La-Net

# EEC 308

## SCIENCE IN EARLY CHILDHOOD


Download on the App Store

GET IT ON Google Play

Course video is available on our app

lanetonline.com

1. **Course code** EEC 308
2. **Course title**: Science in early childhood
3. **Course credit load:** (2 Units C: LH 30)
4. **List of Series:**

1. **Foundations of Science in Early Childhood Education**
2. **Teaching Methods and Concept Development**
3. **Exploring Basic Scientific Concepts: Living, Non-Living, Sky, and Space**
4. **Heat, Light, and Hands-On Science Activities**
5. **Movement Education: Gymnasium, Games, and Teaching Approaches**

**Series 1: Foundations of Science in Early Childhood Education** based on your course framework:

---

**Part 1: Understanding Science in Early Childhood Education**

- Definition of science
- Nature of science in early childhood learning

**Part 2: Importance of Science in Early Childhood Development**

- Role of science in cognitive growth
- Contribution to curiosity and exploration
- Relevance to everyday experiences

**Part 3: Methods of Introducing Science Concepts**

- Storytelling and guided discussion
- Play-based learning approaches
- Observation and questioning techniques

**Part 4: Building Scientific Foundations through Activities**

- Concept maps for young learners
- Hands-on experiments and demonstrations

- Integration with other learning areas

---

**Series Introduction**

**Background**
Children are naturally curious, often asking questions about the world around them. Early childhood education provides the perfect opportunity to nurture this curiosity by introducing science in ways that are simple, engaging, and meaningful. By laying strong foundations, educators help children develop critical thinking skills and a lifelong interest in discovery.

**Series Aim**
The aim of this Series is to equip you with the knowledge and strategies to define, explain, and apply the foundations of science in early childhood education, ensuring that learners gain a solid grounding in scientific exploration.

**Series Synopsis**
We shall commence this Series by examining the meaning and nature of science in early childhood education. Next, we will explore the importance of science in fostering children's development and everyday understanding. Following that, we will consider effective methods of introducing science concepts through storytelling, play, and guided questioning. Finally, we will wrap up by focusing on practical approaches such as concept maps and hands-on activities that help children build lasting scientific foundations.

---

**Series Learning Outcomes (SLOs)**

Upon completing this Series, you should be able to:

- **SLO 2.1** define science and explain the nature of science in early childhood education,
- **SLO 2.2** analyse the importance of science in supporting children's cognitive and exploratory development,
- **SLO 2.3** demonstrate methods of introducing science concepts through storytelling, play, and guided questioning, and
- **SLO 2.4** design simple concept maps and hands-on activities that build scientific foundations for young learners.

**1.1 Understanding Science In Early Childhood Education**

**1.1.1 Definition of science**

Science is the **systematic study of the natural world**, involving observation, experimentation, and reasoning to explain phenomena. In early childhood education, science is not about complex theories but about nurturing curiosity and encouraging children to ask questions about their

environment. For example, when a child wonders why the sun disappears at night, that curiosity forms the foundation of scientific thinking.

Fill in the blank: Science in early childhood education is the _____ study of the natural world.

**Pilot question:** How might you explain the idea of "systematic study" to a child aged five using a simple everyday example?

simple diagram showing the cycle of observation, questioning, and discovery in science.

Caption: Figure 1.1 Cycle of scientific thinking in early childhood


CHILDREN'S SCIENCE LEARNING CYCLE

OER - Creative Commons

### 1.1.2 Nature of science in early childhood learning

The **nature of science** refers to its characteristics, such as being evidence-based, exploratory, and open to revision. For young learners, this means science is presented as a way of thinking rather than a set of fixed facts. Children learn that answers can change as new observations are made. This helps them develop flexibility in thought and resilience when faced with challenges.

Fill in the blank: The nature of science is _____, meaning it can change with new observations.

**Pilot question:** Why is it important for children to learn that scientific answers can change over time?

An image of children exploring nature with magnifying glasses.

Caption: Plate 1.1 Children engaging in scientific exploration outdoors

### 1.1.3 Linking science to early childhood education

In early childhood education, science is integrated into everyday experiences. Activities such as observing plants grow, mixing colours, or playing with water introduce children to scientific concepts naturally. The goal is to make science relatable and enjoyable, so children see it as part of their daily lives rather than a separate subject.

Fill in the blank: In early childhood education, science is best introduced through _____ experiences.

**Pilot question:** Which everyday classroom activity could you adapt to highlight a scientific concept, and how would you explain it to children?

Caption: Box 1.1 Selected examples of science in everyday childhood activities

: A table listing examples such as cooking (heat), gardening (growth), and play (movement).

Sample AI prompt:

| Activity | Science Concept | What's Really Happening? |
|---|---|---|
| **Blowing Bubbles** | **Surface Tension** | Water molecules stick together to form a "skin," while soap allows the water to stretch into a sphere. |
| **Mixing Colors (Paint)** | **Light & Pigment** | Combining primary colors to create secondary colors demonstrates how different materials absorb and reflect light. |
| **Baking Cookies** | **Chemical Reactions** | Heat causes a permanent change in the ingredients (like baking soda releasing $CO_2$ gas), making the dough rise. |
| **Playing on a Slide** | **Friction & Gravity** | Gravity pulls the child down, while the texture of their clothes against the slide creates friction that controls their speed. |
| **Building a Block Tower** | **Engineering & Center of Gravity** | Finding the balance point and creating a wide base to support the weight of the structure. |
| **Watching Shadows** | **Optics (Light Travel)** | Demonstrates that light travels in straight lines and is blocked by opaque objects. |

| Activity | Science Concept | What's Really Happening? |
|---|---|---|
| **Planting Seeds** | **Biology & Life Cycles** | Observing how living things need specific inputs (water, light, nutrients) to grow and change over time. |

### 1.2 Importance of Science In Early Childhood Development

#### 1.2.1 Role of science in cognitive growth

Science plays a vital role in **cognitive growth**, which refers to the development of thinking, reasoning, and problem-solving skills. When children explore their environment, they learn to classify, compare, and predict outcomes. These activities strengthen their ability to think logically and creatively.

Fill in the blank: Science supports children's _____ growth by enhancing reasoning and problem-solving skills.

**Pilot question:** How might observing the growth of a plant help children develop reasoning skills?

Diagram showing stages of plant growth linked to cognitive skills.

Caption: Figure 1.2 Plant growth as a tool for cognitive development


### 1.2.2 Contribution to curiosity and exploration

Curiosity is the natural desire to learn, and exploration is the act of investigating new ideas or environments. Science nurtures both by encouraging children to ask questions and seek answers. For example, experimenting with water and sand allows children to explore texture, weight, and flow.

Fill in the blank: Science nurtures children's _____ by encouraging them to ask questions and explore.

**Pilot question:** What everyday classroom materials could you use to spark curiosity about scientific ideas?

Short description: Image of children experimenting with water and sand.

Caption: Plate 1.2 Children exploring water and sand play

### 1.2.3 Relevance to everyday experiences

Science is most effective when linked to everyday experiences. Activities such as cooking, gardening, or observing the weather help children connect scientific concepts to their daily lives. This makes learning meaningful and memorable.

Fill in the blank: Science becomes more effective when linked to _____ experiences.

**Pilot question:** How could you use cooking activities to introduce children to the concept of heat?

Caption: Box 1.2 Everyday experiences linked to science concepts

Table listing cooking (heat), gardening (growth), weather (change).

| Activity | Science Concept | The "Why" Behind the Magic |
|---|---|---|
| **Melting Ice Cubes** | **States of Matter** | Observing a solid turn into a liquid due to thermal energy (heat) transfer. |
| **Playing with Magnets** | **Magnetism** | Exploring invisible forces, polarity (attraction/repulsion), and identifying magnetic vs. non-magnetic materials. |
| **Whistling or Huming** | **Acoustics (Sound Waves)** | Feeling vibrations in the throat or lips and understanding that sound is caused by vibrating air. |
| **Watching a Sunset** | **Astronomy & Light** | Learning about the Earth's rotation and how the atmosphere scatters light to create different colors. |
| **Mixing Vinegar & Baking Soda** | **Chemistry** | A classic acid-base reaction that produces carbon dioxide ($CO_2$) gas, creating bubbles and foam. |
| **Flying a Kite** | **Aerodynamics** | Understanding how wind speed, lift, and resistance (drag) interact to keep an object in the air. |
| **Sinking vs. Floating in a Tub** | **Density & Buoyancy** | Discovering that an object's ability to float depends on its density relative to the water it displaces. |

## 1.3 Methods Of Introducing Science Concepts

### 1.3.1 Storytelling and guided discussion

**Storytelling** is the use of narratives to explain ideas, while **guided discussion** involves structured conversations that help children think critically. Both methods make science relatable and encourage children to share their ideas.

Fill in the blank: Storytelling and _____ discussion help children connect science to their own experiences.

**Pilot question:** How could you use a simple story about the sun to introduce the concept of day and night?

---

### 1.3.2 Play-based learning approaches

**Play-based learning** refers to teaching through games, role play, and imaginative activities. It allows children to experiment with ideas in a fun and engaging way. For example, building with blocks can introduce concepts of balance and structure.

Fill in the blank: Play-based learning introduces science through _____ activities.

**Pilot question:** What kind of play activity could you design to teach children about movement?

Image of children building with blocks.

Caption: Plate 1.3 Play-based learning with blocks

**1.3.3 Observation and questioning techniques**

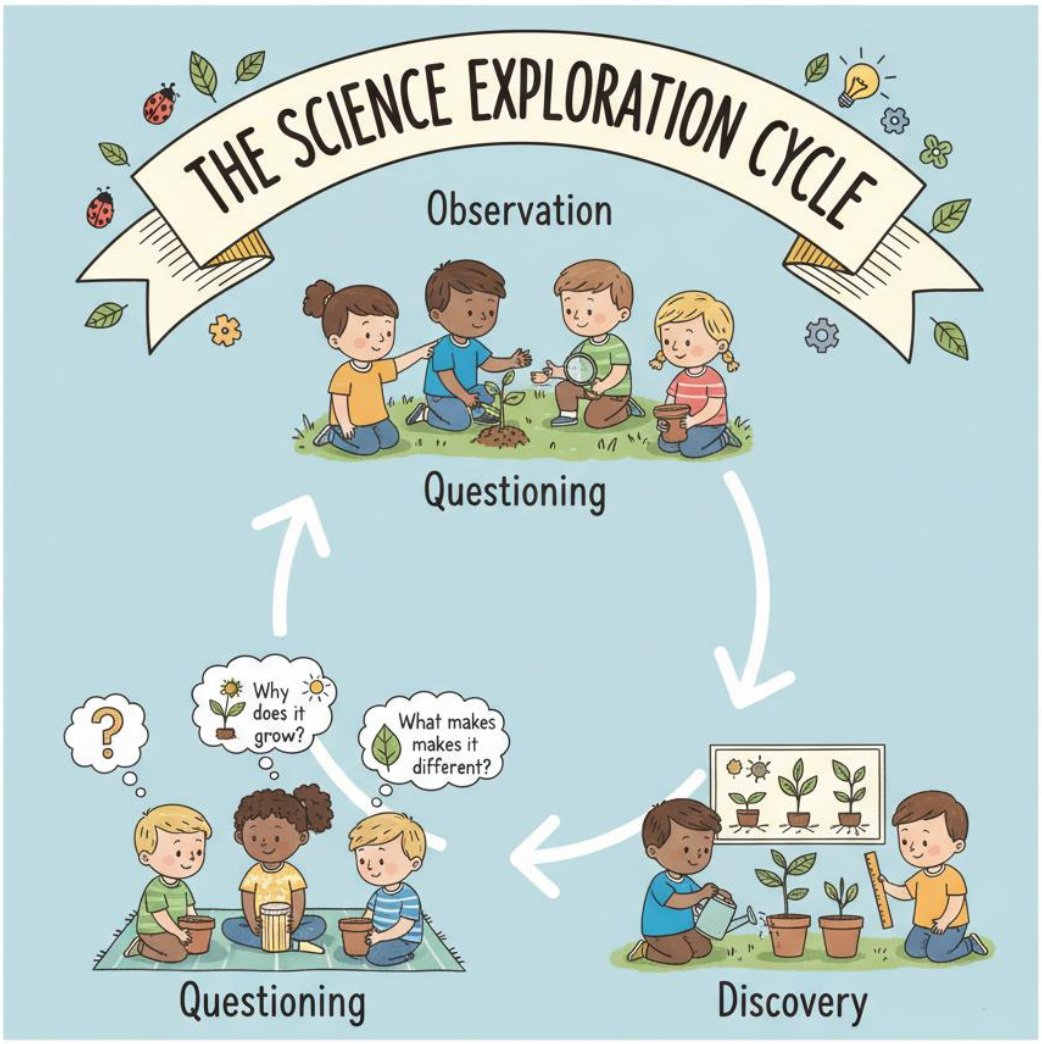
Observation is the careful watching of events or objects, while questioning involves asking why or how something happens. These techniques encourage children to think deeply and develop scientific habits of mind.

Fill in the blank: Observation and _____ techniques encourage children to think deeply about science.

**Pilot question:** How would you guide children to observe the differences between living and non-living things?

Diagram showing observation leading to questioning and discovery.

Caption: Figure 1.3 Observation and questioning cycle in science learning




OER

- **1.4 Building Scientific Foundations Through Activities**

**1.4.1 Concept maps for young learners**

A **concept map** is a visual diagram that shows relationships between ideas. For children, simple maps can help them organise thoughts about topics such as animals, plants, or weather.

Fill in the blank: A _____ map is a visual diagram that shows relationships between ideas.

**Pilot question:** How could you design a concept map to help children distinguish between living and non-living things?

Short description: Simple concept map showing animals, plants, and non-living objects.

Caption: Figure 1.4 Concept map for living and non-living things


•

**1.4.2 Hands-on experiments and demonstrations**

**Hands-on experiments** involve direct participation, while **demonstrations** show processes in action. These activities make science tangible and memorable. For example, mixing colours or observing ice melt introduces children to cause and effect.

Fill in the blank: Hands-on _____ make science tangible and memorable for children.

**Pilot question:** What simple experiment could you use to show children the effect of heat?

Short description: Image of children observing ice melting.

Caption: Plate 1.4 Hands-on experiment with ice melting


### 1.4.3 Integration with other learning areas

Science can be integrated with subjects such as art, music, and language. For example, drawing plants combines science with art, while singing about the weather links science with music. This holistic approach makes learning richer and more engaging.

Fill in the blank: Science can be integrated with other _____ areas such as art and music.

**Pilot question:** How could you integrate science with storytelling to make lessons more engaging?

Caption: Box 1.3 Examples of integrating science with other learning areas

Table showing art (drawing plants), music (weather songs), language (storytelling about animals).

| Subject Integration | Science Concept | Activity Examples for Children |
|---|---|---|
| **Science & Art** | **Color & Light, Patterns, Structures** | **Color Mixing:** Experiment with paint to understand primary/secondary colors (light absorption/reflection).<br><br>**Nature Prints:** Use leaves and flowers to create art, observing plant structures.<br><br>**Building Sculptures:** Design and construct 3D art using various materials, exploring balance and stability.<br><br>**Rainbow Suncatchers:** Create crafts that refract light into colors of the spectrum. |
| **Science & Music** | **Sound Waves, Vibration, Pitch, Rhythm** | **Homemade Instruments:** Build shakers, drums, or wind chimes to explore how different materials create sound through vibration.<br><br>**Pitch Exploration:** Experiment with water levels in glasses to change the pitch of sounds (high/low).<br><br>**Sound Walks:** Listen for different sounds in nature or a classroom, identifying sources and characteristics.<br><br>**Sound Storytelling:** Create a story using sounds made by various objects to represent actions or environments. |

| Subject Integration | Science Concept | Activity Examples for Children |
|---|---|---|
| **Science & Language** | **Observation, Description, Sequencing, Classification, Storytelling** | 📑 **Science Journals:** Draw and write observations from experiments, using descriptive language.<br><br>🗣️ **"If-Then" Predictions:** Formulate hypotheses ("If I add more water, then..."), practicing cause-and-effect reasoning.<br><br>📖 **Nature Stories:** Create fictional stories about animals or plants, incorporating factual information about their life cycles or habitats.<br><br>💬 **Concept Mapping:** Use words and drawings to organize information about living/non-living things, or states of matter.<br><br>📝 **Instruction Writing:** Write step-by-step instructions for a simple experiment. |

**Series Summary**

This Series has introduced the foundations of science in early childhood education, emphasising its purpose and relevance in nurturing curiosity, exploration, and critical thinking among young learners. We began by defining science and examining its nature, before moving on to consider its importance in supporting cognitive growth, sparking curiosity, and linking learning to everyday experiences. We then explored methods of introducing science concepts through storytelling, play, and observation, and concluded with practical approaches such as concept maps, hands-on experiments, and integration with other learning areas.

By engaging with these topics, you should now be able to define science and explain its nature in early childhood education, analyse its importance in development, demonstrate effective teaching methods, and design simple activities that build scientific foundations. These outcomes align directly with the Series Learning Outcomes (SLOs), ensuring you are well prepared to apply science meaningfully in early childhood contexts.

**Series Glossary**

- **Cognitive growth**: The development of thinking, reasoning, and problem-solving skills in children.
- **Concept map**: A visual diagram that shows relationships between ideas, helping learners organise and connect knowledge.
- **Curiosity**: The natural desire to learn and explore new ideas or environments.
- **Exploration**: The act of investigating or experimenting with new concepts, materials, or surroundings.
- **Hands-on experiment**: A practical activity where learners directly participate to observe and understand scientific processes.
- **Nature of science**: The characteristics of science, including being evidence-based, exploratory, and open to revision.
- **Observation**: The careful watching of events or objects to gather information.
- **Play-based learning**: Teaching through games, role play, and imaginative activities that allow children to experiment with ideas.
- **Storytelling**: The use of narratives to explain ideas and make concepts relatable to learners.

---

**Concept Check Questions [Series 1r]**

**Objective Questions**

1. Science in early childhood education is the _____ study of the natural world. (Linked to SLO 2.1)
2. Which of the following best describes the nature of science?
   a) Fixed and unchanging
   b) Evidence-based and open to revision
   c) Based only on memorisation
   d) Dependent on adult authority (Linked to SLO 2.1)

**Short-Answer Questions**

3. Explain one way science supports cognitive growth in children. (Linked to SLO 2.2)
4. Describe how play-based learning can introduce scientific concepts. (Linked to SLO 2.3)
5. What is a concept map, and how can it be used with young learners? (Linked to SLO 2.4)

**Long-Answer Questions**

6. Analyse the importance of linking science to everyday experiences in early childhood education. (Linked to SLO 2.2)
7. Design a simple hands-on activity that introduces children to the concept of heat. (Linked to SLO 2.4)

---

**Answers to Concept Check Questions [Series 1]**

**Objective Questions**

1. Systematic
2. b) Evidence-based and open to revision

**Short-Answer Questions**

3. Science supports cognitive growth by encouraging children to classify, compare, and predict outcomes, which strengthens reasoning skills.
4. Play-based learning introduces science through activities such as building with blocks, which teaches balance and structure.
5. A concept map is a visual diagram showing relationships between ideas; it helps children organise thoughts about topics like living and non-living things.

**Long-Answer Questions**

6. *Basic response*: Linking science to everyday experiences makes learning meaningful and memorable, as children can relate concepts to their daily lives.
   *Value-added response*: It also fosters long-term retention, encourages active participation, and helps children see science as part of their world rather than a separate subject.
7. *Basic response*: A simple activity could involve observing ice melting to show the effect of heat.
   *Value-added response*: Extending this, children could compare how quickly ice melts in different conditions (sunlight, shade, warm water), reinforcing the concept of heat transfer.

---

**Answers to Pilot Questions [Series 1]**

- Systematic study can be explained to a child by showing how they water a plant every day and watch it grow.
- It is important because children learn that knowledge can change, teaching them flexibility and resilience.
- Science is best introduced through everyday experiences such as cooking or gardening.

- Observing plant growth helps children reason about cause and effect.
- Everyday materials like sand, water, or blocks can spark curiosity.
- Cooking activities can introduce the concept of heat.
- A simple story about the sun can explain day and night.
- Play activities such as running or ball games can teach movement.
- Guiding children to observe animals and rocks helps distinguish living and non-living things.
- A concept map can show categories like animals, plants, and non-living objects.
- A simple experiment such as melting ice shows the effect of heat.
- Science can be integrated with storytelling, making lessons engaging and memorable.

---

**References and Attributions [Series 1]**


- Figure 1.1 Cycle of scientific thinking in early childhood. Suggested AI prompt: “Create a simple diagram showing observation, questioning, and discovery cycle for children’s science learning.”
- Plate 1.1 Children engaging in scientific exploration outdoors. Suggested AI prompt: “Children using magnifying glasses to explore plants outdoors.”
- Box 1.1 Selected examples of science in everyday childhood activities. Suggested AI prompt: “Create a simple table listing everyday childhood activities linked to science concepts.”
- Figure 1.2 Plant growth as a tool for cognitive development. Suggested AI prompt: “Diagram showing plant growth stages linked to reasoning skills in children.”
- Plate 1.2 Children exploring water and sand play. Suggested AI prompt: “Children experimenting with water and sand in classroom.”
- Box 1.2 Everyday experiences linked to science concepts. Suggested AI prompt: “Table showing everyday experiences linked to science concepts for children.”
- Plate 1.3 Play-based learning with blocks. Suggested AI prompt: “Children building with blocks to learn balance and structure.”
- Figure 1.3 Observation and questioning cycle in science learning. Suggested AI prompt: “Diagram showing observation leading to questioning and discovery for children.”
- Figure 1.4 Concept map for living and non-living things. Suggested AI prompt: “Simple concept map showing animals, plants, and non-living objects for children.”

- Plate 1.4 Hands-on experiment with ice melting. Suggested AI prompt: “Children observing ice melting as a science experiment.”
- Box 1.3 Examples of integrating science with other learning areas. Suggested AI prompt: “Table showing integration of science with art, music, and language for children.”

All illustration prompts are intended for AI generation or sourcing from open educational resources (OER).

**Outline for Series 2: Teaching Methods and Concept Development**

**Part 2.1: Principles of Teaching Science in Early Childhood**

- Understanding child-centred approaches
- Importance of active participation
- Role of the teacher as facilitator

**Part 2.2: Methods of Teaching Science Concepts**

- Storytelling and narrative techniques
- Play-based and experiential learning
- Observation and guided questioning

**Part 2.3: Constructing Concept Maps and Hands-On Activities**

- Purpose and design of concept maps
- Simple hands-on experiments for young learners
- Linking activities to everyday experiences

**Part 2.4: Strategies for Concept Development**

- Building from simple to complex ideas
- Reinforcing learning through repetition and variation
- Integrating science with other subject areas

**Series Introduction**

**Background**

Teaching science in early childhood education requires more than presenting facts; it involves guiding children to explore, question, and construct their own understanding. Effective teaching methods ensure that science becomes engaging, meaningful, and connected to children's everyday experiences. By focusing on concept development, educators help learners build strong foundations that support future learning.

**Series Aim**

The aim of this Series is to equip you with practical methods and strategies for teaching science concepts in early childhood education, while also showing you how to design activities that foster concept development in young learners.

**Series Synopsis**

We shall commence this Series by examining the principles of teaching science in early childhood, focusing on child-centred approaches and the role of the teacher as facilitator. Next, we will explore specific methods of teaching science concepts, including storytelling, play-based learning, and guided questioning. Following that, we will consider the construction of concept maps and hands-on activities as tools for reinforcing learning. Finally, we will conclude with strategies for concept development, showing how to build ideas progressively, reinforce learning, and integrate science with other subjects.

---

**Series Learning Outcomes (SLOs)**

Upon completing this Series, you should be able to:

- **SLO 2.1** explain the principles of teaching science in early childhood education,
- **SLO 2.2** demonstrate methods of teaching science concepts through storytelling, play, and guided questioning,
- **SLO 2.3** design simple concept maps and hands-on activities that support science learning, and
- **SLO 2.4** apply strategies for concept development by building ideas progressively and integrating science with other learning areas.

Here's the instructional content for **Part 2.1: Principles of Teaching Science in Early Childhood** in the same structured style we used for Series 1:

---

**2.1 Principles Of Teaching Science In Early Childhood**

### 2.1.1 Understanding child-centred approaches

A **child-centred approach** is a teaching method that places the learner at the heart of the process. It recognises children's interests, abilities, and curiosity as the starting point for learning. In science education, this means allowing children to explore questions they naturally ask, such as why leaves fall or how rain forms. The teacher's role is to guide and support rather than dictate.

Fill in the blank: A child-centred approach places the _____ at the heart of the learning process.

**Pilot question:** How could you adapt a science lesson to reflect children's natural curiosity about their environment?

Short description: Image of children exploring leaves and plants outdoors.

Caption: Plate 2.1 Child-centred science exploration

### 2.1.2 Importance of active participation

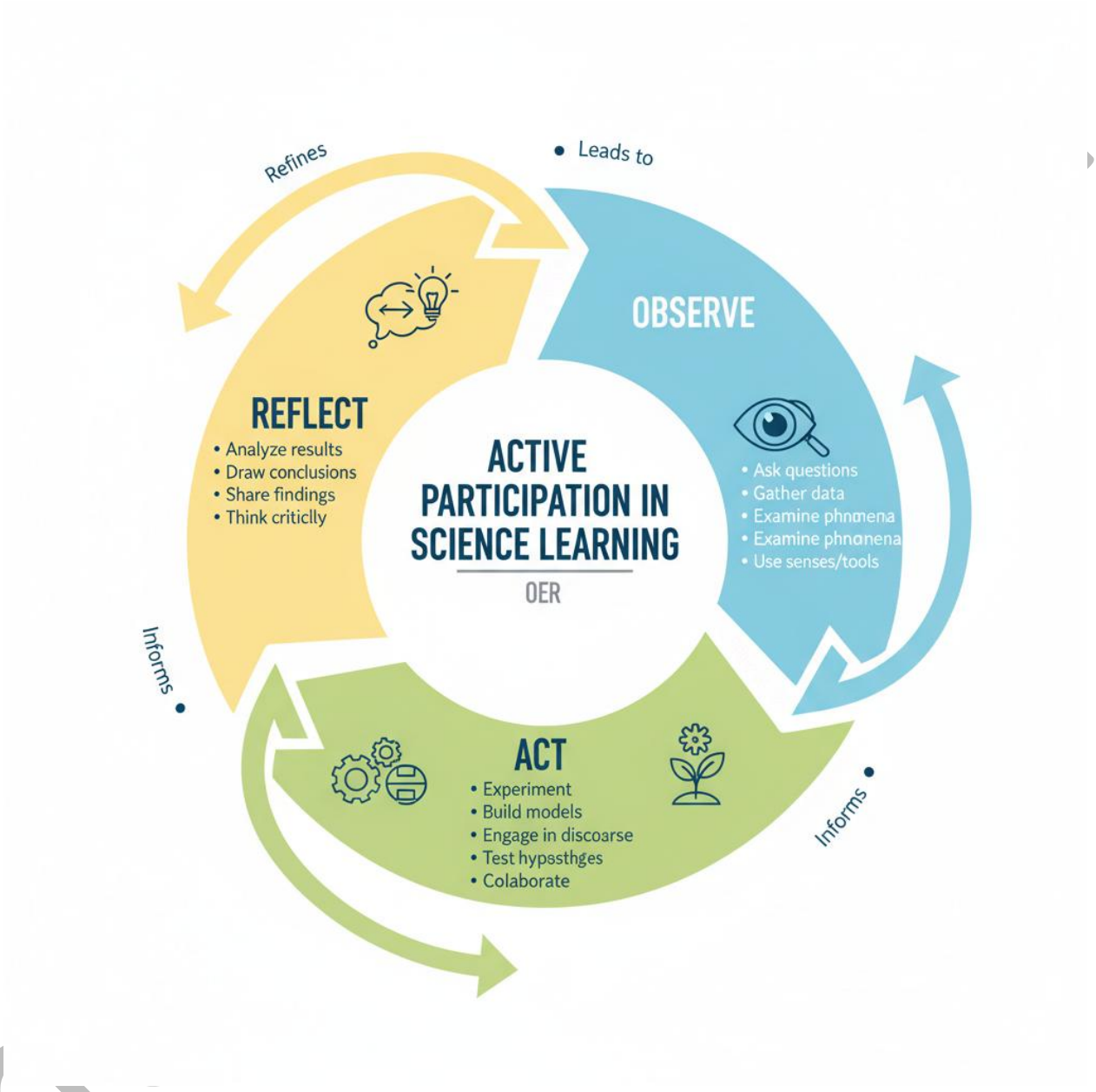
**Active participation** means children are directly involved in the learning process rather than passively listening. In science, this could involve experimenting, observing, or discussing findings. Active participation helps children retain knowledge longer and develop problem-solving skills.

Fill in the blank: Active _____ ensures children are directly involved in the learning process.

**Pilot question:** What simple classroom activity could you use to encourage active participation in a science lesson?

Diagram showing active participation cycle (observe, act, reflect).

Caption: Figure 2.1 Cycle of active participation in science learning




### 2.1.3 Role of the teacher as facilitator

The teacher acts as a **facilitator**, meaning they guide learning rather than simply deliver information. In science education, this involves creating opportunities for exploration, asking open-ended questions, and encouraging children to think critically. The facilitator role helps children take ownership of their learning.

Fill in the blank: In science education, the teacher acts as a _____, guiding rather than dictating learning.

**Pilot question:** How can teachers balance guiding children with allowing them to discover answers independently?

Caption: Box 2.1 Key roles of the teacher as facilitator

Short description: Table listing roles such as guiding exploration, asking questions, encouraging critical thinking.

| Teacher Role | Description |
|---|---|
| **Guide & Mentor** | Provides support and direction, helping students navigate investigations and develop their own questions. |
| **Question-Posed** | Asks open-ended questions that stimulate critical thinking, inquiry, and deeper exploration. |
| **Resource Provider** | Offers access to materials, tools, information, and diverse learning opportunities. |
| **Environment Creator** | Establishes a safe, collaborative, and intellectually stimulating classroom atmosphere. |
| **Active Listener** | Pays close attention to student ideas, questions, and discussions to understand their thinking. |
| **Feedback Giver** | Provides constructive and timely feedback that helps students refine their understanding and skills. |
| **Problem Solver** | Assists students in overcoming challenges and encourages them to find their own solutions. |
| **Connection Maker** | Helps students connect new learning to prior knowledge, real-world phenomena, and other subjects. |
| **Assessor of Learning** | Observes student progress, understanding, and skills through various formative assessment methods. |

## 2.2 Methods Of Teaching Science Concepts

### 2.2.1 Storytelling and narrative techniques

**Storytelling** uses narratives to make science relatable and memorable. A simple story about the sun rising and setting can help children understand day and night. Narratives encourage imagination and link scientific ideas to everyday life.

Fill in the blank: _____ helps children connect science concepts to familiar experiences.

**Pilot question:** How could you use a short story about rain to explain the water cycle to children?

---

### 2.2.2 Play-based and experiential learning

**Play-based learning** involves games, role play, and imaginative activities, while **experiential learning** focuses on direct experiences. Both approaches allow children to experiment with scientific ideas in fun and engaging ways.

Fill in the blank: Play-based learning introduces science through _____ activities.

**Pilot question:** What kind of play activity could you design to teach children about balance and structure?

Short description: Image of children building towers with blocks.

Caption: Plate 2.2 Play-based science learning with blocks

### 2.2.3 Observation and guided questioning

**Observation** is the careful watching of events or objects, while **guided questioning** involves asking open-ended questions to deepen understanding. Together, they encourage children to think critically and explore scientific ideas.

Fill in the blank: Observation and _____ questioning encourage children to think critically.

**Pilot question:** How would you guide children to observe differences between plants and rocks?

Diagram showing observation leading to questioning and discovery.

Caption: Figure 2.2 Observation and questioning cycle in science learning


**2.3 Constructing Concept Maps And Hands-On Activities**

**2.3.1 Purpose and design of concept maps**

A **concept map** is a visual diagram that shows relationships between ideas. For children, simple maps can help them organise thoughts about topics such as animals, plants, or weather.

Fill in the blank: A _____ map is a visual diagram that shows relationships between ideas.

**Pilot question:** How could you design a concept map to help children distinguish between living and non-living things?

---

### 2.3.2 Simple hands-on experiments for young learners

**Hands-on experiments** involve direct participation, making science tangible and memorable. For example, mixing colours or observing ice melt introduces children to cause and effect.

Fill in the blank: Hands-on _____ make science tangible and memorable for children.

**Pilot question:** What simple experiment could you use to show children the effect of heat?

Image of children observing ice melting.

Caption: Plate 2.3 Hands-on experiment with ice melting


### 2.3.3 Linking activities to everyday experiences

Science activities are most effective when linked to everyday experiences. Cooking, gardening, or observing the weather help children connect scientific concepts to their daily lives.

Fill in the blank: Science activities are most effective when linked to _____ experiences.

**Pilot question:** How could you use cooking activities to introduce children to the concept of heat?

Caption: Box 2.1 Everyday experiences linked to science activities

Table listing cooking (heat), gardening (growth), weather (change).

| **Everyday Experience** | **Linked Science Concept(s)** |
|---|---|
| **Blowing Bubbles** | Surface tension, light reflection, air pressure, geometry |
| **Floating a Toy Boat in a Bathtub** | Buoyancy, density, displacement, water resistance |
| **Watching a Plant Grow** | Life cycles, photosynthesis, plant needs, adaptations |
| **Playing with Magnets** | Magnetism, poles, forces, attraction, repulsion |
| **Mixing Colors with Paint** | Color theory, light absorption and reflection, properties of matter |
| **Baking Cookies** | Chemical reactions, states of matter, heat transfer |
| **Rolling a Ball Down a Ramp** | Gravity, friction, momentum, simple machines |
| **Observing Weather Changes** | Meteorology, water cycle, seasons, temperature |
| **Skipping Rocks on Water** | Surface tension, force, trajectory, friction |
| **Making a Paper Airplane** | Aerodynamics, lift, drag, thrust, gravity |

## 2.4 Strategies For Concept Development

### 2.4.1 Building from simple to complex ideas

Concept development involves moving from simple ideas to more complex ones. For example, children may first learn that plants need water, then later explore photosynthesis.

Fill in the blank: Concept development involves moving from _____ ideas to more complex ones.

**Pilot question:** How could you introduce the idea of growth before explaining more complex plant processes?

---

### 2.4.2 Reinforcing learning through repetition and variation

**Repetition** helps children remember, while **variation** keeps learning engaging. Revisiting a concept in different contexts ensures deeper understanding.

Fill in the blank: Repetition and _____ help reinforce learning in science education.

**Pilot question:** What activity could you repeat in different ways to reinforce the concept of movement?

---

### 2.4.3 Integrating science with other subject areas

Science can be integrated with art, music, and language. Drawing plants combines science with art, while singing about the weather links science with music. This holistic approach makes learning richer.

Fill in the blank: Science can be integrated with other _____ areas such as art and music.

**Pilot question:** How could you integrate science with storytelling to make lessons more engaging?

Caption: Box 2.2 Examples of integrating science with other learning areas

Table showing art (drawing plants), music (weather songs), language (storytelling about animals).

| Subject | Science Integration Example |
|---|---|
| Art | **Drawing/Painting Nature:** Observing and drawing plants, animals, or landscapes helps children notice details, understand structures, and learn about ecosystems. **Sculpting Models:** Creating 3D models of molecules, planets, or animal habitats reinforces understanding of scientific concepts and forms. |

| Subject | Science Integration Example |
|---|---|
| Music | **Sound Experiments:** Exploring different instruments, making sounds with various materials, and discussing pitch, volume, and vibration teaches about acoustics and wave properties. **Rhythm & Patterns:** Identifying patterns in nature (e.g., seasons, growth cycles) and representing them through musical rhythms helps connect science to mathematical and musical thinking. |
| Language | **Science Journals/Storytelling:** Encouraging children to record observations, hypotheses, and conclusions in a journal or to create stories based on scientific phenomena develops vocabulary, descriptive language, and sequencing skills. **Reading Non-Fiction:** Exploring science-related books, articles, and diagrams enhances comprehension, expands knowledge, and introduces scientific terminology. **Presentations/Discussions:** Facilitating discussions about experiments or scientific topics helps children articulate their thoughts, ask questions, and develop critical thinking and communication skills. |

- 

**Series Summary**

This Series has focused on teaching methods and concept development in early childhood science education. We began by exploring the principles of teaching science, highlighting child-centred approaches, active participation, and the teacher's role as facilitator. We then examined specific methods such as storytelling, play-based learning, and guided questioning, before moving on to practical tools like concept maps and hands-on activities. Finally, we considered strategies for concept development, including building ideas progressively, reinforcing learning through repetition and variation, and integrating science with other subjects.

By engaging with these topics, you should now be able to explain the principles of teaching science in early childhood, demonstrate effective teaching methods, design concept maps and hands-on activities, and apply strategies for concept development. These outcomes align directly with the Series Learning Outcomes (SLOs), ensuring you are prepared to make science engaging and meaningful for young learners.

---

**Series Glossary**

- **Active participation**: Direct involvement of learners in the learning process through activities such as experimenting and observing.
- **Child-centred approach**: A teaching method that places the learner's interests and curiosity at the heart of the learning process.
- **Concept development**: The process of building understanding by moving from simple ideas to more complex ones.

- **Concept map**: A visual diagram showing relationships between ideas, used to organise and connect knowledge.
- **Experiential learning**: Learning through direct experiences that allow children to explore and experiment.
- **Facilitator**: The role of the teacher in guiding and supporting learning rather than dictating information.
- **Guided questioning**: Asking open-ended questions to encourage deeper thinking and exploration.
- **Observation**: Careful watching of events or objects to gather information and develop understanding.
- **Play-based learning**: Teaching through games, role play, and imaginative activities.
- **Storytelling**: Using narratives to explain ideas and make concepts relatable.

---

**Concept Check Questions [Series 2r]**

**Objective Questions**

1. A child-centred approach places the _____ at the heart of the learning process. (Linked to SLO 2.1)
2. Which of the following best describes the teacher's role in science education?
   a) Dictator of information
   b) Passive observer
   c) Facilitator of learning
   d) Sole source of answers (Linked to SLO 2.1)

**Short-Answer Questions**

3. Explain one way storytelling can be used to teach science concepts. (Linked to SLO 2.2)
4. Describe how a concept map supports children's learning. (Linked to SLO 2.3)
5. Give one example of integrating science with another subject area. (Linked to SLO 2.4)

**Long-Answer Questions**

6. Analyse the importance of active participation in science learning for young children. (Linked to SLO 2.1)
7. Design a simple hands-on activity that introduces children to the concept of balance. (Linked to SLO 2.3)

---

**Answers to Concept Check Questions [Series 2]**

**Objective Questions**

1. Learner
2. c) Facilitator of learning

**Short-Answer Questions**

3. Storytelling can explain scientific ideas by linking them to familiar experiences, such as telling a story about the sun to explain day and night.
4. A concept map helps children organise and connect ideas visually, making relationships between concepts clearer.
5. Science can be integrated with art by drawing plants, or with music by singing songs about the weather.

**Long-Answer Questions**

6. *Basic response*: Active participation ensures children are directly involved, which helps them retain knowledge and develop problem-solving skills.
   *Value-added response*: It also fosters independence, critical thinking, and collaboration, preparing children for lifelong learning.
7. *Basic response*: A simple activity could involve building towers with blocks to demonstrate balance.
   *Value-added response*: Extending this, children could test different shapes and sizes of blocks, comparing which structures are more stable, reinforcing the concept of balance and structure.

---

**Answers to Pilot Questions [Series 2]**

- Adapt lessons by following children's curiosity, such as exploring leaves when they ask about trees.
- A simple classroom activity like mixing colours encourages active participation.
- Teachers balance guidance with independence by asking open-ended questions and allowing children to discover answers.
- A short story about rain can explain the water cycle.
- Play activities like building with blocks teach balance and structure.
- Guiding children to observe plants and rocks helps them distinguish living and non-living things.

- A concept map can show categories like animals, plants, and non-living objects.
- A simple experiment such as melting ice shows the effect of heat.
- Cooking activities can introduce the concept of heat.
- Growth can be introduced by observing plants before explaining photosynthesis.
- Repeating movement activities in different contexts reinforces learning.
- Science can be integrated with storytelling to make lessons engaging.

---

**References and Attributions [Series 2]**

- Plate 2.1 Child-centred science exploration. Suggested AI prompt: “Children exploring leaves and plants outdoors with teacher guidance.”
- Figure 2.1 Cycle of active participation in science learning. Suggested AI prompt: “Diagram showing observe, act, reflect cycle for active participation in science learning.”
- Box 2.1 Key roles of the teacher as facilitator. Suggested AI prompt: “Table listing teacher roles as facilitator in science education.”
- Plate 2.2 Play-based science learning with blocks. Suggested AI prompt: “Children building towers with blocks to learn balance and structure.”
- Figure 2.2 Observation and questioning cycle in science learning. Suggested AI prompt: “Diagram showing observation leading to questioning and discovery for children.”
- Plate 2.3 Hands-on experiment with ice melting. Suggested AI prompt: “Children observing ice melting as a science experiment.”
- Box 2.1 Everyday experiences linked to science activities. Suggested AI prompt: “Table showing everyday experiences linked to science concepts for children.”
- Box 2.2 Examples of integrating science with other learning areas. Suggested AI prompt: “Table showing integration of science with art, music, and language for children.”

All illustration prompts are intended for AI generation or sourcing from open educational resources (OER).



**Series 3: Exploring Basic Scientific Concepts: Living, Non-Living, Sky, and Space**:

**Part 3.1: Living and Non-Living Concepts**

- Characteristics of living things
- Characteristics of non-living things
- Distinguishing between living and non-living

**Part 3.2: Exploring the Sky**

- Daytime sky features (sun, clouds)
- Night-time sky features (moon, stars)
- Observing changes in the sky

**Part 3.3: Understanding Space**

- Basic distinction between sky and space
- Introduction to planets and celestial bodies
- Simple activities to illustrate space concepts

**Part 3.4: Linking Concepts to Early Childhood Learning**

- Everyday examples of living and non-living
- Activities for observing the sky
- Integrating sky and space concepts into play and storytelling

---

**Series Introduction**

**Background**

Children are naturally fascinated by the world around them, often asking questions such as “Is this alive?” or “Why do stars shine at night?”. Exploring basic scientific concepts like living and non-living, as well as the sky and space, provides a foundation for scientific thinking and nurtures curiosity. These concepts are essential in early childhood education because they connect directly to children’s everyday experiences and observations.

**Series Aim**

The aim of this Series is to introduce you to the fundamental scientific concepts of living and non-living, sky, and space, and to equip you with strategies for presenting these ideas in ways that are engaging and meaningful for young learners.

**Series Synopsis**

We shall commence this Series by examining the characteristics of living and non-living things, focusing on how to help children distinguish between them. Next, we will explore the features of the

sky, both during the day and at night, and consider how children can observe changes over time. Following that, we will move on to understanding space, introducing simple ideas about planets and celestial bodies. Finally, we will wrap up by linking these concepts to everyday learning, showing how they can be integrated into activities, play, and storytelling in early childhood education.

---

**Series Learning Outcomes (SLOs)**

Upon completing this Series, you should be able to:

- **SLO 3.1** define the characteristics of living and non-living things,
- **SLO 3.2** distinguish between living and non-living through examples and activities,
- **SLO 3.3** describe the features of the sky during the day and night,
- **SLO 3.4** explain the basic distinction between sky and space,
- **SLO 3.5** design simple activities that introduce children to planets and celestial bodies, and
- **SLO 3.6** apply strategies to link living, non-living, sky, and space concepts to everyday learning experiences.

## 3.1 Living And Non-Living Concepts

### 3.1.1 Characteristics of living things

**Living things** are organisms that show basic life processes such as growth, movement, reproduction, and response to stimuli. In early childhood education, children can be guided to observe plants growing, animals moving, or humans breathing to understand these characteristics.

Fill in the blank: Living things show basic life processes such as _____, movement, and reproduction.

**Pilot question:** How could you help children recognise that plants are living things even though they do not move like animals?

Image of children watering plants and observing growth.

Caption: Plate 3.1 Children observing plant growth as evidence of life


### 3.1.2 Characteristics of non-living things

**Non-living things** are objects that do not show life processes. They do not grow, reproduce, or respond to stimuli. Examples include rocks, toys, and furniture. In teaching, children can compare a rock with a plant to see the difference.

Fill in the blank: Non-living things do not show basic _____ processes such as growth or reproduction.

**Pilot question:** What everyday classroom objects could you use to demonstrate non-living characteristics to children?

Short description: Diagram comparing living and non-living characteristics side by side.

Caption: Figure 3.1 Comparison of living and non-living characteristics


### 3.1.3 Distinguishing between living and non-living

Children often confuse living and non-living things, especially when non-living objects can move (like cars or toys). Teachers should emphasise that movement alone does not mean something is alive. Instead, learners should look for multiple characteristics such as growth, reproduction, and response to stimuli.

Fill in the blank: Movement alone does not mean something is _____; other characteristics must be considered.

**Pilot question:** How would you explain to children why a car is non-living even though it moves?

Caption: Box 3.1 Examples of living and non-living things for classroom use

Table listing examples such as plants, animals, humans (living) and rocks, toys, cars (non-living).


Here's the continuation of **Series 3: Exploring Basic Scientific Concepts: Living, Non-Living, Sky, and Space**, covering the remaining Parts in the same structured style:

---

**3.2 Exploring The Sky**

**3.2.1 Daytime sky features**

The **daytime sky** is dominated by the sun, which provides light and warmth. Clouds also appear, changing shape and moving across the sky. These features can be observed directly by children, helping them understand weather and time.

Fill in the blank: The _____ provides light and warmth during the daytime sky.

**Pilot question:** How could you guide children to observe changes in cloud shapes during the day?

Image of children looking at clouds in the sky.

Caption: Plate 3.2 Children observing clouds in the daytime sky

### 3.2.2 Night-time sky features

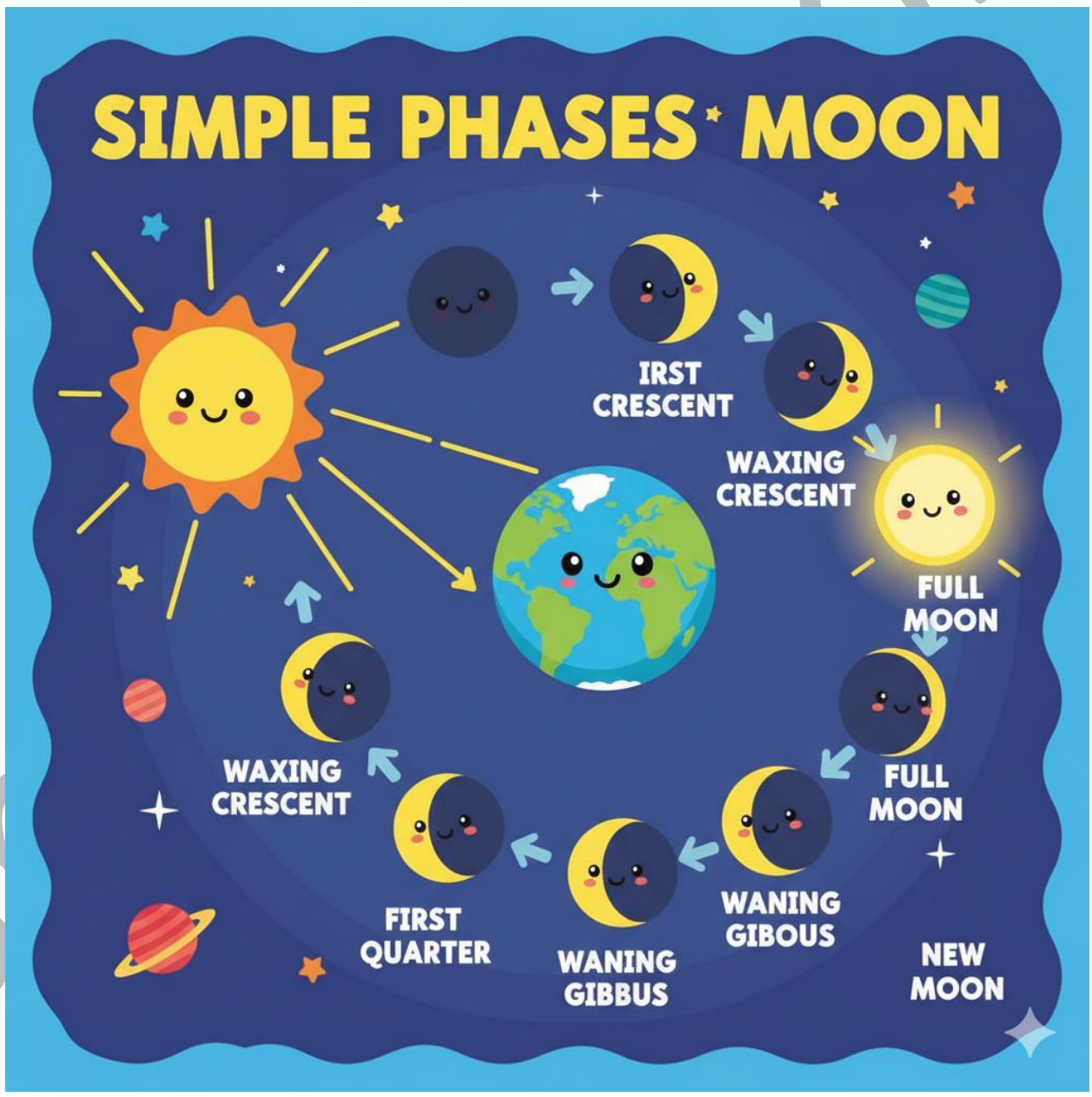
The **night-time sky** reveals the moon, stars, and sometimes planets. These features fascinate children and can be introduced through simple observation activities. Teachers can encourage learners to notice differences between the daytime and night-time sky.

Fill in the blank: The _____ and stars are the main features of the night-time sky.

**Pilot question:** How would you explain to children why the moon changes shape over time?

Diagram showing phases of the moon.

Caption: Figure 3.2 Phases of the moon for children




### 3.2.3 Observing changes in the sky

Children can be guided to observe how the sky changes from day to night and across seasons. These observations help them understand natural cycles and patterns.

Fill in the blank: Observing changes in the _____ helps children understand natural cycles.

**Pilot question:** What simple activity could you use to help children notice the difference between day and night skies?

---

### 3.3 Understanding Space

#### 3.3.1 Basic distinction between sky and space

The **sky** is what we see above us from Earth, while **space** refers to the vast universe beyond the Earth's atmosphere. Helping children distinguish between the two builds clarity in their understanding.

Fill in the blank: The sky is what we see above Earth, while _____ is beyond the Earth's atmosphere.

**Pilot question:** How would you explain to children the difference between the sky and space using everyday language?

---

#### 3.3.2 Introduction to planets and celestial bodies

**Celestial bodies** are objects in space such as planets, stars, and moons. Introducing children to these concepts can be done through stories, pictures, or simple models.

Fill in the blank: Planets, stars, and moons are examples of _____ bodies.

**Pilot question:** What simple classroom resource could you use to introduce children to planets?

Image of a simple solar system model for children.

Caption: Plate 3.3 Simple solar system model for classroom use


#### 3.3.3 Simple activities to illustrate space concepts

Activities such as drawing planets, using globes, or storytelling about astronauts can make space concepts engaging for children.

Fill in the blank: Drawing planets or using a _____ are simple activities to illustrate space concepts.

**Pilot question:** How could you use storytelling to introduce children to the idea of astronauts?

---

### 3.4 Linking Concepts To Early Childhood Learning

#### 3.4.1 Everyday examples of living and non-living

Teachers can use familiar objects such as pets, plants, toys, and furniture to help children distinguish between living and non-living.

Fill in the blank: Pets and plants are examples of _____ things.

**Pilot question:** What everyday classroom items could you use to explain non-living things?

---

#### 3.4.2 Activities for observing the sky

Simple activities such as sky watching, drawing the sun and moon, or singing songs about the weather can help children connect science to daily life.

Fill in the blank: Drawing the _____ and moon are simple activities for observing the sky.

**Pilot question:** How could you design a short activity to help children observe the sky at different times of day?

---

#### 3.4.3 Integrating sky and space concepts into play and storytelling

Play and storytelling make abstract concepts like space more relatable. For example, role-playing as astronauts or telling stories about stars can spark imagination.

Fill in the blank: Role-playing as _____ can help children learn about space.

**Pilot question:** How could you integrate sky and space concepts into a classroom play activity?

Caption: Box 3.1 Examples of integrating sky and space concepts into play and storytelling

Table listing role play (astronauts), drawing (stars and planets), storytelling (moon journeys).


**Series Summary**

This Series has explored basic scientific concepts that are central to early childhood education. We began by examining the characteristics of living and non-living things, focusing on how children can distinguish between them through observation and comparison. We then moved on to the sky, considering its daytime and night-time features and how children can observe changes over time. Following that, we introduced the concept of space, highlighting the distinction between sky and space, and providing simple ways to present planets and celestial bodies. Finally, we linked these concepts to everyday learning, showing how they can be integrated into activities, play, and storytelling.

By engaging with these topics, you should now be able to define and distinguish living and non-living things, describe features of the sky, explain the difference between sky and space, design simple activities to introduce space concepts, and apply strategies to connect these ideas to everyday experiences. These outcomes align directly with the Series Learning Outcomes (SLOs), ensuring you are equipped to make science both accessible and engaging for young learners.

---

**Series Glossary**

- **Celestial bodies**: Objects in space such as planets, stars, and moons.
- **Daytime sky**: The sky as seen during the day, featuring the sun and clouds.
- **Living things**: Organisms that show life processes such as growth, reproduction, and response to stimuli.
- **Moon phases**: The changing shapes of the moon as seen from Earth.
- **Night-time sky**: The sky as seen at night, featuring the moon, stars, and sometimes planets.
- **Non-living things**: Objects that do not show life processes such as growth or reproduction.
- **Observation**: Careful watching of events or objects to gather information.
- **Sky**: What we see above us from Earth, including the sun, moon, clouds, and stars.
- **Space**: The vast universe beyond Earth's atmosphere.

---

**Concept Check Questions [Series 3r]**

**Objective Questions**

1. Living things show basic life processes such as _____, movement, and reproduction. (Linked to SLO 3.1)
2. Which of the following is a non-living thing?
   a) Dog
   b) Rock
   c) Plant
   d) Child (Linked to SLO 3.2)

**Short-Answer Questions**

3. Describe one feature of the daytime sky. (Linked to SLO 3.3)
4. Explain the difference between the sky and space. (Linked to SLO 3.4)
5. Give one example of a celestial body. (Linked to SLO 3.5)

**Long-Answer Questions**

6. Analyse how observing the sky can help children understand natural cycles. (Linked to SLO 3.3)
7. Design a simple classroom activity to introduce children to the concept of planets. (Linked to SLO 3.5)

---

**Answers to Concept Check Questions [Series 3]**

**Objective Questions**

1. Growth
2. b) Rock

**Short-Answer Questions**

3. The daytime sky features the sun, which provides light and warmth.
4. The sky is what we see above Earth, while space is the vast universe beyond Earth's atmosphere.
5. An example of a celestial body is a planet.

**Long-Answer Questions**

6. *Basic response*: Observing the sky helps children notice changes such as day and night, which introduces them to natural cycles. *Value-added response*: It also helps them understand seasonal changes, weather patterns, and the relationship between the sun, moon, and Earth.
7. *Basic response*: A simple activity could involve showing children a model of the solar system. *Value-added response*: Extending this, children could draw planets and compare their sizes, or role-play as astronauts exploring space.

---

**Answers to Pilot Questions [Series 3]**

- Plants are living because they grow, even though they do not move like animals.
- Non-living things do not show life processes such as growth or reproduction.
- Movement alone does not mean something is alive; cars move but do not grow or reproduce.
- Children can observe cloud shapes changing during the day.
- The moon changes shape because of its phases.
- Observing the sky helps children notice differences between day and night.

- The sky is what we see above Earth, while space is beyond the atmosphere.
- Classroom resources such as globes or solar system models can introduce planets.
- Drawing planets or using a globe illustrates space concepts.
- Storytelling about astronauts introduces children to space exploration.
- Pets and plants are living things.
- Toys and furniture are non-living examples.
- Drawing the sun and moon helps children observe the sky.
- Role-playing as astronauts makes space concepts engaging.

---

**References and Attributions [Series 3]**

- Plate 3.1 Children observing plant growth as evidence of life. Suggested AI prompt: “Children watering plants and observing growth in classroom.”
- Figure 3.1 Comparison of living and non-living characteristics. Suggested AI prompt: “Diagram comparing living and non-living characteristics for children.”
- Box 3.1 Examples of living and non-living things for classroom use. Suggested AI prompt: “Table listing examples of living and non-living things for children.”
- Plate 3.2 Children observing clouds in the daytime sky. Suggested AI prompt: “Children looking at clouds in the sky during daytime.”
- Figure 3.2 Phases of the moon for children. Suggested AI prompt: “Diagram showing simple phases of the moon for children.”
- Plate 3.3 Simple solar system model for classroom use. Suggested AI prompt: “Simple solar system model for children in classroom.”
- Box 3.1 Examples of integrating sky and space concepts into play and storytelling. Suggested AI prompt: “Table showing integration of sky and space concepts into play and storytelling for children.”

All illustration prompts are intended for AI generation or sourcing from open educational resources (OER).

**Series 4: Heat, Light, and Hands-On Science Activities**:

---

**Part 4.1: Understanding Heat**

- Definition and sources of heat
- Effects of heat on materials
- Everyday examples of heat

**Part 4.2: Exploring Light**

- Definition and sources of light
- Properties of light (reflection, shadows)
- Everyday examples of light

**Part 4.3: Hands-On Science Activities**

- Simple experiments with heat (melting, cooking)
- Simple experiments with light (shadows, mirrors)
- Safety considerations in science activities

**Part 4.4: Linking Heat and Light to Early Childhood Learning**

- Integrating heat and light into play
- Using storytelling and art to explain concepts
- Reinforcing learning through observation and repetition

---

**Series Introduction**

**Background**
Children are naturally curious about everyday phenomena such as why ice melts or why shadows appear. Exploring heat and light through hands-on activities provides opportunities to answer these questions in ways that are engaging and meaningful. These concepts are central to early childhood science education because they connect directly to children's daily experiences and observations.

**Series Aim**
The aim of this Series is to introduce you to the basic concepts of heat and light and to equip you with practical strategies for teaching these ideas through hands-on science activities that are safe, enjoyable, and effective for young learners.

**Series Synopsis**
We shall commence this Series by examining the concept of heat, its sources, and its effects on

materials. Next, we will explore light, focusing on its sources, properties, and everyday examples. Following that, we will consider hands-on science activities that use heat and light to make learning tangible and memorable. Finally, we will wrap up by linking these concepts to early childhood learning, showing how they can be integrated into play, storytelling, and art to reinforce understanding.

---

**Series Learning Outcomes (SLOs)**

Upon completing this Series, you should be able to:

- **SLO 4.1** define heat and identify its sources,
- **SLO 4.2** explain the effects of heat on materials using everyday examples,
- **SLO 4.3** define light and identify its sources,
- **SLO 4.4** describe basic properties of light such as reflection and shadows,
- **SLO 4.5** design simple hands-on activities that demonstrate heat and light concepts safely, and
- **SLO 4.6** apply strategies to link heat and light concepts to everyday learning through play, storytelling, and art.

## 4.1 Understanding Heat

### 4.1.1 Definition and sources of heat

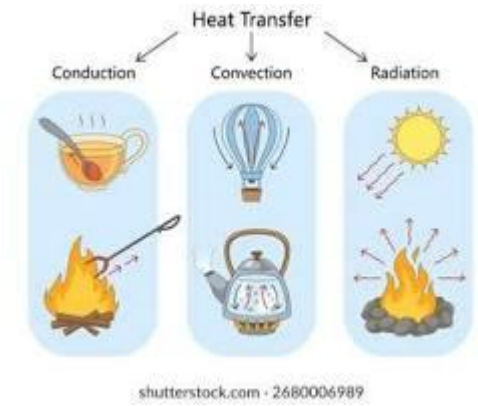
**Heat** is a form of energy that is transferred between objects due to a difference in temperature. It can be felt as warmth and is essential for everyday life. Common **sources of heat** include the sun, fire, electricity, and even the human body. In early childhood education, children can be guided to recognise these sources in their environment.

Fill in the blank: Heat is a form of _____ transferred between objects due to temperature difference.

**Pilot question:** How could you explain to children that the sun is a source of heat using a simple everyday example?

Diagram showing different sources of heat (sun, fire, electricity, body).

Caption: Figure 4.1 Common sources of heat




**4.1.2 Effects of heat on materials**

Heat can cause materials to change in different ways. For example, ice melts into water, metals expand when heated, and food cooks when exposed to heat. These changes help children understand cause and effect in science.

Fill in the blank: Heat can cause materials to _____, expand, or cook depending on the situation.

**Pilot question:** What simple classroom experiment could you use to show children the effect of heat on ice?

Image of children observing ice melting in a bowl.

Caption: Plate 4.1 Children observing the melting of ice


### 4.1.3 Everyday examples of heat

Children encounter heat in daily life, such as feeling warmth from the sun, cooking food, or touching a warm cup of tea. Teachers can use these everyday examples to make the concept relatable and memorable.

Fill in the blank: Everyday examples of heat include cooking, the warmth of the _____, and hot drinks.

**Pilot question:** How could you use cooking activities to help children understand the everyday role of heat?

Caption: Box 4.1 Everyday examples of heat for classroom discussion

Table listing examples such as sun (warmth), cooking (food preparation), hot drinks (warmth), fire (light and heat).

| Source | Example in a Child's Life | What it does |
|---|---|---|
| **The Sun** | Playing at the park on a sunny day | Warms the slide and your skin. |
| **Electricity** | A toaster or a blow dryer | Browns the bread or dries your hair. |
| **Friction** | Rubbing your hands together quickly | Makes your palms feel warm. |
| **Fire** | A campfire or a candle | Roasts marshmallows or provides light and warmth. |
| **Living Things** | A warm hug or a pet sleeping on your lap | Our bodies make heat from the food we eat. |
| **Stovetop** | Boiling water for hot cocoa | Transfers heat to the water to make it hot. |

**4.2 Exploring Light**

**4.2.1 Definition and sources of light**

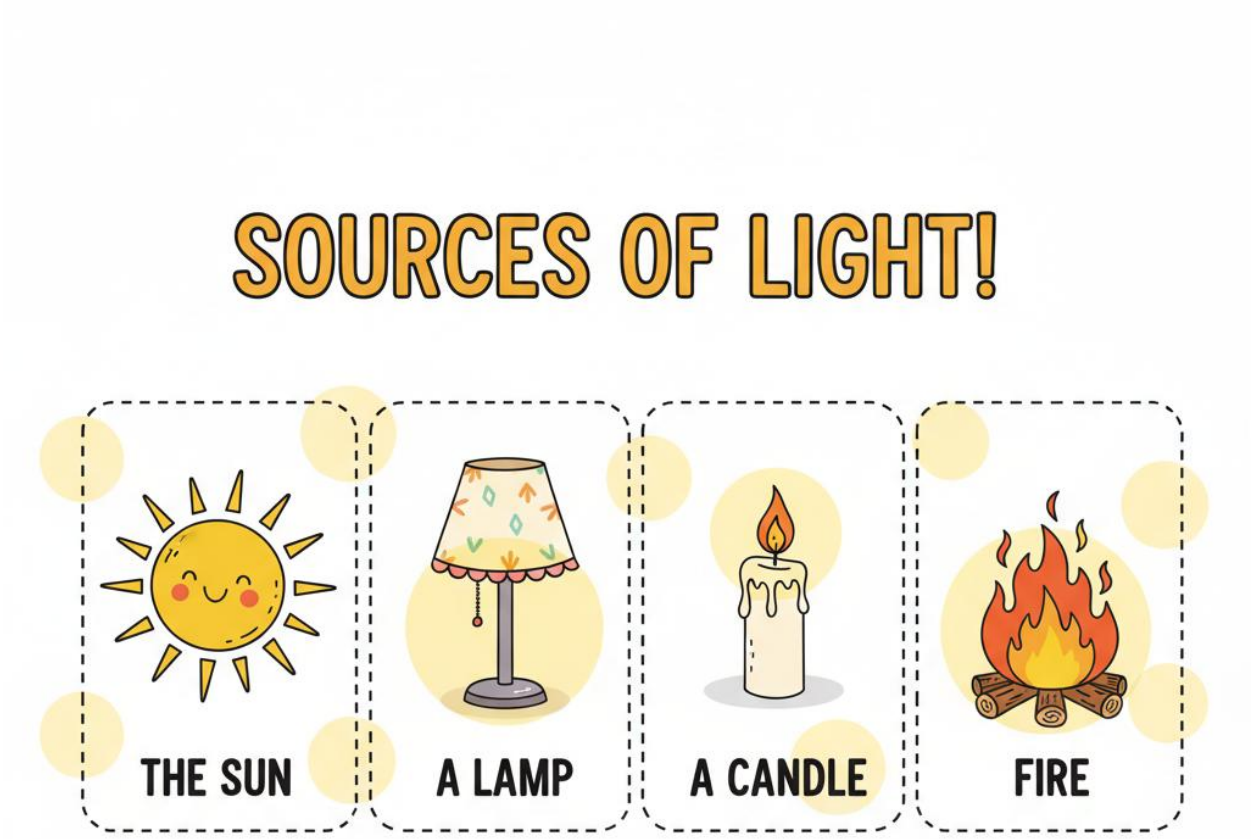
**Light** is a form of energy that makes things visible. Without light, we cannot see. Common **sources of light** include the sun, fire, lamps, and candles. Children can be guided to recognise these sources in everyday life.

Fill in the blank: Light is a form of _____ that makes things visible.

**Pilot question:** How could you explain to children why we need light to see objects?

Diagram showing sources of light (sun, lamp, candle, fire).

Caption: Figure 4.2 Common sources of light




OER

**4.2.2 Properties of light (reflection, shadows)**

Light has interesting properties. **Reflection** occurs when light bounces off surfaces like mirrors, while **shadows** are formed when an object blocks light. These properties can be demonstrated through simple classroom activities.

Fill in the blank: Shadows are formed when an object _____ light.

**Pilot question:** What simple activity could you use to show children how shadows are formed?

Image of children playing with shadows outdoors.

Caption: Plate 4.2 Children observing shadows in sunlight

### 4.2.3 Everyday examples of light

Children encounter light daily, such as switching on lamps, seeing sunlight, or watching fire burn. Teachers can use these examples to make the concept relatable.

Fill in the blank: Everyday examples of light include sunlight, lamps, and _____.

**Pilot question:** How could you use a torchlight in class to explain the everyday role of light?

Caption: Box 4.2 Everyday examples of light for classroom discussion

Short description: Table listing examples such as sunlight, lamps, candles, fire, torchlight.

| Source | Where we see it | Why we use it |
|---|---|---|
| **The Sun** | Outside during the daytime | To see everything clearly and help plants grow. |
| **Light Bulbs** | Lamps and ceiling lights | To see inside our houses when it is dark or cloudy. |
| **Flashlight** | In a dark closet or under the covers | To find things in small, dark spaces. |
| **Traffic Lights** | At the street corner (Red, Yellow, Green) | To tell cars when to stop and go so we stay safe. |
| **Television/Tablets** | On the screen while watching a show | To show us pictures and colors. |
| **Stars** | In the sky at night | They are far-away suns that twinkle in the dark. |
| **Fireflies** | In the garden on summer nights | These amazing bugs make their own "living light." |

- 

**4.3 Hands-On Science Activities**

**4.3.1 Simple experiments with heat (melting, cooking)**

Children can observe heat through experiments such as melting ice or cooking simple food items. These activities make science tangible and memorable.

Fill in the blank: Melting _____ is a simple experiment to show the effect of heat.

**Pilot question:** What everyday kitchen activity could you adapt to show children the effect of heat?

---

**4.3.2 Simple experiments with light (shadows, mirrors)**

Experiments with light include creating shadows using a torch or observing reflection with a mirror. These activities help children understand properties of light.

Fill in the blank: Reflection occurs when light _____ off surfaces like mirrors.

**Pilot question:** How could you use a mirror to demonstrate reflection to children?

Image of children using a torch and mirror to observe reflection.

Caption: Plate 4.3 Children experimenting with reflection using a mirror

### 4.3.3 Safety considerations in science activities

Safety is essential when conducting experiments. Teachers must ensure children do not touch fire directly, handle hot objects, or misuse mirrors and torches. Clear instructions and supervision are vital.

Fill in the blank: Safety in science activities requires clear _____ and supervision.

**Pilot question:** What safety rule would you emphasise when children are experimenting with heat?

Caption: Box 4.3 Safety rules for heat and light experiments

Table listing rules such as “Do not touch fire”, “Handle hot objects carefully”, “Use torches responsibly”.

| Rule | What to Do | Why it Matters |
|---|---|---|
| **Ask an Adult** | Always have a teacher or parent help you start the experiment. | Adults make sure the equipment is safe to use. |
| **Protect Your Eyes** | Never look directly at the Sun or a very bright laser/torch. | Bright light can hurt your "retina" (the back of your eye). |
| **Touch with Caution** | Use a "hover test" (put your hand near, but not on, an object) to see if it's hot. | Some things stay hot even after the light is turned off. |
| **Water & Wires** | Keep all liquids (like the bowl of ice) away from electrical plugs and lamps. | Water and electricity do not mix and can cause a shock. |
| **Tie it Back** | Keep long hair tied back and loose sleeves rolled up. | This prevents hair or clothes from touching a flame or a hot bulb. |
| **The "No-Run" Zone** | Walk carefully and stay at your station during the experiment. | Bumping into a table could spill hot water or break a mirror. |
| **Cleanup Time** | Let bulbs and heated objects cool down before putting them away. | Putting hot items in a box can be a fire hazard. |

- **4.4 Linking Heat And Light To Early Childhood Learning**

**4.4.1 Integrating heat and light into play**

Play activities such as role-playing cooking or shadow games can help children learn about heat and light in enjoyable ways.

Fill in the blank: Role-playing cooking activities can help children learn about _____.

**Pilot question:** How could you design a shadow play activity for children?

### 4.4.2 Using storytelling and art to explain concepts

Storytelling and art make abstract concepts relatable. For example, a story about the sun warming the earth or drawing pictures of lamps can reinforce learning.

Fill in the blank: Drawing pictures of _____ can help children learn about light.

**Pilot question:** How could you use a short story to explain the role of the sun in everyday life?

### 4.4.3 Reinforcing learning through observation and repetition

Children learn best when concepts are repeated in different contexts. Observing the sun daily or repeating shadow activities helps reinforce understanding.

Fill in the blank: Repetition and _____ help reinforce learning in science education.

**Pilot question:** What everyday observation could you encourage children to repeat to reinforce the concept of light?

Caption: Box 4.4 Strategies for reinforcing heat and light concepts

Short description: Table listing repetition (daily sun observation), variation (different shadow activities), integration (storytelling and play).

| Strategy | Activity Example | Why it Works |
|---|---|---|
| **Daily Observations** | Ask, "Where is the light coming from right now?" during different times of the day. | Connects classroom learning to the real world. |
| **Sensory Variation** | Let them feel the warmth of a sunny window vs. a shaded wall. | Uses touch to confirm what they see with their eyes. |
| **Predict & Record** | Have them guess which ice cube will melt faster: one in the sun or one in a hat. | Develops the "Scientific Method" (forming a hypothesis). |
| **Creative Expression** | Draw a picture using only "hot" colors (red, orange, yellow) or "cool" colors. | Reinforces the visual and emotional associations with heat. |

| Strategy | Activity Example | Why it Works |
|---|---|---|
| **Comparative Talk** | Compare a torch to the sun. Which is bigger? Which is hotter? | Helps children understand the scale and intensity of different sources. |
| **Role Play** | Have one child be the "Sun" (light source) and another be a "Tree" (object) to create a shadow. | Physical movement helps memory retention. |

**Series Summary**

This Series has focused on heat, light, and hands-on science activities, showing how these concepts can be introduced meaningfully in early childhood education. We began by examining heat, its sources, and its effects on materials, before moving on to light, its sources, properties, and everyday examples. We then explored hands-on science activities, including simple experiments with heat and light, while emphasising safety considerations. Finally, we linked these concepts to early childhood learning, highlighting integration into play, storytelling, and art.

By engaging with these topics, you should now be able to define heat and light, explain their sources and properties, design simple experiments, and apply strategies to connect these concepts to everyday experiences. These outcomes align directly with the Series Learning Outcomes (SLOs), ensuring you are well prepared to make science engaging, safe, and practical for young learners.

---

**Series Glossary**

- **Heat**: A form of energy transferred between objects due to temperature difference.
- **Light**: A form of energy that makes objects visible.
- **Reflection**: The bouncing of light off surfaces such as mirrors.
- **Shadow**: A dark shape formed when an object blocks light.
- **Sources of heat**: Natural or artificial origins of heat, such as the sun, fire, electricity, or the human body.
- **Sources of light**: Natural or artificial origins of light, such as the sun, lamps, candles, or fire.
- **Safety considerations**: Rules and practices that ensure children's safety during experiments.
- **Hands-on experiment**: A practical activity where learners directly participate to observe scientific processes.

**Concept Check Questions [Series 4r]**

**Objective Questions**

1. Heat is a form of _____ transferred between objects due to temperature difference. (Linked to SLO 4.1)
2. Which of the following is a source of light?
   a) Rock
   b) Candle
   c) Chair
   d) Book (Linked to SLO 4.3)

**Short-Answer Questions**

3. Explain one effect of heat on materials. (Linked to SLO 4.2)
4. Describe how shadows are formed. (Linked to SLO 4.4)
5. Give one example of a simple hands-on experiment with light. (Linked to SLO 4.5)

**Long-Answer Questions**

6. Analyse why safety considerations are important in hands-on science activities for children. (Linked to SLO 4.5)
7. Design a classroom activity that integrates heat or light into play or storytelling. (Linked to SLO 4.6)

---

**Answers to Concept Check Questions [Series 4]**

**Objective Questions**

1. Energy
2. b) Candle

**Short-Answer Questions**

3. Heat can cause ice to melt into water.
4. Shadows are formed when an object blocks light.
5. Using a torch to create shadows is a simple experiment with light.

**Long-Answer Questions**

6. *Basic response*: Safety considerations are important because children may be exposed to risks such as burns or misuse of equipment.

*Value-added response*: They also teach children responsibility, encourage safe practices, and ensure experiments remain enjoyable and educational without accidents.

7. *Basic response*: A classroom activity could involve shadow play, where children use their hands to create shapes in torchlight. *Value-added response*: Extending this, children could role-play a story about the sun and shadows, combining science with storytelling and imagination.

---

**Answers to Pilot Questions [Series 4]**

- The sun is a source of heat because it warms the earth and our bodies.
- Ice melts when exposed to heat, showing its effect on materials.
- Everyday examples of heat include cooking food and drinking hot tea.
- We need light to see objects because it makes them visible.
- Shadows are formed when an object blocks light.
- Torchlight can be used to explain the everyday role of light.
- Melting ice is a simple experiment to show heat.
- Reflection occurs when light bounces off mirrors.
- Safety requires clear instructions and supervision.
- Cooking activities can show the effect of heat.
- Shadow play activities help children learn about light.
- Drawing lamps or telling stories about the sun explains light.
- Observing the sun daily reinforces learning about light.

---

**References and Attributions [Series 4]**

- Figure 4.1 Common sources of heat. Suggested AI prompt: “Diagram showing sun, fire, electricity, and human body as sources of heat.”
- Plate 4.1 Children observing the melting of ice. Suggested AI prompt: “Children observing ice melting in a bowl as a heat experiment.”
- Box 4.1 Everyday examples of heat for classroom discussion. Suggested AI prompt: “Table listing everyday examples of heat for children.”

- Figure 4.2 Common sources of light. Suggested AI prompt: “Diagram showing sun, lamp, candle, and fire as sources of light.”
- Plate 4.2 Children observing shadows in sunlight. Suggested AI prompt: “Children playing outdoors and observing shadows in sunlight.”
- Box 4.2 Everyday examples of light for classroom discussion. Suggested AI prompt: “Table listing everyday examples of light for children.”
- Plate 4.3 Children experimenting with reflection using a mirror. Suggested AI prompt: “Children using torch and mirror to observe reflection.”
- Box 4.3 Safety rules for heat and light experiments. Suggested AI prompt: “Table listing safety rules for heat and light experiments for children.”
- Box 4.4 Strategies for reinforcing heat and light concepts. Suggested AI prompt: “Table showing strategies for reinforcing heat and light concepts for children.”

All illustration prompts are intended for AI generation or sourcing from open educational resources (OER).

**Series 5: Water, Air, and Environmental Awareness**:

---

**Part 5.1: Exploring Water**

- Definition and importance of water
- Sources of water
- Uses of water in everyday life

**Part 5.2: Understanding Air**

- Definition and importance of air
- Properties of air
- Everyday examples of air in action

**Part 5.3: Environmental Awareness**

- Meaning of environmental awareness
- Importance of caring for the environment
- Simple ways children can practise environmental care

**Part 5.4: Linking Water, Air, and Environment to Early Childhood Learning**

- Everyday activities involving water and air
- Play and storytelling for environmental awareness
- Reinforcing concepts through observation and repetition

---

**Series Introduction**

**Background**

Children often ask questions such as “Where does water come from?” or “Why do we need air?”. These everyday elements are essential for life and provide a natural entry point into science learning. At the same time, introducing environmental awareness helps children understand the importance of caring for the world around them. Together, these concepts form a foundation for responsible and curious learners.

**Series Aim**

The aim of this Series is to introduce you to the basic concepts of water, air, and environmental awareness, and to equip you with strategies for teaching these ideas in ways that are practical, engaging, and meaningful for young learners.

**Series Synopsis**

We shall commence this Series by exploring water, its definition, sources, and uses in everyday life. Next, we will move on to air, considering its importance, properties, and everyday examples. Following that, we will focus on environmental awareness, highlighting its meaning, importance, and simple practices children can adopt. Finally, we will wrap up by linking water, air, and environmental concepts to early childhood learning, showing how they can be integrated into everyday activities, play, and storytelling.

---

**Series Learning Outcomes (SLOs)**

Upon completing this Series, you should be able to:

- **SLO 5.1** define water and identify its sources,
- **SLO 5.2** explain the everyday uses and importance of water,
- **SLO 5.3** define air and describe its properties,
- **SLO 5.4** illustrate everyday examples of air in action,

- **SLO 5.5** explain the meaning and importance of environmental awareness,
- **SLO 5.6** design simple activities that help children practise environmental care, and
- **SLO 5.7** apply strategies to link water, air, and environmental concepts to everyday learning through play, storytelling, and observation.

## 5.1 Exploring Water

### 5.1.1 Definition and importance of water

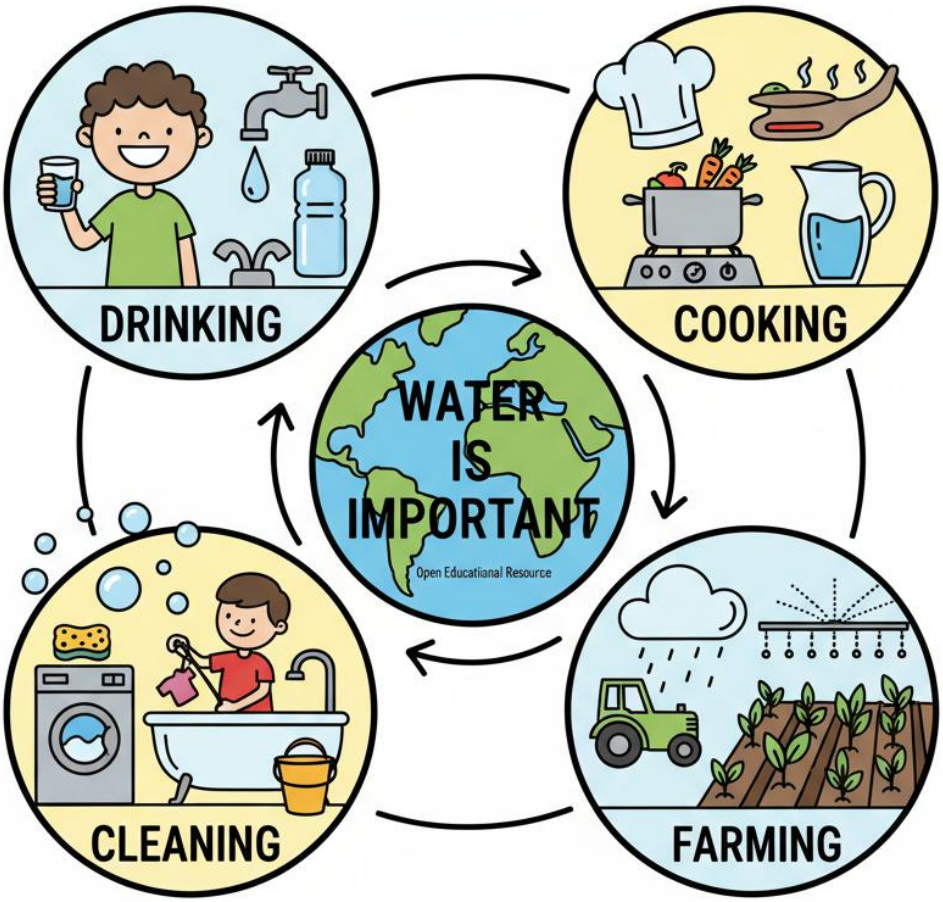
**Water** is a clear, tasteless, and odourless liquid that is essential for all forms of life. It covers most of the Earth's surface and is vital for drinking, cooking, cleaning, farming, and sustaining plants and animals. In early childhood education, children can be guided to recognise water as something they use every day and cannot live without.

Fill in the blank: _____ is a clear, tasteless, and odourless liquid essential for life.

**Pilot question:** How could you explain to children why water is important for both humans and plants?

Diagram showing uses of water (drinking, cooking, cleaning, farming).

Caption: Figure 5.1 Everyday importance of water




### 5.1.2 Sources of water

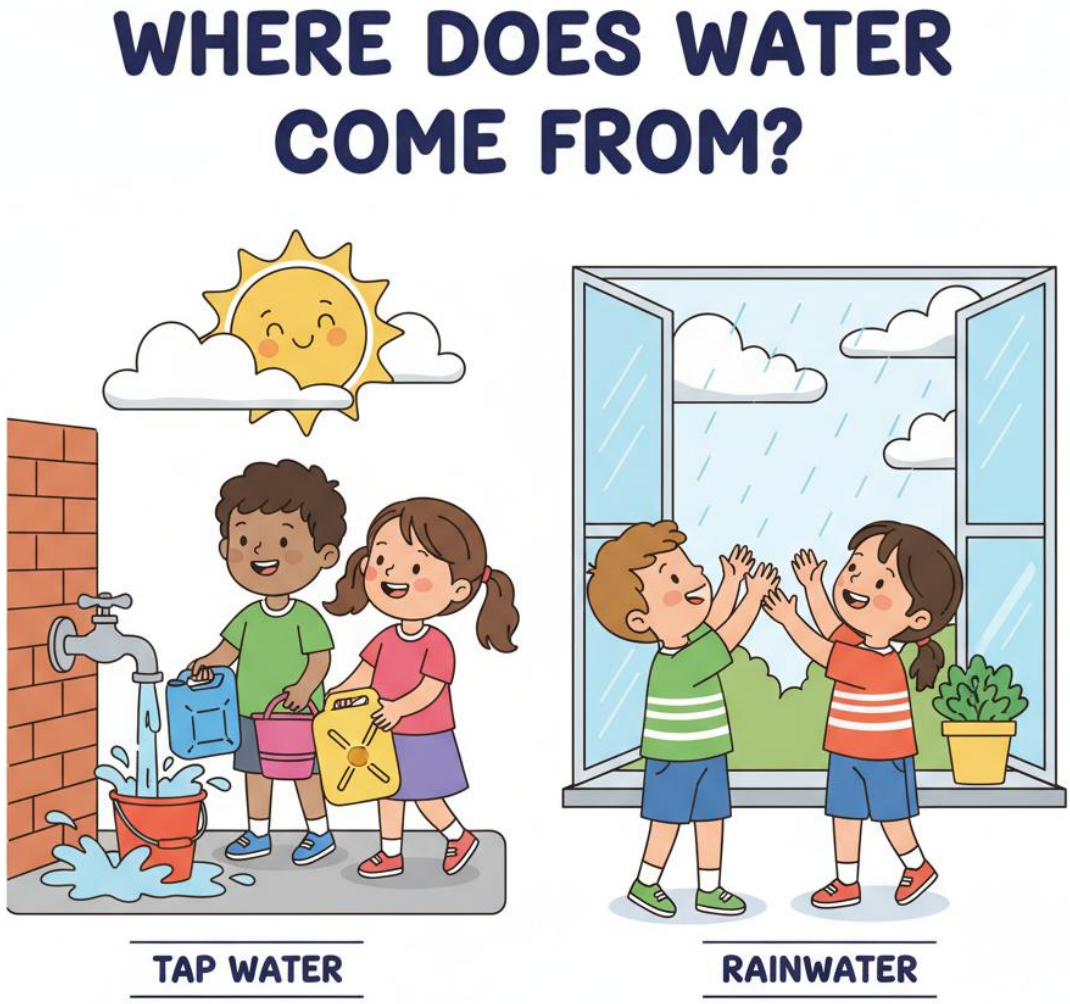
**Sources of water** are places where water is naturally found or collected. Common sources include rivers, lakes, rain, wells, and taps. Children can be taught to identify these sources in their environment and understand that some are natural while others are man-made.

Fill in the blank: Rivers, lakes, and rain are _____ sources of water.

**Pilot question:** What everyday examples could you use to show children the difference between natural and man-made sources of water?

Image of children collecting water from a tap and observing rain.

Caption: Plate 5.1 Children learning about sources of water




**5.1.3 Uses of water in everyday life**

Water is used daily for drinking, cooking, bathing, cleaning, and farming. These uses make water an essential part of life. Teachers can help children connect these uses to their own experiences, such as drinking water when thirsty or washing hands before meals.

Fill in the blank: Water is used daily for drinking, cooking, bathing, cleaning, and _____.

**Pilot question:** How could you design a simple classroom activity to show children the different uses of water?

Caption: Box 5.1 Everyday uses of water for classroom discussion

Table listing uses such as drinking, cooking, bathing, cleaning, farming.

| Category | How We Use It | Why It Is Important |
|---|---|---|
| **Health** | Drinking | Keeps our bodies hydrated and healthy. |
| **Hygiene** | Washing hands and bathing | Washes away germs and keeps us clean. |
| **Home** | Washing dishes and clothes | Keeps our environment and things we wear tidy. |
| **Nature** | Watering plants and gardens | Helps flowers, trees, and food grow. |
| **Fun** | Swimming or water play | Provides exercise and a way to stay cool. |
| **Cooking** | Boiling pasta or making soup | Helps soften and prepare the food we eat. |

---

**5.2 Understanding Air**

**5.2.1 Definition and importance of air**

**Air** is an invisible mixture of gases that surrounds the Earth and is essential for breathing, burning, and supporting life. Though we cannot see it, we feel its presence when the wind blows or when we breathe.

Fill in the blank: _____ is an invisible mixture of gases that surrounds the Earth.

**Pilot question:** How could you explain to children why air is important for breathing?

Diagram showing air as essential for breathing, burning, and supporting life.

Caption: Figure 5.2 Importance of air


**5.2.2 Properties of air**

Air has several properties. It occupies space, has weight, and can move. These properties can be demonstrated through simple experiments such as inflating a balloon or observing wind moving leaves.

Fill in the blank: Air occupies _____, has weight, and can move.

**Pilot question:** What simple classroom experiment could you use to show children that air occupies space?

Image of children inflating balloons to demonstrate air.

Caption: Plate 5.2 Children inflating balloons to show air occupies space


**5.2.3 Everyday examples of air in action**

Children encounter air daily, such as feeling the wind, flying kites, or watching fans move air. Teachers can use these examples to make the concept relatable.

Fill in the blank: Everyday examples of air include wind, fans, and flying _____.

**Pilot question:** How could you use kite flying to explain the role of air to children?

Caption: Box 5.2 Everyday examples of air for classroom discussion

Table listing examples such as wind, fans, balloons, kites.

| Where we find air | What it is doing | How we know it's there |
|---|---|---|
| **Inside a Tire** | Holding up a bike or car | The tire stays round and bouncy instead of flat. |
| **In the Wind** | Pushing the leaves on trees | We can see the branches swaying and hear the rustle. |
| **Inside a Soccer Ball** | Making the ball firm | The ball bounces when it hits the ground. |
| **Bubbles** | Trapped inside soapy water | We see the round shapes floating through the air. |
| **Our Lungs** | Moving in and out as we breathe | We can feel our chests rise and fall. |
| **A Kites/Sails** | Pushing against the fabric | It lifts the kite high or moves the boat across the water. |

- 

**5.3 Environmental Awareness**

**5.3.1 Meaning of environmental awareness**

**Environmental awareness** means understanding the importance of protecting and caring for the environment. It involves recognising that our actions affect the world around us.

Fill in the blank: Environmental _____ means understanding the importance of protecting the environment.

**Pilot question:** How could you explain to children why littering harms the environment?

---

**5.3.2 Importance of caring for the environment**

Caring for the environment ensures clean air, safe water, and healthy living conditions. Teaching children to value the environment helps them grow into responsible citizens.

Fill in the blank: Caring for the environment ensures clean _____, safe water, and healthy living conditions.

**Pilot question:** What everyday example could you use to show children the importance of keeping water clean?

Image of children cleaning up litter in a playground.

Caption: Plate 5.3 Children practising environmental care


### 5.3.3 Simple ways children can practise environmental care

Children can practise environmental care by planting trees, recycling, saving water, and avoiding littering. These simple actions make a big difference.

Fill in the blank: Planting trees and recycling are simple ways children can practise _____ care.

**Pilot question:** What simple classroom activity could you design to teach children about recycling?

Caption: Box 5.3 Simple ways children can practise environmental care

Table listing actions such as planting trees, recycling, saving water, avoiding littering.

| What to Do | How it Helps Our Planet | Connects to Our Learning |
|---|---|---|
| **Turn off Lights** | Saves energy that comes from power plants. | Less energy used means less "heat" released into the air. |
| **Turn off the Tap** | Saves fresh, clean water. | We use water for so many things, so we need to save it! |
| **Recycle Paper & Plastic** | Reduces waste and saves trees. | It takes less energy (and creates less air pollution) to make new things from old ones. |
| **Walk or Bike** | Reduces car pollution in the air. | Less exhaust means cleaner "air" for everyone to breathe. |
| **Plant a Seed or Tree** | Grows new plants that make fresh air. | Plants take in bad air and give out good air for us to breathe. |
| **Don't Litter** | Keeps our parks, streets, and water clean. | Animals can get hurt by trash, and it keeps our "air" and "water" nice. |
| **Share Toys & Books** | Means fewer new things need to be made. | Saves materials and energy (and prevents waste!). |

- 

**5.4 Linking Water, Air, And Environment To Early Childhood Learning**

**5.4.1 Everyday activities involving water and air**

Children can learn about water and air through everyday activities such as washing hands, drinking water, inflating balloons, or feeling the wind.

Fill in the blank: Washing hands and inflating _____ are everyday activities involving water and air.

**Pilot question:** How could you design a simple activity to show children the importance of washing hands with water?

### 5.4.2 Play and storytelling for environmental awareness

Play and storytelling make environmental concepts engaging. For example, role-playing as “environment protectors” or telling stories about clean rivers can spark interest.

Fill in the blank: Role-playing as _____ protectors can help children learn about environmental care.

**Pilot question:** How could you use storytelling to explain the importance of keeping rivers clean?

### 5.4.3 Reinforcing concepts through observation and repetition

Children learn best when concepts are repeated in different contexts. Observing clean and dirty surroundings or repeating recycling activities reinforces environmental awareness.

Fill in the blank: Repetition and _____ help reinforce environmental concepts in children.

**Pilot question:** What everyday observation could you encourage children to repeat to reinforce environmental awareness?

Caption: Box 5.4 Strategies for reinforcing water, air, and environmental concepts

Table listing repetition (daily handwashing), variation (different recycling activities), integration (storytelling and play).

| Strategy | How to Use It (Air, Water, & Heat) | Why it Works |
|---|---|---|
| **Daily Rituals** | Have a "Water Monitor" check for dripping taps or a "Light Captain" ensure heat/energy isn't wasted. | **Repetition:** Turns a one-time lesson into a long-term habit. |
| **Sensory Play** | Use "feely bags" with warm/cold items (Heat) or blow bubbles through straws in water (Air/Water). | **Variation:** Engages different senses to build stronger brain connections. |
| **Nature Journaling** | Draw the "Steam" from a cocoa cup (Heat) or "Wind" moving a flag (Air) in a weekly diary. | **Reflection:** Encourages kids to slow down and observe science in the real world. |
| **Dramatic Play** | Set up a "Plumber’s Shop" to "fix" leaks or a "Weather Station" to report on wind and sun. | **Application:** Allows children to "practice" being scientists and stewards. |

| Strategy | How to Use It (Air, Water, & Heat) | Why it Works |
|---|---|---|
| **Storytelling** | Read books about the Water Cycle or Air Pollution, then ask "What if?" questions. | **Context:** Connects abstract science to characters and emotions. |
| **Positive Praise** | Give "Planet Protector" stickers when you catch a child saving water or picking up litter. | **Reinforcement:** Associates environmental care with pride and success. |

**Series Summary**

This Series has focused on water, air, and environmental awareness, showing how these concepts can be introduced meaningfully in early childhood education. We began by exploring water, its definition, sources, and everyday uses. We then examined air, considering its importance, properties, and examples of air in action. Following that, we discussed environmental awareness, highlighting its meaning, importance, and simple practices children can adopt. Finally, we linked these concepts to early childhood learning, demonstrating how they can be integrated into everyday activities, play, and storytelling.

By engaging with these topics, you should now be able to define water and air, explain their importance and uses, describe their properties, explain environmental awareness, design simple activities for environmental care, and apply strategies to connect these ideas to everyday learning. These outcomes align directly with the Series Learning Outcomes (SLOs), ensuring you are equipped to make science relevant and practical for young learners.

---

**Series Glossary**

- **Air**: An invisible mixture of gases that surrounds the Earth and is essential for breathing and supporting life.
- **Environmental awareness**: Understanding the importance of protecting and caring for the environment.
- **Natural sources of water**: Places where water occurs naturally, such as rivers, lakes, and rain.
- **Non-living sources of water**: Man-made sources such as taps and wells.
- **Properties of air**: Characteristics of air, including that it occupies space, has weight, and can move.
- **Recycling**: The process of reusing materials to reduce waste and protect the environment.

- **Water**: A clear, tasteless, and odourless liquid essential for life.

---

**Concept Check Questions [Series 5r]**

**Objective Questions**

1. Water is a clear, tasteless, and _____ liquid essential for life. (Linked to SLO 5.1)
2. Which of the following is a property of air?
   a) It is visible
   b) It occupies space
   c) It has no weight
   d) It cannot move (Linked to SLO 5.3)

**Short-Answer Questions**

3. Name one natural source of water. (Linked to SLO 5.1)
4. Explain one everyday use of water. (Linked to SLO 5.2)
5. Give one example of air in action. (Linked to SLO 5.4)
6. Define environmental awareness. (Linked to SLO 5.5)

**Long-Answer Questions**

7. Analyse why caring for the environment is important for children's health and learning. (Linked to SLO 5.5)
8. Design a simple classroom activity that teaches children about recycling. (Linked to SLO 5.6)

---

**Answers to Concept Check Questions [Series 5]**

**Objective Questions**

1. Odourless
2. b) It occupies space

**Short-Answer Questions**

3. Rain is a natural source of water.
4. Water is used for drinking to quench thirst.
5. Flying a kite is an example of air in action.
6. Environmental awareness means understanding the importance of protecting and caring for the environment.

**Long-Answer Questions**

7. *Basic response*: Caring for the environment ensures clean air, safe water, and healthy surroundings.
   *Value-added response*: It also teaches children responsibility, helps prevent diseases, and fosters respect for nature, which supports both health and learning.
8. *Basic response*: A simple activity could involve sorting waste into bins for recycling. *Value-added response*: Extending this, children could create art projects using recycled materials, reinforcing the idea of reusing and reducing waste.

---

**Answers to Pilot Questions [Series 5]**

- Water is important for humans because it quenches thirst, and for plants because it helps them grow.
- Rivers, lakes, and rain are natural sources of water, while taps and wells are man-made sources.
- Water is used daily for drinking, cooking, bathing, cleaning, and farming.
- Air is important for breathing because it contains oxygen.
- Air occupies space, shown by inflating a balloon.
- Kite flying demonstrates the role of air.
- Environmental awareness means understanding the importance of protecting the environment.
- Caring for the environment ensures clean air, safe water, and healthy living conditions.
- Recycling is a simple way children can practise environmental care.
- Washing hands with water shows its importance in everyday life.
- Role-playing as environment protectors helps children learn about environmental care.
- Observing clean and dirty surroundings reinforces environmental awareness.

---

**References and Attributions [Series 5]**


- Figure 5.1 Everyday importance of water. Suggested AI prompt: “Diagram showing drinking, cooking, cleaning, and farming as uses of water.”
- Plate 5.1 Children learning about sources of water. Suggested AI prompt: “Children collecting water from a tap and observing rain.”

- Box 5.1 Everyday uses of water for classroom discussion. Suggested AI prompt: “Table listing everyday uses of water for children.”
- Figure 5.2 Importance of air. Suggested AI prompt: “Diagram showing air used for breathing, burning, and supporting life.”
- Plate 5.2 Children inflating balloons to show air occupies space. Suggested AI prompt: “Children inflating balloons to demonstrate air occupies space.”
- Box 5.2 Everyday examples of air for classroom discussion. Suggested AI prompt: “Table listing everyday examples of air for children.”
- Plate 5.3 Children practising environmental care. Suggested AI prompt: “Children cleaning litter in playground to practise environmental care.”
- Box 5.3 Simple ways children can practise environmental care. Suggested AI prompt: “Table listing simple ways children can practise environmental care.”
- Box 5.4 Strategies for reinforcing water, air, and environmental concepts. Suggested AI prompt: “Table showing strategies for reinforcing water, air, and environmental concepts for children.”

All illustration prompts are intended for AI generation or sourcing from open educational resources (OER).