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RESEARCH ARTICLE

NURTURING LIFE SKILLS THROUGH INQUIRY-BASED LEARNING: A STUDY OF CLASS VI 'CURIOSITY' SCIENCE TEXTBOOK

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Abstract

The 21st century demands individuals equipped not only with scientific knowledge but also with a robust set of life skills that enable them to navigate complex challenges, collaborate effectively and engage meaningfully with the world around them (UNESCO, 2015). National Education Policy 2020 also emphasizes on conceptual understanding and inquiry- based learning rather than rote learning and memorization. An inquiry-based learning which encourages questioning, exploration, and hands-on experimentation, holds the potential to cultivate essential life skills alongside scientific understanding (National Research Council, 2012). This researchpaper examines a newly developed science textbook named "Curiosity" for 6th Standard under the norms of new National Education Policy 2020. The first edition of the book has come in July 2024 under the National Council of Educational Research and Training, New Delhi.

Introduction

The textbook is also available at NCERT website. Curiosity have 12 chapters in total that are ("The Wonderful World of Science," "Diversity in the Living World," "Mindful Eating: A Path to a Healthy Body," "Exploring Magnets," "Measurement of Length & Motion," "Materials around Us," "Temperature and its Measurement," "A Journey Through States of Water," "Methods of Separation in Everyday Life," "Living Creatures Exploring their Characteristics," "Nature's Treasures," and "Beyond Earth"). Researcher has analyzed all the chapters to identify the embedded opportunities for life skill development by content, suggested activities and learning for further within all chapters through inquiry-based learning. This research paper also aims to build a conceptual framework for understanding how inquiry-based learning can contribute to the cultivation of life skills.

Conceptual Framework: This research draws upon the following conceptual frameworks:

- **Constructivist Learning Theory:** This theory posits that learners actively construct knowledge and meaning through their experiences (Piaget, 1977 & Vygotsky, 1978). Inquiry-based science learning aligns with constructivism by providing students with opportunities to explore, experiment, and build their understanding of scientific concepts and related life skills through active engagement.
- **Socio-Emotional Learning (SEL):** SEL emphasizes onthe development of skills such as self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2020). Many of

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the life skills identified within the science chapters, such as collaboration, communication, empathy, and ethical awareness, directly align with the principles of SEL.

- **Inquiry-Based Science Education:** This pedagogical approach emphasizes student-led investigation, questioning, evidence-based reasoning and communication(Anderson, 2002). The structure and activities within the analyzed science chapters reflect key elements of inquiry-based learning providing a context for the development of both scientific understanding and life skills.

The interconnectedness of these frameworks suggests that a well-designed inquiry-based science curriculum can serve as a powerful platform for fostering both cognitive and socio-emotional growth, leading to the development of essential life skills. This research paper focused on the study of integration of life skills in the 6th class science textbook named "Curiosity" through inquiry-based learning approach.

Literature Review:-

Some researches studies life skills development in education, inquiry-based science education and the integration of socio-emotional learning. They are reviewed and presented below for understanding the context of the present study.

- **Life Skills Development in Education:** Research in educational psychology and curriculum studies has increasingly emphasized the importance of life skills for student success in academics, personal life, and future careers (Darling-Hammond et al., 2020; World Health Organization, 1997). Studies have explored various frameworks for life skills, including critical thinking, problem-solving, communication, collaboration, creativity, and self-management. Existing literature highlights the need for explicit and implicit integration of these skills across the curriculum, rather than treating them as separate subjects (Jones & Doolittle, 2017). Furthermore, research suggests that the development of life skills is closely linked to students' socio-emotional well-being and their ability to engage in meaningful learning experiences (Zins et al., 2004).
- **Inquiry-Based Science Education:** A substantial body of research supports the effectiveness of inquiry-based science education in enhancing students' scientific understanding, engagement, and attitudes towards science (Crawford, 2007; Furtak et al., 2012). Inquiry-based approaches, characterized by student-led questioning, investigation and evidence-based reasoning have been shown to promote deeper conceptual understanding and the development of scientific process skills (National Research Council, 1996). Some studies have indicated that inquiry-based learning can indirectly foster life skills such as critical thinking, problem-solving, and collaboration through the nature of its activities (Hmelo-Silver et al., 2007).
- **Integration of Socio-Emotional Learning (SEL) in Science Education:** Emerging research explores the natural synergies between science education and socio-emotional learning (Bricker & Bell, 2014). Collaborative science activities, for instance, provide opportunities for students to develop social awareness, relationship skills, and responsible decision-making (NRC, 2012). Engaging with scientific issues that have ethical or societal implications can also foster empathy and ethical reasoning (Sadler et al., 2007). Studies have begun to examine how specific science curricula and pedagogical strategies can be designed to intentionally cultivate both scientific literacy and socio-emotional competencies (Osborne & Dillon, 2008).

This review of related literature underscores the importance of life skills in education, the benefits of inquiry-based science pedagogy and the growing recognition of the value of integrating socio-emotional learning within science. This research aims to contribute to this body of knowledge by specifically analyzing a science textbook for its embedded opportunities to foster a broad range of life skills through its inquiry-oriented activities.

Methodology and Methods:-

This research employs a Qualitative content analysis approach to examine all the chapters from the science textbook. The process involves:

1. **Unit of Analysis:** The primary units of analysis are the text, activities, discussion prompts, assessment and suggestions within each of the twelve selected chapters.
2. **Data Extraction:** Relevant text segments that explicitly or implicitly refer to life skills (e.g., critical thinking, observation, collaboration, communication, problem-solving, empathy, etc.) have been extracted and documented.
3. **Categorization and Coding:** The extracted data havebeen analyzed and coded based on the specific life skills they promote drawing upon established frameworks for life skills and socio-emotional learning (e.g., WHO's life skills framework, CASEL's SEL competencies).

4. **Thematic Analysis:** The coded data werefurther analyzed to identify recurring themes and patterns as tohow different science topics and activities contribute to the development of various life skills.
5. **Framework Mapping:** The identified life skills were mapped against the conceptual framework of constructivism, SEL, and inquiry-based science education to illustrate the theoretical connections.

Findings/Results:-

In the present study all the chapters of the textbook are analyzed on the basis ofunits of analysis that are learning objectives, activities, discussion prompts, and assessment suggestions within each of the twelve selected chapters.

Chapter 1- The Wonderful World of Science

1. **Critical Thinking:**The chapter encourages students to ask questions, make observations, form hypotheses, and test them through experiments, which are fundamental aspects of critical thinking and problem-solving. Activity 2 ("Describe a daily life situation where you feel someone was following a scientific method") encourages students to think critically about everyday situations and identify the application of a logical, step-by-step process.
2. **Problem Solving:** Activity 1 directly focuses on problem-solving: "Write about a similar problem that you tried to solve." And "What steps did you take?"
3. **Curiosity and Inquiry**: Questions like "Have you ever looked up at the night sky and wondered why the stars shine?" and "Or watched a flower bloom and wondered how it knows when to open?" directly stimulate curiosity and the spirit of inquiry among students.
4. **Observation:** The chapter mentions observing "tiny grains of sand or massive mountains, a leaf of grass or a vast forest," and the transformation of a "seed grow into a plant, a caterpillar transform into a beautiful butterfly." These examples encourage students to notice and observe the details in the natural world.
5. **Collaboration:** The chapter mentions that science is often done in teams and encourages students to work together to find answers, promoting teamwork and collaboration. The chapter explicitly states, "Science is rarely done alone. Scientists across the world work together, often in large teams. So, if you cannot find an answer yourself, ask your friends to help you out! It is always more fun to discover things together."
6. **Communication:** By engaging in activities that require writing and discussing their observations and findings, students develop their communication skills. The suggestion to "ask your friends to help you out!" directly promotes communication in the process of scientific exploration.
7. **Scientific Literacy:** The chapter aims to build a foundational understanding of scientific concepts and the scientific method, which are crucial for scientific literacy.
8. **Adaptability:** It teaches students to be open to new discoveries and to adjust their understanding based on new evidence, fostering adaptability.

Chapter 2-Diversity in the Living World

The chapter is about a nature walk led by Dr. Raghu and Maniramchacha, focusing on exploring the diversity of plants and animals in the living world. The chapter "Diversity in the Living World" includes life skills that are essential for students' holistic development. Some key life skills highlighted in the chapter:

1. **Observation Skills:** The chapter encourages students to observe different plants and animals during nature walks, noting their features, habitats, and behaviors. This enhances their ability to notice details and patterns in the natural world.
2. **Analytical Thinking**: Students are asked to group plants and animals based on various features such as stem type, leaf venation, root type, and movement. This helps them develop analytical skills by comparing and contrasting different characteristics.
3. **Recording and Documentation**: The activities involve recording observations in tables and creating scrapbooks. This teaches students how to systematically document their findings, which is a valuable skill in scientific research and everyday life.
4. **Respect for Nature**: The chapter emphasizes the importance of not disturbing plants and animals during observations. This fosters a sense of respect and responsibility towards the environment.
5. **Collaboration and Communication**: Group activities and discussions encourage students to work together, share their observations, and communicate their findings effectively. This builds teamwork and communication skills.
6. **Critical Thinking**: By analyzing the adaptations of plants and animals to their habitats, students learn to think critically about how organisms survive and thrive in different environments.

7. **Creativity**: Activities like drawing plants and animals on the blackboard and creating posters allow students to express their creativity while learning about biodiversity.
8. **Problem-Solving**: The chapter discusses the impact of habitat destruction on biodiversity and encourages students to think about solutions to protect the environment. This enhances their problem-solving abilities.
9. **Empathy and Ethical Awareness**: Learning about the interdependence of plants and animals and the importance of biodiversity helps students develop empathy and an ethical perspective towards conservation.
10. **Curiosity and Lifelong Learning**: The chapter stimulates curiosity about the natural world and encourages students to continue exploring and learning about biodiversity beyond the classroom.

Chapter 3 Mindful Eating: A Path to a Healthy Body

This chapter includes life skills that are essential for maintaining a healthy lifestyle. Here are some key life skills highlighted in this chapter:

1. **Nutritional Awareness**: This chapter shows the importance of different nutrients (carbohydrates, proteins, fats, vitamins, and minerals) and their sources helps in making informed food choices.
2. **Balanced Diet Planning**: After reading this chapter, students will learn to plan a balanced diet that includes all essential nutrients, roughage, and water for proper growth and development.
3. **Critical Thinking**: In this chapter, students are analyzing activitiesabout the nutritional information on food packets and comparing different food items to make healthier choices.
4. **Cultural Awareness**: This chapter emphasizes on the diversity in traditional foods across different regions and understanding how local crops influence dietary habits which increase cultural awareness in students.
5. **Environmental Awareness**: This chapter also builds understanding in students for the concept of food miles and the benefits of consuming locally grown food to reduce environmental impact.
6. **Health Management**: Students will identify deficiency diseases and understanding how to prevent them through proper diet and nutrition.
7. **Practical Skills**: Students will conduct simple tests to detect the presence of nutrients in food items, which enhances practical knowledge and scientific inquiry in the students.
8. **Interpersonal Skills**: Interacting with elderly people to learn about traditional food habits and cooking practices, fostering respect and understanding across generations.
9. **Problem-Solving**: Addressing dietary issues such as constipation or nutrient deficiencies by making appropriate changes in food habits.
10. **Self-Discipline**: Avoiding junk food and making conscious efforts to eat a balanced diet for long-term health benefits.

Chapter 4 Exploring Magnets

The chapter on exploring magnets includes several life skills that are beneficial for students. Here are some of the key life skills highlighted:

1. Critical Thinking and Problem Solving: Reshma's story demonstrates problem-solving when she searches a way for sailors to find directions during an overcast sky. Activities like predicting which materials will be attracted to magnets and observing the results encourage critical thinking.
2. Curiosity and Inquiry: Reshma's curiosity about magnets and magnetic compasses leads her to explore and learn more about them. Activities such as making a magnetic compass and experimenting with magnetic materials foster a sense of inquiry.
3. Observation and Recording: Students are encouraged to observe the behaviour of magnets and record their findings in tables, enhancing their observation and documentation skills.
4. Experimentation and Hands-on Learning: Various activities, such as making a magnetic compass and experimenting with attraction and repulsion, provide hands-on learning experiences.
5. Analytical Skills: Analyzing the results of experiments, such as the behaviour of iron filings around a magnet or the deflection of a compass needle, helps students to develop analytical skills.
6. Creativity: The chapter also enhances creativity through activities like making a magnetic garland or a toy hopping frog using magnets.
7. Collaboration and Teamwork: One activity, like making the hopping frog as a class activity also promotes collaboration and teamwork.
8. Application of Knowledge: Understanding the practical applications of magnets, such as in navigation and medicine helps students to see the relevance of their learning.
9. Safety and Care: This chapter also includes guidelines on how to handle and store magnets safely and teaching the importance of safety and care in handling materials.

Chapter 5 Measurement of Length & Motion

The chapter "Measurement of Length and Motion" includes life skills that are crucial for practical understanding and application in daily life. Here are some key life skills highlighted in the chapter-

1. **Measurement Skills**: This chapter focuses on that how to measure lengths accurately using different tools like scales, measuring tapes, and even body parts. This skill is fundamental in various real-life scenarios, such as tailoring, construction, and everyday tasks.
2. **Observation and Comparison**: The chapter encourages students to observe and compare measurements taken by different methods and tools. This helps in developing critical thinking and analytical skills.
3. **Problem-Solving**: By engaging in activities like measuring the length of a table using handspans and then comparing it with standard units, students learn to solve practical problems and understand the importance of standardization.
4. **Practical skills:** The chapter includes activities that require students to apply the concepts learned, such as measuring the length of curved lines using threads and scales, which enhances their practical application skills.
5. **Teamwork and Collaboration**: Through group activities and discussions, students learn to work together, share ideas, and arrive at conclusions collectively, fostering teamwork and collaboration.
6. **Attention to Detail**: This chapter emphasizes on the correct way to place scales and the correct position of the eye while reading measurements teaches students to pay attention to details, which is crucial in achieving accurate results.
7. **Adaptability:** Students will understand that different tools are suitable for different types of measurements (e.g., flexible measuring tapes for curved lines) helps students become adaptable and choose the right tools for specific tasks.
8. **Historical and Cultural Awareness**: Learning about traditional units of measurement and their historical context provides cultural awareness and appreciation for the evolution of measurement systems.
9. **Practical Application of Mathematics**: The chapter integrates mathematical concepts such as addition, subtraction, and unit conversion, demonstrating their practical applications in everyday life.

Chapter 6 Materials around Us

This chapter is about observing and identifying materials around us, grouping materials based on properties and learning about different properties of materials such as appearance, hardness and luster.

1. Observation and Inquiry: Right from the initial dialogue between Ghulan and Sheeta, the chapter encourages observation of everyday objects. Madam Vidya's questions prompt students to actively notice similarities, differences, shapes, colors, and textures.Activities 6.1, 6.5, and the "Sorting Challenge" explicitly requires careful observation. Activity 6.7 "Let us explore" solubility encourages prediction before observation, fostering a scientific mindset of inquiry.**"Do you know?" boxes and questions**spark curiosity and encourage further questioning about the properties and classifications of materials.

2. Critical Thinking and Problem Solving: The questions posed throughout the text encourage students to think critically about the suitability of materials for specific purposes.Activity 6.2 ("Let us group") requires students to identify common properties and use them as a basis for classification, a fundamental critical thinking skill. **"Let us think" (tumbler materials),** this section directly asks students to solve problem by considering the necessary properties of a material for a specific function.

3. Collaboration and Communication: The instruction to "Discuss in class" after observing sports balls and comparing observations in Activity 6.5 promotes collaborative learning and the sharing of ideas.Many activities, like Activity 6.2 and 6.5, implicitly encourage discussion and sharing of perspectives among students. The suggestions to survey recyclers and discuss creations encourage interaction and communication with peers and the community.

4. Organization and Classification: The examples of organizing utensils in a kitchen and spices in a grocery store illustrate the real-world application of classification.Activity 6.2 is entirely focused on grouping objects based on properties. Table 6.1 and Table 6.4 provide structured formats for organizing observations and classifications.

5. Application of Knowledge and Understanding: The discussion about why certain materials are used for specific objects (e.g., tumbler needing to hold water) encourages the application of learned properties.The task of classifying household objects based on their material properties directly applies the concepts learned in the chapter.

6. Awareness of Sustainability and Resource Management:"Learning further" activities, focus on recyclable materials and surveying recyclers introduces the concept of waste management and the value of reusing materials, although it's not explicitly labeled as a life skill.

7. Historical and Cultural Awareness (Implicit). "Do you know?" boxes: The information about ancient Indian pottery and the Ayurvedic classification system broadens students' perspectives and connects scientific concepts to history and culture.

Chapter 7 Temperature and its Measurement

The chapter "Temperature and Its Measurement" is packed with opportunities to develop life skills.

1. Observation and Critical Thinking: Students are asked to predict how their hands will feel when placed in different temperatures of water in activity 7.1. This encourages them to observe, analyze, and form hypotheses. While, measuring temperature students are guided to observe the rise and fall of the liquid column in a thermometer, helping them develop careful observation skills.Students are asked to compare their own temperature readings with those of their classmates, leading to critical thinking about potential reasons for variations.

2. Scientific Inquiry and Experimentation: In Activity 7.2, Students learn the correct procedure for using a clinical thermometer, emphasizing the importance of following instructions and maintaining hygiene.

Students investigate the range and smallest division of a laboratory thermometer, fostering curiosity and a desire to explore in activity 7.3 and 7.4.Students observe the temperature readings of ice and boiling water, leading to the discovery that these temperatures remain constant during phase changes.

3. Problem-Solving: Students are presented with a scenario where they need to select the appropriate thermometer for a specific temperature measurement, encouraging them to think critically and make informed decisions.Students are asked to analyze their own temperature readings taken at different times of the day, prompting them to identify potential factors influencing body temperature.

4. Communication and Collaboration: Students are encouraged to discuss their observations, findings, and conclusions with their classmates, promoting effective communication and teamwork.Students may be asked to share their findings with the class, developing their presentation and communication skills.

5. Data Handling and Analysis: Students are guided to record their temperature readings in tables, reinforcing the importance of organized data collection.Students analyze weather data, identifying trends and patterns in temperature variations over time.

6. Research and Information Literacy: Students are encouraged to research topics like animal body temperatures, temperature extremes in different regions, and the relationship between temperature and distance from the Sun. This promotes independent learning and the ability to gather information from various sources.

7. Responsibility and Safety: Students are instructed to handle thermometers carefully, emphasizing the importance of responsible behavior and safety in scientific investigations.

8. Curiosity and Exploration: The chapter includes activities that encourage students to explore beyond the textbook, such as investigating the factors affecting room temperature and comparing different types of thermometers. This fosters a sense of curiosity and a desire to learn more.

Chapter 8 A Journey Through States of Water

1.Observation & Critical Thinking: In activity 8.1,Students carefully observe the changes in the state of ice, leading to critical thinking about the relationship between ice and water.Students observe the disappearance of water from puddles and utensils, prompting them to question and analyze the possible reasons.Students observe the formation of water droplets on the outer surface of a glass containing cold water and ice, leading to critical thinking about the possible causes.

2. Scientific Inquiry & Experimentation: Students design and conduct an experiment to test whether water seeps through a steel plate, fostering scientific inquiry and experimental skills in activity 8.1. In activity 8.3 students observe the formation of water droplets on the outer surface of a glass and record their observations, developing experimental skills and data collection techniques. In Activity 8.4Students conduct a controlled experiment to investigate the increase in mass due to condensation, further refining their experimental skills. In Activity 8.7Students design and conduct experiments to investigate how factors like surface area, temperature, and air movement affect the rate of evaporation.

3. Problem-Solving:Students analyze different scenarios where water disappears (e.g., puddles, wet utensils) and propose and evaluate possible explanations.Students analyze the formation of water droplets on a cold glass and propose and discuss possible reasons, applying critical thinking and problem-solving skills.Students design experiments to investigate specific questions related to water evaporation, demonstrating their ability to formulate and test hypotheses.

4. Communication & Collaboration: Students engage in discussions with their peers to share observations, ideas, and explanations, promoting effective communication and collaborative learning.Students present their findings from experiments and observations to the class, developing their communication and presentation skills.

5. Data Handling & Analysis: Students record their observations and measurements systematically in tables, developing data handling skills.Students analyze the data collected from their experiments to draw conclusions and identify patterns.Students interpret their experimental findings to understand the factors that influence the rate of evaporation.

6. Research & Information Literacy: Students are encouraged to explore topics like the water cycle, the effects of humidity, and the use of earthen pots for cooling, promoting independent research and information gathering skills.
7. Responsibility & Safety: Students are guided to handle equipment safely during experiments, fostering a sense of responsibility and safety in scientific investigations.
8. Curiosity &Exploration: The chapter encourages students to explore the properties of water, investigate the water cycle, and think critically about water conservation, fostering a sense of curiosity and a desire to learn more.
9. Creativity & Imagination:Students are encouraged to write a poem about rain, fostering creativity and imagination.Students can design a game based on the water cycle and its concepts, encouraging creative thinking and game design skills.
10. Environmental Awareness: The chapter emphasizes the importance of water conservation and responsible water usage, fostering environmental awareness and a sense of responsibility towards the environment.

Chapter 9 Methods of Separation in Ever day Life
1. Observation & Critical Thinking: Students are observing how farmers separate grains from stalks, how tea leaves settle in a cup, and how water evaporates from a puddle. They are also analyzing the differences between handpicking, sieving, and filtration, and understanding why each method is suitable for specific situations. Students are inferring that wind can be used to separate lighter components from heavier ones based on observations of winnowing.
2. Scientific Inquiry & Experimentation: Students are designing and conducting experiments to investigate how different factors (like surface area, temperature, and air movement) affect the rate of evaporation. They are also observing and recording observations during experiments, such as the time taken for water to evaporate under different conditions and analyzing the results of experiments to draw conclusions about the effectiveness of different separation methods.
3. Problem-Solving: Students will be identifying the most appropriate method of separation for a given mixture, considering factors like the size, shape, and properties of the components. In this chapter, they are identifying and resolving problems encountered during experiments such as ensuring a proper seal in the filtration setup and designing a water filter using low-cost materials, demonstrating creative problem-solving skills.
4. Communication & Collaboration: Students are engaged in discussions with classmates to share observations, ideas, and explanations for different phenomena. Present findingsand observations from experiments with the classmates develop communication, presentation skills and Collaboration.
5. Data Handling & Analysis: Students will record observations and measurements systematically in tables and charts and analyzing data to identify trends and patterns, such as the relationship between surface area and the rate of evaporation and drawing conclusions from the data collected during experiments.
6. Research & Information Literacy: Gathering information from various sources, such as textbooks, the internet, and interviews with local farmers, to learn more about separation techniques.Evaluating the reliability of information from different sources and identifying any biases.
7. Responsibility & Safety: Handling materials carefully during experiments, such as using caution when handling hot liquids and follow safety instructions and guidelines while conducting experiments.
8. Curiosity & Exploration: Asking questions about the world around them, such as how different substances are separated in everyday life.Exploring topics beyond the textbook such as researching different types of filters, investigating the water cycle and learning about the environmental impact of different separation methods will increase the curiosity the curiosity.
9. Creativity & Imagination: Writing a poem about rain, designing a game based on separation methods, and creating a play about the journey of Malli and Valli is developing the creativity in the students.
By engaging in these activities and developing these life skills, students not only gain a deeper understanding of separation techniques but also become more well-rounded learners prepared for future challenges.

Chapter 10 Living Creatures Exploring their Characteristics
1. **Observation:**Malli and Valli observe the various methods used to separate substances throughout their trip, such as handpicking stones from grains, threshing wheat stalks to separate grains, and winnowing to remove husk from grains.
2. **Critical Thinking:** Valli wonders how long it would take farmers to remove the entire husk from the grains by handpicking. She then observes the winnowing process, a more efficient method.
3. **Problem-Solving:** When Malli and Valli see muddy water, they don't just accept it. They brainstorm solutions, eventually using filtration with a cloth to separate the impurities.

4. **Experimentation:** Activity 9.2 and Activity 9.3 involve experimenting with salt solution to observe the effects of evaporation and heating.
5. **Creativity:** Valli designs and creates a model water filter using low-cost materials.
6. Communication: Malli and Valli discuss their observations and ask questions throughout the trip, learning from their Nani, Mama, Mami, Dada, and others.
7. **Collaboration:** They work together with their family members to complete tasks, like helping Mami prepare meethipuri.

Chapter 11 Natures Treasures

1. Observation & Critical Thinking: Bhoomi and Surya observe the changes in the color of the sky and the smell of the air when they travel from the village to the city, leading them to critically think about air pollution.
2. Scientific Inquiry & Experimentation: Conducting the "Let us investigate" activity (Activity 11.4) to observe and compare different soil samples will develop observational and analytical skills among students.
3. Problem-Solving: Activities such as turning off taps when not in use and fixing leaks, they will be able to demonstrate practical problem-solving skills.
4. Communication & Collaboration: Discussing with friends the consequences of deforestation student will be able to propose solutions and also foster collaborative learning and communication among them.
5. Data Handling & Analysis: Student will conduct a survey of vehicles in their neighborhood and record the data in Table 11.3 which will develop their data collection and analysis skills.
6. Research & Information Literacy: Gathering information from various sources, such as books, the internet, and discussions with elders, to learn about different types of renewable energy sources.
7. Responsibility & Safety: After reading this chapter student will understand the importance of conserving natural resources and learn to minimize the environmental impact, such as reducing water usage and avoiding the wastage of resources.
8. Curiosity & Exploration: By asking questions about the natural world, such as how plants get their energy, how soil is formed, and how different animals interact with their environment curiosity can be develop among students.
9. Creativity & Imagination: Students will be able to drawing pictures to illustrate the uses of sunlight, designing a plan to reduce water usage in school, and writing a poem or story about the importance of nature.
10. Environmental Awareness: Students will understand the impact of human activities on the environment, such as deforestation, air pollution, and water pollution, and acting to reduce their own environmental footprint.

Chapter 12 Beyond Earth

The chapter "Beyond Earth" focuses on the night sky and our solar system but it also sneaks in some valuable life skills for young learners. Here are some examples:
1.Observation: Yangdol and Dorjay's curiosity about the stars and their patterns encourages observation skills. The chapter guides readers to observe the night sky and identify constellations.
2.Critical Thinking: Activities like making patterns from constellations and solving riddles encourage critical thinking and problem-solving skills.
3.Imagination: This chapter uses constellations and their stories to spark imagination. Connecting stars with imaginary lines and creating stories helps children develop their creativity.
4.Research: This chapter encourages research by suggesting using apps and sky maps to learn more about constellations and night sky viewing.
5.Appreciation for Nature: This chapter fosters an appreciation for the natural world by highlighting the beauty of the night sky and the vastness of space.

Table 1
Chapter Wise Analysis of Life Skills

The table below depicts the possibilities of nurturing Life Skills through Content and Pedagogyfrom the textbook“Curiosity”

S. No.	Name of the chapter	Life Skills that are embedded in the Chapters
1.	The Wonderful World of Science	Critical Thinking, Problem Solving, Observation, Curiosity & Inquiry, Observation, Collaboration, Communication, Scientific Literacy, Adaptability

2.	Diversity in the Living World	Observation, Analytical Thinking,Collaboration, respect for nature, Recording and Documentation, Communication, Creativity, Critical Thinking, Problem Solving, Empathy & Ethical Awareness, Curiosity & Lifelong Learning
3.	Mindful Eating: A Path to a Healthy Body	Nutritional Awareness**,** Balanced Diet Planning, Critical Thinking, Cultural awareness, environment awareness, Health Management, Practical Skills, Interpersonal Skills, Problem Solving, Self Discipline
4.	Exploring Magnets	Critical Thinking and Problem Solving, Curiosity and Inquiry, Observation and Recording, Experimentation and Hands-on Learning, Analytical Skills, Creativity, Collaboration and Teamwork, Application of Knowledge, Safety and Care
5.	Measurement of Length & Motion	Measurement Skills, Observation and Comparison, Practical skills, Problem Solving, Teamwork and Collaboration, Practical Application of Mathematic, Historical and Cultural Awareness, Adaptability
6.	Materials around Us	Observation and Inquiry, Critical Thinking and Problem Solving,Collaboration and Communication, Organization and Classification, Application of Knowledge and Understanding, Awareness of Sustainability and Resource Management, Historical and Cultural Awareness
7.	Temperature and its Measurement	Observation and Critical Thinking, Scientific Inquiry and Experimentation, Communication and Collaboration, Problem Solving, Data Handling and Analysis, Research and Information literacy, Sense of Responsibility, Curiosity and Exploration
8.	A Journey Through States of Water	Observation & Critical Thinking, Scientific Inquiry & Experimentation, Problem-Solving, Communication & Collaboration, Data Handling and Analysis, Research and Information literacy, Responsibility & Safety, Curiosity and Exploration, Creativity & Imagination, Environmental Awareness
9.	Methods of Separation in Ever day Life	Observation & Critical Thinking, Scientific Inquiry & Experimentation, Scientific Inquiry & Experimentation, Problem-Solving, Communication, Collaboration, Curiosity, Creativity, Imagination
10.	Living Creatures Exploring their Characteristics	Observation, Critical Thinking, Problem-Solving, Collaboration, Curiosity, Creativity, Collaboration, Experimentation
11.	Natures Treasures	Observation & Critical Thinking, Scientific Inquiry & Experimentation, Problem-Solving, Communication & Collaboration, Data Handling & Analysis, Research & Information Literacy, Responsibility & Safety, Curiosity & Exploration, Creativity & Imagination, Environmental Awareness
12.	Beyond Earth	Observation, Critical Thinking, Creativity & Imagination, Research Skills, Appreciation of nature

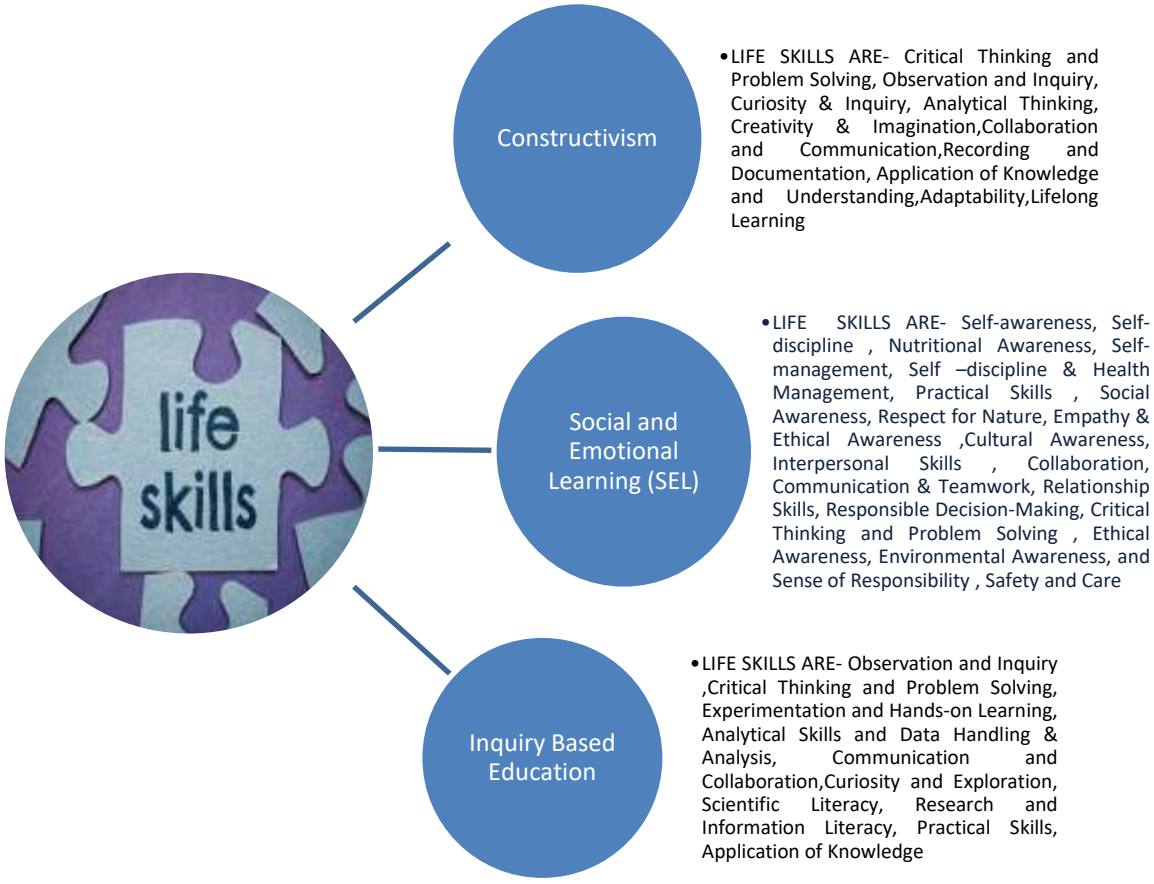
The analysis suggests a strong alignment between the inquiry-based activities proposed in these science chapters and the development of a wide range of life skills. The emphasis on hands-on experimentation, observation, discussion, and problem-solving provides a rich context for students to not only learn scientific concepts but also to cultivate the skills necessary for success in various aspects of life. The interconnectedness of the chapters, building upon observational skills in early chapters to more complex problem-solving and analytical thinking in later ones, indicates a potential for progressive life skill development. Many chapters also develop environmental awareness and its importance for future.

Analysis of Framework Mapping

The identified life skills havebeen mapped against the conceptual framework of constructivism, SEL, and inquiry-based science education to illustrate the theoretical aspects. The detailed mapping for each chapter clearly demonstrates a commitment to holistic development alongside scientific understanding. It's interesting to see how certain skills, like Observation and Critical Thinking, weave through almost every chapter, highlighting their foundational importance in scientific learning and beyond. The inclusion of Life skills like Empathy & Ethical Awareness in the "Diversity in the Living World" chapter and Cultural Awareness in "Mindful Eating" showcases a thoughtful approach to connecting science with broader human values.The promise of a framework mapping against constructivism, SEL (Social and Emotional Learning), and inquiry-based science education strengthens the theoretical underpinnings of this textbook design. It is valuable to see how the identified life skills align and cultivated within the textbook. In the diagram 1.1 has clearly shown the framework mapping of life skills cultivated in the science textbook through constructivism, SEL, and inquiry-based science education.

Figure 1

Showing Alignment of Life Skills with in the content in the textbook through Conceptual Mapping



Discussions:-

The New Education Policy, 2020 envisages a new curricular and pedagogical structure for school education that is responsive and relevant to the needs and interests of learners at different stages of their development. The aim of education has to go beyond cognitive development by building character and creating holistic and well-rounded individuals equipped with key 21st-century skills. Imparting life skills education can go a long way in imparting such holistic and well-rounded education which is cognizant of the changing needs of our time (Pathan & Amin 2023). This study emphasis on the integration of various life skills within a science textbook named Curiosity. The importance lies in demonstrating how scientific education can go beyond the theoretical knowledge to build

practical skills in students that are crucial for their holistic development (Kauts& Saini 2022). This study provides a clear framework that how science textbook can nurture life skills that are vital for a well-rounded individual.The theory, activities,illustrations and learning further in each chapter are showing the real-world scenarios which makes learning more relevant and applicable to daily challenges.

The study also focused on that science textbook can implicitly demonstrates and incorporate elements of mathematics (e.g., measurement, data analysis), history and cultural awareness naturally by showcasing a more integrated learning experience. The life skills in each chapter is showing the involvement of students in experimentation and scientific process rather than memorizing the facts. The inclusion of environmental awareness, respect for nature, safety, and ethical considerations suggests that the textbook aims to develop environmentally conscious and responsible individuals for sustainable development.(Agarwal & Singh 2022), has also directly support the idea of active involvement of students (inquiry-based learning) in activities to enhance scientific process skills and critical thinking which are core life skills. New Education Policy (2020) has also focused on the life skills integration through curriculum and textbook. Newly developed 6th class Science textbook "Curiosity" signifies a crucial move towards a holistic development in students by integrating life skills through Inquiry Based Learning. The present Science textbook "Curiosity" is not developing the scientific literacy but also building the essential life skills that are crucial for facing the challenges of the present world.

Recommendations:-

- Curriculum Design: Curriculum developers should intentionally integrate content, activities and learning for further within science curricula that explicitly promote the development of specific life skills (Grimus2020). The examples from these chapters can serve as a model for designing such integrated learning experiences.
- Pedagogical Practices: Teachers should adopt pedagogical approaches that emphasize inquiry, collaboration, and active learning to maximize the opportunities for life skill development which are embedded in science curriculum. Facilitating discussions, encouraging students for investigations and providing opportunities for critical thinking, teamwork and collaboration are crucial (NCFSE 2023).
- Assessment: Assessment methods should go beyond evaluating factual recall and also assess student's application of life skills, such as their problem-solving abilities, communication skills during group work, and critical thinking during experimental design and analysis. The National Curriculum Framework (2023) encourages different assessment tools that go beyond traditional pen-and-paper exams. It supports methods that are more authentic and aligned with the learning process like Formative & Continuous Assessment, Self and Peer assessment, Project and Performance Based Assessment (NCFSE 2023).
- Teacher Training: Teacher training programs should equip educators with the knowledge and skills necessary to effectively implement inquiry-based science teaching that fosters both scientific understanding and life skill development.
- Future Research: Empirical research is needed to investigate the actual impact of these science lessons and pedagogical approaches on students' life skill acquisition. Studies employing both quantitative and qualitative methods could assess changes in student's critical thinking abilities, collaboration skills, communication effectiveness, and problem-solving capabilities as a result of engaging with this curriculum.

Conclusion:-

This theoretical exploration highlights the significant potential of an inquiry-based science curriculum, as exemplified by the analyzed chapters to foster a wide array of essential life skills in students. The embedded activities and learning further provide numerous opportunities for developing critical thinking, problem-solving, collaboration, communication, observation and analytical skills. The New Education Policy places a high priority on the development of foundational and higher-order skills. It explicitly aims to foster critical thinking and problem-solving, creativity, collaboration, communication, and digital literacy (NEP 2020). Science inquiry learning method can be used to promote social and emotional learning (SEL). The researcher argues that inquiry-based science lessons—which involve students asking questions, conducting investigations, and collaborating to find answers—are excellent vehicles for developing skills such as self-awareness, responsible decision-making, and teamwork (Heitmann2019). The conceptual framework, drawing upon constructivist learning theory, socio-emotional learning principles and the tenets of inquiry-based learning supports that science education is a powerful way to develop students in holistic manner. The National Curriculum Framework for School Education (NCFSE 2023) specifically recommends a shift in pedagogy from memorization to more engaging and effective which promotes a range of age-

appropriate teaching methods i.e.play-based, activity-based, inquiry-based, dialogue based and more(NCERT 2023). Inquiry based learning in science can develop various core life skills in students which are necessary for their life.

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