideas (DCIs):**

**1. LS1.A: Structure and Function:** The lesson emphasizes the importance of regular exercise in making the heart and lungs efficient and strengthening muscles and bones.

**2. LS1.B: Growth and Development of Organisms:** The discussion on a balanced and nutritious diet supporting energy needs relates to the growth and development of the body.

**3. PS1.A: Structure and Properties of Matter:** The idea of choosing healthy foods (e.g., fruits, vegetables, whole grains) ties into the properties of matter and their impact on health.

**4. ESS3.A: Natural Resources:** The concept of sleep as a crucial aspect of well-being aligns with the need for natural resources (e.g., rest) for human health.

**Crosscutting Concepts (CCCs):**

**1. Patterns:** Students are encouraged to identify patterns in their food diary, distinguishing between healthy and unhealthy foods.

**2. Cause and Effect:** The cause-and-effect relationship between healthy choices (e.g., exercise, nutrition, sleep) and overall well-being is a central theme.

**3. Systems and System Models:** The interconnectedness of physical, mental, social, and emotional health highlights the concept of systems.

**Science and Engineering Practices (SEPs):**

**1. Asking Questions and Defining Problems:** The lesson encourages students to ask

questions about the science behind healthy living and prompts investigation.

**2. Planning and Carrying Out Investigations:** The lab work activities (Lab Work 1 and Lab Work 2) involve planning and carrying out investigations related to healthy eating and overall well-being.

**3. Developing and Using Models:** Creating a poster or infographic (Lab Work 1) involves developing a model to explain the science behind healthy eating.

**4. Engaging in Argument from Evidence:** The presentation of posters or infographics and sharing experiences in the well-being challenge (Lab Work 1 and Lab Work 2) provides opportunities for students to engage in arguments based on evidence.

**Connections to Nature of Science (NOS):**

**1. Scientific Knowledge is Based on Empirical Evidence:** The emphasis on taking a scientific approach involves relying on evidence to understand the impact of choices on health.

**2. Science is a Human Endeavor:** Students engage in health-related activities and challenges, reflecting the role of science in improving human well-being.



**1.** If your well-being were a top-secret mission, what would be the secret code name for it, and what kind of 'spy gadgets' (healthy habits) would you equip yourself with to ensure success?

**ENGAGE**

## EXPLORE

Let's explore the science behind living a healthy life! Health is a complex balancing act between your physical, mental, social, and emotional wellbeing. Many factors influence your health over which you have some control. Taking a scientific approach helps uncover how the choices we make each day shape our health and happiness.

The physical body provides a great place to start. Regular exercise makes the heart and lungs efficient, strengthens muscles and bones, and releases endorphins boosting mood. A balanced, nutritious diet provides energy and protects against disease. Getting enough sleep allows the body to recharge. Prioritizing these science-backed basics sets the stage for wellness.

But mental and emotional health matter too. Activities like yoga, meditation, journaling, or walking in nature can calm your mind, relieve stress, and prevent burnout. Develop interests and hobbies you love. Surround yourself with positive social networks. Find purpose in helping others. Listen to your mind's needs as much as your body's.

Additionally, avoid risky behaviors like smoking, using substances, misusing drugs, and sun tanning. These bring only temporary relief while damaging health long-term. Healthy living requires patience and perseverance through ups and downs.

The scientific method applies to health - ask questions, research reliable answers, construct and test solutions. Treat your body and mind compassionately, keep learning, and take small steps each day. A journey of a thousand miles begins with one step!

Living a healthy life is important for our overall well-being. It involves taking care of our physical, mental, social, and emotional health. By understanding the science behind it, we can make informed choices that positively impact our health and happiness. Let's dive deeper into this fascinating topic!



## HEALTHY CHOICES



Physical health is a great place to start. Regular exercise is like a superhero for our body. It makes our heart and lungs stronger, which helps us stay active and full of energy. Exercise also strengthens our muscles and bones, making us stronger and less prone to injuries. When we exercise, our body releases endorphins, which are chemicals that boost our mood and make us feel happy. So, let's get moving and have some fun while taking care of our physical health!

Eating a balanced and nutritious diet is another important aspect of staying healthy. Our body needs energy to function properly, and we get that energy from the food we eat. By choosing healthy foods like fruits, vegetables, whole grains, and lean proteins, we provide our body with the nutrients it needs to stay strong and fight off diseases. It's like giving our body the right fuel to keep it running smoothly.

Getting enough sleep is crucial for our well-being. When we sleep, our body recharges and repairs itself. It's like pressing the reset button for our brain. Lack of sleep can make us feel tired, cranky, and it can even affect our ability to concentrate and learn. So, let's make sure we prioritize our sleep and aim for around 8-9 hours of quality sleep each night.

While physical health is important, we must also take care of our mental and emotional health. Our mind needs some TLC too! Activities like yoga, meditation, journaling, or simply taking a walk in nature can help calm our mind, relieve stress, and prevent burnout. These activities allow us to take a break from our busy lives and focus on our mental well-being. It's like giving our mind a little vacation!

Having interests and hobbies that we love is another way to boost our mental and emotional health. When we engage in activities that we enjoy, it brings us joy and a sense of fulfillment. It could be playing a musical instrument, painting, playing a sport, or even reading a good book. These activities help us relax, unwind, and find happiness in the things we love.

Building positive social networks is also important for our well-being. Surrounding ourselves with supportive and caring friends and family members can make a big difference in our happiness. It's like having a safety net of love and support. We can also find purpose in helping others. By lending a helping hand to those in need, we not only make a positive impact on their lives but also feel a sense of fulfillment and purpose within ourselves.

Remember, living a healthy life is a journey, and it's all about finding a balance that works for us. By understanding the science behind it, we can make informed choices and take small steps each day to improve our overall well-being. So, let's embark on this exciting journey together and make health a priority in our lives!

Keep exploring,  
stay curious, and have  
fun on your path to a  
healthy and happy life!





# INVESTIGATE

## Lab Work



### LAB WORK 1.

#### The Science Behind Healthy Eating

##### Steps:

1. Choose a day to keep a food diary. Write down everything you eat and drink throughout the day.
2. After a week, review your food diary and highlight foods that are considered healthy and those that are not so healthy.
3. With the help of a parent or guardian, research the science behind healthy eating. Find out why certain foods are good for our bodies and why some are not.
4. Create a colorful poster or infographic that explains the science behind healthy eating. Include fun facts and easy-to-understand explanations.
5. Present your poster or infographic to your classmates, sharing the key takeaways from your research and encouraging them to make informed food choices.



### LAB WORK 2.

#### Small Steps to Improve Well-being

##### Steps:

1. Brainstorm a list of small steps that can be taken each day to improve overall well-being. For example, taking a short walk, drinking enough water, getting enough sleep, or practicing deep breathing exercises.
2. Choose one step from your list and create a fun and engaging tutorial video demonstrating how to do it.
3. Share your video with your classmates, encouraging them to try out the step you demonstrated.
4. Start a well-being challenge in your class, where each student picks a different step from the list to incorporate into their daily routine for a week. Keep a journal to track progress and share experiences at the end of the challenge.





## LAB WORK 3.

## Exploring Physical Activities

**Steps:**

1. Research different physical activities that can be done for fun and fitness. Examples include dancing, cycling, swimming, hiking, or playing team sports.
2. Create a survey to find out which physical activities your classmates enjoy the most.
3. Organize a class vote to determine the top three most popular activities.
4. Plan a field trip or outdoor activity day based on the top three choices. Each student should have the opportunity to try at least one of the activities and share their experience with the class afterward.
5. Reflect on the benefits of regular physical activity and discuss how it contributes to overall well-being.





# Evaluate

## Lesson 1. Self-check.

### Review Test

#### Self-Check on Health and Wellness

1. Identify:

- Question: Can you identify three key factors that contribute to physical well-being?

2. Explain:

- Question: Why is it important to consider both physical and mental well-being for a balanced lifestyle?

3. Compare and Contrast:

- Question: Compare and contrast the benefits of regular exercise and a balanced diet on physical health.

4. Describe:

- Question: Describe two activities that promote mental and emotional well-being.

5. Summarize:

- Question: Summarize the main idea of the lesson regarding the scientific approach to health.

6. Predict:

- Question: Predict how incorporating a new well-being practice into your daily routine might impact your overall health after a month.





## LESSON 2

# Nutritional Wizards and Dietary Detectives



### LESSON OBJECTIVES

**STEM (Science, Technology, Engineering, and Mathematics) and STEAM (STEM + Arts) elements:**

**1. STEM Objective:**

■ **Objective:** Students will demonstrate an understanding of the scientific principles behind nutrition by identifying and explaining the role of phytonutrients in different colored fruits and vegetables.

■ **Measurable Outcome:** Students will create a visual representation (poster or infographic) showcasing a variety of fruits and vegetables, their colors, and the corresponding phytonutrients, emphasizing the STEM aspect of biology and chemistry.

**2. STEAM Objective:**

■ **Objective:** Students will engage in a creative exploration of phytonutrients through the development of a colorful and visually appealing "Phytonutrient Rainbow Salad."

■ **Measurable Outcome:** Students will collaborate to design and present their unique salads, incorporating artistic elements in the arrangement of fruits and vegetables. This integrates STEM concepts (biology and chemistry) with the artistic expression of culinary creativity.

**3. STEM & Technology Objective:**

■ **Objective:** Students will apply technology and STEM principles in conducting a taste-test party for phytonutrient-rich smoothies.

■ **Measurable Outcome:** Students will use technology tools (such as digital scales or apps for nutritional analysis) to measure and compare the nutritional content of the smoothies. They will present their findings using charts or graphs, connecting STEM principles with the use of technology for data analysis.

### KEY VOCABULARY



**1. Phytonutrients:**

■ **Explanation:** Phytonutrients are natural compounds found in plants that contribute to the health benefits of fruits and vegetables. They often have antioxidant properties and play a role in protecting the human body against diseases.

■ **Synonyms:** Phytochemicals, plant nutrients, bioactive compounds.

**2. Nutrition:**

■ **Explanation:** Nutrition refers to the process of obtaining and consuming food, as well as the body's use of nutrients for growth, maintenance, and overall health.

■ **Synonyms:** Dietary intake, nourishment, sustenance.

**3. Flexibility:**

■ **Explanation:** Flexibility, in the context of the lesson, refers to the balanced approach to eating, allowing occasional treats while maintaining overall healthy dietary habits.

■ **Synonyms:** Adaptability, openness, moderation.

**4. Phytonutrient-rich:**

■ **Explanation:** Phytonutrient-rich describes foods that are abundant in natural plant compounds, providing various health benefits. These foods often have vibrant colors associated with the presence of specific phytonutrients.

■ **Synonyms:** Nutrient-dense, rich in plant compounds, health-promoting.

