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# **Grade 9 Science: Biology Sustainable Ecosystems and Climate Change**

# **B2. Investigating and Understanding Concepts**

**Overall Expectations:**

* Demonstrate an understanding of the dynamic and interconnected nature of ecosystems, including how matter cycles and energy flows through ecosystems

## **🌍 Introduction**

Welcome to our exciting journey into the world of ecosystems! Have you ever wondered how different parts of our environment interact to create a balanced and thriving ecosystem? Imagine walking through a forest where trees, animals, water, and soil all work together harmoniously. This lesson will help you understand these intricate connections and how they contribute to the sustainability of our ecosystems. Grab your curiosity hat, and let’s dive into the fascinating world of ecosystems and climate change!

## **🚀 Engage: Understanding Ecosystem Interactions**

To start our exploration, let's think about the environments we encounter daily. Consider a nearby park, garden, or even your backyard. Have you noticed how plants, animals, water, and soil interact in these spaces? These interactions are the building blocks of sustainable ecosystems.

### **🧠 Think-Pair-Share Activity (Modified for Individual Work)**

**Task:** Think about a place you are familiar with, such as your backyard, a local park, or even a school garden. Spend some time observing or recalling the interactions you see there. Write down your observations, focusing on how plants, animals, water, and soil interact.

**Reflection Questions:**

* What types of plants and animals do you see?
* How does water move through this environment?
* What role does soil play in supporting plant life?
* How do these elements interact with each other?

Take a moment to reflect on your observations. How do these interactions contribute to the health and sustainability of the ecosystem you observed?

## **🌱 Explore: The Four Spheres of Earth**

To understand ecosystems better, we need to explore the four major spheres of Earth. Each sphere plays a crucial role in sustaining life on our planet.

### **🌱 Biosphere**

The biosphere includes all living organisms. From tiny bacteria to large mammals, every living thing is part of the biosphere. Think about the plants and animals you observed. They all belong to the biosphere and interact with each other in various ways.

**Activity:** Observe Your Surroundings

1. **Task:** Take a walk in your backyard, a local park, or a garden. Note down the different plants and animals you see.
2. **Questions to Consider:**
   * What types of plants and animals are present?
   * How do these organisms interact with each other?
   * Are there any visible dependencies, such as bees pollinating flowers?

### **🌊 Hydrosphere**

The hydrosphere encompasses all water bodies, including oceans, rivers, lakes, and even the water vapor in the atmosphere. Water is essential for all life forms. How do you think water in your observed environment supports life?

**Activity:** Water Cycle Exploration

1. **Task:** Observe a local water body (river, lake, pond, or even a rain puddle) or use a water cycle diagram.
2. **Questions to Consider:**
   * How does water move through this environment?
   * What are the sources of water in your area?
   * How do plants and animals utilize this water?

### **🪨 Lithosphere**

The lithosphere is the rigid outer layer of Earth, consisting of rocks and soil. It provides nutrients and a foundation for plants and animals. Consider the soil in your observation area. How does it support plant growth and provide habitat for animals?

**Activity:** Soil Analysis

1. **Task:** Collect a small soil sample from your yard or garden. Observe its texture, color, and components.
2. **Questions to Consider:**
   * What does the soil look like? (Color, texture, moisture)
   * Can you find any living organisms in the soil?
   * How does the soil help plants grow?

### **☁️ Atmosphere**

The atmosphere is the layer of gases surrounding Earth. It is crucial for weather patterns, climate, and protecting living organisms from harmful solar radiation. The air we breathe is part of the atmosphere. How does the atmosphere influence the environment you observed?

**Activity:** Air Quality Observation

1. **Task:** Check the air quality in your area using a local air quality index (AQI) app or website. Observe the sky and weather conditions.
2. **Questions to Consider:**
   * What is the current air quality index in your area?
   * How does the air quality affect living organisms in your environment?
   * Are there any visible signs of air pollution?

### **🔄 Interaction Investigation**

Now, let's see how these four spheres interact in your environment.

**Activity:** Interaction Mapping

1. **Task:** Create a simple diagram or map showing how the biosphere, hydrosphere, lithosphere, and atmosphere interact in your observed environment.
2. **Steps:**
   * Draw representations of the different spheres.
   * Illustrate how water (hydrosphere) supports plants (biosphere).
   * Show how soil (lithosphere) provides nutrients to plants and habitats for animals (biosphere).
   * Indicate how the atmosphere influences weather and climate in your area.
3. **Reflection:**
   * How do these interactions contribute to the sustainability of your local ecosystem?
   * What changes might disrupt these interactions?

### **🌳 Biodiversity and Sustainability**

Understanding biodiversity is key to appreciating ecosystem interactions.

**Activity:** Biodiversity Count

1. **Task:** Conduct a simple biodiversity count in your chosen observation area.
2. **Steps:**
   * List the different species of plants, animals, and insects you see.
   * Note the variety and number of each species.
3. **Questions to Consider:**
   * How diverse is the ecosystem you observed?
   * Why is biodiversity important for ecosystem sustainability?

By exploring these activities, you'll gain a deeper understanding of how the Earth's spheres interact and contribute to the dynamic balance of ecosystems. This hands-on approach will help you appreciate the complexity and interconnectedness of the natural world.

## **🌿 Explain: The Dynamic Equilibrium of Ecosystems**

In this section, we will thoroughly explore the concepts outlined in the specific expectations for B2. Investigating and Understanding Concepts. By the end of this section, you should have a clear understanding of how ecosystems function and maintain their balance.

### **🌱 B2.1 Interactions Between the Spheres**

The biosphere, hydrosphere, lithosphere, and atmosphere interact in complex ways that are crucial for ecosystem sustainability. Let’s delve deeper into these interactions.

#### **🌀 The Water Cycle**

The water cycle is a perfect example of how the hydrosphere interacts with the other spheres:

* **Evaporation**: Water from oceans, lakes, and rivers evaporates into the atmosphere.
* **Condensation**: Water vapor in the atmosphere cools and condenses into clouds.
* **Precipitation**: Water falls back to the lithosphere and hydrosphere as rain or snow.
* **Infiltration and Runoff**: Water soaks into the soil (lithosphere) or runs off into water bodies (hydrosphere), supporting plant and animal life (biosphere).

#### **🌾 Nutrient Cycles**

Nutrient cycles, such as the carbon and nitrogen cycles, show interactions between spheres:

* **Carbon Cycle**: Plants (biosphere) absorb carbon dioxide (atmosphere) during photosynthesis and store carbon in their tissues. When plants die, decomposers (biosphere) break them down, returning carbon to the soil (lithosphere) and releasing it back into the atmosphere.
* **Nitrogen Cycle**: Nitrogen-fixing bacteria (biosphere) convert nitrogen from the atmosphere into forms that plants can use. Animals then consume these plants, and nitrogen is returned to the soil through waste and decomposition.

#### **🌍 Individual Activity: Ecosystem Interactions Journal**

1. **Task**: Over a week, observe and journal how water, plants, animals, soil, and weather interact in your environment.
2. **Reflection Questions**:
   * How do these interactions support the ecosystem?
   * What would happen if one element was disrupted?

### **🔄 B2.2 Cycling of Matter and Flow of Energy**

Naturally occurring phenomena like the cycling of matter and flow of energy are crucial for maintaining dynamic equilibrium within ecosystems.

#### **🌞 Energy Flow**

Energy flows through ecosystems in food chains and food webs:

* **Producers**: Plants convert solar energy into chemical energy through photosynthesis.
* **Consumers**: Herbivores eat plants, carnivores eat herbivores, and so on, transferring energy through each trophic level.
* **Decomposers**: Organisms like fungi and bacteria break down dead matter, recycling nutrients back into the ecosystem.

#### **🌱 Matter Cycling**

Matter cycles through ecosystems in various forms:

* **Water Cycle**: As discussed earlier, water cycles through evaporation, condensation, and precipitation.
* **Carbon Cycle**: Carbon moves through the atmosphere, biosphere, lithosphere, and hydrosphere in different forms, supporting life and energy flow.
* **Nitrogen Cycle**: Nitrogen is transformed through biological processes, supporting plant growth and ecosystem health.

#### **📝 Individual Activity: Food Web Creation**

1. **Task**: Create a food web diagram for a local ecosystem, identifying producers, consumers, and decomposers.
2. **Reflection Questions**:
   * How does energy flow through this food web?
   * How do decomposers contribute to nutrient cycling?

### **🌿 B2.3 Cellular Respiration and Photosynthesis**

These two processes are fundamental to life on Earth and illustrate the complementary relationship between plants and animals.

#### **🌱 Photosynthesis**

* **Process**: Plants use sunlight, carbon dioxide, and water to produce glucose and oxygen.
* **Equation**: 6CO₂ + 6H₂O + sunlight → C₆H₁₂O₆ + 6O₂
* **Importance**: Photosynthesis is the foundation of most food webs, providing energy for plants and oxygen for animals.

#### **🏃‍♂️ Cellular Respiration**

* **Process**: Animals (and plants) convert glucose and oxygen into energy, carbon dioxide, and water.
* **Equation**: C₆H₁₂O₆ + 6O₂ → 6CO₂ + 6H₂O + energy
* **Importance**: Cellular respiration releases the energy stored in glucose, which organisms use for growth and activity.

#### **🌿 Complementary Relationship**

Photosynthesis and cellular respiration are interconnected:

* **Photosynthesis** produces oxygen and glucose, which are used in cellular respiration.
* **Cellular Respiration** produces carbon dioxide and water, which are used in photosynthesis.

#### **🌿 Individual Activity: Photosynthesis Experiment**

1. **Task**: Conduct an experiment by placing a plant in sunlight and another in the dark. Observe the differences over a week.
2. **Reflection Questions**:
   * How does light affect the plant's growth?
   * What role does photosynthesis play in this process?

### **🌳 B2.4 Factors Contributing to Ecosystem Sustainability**

Several factors and processes, such as biodiversity, air and water quality, soil health, and succession, contribute to the sustainability of ecosystems.

#### **🌿 Biodiversity**

* **Definition**: The variety of life in an ecosystem.
* **Importance**: Higher biodiversity increases ecosystem resilience and stability.

#### **💧 Air and Water Quality**

* **Importance**: Clean air and water are essential for the health of all living organisms.
* **Pollution Impact**: Air and water pollution can harm organisms and disrupt ecosystems.

#### **🌾 Soil Health**

* **Importance**: Healthy soil supports plant growth and provides habitat for many organisms.
* **Components**: Soil texture, nutrient content, and organic matter contribute to soil health.

#### **🌱 Succession**

* **Definition**: The gradual process of change in an ecosystem's species composition over time.
* **Types**: Primary succession (on new land) and secondary succession (on disturbed land).

#### **🌳 Individual Activity: Biodiversity Survey**

1. **Task**: Conduct a biodiversity survey in a local area, noting different plant and animal species.
2. **Reflection Questions**:
   * How diverse is the ecosystem?
   * How does biodiversity contribute to ecosystem sustainability?

### **🏭 B2.5 Human Activities and Ecosystem Equilibrium**

Human activities can significantly impact the dynamic equilibrium of ecosystems.

#### **🌲 Deforestation**

* **Impact**: Reduces biodiversity, disrupts carbon cycle, and leads to habitat loss.

#### **🏭 Pollution**

* **Types**: Air, water, and soil pollution.
* **Impact**: Harms organisms, alters natural processes, and degrades ecosystem health.

#### **🏙️ Urbanization**

* **Impact**: Converts natural landscapes into urban areas, fragmenting habitats and affecting species interactions.

#### **🏞️ Individual Activity: Human Impact Assessment**

1. **Task**: Identify a local area affected by human activities and assess its impact on the ecosystem.
2. **Reflection Questions**:
   * What human activities are present in the area?
   * How do these activities affect the ecosystem’s balance?

### **🌡️ B2.6 Climate Change Indicators and Impacts**

Climate change impacts ecosystems both locally and globally. Understanding these impacts is crucial for developing sustainable practices.

#### **🌡️ Indicators of Climate Change**

* **Rising Temperatures**: Affect species distribution and behavior.
* **Melting Ice Caps**: Lead to rising sea levels and habitat loss.
* **Extreme Weather Events**: Disrupt ecosystems and species' survival.

#### **🌡️ Human Contributions**

* **Fossil Fuels**: Burning fossil fuels releases greenhouse gases, contributing to global warming.
* **Deforestation**: Reduces carbon sequestration, increasing atmospheric CO₂ levels.

#### **🌡️ Individual Activity: Climate Change Research**

1. **Task**: Research and identify indicators of climate change in your local area.
2. **Reflection Questions**:
   * What signs of climate change can you observe?
   * How do these changes impact local ecosystems?

### **🌾 B2.7 Sustainable Practices in Agriculture**

Sustainable agricultural practices can help mitigate the negative impacts on ecosystems and promote sustainability.

#### **🌾 Crop Rotation**

* **Definition**: Rotating different crops in the same field to maintain soil fertility.
* **Benefits**: Reduces soil erosion, improves soil health, and controls pests.

#### **🚜 Conservation Tillage**

* **Definition**: Minimizing soil disturbance to preserve soil structure.
* **Benefits**: Reduces soil erosion, improves water retention, and increases organic matter.

#### **🌱 Organic Farming**

* **Definition**: Using natural inputs and processes in farming.
* **Benefits**: Promotes biodiversity, reduces chemical use, and enhances soil health.

#### **🌾 Individual Activity: Sustainable Farming Project**

1. **Task**: Design a small garden using sustainable farming practices, such as crop rotation or organic methods.
2. **Reflection Questions**:
   * How do these practices contribute to sustainability?
   * What challenges might you face in implementing these practices?

By thoroughly understanding these concepts and completing these activities, you will gain a comprehensive understanding of how ecosystems function and how we can contribute to their sustainability.

## **🌿 Elaborate: Applying Ecosystem Concepts**

In this section, we will extend our understanding by applying the knowledge gained in different contexts and making connections to real-world situations. Each activity is designed to deepen your understanding of ecosystems and their sustainability.

### **🌀 B2.1 Interactions Between the Spheres**

#### **🌍 Case Study: Local Ecosystem Analysis**

**Activity:** Local Ecosystem Analysis

1. **Task**: Select a local ecosystem (e.g., forest, wetland, urban park) and analyze the interactions between the biosphere, hydrosphere, lithosphere, and atmosphere.
2. **Steps**:
   * Visit the chosen ecosystem or research it online.
   * Identify examples of how the four spheres interact.
   * Document these interactions with notes, photos, or drawings.
3. **Reflection Questions**:
   * How do these interactions support the ecosystem’s sustainability?
   * What might happen if one sphere is disrupted?

### **🔄 B2.2 Cycling of Matter and Flow of Energy**

#### **🌞 Simulation: Energy Flow in an Ecosystem**

**Activity:** Create a Food Chain Model

1. **Task**: Build a physical or digital model of a food chain that includes at least four trophic levels (producers, primary consumers, secondary consumers, and decomposers).
2. **Steps**:
   * Identify organisms at each trophic level in a chosen ecosystem.
   * Create a visual representation (using drawings, models, or software).
   * Show the flow of energy between trophic levels.
3. **Reflection Questions**:
   * How does energy flow through your food chain?
   * What role do decomposers play in cycling matter?

### **🌱 B2.3 Cellular Respiration and Photosynthesis**

#### **🌿 Experiment: Measuring Photosynthesis**

**Activity:** Photosynthesis and Respiration Experiment

1. **Task**: Conduct an experiment to measure the rate of photosynthesis and respiration in plants.
2. **Steps**:
   * Place a plant in a sealed container with water and light. Measure oxygen production as an indicator of photosynthesis.
   * Place another plant in a sealed container in the dark. Measure carbon dioxide production as an indicator of respiration.
   * Record your observations over a week.
3. **Reflection Questions**:
   * How do light and dark conditions affect photosynthesis and respiration?
   * How do these processes contribute to ecosystem balance?

### **🌳 B2.4 Factors Contributing to Ecosystem Sustainability**

#### **🌾 Project: Soil Health Assessment**

**Activity:** Soil Health Assessment

1. **Task**: Assess the health of soil in a local garden or natural area.
2. **Steps**:
   * Collect a soil sample and analyze its texture, color, moisture, and presence of living organisms.
   * Test the soil pH and nutrient content using a soil testing kit.
   * Compare your findings to healthy soil standards.
3. **Reflection Questions**:
   * What factors indicate healthy soil?
   * How does soil health contribute to ecosystem sustainability?

### **🏭 B2.5 Human Activities and Ecosystem Equilibrium**

#### **🏙️ Report: Impact of Urbanization**

**Activity:** Urbanization Impact Report

1. **Task**: Research the impact of urbanization on a local ecosystem and write a report.
2. **Steps**:
   * Identify an urban area and the natural ecosystems it replaced.
   * Investigate how urbanization has affected biodiversity, air and water quality, and soil health.
   * Propose solutions to mitigate negative impacts.
3. **Reflection Questions**:
   * What are the main environmental impacts of urbanization?
   * How can urban areas be designed to minimize harm to ecosystems?

### **🌡️ B2.6 Climate Change Indicators and Impacts**

#### **🌡️ Investigation: Local Climate Change Indicators**

**Activity:** Investigate Climate Change Indicators

1. **Task**: Identify and document indicators of climate change in your local area.
2. **Steps**:
   * Research local climate data (temperature, precipitation patterns, extreme weather events).
   * Observe physical indicators (e.g., plant blooming times, animal migration patterns).
   * Interview local experts or community members about observed changes.
3. **Reflection Questions**:
   * What indicators of climate change are evident in your area?
   * How do these changes affect local ecosystems?

### **🌾 B2.7 Sustainable Practices in Agriculture**

#### **🌾 Design: Sustainable Garden Plan**

**Activity:** Sustainable Garden Plan

1. **Task**: Design a plan for a sustainable garden using principles of crop rotation, conservation tillage, and organic farming.
2. **Steps**:
   * Choose a site and create a layout for your garden.
   * Select crops and plan their rotation schedule.
   * Incorporate techniques like mulching, composting, and natural pest control.
   * Create a maintenance plan that promotes soil health and biodiversity.
3. **Reflection Questions**:
   * How do your chosen practices promote sustainability?
   * What challenges might you encounter in maintaining a sustainable garden?

### **📝 Summary and Application**

By completing these activities, you will apply your knowledge of ecosystems in real-world contexts, enhancing your understanding and appreciation of their complexity and sustainability. Each task helps you make connections between theoretical concepts and practical applications, fostering a deeper comprehension of the dynamic equilibrium within ecosystems.

## **📝 Evaluate: Assessing Understanding of Ecosystems**

This section is designed to help you assess your understanding of the dynamic and interconnected nature of ecosystems. You'll complete activities and quizzes to evaluate your knowledge and identify areas where you may need further study.

### **🌍 Individual Reflection and Application**

**Activity:** Reflect on Your Learning

1. **Task**: Write a reflection on what you have learned about ecosystems, focusing on the interactions between the biosphere, hydrosphere, lithosphere, and atmosphere.
2. **Questions to Consider**:
   * How do these interactions support ecosystem sustainability?
   * What was the most surprising or interesting thing you learned?
   * How can you apply this knowledge in real-life situations?

### **🧠 Knowledge Check: Quizzes**

Complete the following quizzes to test your understanding of the material. The questions are divided into easy, moderate, and hard categories.

#### **🟢 Easy Quiz**

1. Which of the following is part of the biosphere? a) Rocks b) Water c) Plants d) Air
2. What process do plants use to convert sunlight into energy? a) Cellular respiration b) Photosynthesis c) Decomposition d) Nitrogen fixation
3. What is the lithosphere made of? a) Water and air b) Rocks and soil c) Plants and animals d) Gases
4. Which cycle involves the movement of water through evaporation, condensation, and precipitation? a) Carbon cycle b) Nitrogen cycle c) Water cycle d) Oxygen cycle
5. What is the main source of energy for producers in an ecosystem? a) Water b) Sunlight c) Soil d) Oxygen
6. What is the role of decomposers in an ecosystem? a) Produce food b) Consume plants c) Break down dead matter d) Absorb sunlight
7. What does biodiversity refer to? a) The variety of ecosystems b) The variety of species c) The amount of sunlight d) The amount of water
8. What is the main gas produced by plants during photosynthesis? a) Carbon dioxide b) Nitrogen c) Oxygen d) Hydrogen
9. What is one effect of deforestation? a) Increased biodiversity b) Improved soil health c) Habitat loss d) Clean air
10. Which layer of gases surrounds the Earth? a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere

#### **🟡 Moderate Quiz**

1. How do plants contribute to the carbon cycle? a) By releasing nitrogen b) By absorbing carbon dioxide c) By producing methane d) By decomposing
2. What is one way human activities contribute to climate change? a) Planting more trees b) Reducing pollution c) Burning fossil fuels d) Using renewable energy
3. Which process is directly involved in the nitrogen cycle? a) Photosynthesis b) Cellular respiration c) Nitrogen fixation d) Evaporation
4. How does urbanization affect ecosystems? a) Increases biodiversity b) Reduces pollution c) Converts natural landscapes to urban areas d) Improves soil health
5. What is the primary function of the hydrosphere in an ecosystem? a) Provide habitat for animals b) Supply nutrients to plants c) Regulate temperature d) Supply water
6. How does soil health impact plant growth? a) Determines water availability b) Influences air quality c) Provides nutrients and structure d) Controls sunlight exposure
7. What is succession in an ecosystem? a) Rapid change in species composition b) Gradual change in species composition c) Complete destruction of an ecosystem d) Immediate recovery after disturbance
8. How does photosynthesis benefit animals in an ecosystem? a) Produces oxygen for respiration b) Converts nitrogen to usable form c) Decomposes dead organisms d) Absorbs pollutants
9. What is one indicator of climate change? a) Stable weather patterns b) Rising temperatures c) Increased biodiversity d) Clean air
10. How can conservation tillage benefit soil health? a) By reducing soil erosion b) By increasing water pollution c) By decreasing organic matter d) By compacting soil

#### **🔴 Hard Quiz**

1. Explain how the cycling of matter contributes to ecosystem sustainability. a) It reduces biodiversity. b) It maintains nutrient balance. c) It increases soil erosion. d) It decreases water availability.
2. What is the complementary relationship between cellular respiration and photosynthesis? a) Both processes produce carbon dioxide. b) Photosynthesis produces oxygen used in respiration, and respiration produces carbon dioxide used in photosynthesis. c) Both processes require sunlight. d) Both processes occur only in animals.
3. How do decomposers support nutrient cycling in an ecosystem? a) By producing glucose b) By breaking down dead organisms and returning nutrients to the soil c) By absorbing sunlight d) By consuming primary producers
4. Describe one way urbanization can disrupt the dynamic equilibrium of an ecosystem. a) By increasing habitat diversity b) By enhancing natural water cycles c) By fragmenting habitats and reducing species interactions d) By improving soil health
5. How does biodiversity contribute to the resilience of an ecosystem? a) By reducing the variety of species b) By ensuring that ecosystems can recover from disturbances c) By decreasing genetic variation d) By limiting species interactions
6. What role do primary producers play in the flow of energy in an ecosystem? a) They consume secondary consumers. b) They convert solar energy into chemical energy through photosynthesis. c) They decompose dead organisms. d) They produce carbon dioxide for photosynthesis.
7. How can sustainable agricultural practices mitigate the negative impacts of farming on ecosystems? a) By increasing chemical inputs b) By reducing biodiversity c) By maintaining soil health and reducing erosion d) By promoting monoculture farming
8. Identify one natural phenomenon that contributes to the cycling of matter in an ecosystem. a) Urbanization b) Deforestation c) Succession d) Eutrophication
9. Explain how climate change can impact local ecosystems. a) By stabilizing temperatures b) By causing shifts in species distribution and behavior c) By reducing extreme weather events d) By increasing habitat connectivity
10. How can indicators of climate change be used to develop sustainable practices? a) By ignoring scientific data b) By maintaining current industrial practices c) By informing policies and practices to reduce greenhouse gas emissions d) By promoting deforestation

### **📚 Answer Key**

#### **🟢 Easy Quiz**

1. c) Plants
2. b) Photosynthesis
3. b) Rocks and soil
4. c) Water cycle
5. b) Sunlight
6. c) Break down dead matter
7. b) The variety of species
8. c) Oxygen
9. c) Habitat loss
10. c) Atmosphere

#### **🟡 Moderate Quiz**

1. b) By absorbing carbon dioxide
2. c) Burning fossil fuels
3. c) Nitrogen fixation
4. c) Converts natural landscapes to urban areas
5. d) Supply water
6. c) Provides nutrients and structure
7. b) Gradual change in species composition
8. a) Produces oxygen for respiration
9. b) Rising temperatures
10. a) By reducing soil erosion

#### **🔴 Hard Quiz**

1. b) It maintains nutrient balance.
2. b) Photosynthesis produces oxygen used in respiration, and respiration produces carbon dioxide used in photosynthesis.
3. b) By breaking down dead organisms and returning nutrients to the soil
4. c) By fragmenting habitats and reducing species interactions
5. b) By ensuring that ecosystems can recover from disturbances
6. b) They convert solar energy into chemical energy through photosynthesis.
7. c) By maintaining soil health and reducing erosion
8. c) Succession
9. b) By causing shifts in species distribution and behavior
10. c) By informing policies and practices to reduce greenhouse gas emissions