

Effectiveness of Differentiated Instruction-Based Content Vs Traditional Content on Environmental Science of Grade V Inclusive Classroom

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June- 2026

CERTIFICATE

This is to certify that this dissertation entitled "**Effectiveness of Differentiated Instruction-Based Content vs Traditional Content on Environmental Science of Grade V Inclusive Classroom**" is a bonafide work submitted as part of fulfilment of the degree of **Master of Education - Special Education (Hearing Impairment)** of the student with Registration Number **P01II24E012001**. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other university for the award of any other Diploma or Degree.

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This is to certify that this dissertation entitled " Effectiveness of Differentiated Instruction-Based Content vs Traditional Content on Environmental Science of Grade V Inclusive Classroom " is the result of my own study under the guidance of Dhivya D., Lecturer in Special Education Department, All India Institute of Speech and Hearing, Mysuru and has not been submitted earlier to any other university for the award of any other Diploma or Degree.

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List of Frequently Used Abbreviations

DI – Differentiated Instruction

DIT – Differentiated Instruction Test

LR – Learner Readiness

LI – Learner Interest

LP – Learner Profile

ABSTRACT

Background: *Differentiated Instruction (DI) is a learner-centered teaching approach that addresses the diverse learning needs, interests, readiness levels, and learning profiles of students. It enables teachers to provide flexible learning experiences that support participation and understanding among all learners.*

Objective: *To develop differentiated instruction-based content for Grade V Environmental Studies (EVS) and to examine its effectiveness with learners' readiness, interest and profile.*

Methodology: *The study adopted a pre-test–post-test control group experimental design. A total of 31 Grade V students from general and special schools participated in the study. Differentiated instruction-based EVS content was developed by the researcher. An achievement test was used for collecting pre-test and post-test data.*

Results: *The findings showed that students in the experimental group performed better than those in the control group. Learners with different readiness levels, interests, and learning profiles demonstrated improvement in achievement. Positive outcomes were also observed among both typically developing students and students with special needs.*

Conclusion: *The study concludes that differentiated instruction is an effective approach for teaching EVS at the primary level. It promotes academic achievement and supports inclusive classroom practices by addressing learner diversity.*

Keywords: *Differentiated Instruction, Inclusive Classroom, Environmental Science, Grade 5, Learners' Readiness, Learning Profile, Learners' Interest, EVS.*

CHAPTER 1

INTRODUCTION

1.1 Differentiated Instruction: Concept and Meaning

In present-day classrooms, students differ in their learning abilities, interests, experiences, and pace of understanding. Because of this diversity, using the same teaching method for every learner may not support all students equally. Differentiated Instruction (DI) is considered an important teaching approach that helps teachers address these differences by adapting instruction according to the learning needs of students. It supports meaningful participation and learning opportunities for learners with varied educational needs within the same classroom environment. In contrast to traditional methods of teaching, which often adopt a uniform approach for all learners, differentiated instruction recognizes that students differ in their readiness levels, interests, and ways of learning. Therefore, it emphasizes the need for flexible and adaptive teaching practices that can cater to individual differences within the same classroom.

According to Tomlinson (1999), differentiated instruction is a proactive approach in which teachers plan varied instructional strategies to address the diverse learning needs of students. It involves modifying the content that students learn, the process through which they learn, and the product through which they demonstrate their understanding. Tomlinson (2001, 2014) further elaborated that differentiation is not a reactive strategy applied after students fail to understand, but rather a planned approach that anticipates learner diversity from the beginning.

Tomlinson and Imbeau (2010) explained that differentiated instruction is not about preparing separate lessons for every single student in the classroom. Instead, it means making small and meaningful changes in teaching according to students' learning needs. Teachers can adjust the classroom activities, teaching style, learning materials, and grouping patterns based on how students learn and understand concepts.

They also discussed that students do not all learn in the same way or at the same speed. Because of this, teachers can use flexible grouping and provide tasks at different difficulty levels within the same classroom. This helps learners feel more comfortable during learning and gives every student an opportunity to participate according to their ability level. As a result, students remain more involved in classroom activities and are able to understand the concepts in a better and more meaningful way.

Differentiated instruction works on the understanding that every student learns differently. In a regular classroom, teachers often teach the same lesson in the same way to all students. But in reality, not every child learns at the same pace. Some students may need extra support to understand the topic, while others may quickly finish the work and look for something more challenging. Because of this, many learners either struggle to keep up or lose interest during the lesson. Differentiated instruction tries to make classroom learning more suitable for all kinds of learners. Differentiated instruction is based on the idea that students in a classroom do not learn in the same way. Some learners understand concepts quickly, while others may need additional support, different explanations, or more time. Because of these differences, teaching every student through a single method may not always help everyone learn

effectively. Differentiated instruction encourages teachers to adjust classroom teaching according to the learning needs of their students. This may include using different activities, teaching methods, learning materials, or classroom tasks so that learners can understand concepts in ways that work best for them.

According to Roe and Egbert's (2010) findings on differentiated instruction, simple classroom strategies can be used to implement differentiated instruction; one of these strategies is flexible grouping wherein students participate in variously sized groups based upon their individual learning rates, degree of knowledge or ability level regarding a subject matter. Working within smaller-sized groups may give students an increased opportunity to participate in the learning process and receive support from their teacher. In addition, the authors acknowledged that all students do not have to complete the same task in the classroom in order for those tasks to be successful. With that in mind, when designing activities for students to complete, teachers might offer some activities that require the use of advanced skills, while other students might still be working on more basic skills. In many instances, one or two students will benefit from receiving extra guidance related to completing certain tasks, while the remainder of their classmates may benefit from being given more challenging tasks that require advanced thought processes. Further, the authors stated that when providing learning experiences to students, those experiences should be designed to enable students to develop their skills at their own pace and based on their own abilities. When teachers adapt their instructional methods to meet individual student needs, they are better able to accommodate and respond to students' academic/learning performance and needs. Ferlazzo (2022) provides further support for the above by stating that differentiated instructional practices do not have to be drastically altered in order for teachers to continue providing appropriate and

effective differentiated instruction to students with a wide variety of educational strengths and weaknesses; however, it does take practical modifications within the classroom.

1.2 Principles of Differentiated Instruction

There are core principles that guide how teachers will be able to meet the learning needs of different types of learners when using differentiated instruction. These core principles relate to our knowledge regarding how different types of learners learn; as such, they help classroom teachers plan instruction more intentionally based on learner similarities in these areas. As stated by Tomlinson (2001) and Tomlinson and Imbeau (2010), designers of differentiated instruction are always considering three areas of students - readiness, interest, and profile of learning. At the same time that teachers are considering differences based on the three above-mentioned areas, they are also manipulating elements of instruction - content, process, and product - when doing so. By bringing together all aspects of differentiated instruction, teachers are able to plan and implement instruction that supports the diverse ways in which students want and need to learn while still providing a meaningful classroom experience for all learners.

1.2.1 Learner Characteristics in Differentiated Instruction

In differentiated instruction, one of the key characteristics of learners is their readiness, which refers to how much a student currently understands and knows about a specific topic or subject. In any given classroom, students possess a variety of prior experiences as well as degrees of previous knowledge, and therefore, it is common for some learners to have developed a foundation of knowledge about an idea, while

others are being introduced to the concept for the first time and need assistance developing their knowledge base for full understanding. Due to the differences in their respective backgrounds and readiness to learn, no two children will learn concurrently or in the same manner. Some children may require simpler descriptions or examples, as well as additional practice, or more direct teacher intervention to master the skill or knowledge; while others may be ready to undertake more difficult tasks independently and at an accelerated pace. According to Tomlinson (2001), alignment between what is taught and what students already know will enhance the effectiveness of their learning. When lessons are provided to students based on their current readiness, they will more successfully participate in classroom projects, develop further insight into the concept being studied, and ultimately achieve performance autonomy for the task or subject area.

When learners take on tasks that are suitable for them then they will have much more likely continue to participate in the process of learning. Activities that provide neither too little nor too much challenge will typically encourage learners to become more involved, hence building their self-confidence. Reis and Renzulli's (1998, 2016) studies indicate that when learners are able to have their learning experiences matched with their needs and level of learning, they create an increase in the number of engaging experiences that they will have.

Another important characteristic of learners in differentiated instruction is interest. Interest is the topic, activity, or experience that draws a student in and piques their interest. When the activities and experiences in the classroom have relevance to a student's level of interest, students typically exhibit increased levels of engagement in the classroom.

According to Safawi and Akay (2022), students are more active in their learning when the learning activities closely relate to their interests. When the activity is seen as relevant and fun, students become engaged and more willing to participate in the learning that takes place within the classroom. Differentiated instruction supports this by providing students with multiple choices and opportunities to learn based upon their individual interests. This flexibility creates an environment where students are more motivated to participate and positively engage with the content they are learning.

The third student characteristic most often included by teachers while using differentiated instruction is the learning profile of a student. The learning profile describes how different students prefer to learn and process information. Students differ in the manner in which they acquire new knowledge. While some students are able to acquire knowledge through the use of visuals such as illustrations, pictures, or diagrams, other students can acquire knowledge better through auditory means such as discussions, talking, or actually doing something in order to gain knowledge.

In addition to preference for learning styles, other means such as background of the student, culture, prior learning experience, and strength of the student have an impact on the way that student is able to learn. Since students have different learning styles, it is not realistic to expect every learner in the classroom to be able to learn through one specific teaching method. Therefore, teachers need to incorporate various types of instructional strategies and classroom activities in order to provide all students with opportunities to learn and understand the content.

Gardner's (1983, 1999) theory of multiple intelligences provides support for this belief. Gardner states students have different strengths and abilities, which also impact how they learn. For example, some students learn best with visual

representations such as charts, diagrams or images; while others learn more effectively through discussion, listening to audio materials or doing hands-on activities. When teachers recognize these different ways that students learn, they are able to design their lessons accordingly with multiple pathways for students to learn the same material. This provides students the chance to learn using their strengths and in ways that suit their learning preferences.

Therefore, students tend to feel more confident and engaged when learning, leading them to become more successful in a classroom. In addition, these practices create an inclusive, supportive and responsive learning environment for diverse groups of learners.

1.2.2 Instructional Elements of Differentiated Instruction: Content, Process, and Product

Characteristics of learners provide the foundation for differentiated instruction because effective teaching begins with understanding the learners.

However, identifying students' needs is just one of many steps teachers should take; teachers must also adjust the way lessons are developed and implemented. Tomlinson (2014) indicated that differentiated instruction is primarily focused on three elements of instruction: **content, process and product**. These three elements represent all aspects of teaching in the classroom.

Teachers can change these areas to be more responsive to the many views of the range of learning and ability found in any given classroom. A student may need extra support with simpler explanations, while another student may be able to work with a more difficult form of idea. Differentiated learning provides a practical means of successfully addressing the other differences among all students.

Instead of having every element from the same relative path, this process allows for creating educational opportunities that are more individualized to a student's situation and needs, while still reaching the overarching learning objectives for everyone in the classroom.

Content is the knowledge/concepts/facts/skills students are to learn during the lesson, and represents the learning objectives of the lesson. All students will progress on to the same learning goal in the differentiated model, but content may be taught via different methods based on the learning needs and readiness of the individual students in the class.

For instance, some students can understand a specific concept more easily when the teacher presents content to them in simpler language, through visual materials, real-world examples, or hands-on or tactile materials. Other students may benefit from teachers providing further explanation of the same concept, providing higher-order questions to the same students, and/or creating critical and/or creative-thinking opportunities for the students involved. Therefore, by providing access to the content to all of the students in the classroom, the teacher is still achieving the same overall learning goal.

Process refers to the ways through which students interact with the content and develop understanding during classroom learning. In differentiated instruction, teachers use different teaching methods and classroom activities so that learners with varied learning needs and preferences can participate effectively in the learning process. These activities may include group work, individual assignments, classroom discussions, activity-based learning, practical tasks, and the use of visual materials or technology during instruction.

Tomlinson (2014) explained that flexible grouping is an important part of process differentiation. In this approach, students may work individually, in pairs, or in groups depending on the learning activity and their instructional needs. Such classroom arrangements help teachers provide support according to learners' requirements and also encourage interaction and collaborative learning among students.

Product refers to the different ways through which learners show what they have understood after the learning process. In differentiated instruction, students are given opportunities to express their learning using methods that match their abilities, interests, and strengths. Instead of using only one common form of assessment, teachers may allow learners to present their understanding through written work, oral presentations, charts, models, drawings, projects, or other creative activities.

Tomlinson (2014) explained that when students are given different ways to show what they have learned, they feel more comfortable taking part in classroom activities. This also helps build their confidence during learning. Not every student express understanding in the same way. Some may explain better through writing, while others may do well through speaking, drawing, or activities. Giving such choices helps students express their learning in a way that suits them best. It also helps teachers understand students' knowledge and skills more clearly because learners are able to show their understanding in ways that feel meaningful and comfortable to them.

1.2.3 Integration of Principles in Classroom Practice

The success of differentiated instruction depends, in large part, on how well differentiated instruction can be implemented in the classroom on a daily basis.

In order to successfully implement differentiated instruction, it is important for teachers to know their students. This is defined as how they are ready to learn, what their interests are, their strengths, and how they learn and participate in the classroom in a variety of ways. By knowing their students in this way, lesson planning becomes more intentional and responsive to the needs of the students.

When implementing differentiated instruction in the classroom, teachers can use a variety of strategies to differentiate the content presented to learners, the activities the learners will perform during the lesson, the grouping arrangements of the learners, the teaching strategies that will be used to deliver the information to the learners, and the assessment strategies that will be utilized to evaluate the learner's mastery or completion of the learning objectives for that lesson. By differentiating instruction through these methods, learning becomes a much more accessible process to the learner because the instructional activities are aligned with the current level of the learner's understanding. Consequently, learners tend to feel at ease when they participate in the various learning activities during the class time.

These practices help promote a learning environment that is flexible, yet supportive. Whereas traditional instructional approaches expect all learners to learn the same way, differentiated instruction approach provides a practical means for providing opportunities for diverse learners to learn and grow based on their respective learning needs and abilities.

Varied classroom activities can be incorporated into Environmental Studies (EVS) with differentiated instruction based on student preference and ability. The

same topic may be taught differently depending on the student's individual learning style or how they prefer to learn. Some will benefit from using pictures, charts, flash cards, and simple explanations, while other students will learn better through discussion, experiment, small group work, or hands-on activities.

Also, providing multiple methods of instruction encourages participation from students of all ability levels.

Different ways of demonstrating learning can be given to students. Some will prefer answering questions in writing, while others may want to show their understanding through projects, posters, models, role-play, or giving an oral report. When options are provided to demonstrate learning, students can take advantage of their strengths and ability to show what they know.

The implementation of these classroom strategies will encourage active participation, increase the development of understanding, and enhance the potential for success academically. In addition, using principles of differentiated instruction ensures that students with varying needs and abilities are equally involved in learning.

Through providing teachers with a framework for supporting learner diversity, the principles of differentiated instruction allow for responses to individual learners' differences. The use of varied approaches to learning and participation provide learners with meaningful experiences and contribute to creating inclusive, learner-centred classrooms.

1.3 Differentiated Instruction and Inclusive Education

The emergence of inclusive education as a global priority to reinforces the idea that every child should receive equitable access to education, regardless of his/her disability or other special needs. There are number of frameworks from international organization that support this vision — in particular, the Salamanca

statement (1994) and the United Nations Convention on the Rights of Persons with Disabilities (2006) - which assert that all individuals should receive an education, to the fullest extent possible, in regular classroom settings, regardless of their difference from other learners.

India's Right to Education Act (2009), which guarantees the right to an education that is free and compulsory for all children, has been instigated as part of this inclusive philosophy. Schools are expected to create a learning environment that allows individuals with varying needs or abilities to learn together.

Integrating inclusive practices into daily teaching can be difficult. There are learners who learn at varying rates, have different interests, have different first languages or backgrounds, learn differently, and engage with learning at different levels. Some learners may grasp an idea quickly, while others require more time, further explanation and support. When teachers use the same instructional strategies for all students, they may not meet the needs of each student in the classroom.

Many researchers have documented many difficulties associated with teaching students with diverse learning needs. For instance, Sharma & Nandini (2018) found many teachers are challenged to facilitate successfully diverse classrooms due to the lack of practical strategies and adequate training to teach inclusively.

Singal (2019) indicated that although India has inclusive education policies to support teaching, teaching methods commonly used in Indian classrooms remain largely traditional. Generally, as a result of traditional teaching methods, the individual learning needs of students may not be fully supported through classroom instruction.

Differentiated instruction was identified as a helpful approach to aid in the implementation of inclusive education. Differentiated instruction enables the teacher to adjust his/her methods of teaching, his/her activities used in the classroom, and the learning resources tested by all students based on his/her individual students' learning styles and capacity to learn.

Differentiated instruction provides students with many avenues to access their learning, engage in their learning, and demonstrate their learning.

Students are more likely to participate in class and have a sense of belonging when they are allowed to learn in a way that suits their individual learning needs. Educators must implement strategies that foster inclusiveness for their students through differentiated instructional methods. Researchers have shown that differentiated instructional methods are effective in teaching all student populations, especially those with different educational needs.

Gaitas and Martins (2017) reported that differentiated instruction practices improved the students' classroom participation rate in inclusive classrooms, and the students were able to grasp concepts more thoroughly when they were able to learn through methods and activities aligned with their learning needs.

Similarly, Dixon et al. (2014) found that the use of differentiated instruction resulted in improved student academic achievement and motivation in inclusive classrooms. Students were able to achieve at higher levels and have lower rates of difficulty in learning when they were provided with learning opportunities appropriate for their learning needs.

In addition, Langelaan et al. (2024) noted that socially inclusive classroom environments can be created by implementing differentiated instructional strategies. Specific practices in the classroom, such as cooperative learning and flexible

grouping, provide opportunities for students to interact with one another, collaborate, share ideas, and work together. These types of experiences help students feel more connected to their fellow classmates and increase their feelings of belonging. Ultimately, providing students with differentiated instructional opportunities will increase the likelihood that they will actively participate in classroom activities and develop positive relationships within their peer group.

While differentiated instruction has been recognized as important by many researchers, implementing differentiated instruction in the classroom has not been easy. According to Gaitas and Martins (2017), teachers often struggle with effective classroom time management, lesson planning, and preparing for individual learners' needs by producing different learning materials. Similarly, Dixon et al. (2014) stated that appropriate teacher preparation and professional development are necessary for successful differentiated instruction in the classroom.

However, research continues to show that differentiated instruction is an effective method of promoting inclusive education. When teachers differentiate their content, student activities, and assessment based on each student's readiness to learn, interests, and learning need, students will be more likely to participate fully in their learning and find success in the classroom.

1.4 Role of Differentiated Instruction in Improving Learning in Environmental Studies (EVS)

Environmental Studies at the primary stage is necessary because it assists children in understanding their environment (both physical and human). Environmental Studies provides children with exposure to their natural environment and an understanding of human society, the people around them, and what they encounter on a daily basis from a childhood development perspective. Children will

be taught concepts from each area of Environmental Studies: Science, Social Science, and Environmental Awareness and be able to make connections between their classroom learning and what they experience in their daily lives.

Unfortunately, in many classrooms, Environmental Studies is still primarily taught from the textbook and by using a lecture-based style of teaching. This method does not address the diverse learning styles and learning capabilities of the learners. For example, a child may be finding a particular concept difficult to comprehend, while another child may not have been provided with many options for further exploration of concepts that are beyond the basic lesson. The challenge becomes greater in inclusive classrooms where learners differ in their readiness levels, interests, pace of learning, and preferred ways of learning. In such situations, a single teaching approach may not work equally well for all students.

Differentiated instruction presents a viable approach to dealing with the diversity exhibited by students in all Environmental Studies (EVS) classrooms. In EVS the requirements to observe, discuss, explore and learn in different ways support the concept of differentiation. By implementing differentiated instruction, teachers can modify how they deliver their lesson and implement classroom-based activities based upon the respective needs of their diverse student population.

Through differentiated instruction, teachers can use a variety of means to teach the same concept. For example, some students may learn more productively through activity and discussion-based learning, while other students may learn better through visual aids, demonstration and simplified explanations. Overall, this level of flexibility within the classroom will promote the active and meaningful participation of students who may have diverse learning abilities.

Research studies have revealed positive outcomes when differentiation has been used. For example, Magableh and Abdullah (2020) indicated that differentiated instruction increased students' academic performance and classroom engagement across science subjects.

Likewise, Bhagarathi et al. (2025) determined that differentiated instructional strategies increased students' conceptual understanding and their participation in environmental studies/science education classes. Their research revealed that when learning activities are designed based upon student needs, students are able to draw a connection between concepts they learn in the classroom and experiences they encounter in the world.

According to Agato, Sitompul, and Firdaus (2025), students perform better academically with differentiated instruction. Their research found that when teachers differentiate the way in which they teach their students by providing them with varied learning opportunities based on how students learn best and how quickly they learn these things, then students are able to understand and remember what is being taught much more effectively.

Differentiated instruction can be valuable in inclusive classrooms for EVS, where students have a variety of different types of learning needs, all of whom learn together in the same classroom. Some students may require visual assistance; additional practice; a structured learning environment; or simplified instruction in order to be successful in learning the concepts being taught. By adjusting the way that teachers present their lessons and by making modifications to the way that students learn in an EVS classroom, teachers can create an accessible and meaningful EVS learning experience for all students.

Research has also indicated that there are challenges associated with implementing differentiated instruction in the classroom. The challenges that teachers face with regard to the use of differentiated instruction can include issues with lesson preparation, classroom management and timing, and preparing different types of learning materials. In addition, some schools have a lack of resources and/or inadequate teacher training, which can create additional barriers to implementing differentiated instruction in the classroom.

Even with these difficulties, many researchers believe that proper teacher training, planning, and school support can help teachers use differentiated instruction more effectively. Overall, research studies show that differentiated instruction is an effective approach for teaching EVS at the primary level because it improves students' understanding, participation, motivation, and classroom learning experiences.

1.5 Differentiated Instruction for Grade V Learners

Grade V is an important stage in primary education because children at this age show noticeable development in their thinking, understanding, communication, and social skills. According to Piaget (1977), learners at this stage are generally in the concrete operational stage of cognitive development. At this stage, children begin to think more logically and understand relationships between ideas more clearly. However, their learning still depends greatly on concrete experiences, visual materials, examples, and situations connected with real life.

Because of this, Grade V learners usually understand concepts better when teaching includes activities, observation, discussions, and practical experiences. Only textbook-based teaching may not support all learners equally.

Even though students study in the same grade, they do not all learn in the same way or at the same speed. Some learners may understand concepts quickly and work independently, while others may need repeated explanation, visual support, or additional guidance from the teacher. Differences can also be seen in students' interests, participation levels, communication skills, and learning preferences. These differences become even more visible in inclusive classrooms where students with different learning needs study together.

Researchers have explained that such learner diversity should be addressed through flexible teaching methods. Tomlinson (2001,2014) pointed out that differentiated instruction is especially useful at the elementary level because learner differences are more clearly visible during these years. According to the author, when teachers adjust teaching according to students' readiness levels, interests, and learning profiles, learners receive learning opportunities that better match their abilities and educational needs.

Reis & Renzulli, (1998,2017) Studies have found that differentiated instructional strategies result in a higher level of engagement for students and that when the activities are appropriate to the level of the student, they show a better understanding of the learning outcomes achieved.

Dixon et al. (2014) provide many examples of students in various types of classrooms being motivated to do well academically. The results of their research found that learners were able to achieve higher levels of academic success when provided with multiple types of learning opportunities that were aligned with their strengths and preferred learning styles.

The authors Safawi and Akay, (2022) further stressed how the use of interest-based differentiation is essential for younger children (any student at grade v) since students are inquisitive by nature and usually respond best to lessons that are a part of their everyday experiences or are connected to their personal interests. When classroom activities relate and connect to those interests and experiences, learners are typically more focused, eager to participate, and involved in learning.

Differentiated instruction is extremely valuable in inclusive classrooms because it allows teachers to teach a variety of students' learning needs within the same setting. Some students will require visual aids, guided activities, simpler explanations, or repeated practice to successfully comprehend a concept; on the other hand, some students will be able to complete more challenging tasks, be more independent, and have more opportunities to expand or build upon their learning. Providing teachers with the flexibility to do this helps teachers create meaningful learning experiences for all students regardless of their level of ability to learn.

Many of the challenges associated with implementing differentiated instruction at the elementary school level have been identified by researchers. The difficulties faced by teachers with respect to classroom management, lesson preparation, time management, and varied learning materials may hinder their ability to implement differentiated instruction successfully. According to Gaitas and Martins (2017), differentiating instruction can only be successful if it is carefully planned, adequately prepared by the teacher, and if there is continuous support from the school's environment.

Based on existing research, it is apparent that differentiated instruction is extremely well suited to Grade V learners, as it meets the learning diversity of students and provides support for the developmental needs of all students. Through

the use of various teaching styles and activities in the classroom, teachers can help Grade V students to develop their understanding, increase their participation, enjoy their learning, and have a positive experience learning in an inclusive primary classroom.

1.6 Need for the Study

There is a well-established body of literature supporting differentiated instruction as a valuable method of addressing learning diversity in the classroom. Past studies have demonstrated that using differentiated instruction has a positive effect on student achievement, participation, motivation, and overall experience of learning. Reis and Renzulli (2016, 1995), Safawi and Akay (2022), and Agato, Sitompul, and Firdaus (2025) have indicated that the more instruction is modified to meet the needs of individual learners, the more actively they engage in the lesson and the more effectively they learn.

Encouraging as these results are, the review of the literature highlights substantial gaps in the research area. Many of the current studies in this field have been conducted in the disciplines of maths, science, language acquisition, foreign language education, in higher education and secondary education. In comparison the research examining the primary level is limited.

The literature review also revealed similar gaps in relation to Environmental Studies (EVS) especially in relation to Grade 5 students. The role of EVS in the primary education system is very significant as this subject supports the development of students' understanding of their surroundings, environment and everyday life via observation, discussion and experiential learning. As primary students have different ability levels, interests, readiness, and learning preferences, there is a need for exploration of teaching approaches that will meet these differences successfully.

Additionally, the literature indicates that many of the studies on differentiated instruction have occurred outside India. The amount of research that examines the Indian classroom particularly the inclusive classroom where students with diverse educational requirements learn together is relatively small. Sharma and Nandini (2018) and Singal (2019) have both identified the problems teachers face when implementing inclusive education practices in Indian schools.

While reviewing the research literature related to differentiated instruction-based content versus traditional content, some research studies have shown that there is limited research related to this area of education and most studies that were available focused on how well students have done academically when differentiated instruction was used in the classroom. It is also known that many of the previous studies have not paid any attention to how well learners were engaged and participated in the classroom and all of their prior educational experiences regardless of their educational background. As such, the gaps in current research indicate a need for ongoing research into the effectiveness of differentiated instruction in the teaching of Grade V Environmental Studies in India.

Therefore, after reviewing the available literature, it was felt that there is a need to conduct a study on differentiated instruction in teaching Environmental Studies at the primary level, especially among Grade V learners in the Indian context. The present study was undertaken to examine the effectiveness of differentiated instruction-based content in EVS and to compare it with traditional content in inclusive classroom settings.

1.7 Justification of the study

The literature review states that the differentiated instruction-based principles were implemented on higher education, secondary education and certain other

courses and subject like nursing, literature, etc. Studies specifically on EVS subject and at the elementary level is very less. The review of related literature revealed that research on Differentiated Instruction in Indian classrooms is still limited.

1.8 Statement of the problem

The present study focuses on examining the “Effectiveness of differentiated instruction-based content vs traditional content for Grade V in Environmental Studies (EVS) in inclusive classrooms”.

Research Question

In order to achieve this purpose, the study attempts to answer the following research questions:

1. Does Differentiated Instruction (DI)-based content significantly improve the performance of Grade V students in Environmental Science compared to traditional content?
2. Does learner’s readiness level in differentiated instruction-based content affect Grade V students’ performance in EVS?
3. Does learner’s interest level in differentiated instruction-based content affect Grade V students’ performance in EVS?
4. Does learner’s learning profile in differentiated instruction-based content affect Grade V students’ performance in EVS?
5. Is differentiated instruction-based content effective in enhancing the performance of students with special needs in inclusive classrooms?

1.9 Objectives of the Study

The present study has been undertaken with the following objectives:

1. To develop differentiated instruction-based content for Grade V Environmental Science.
2. To compare the effectiveness of differentiated instruction-based content and traditional content in EVS.
3. To examine the influence of learner's readiness, interest, and learning profile on learner performance.
4. To analyze the performance of typically developing students with respect to differentiated instruction-based content.
5. To analyze the performance of students with special needs with respect to differentiated instruction-based content.

1.10 Hypotheses of the Study (Null Hypotheses)

The following null hypotheses have been formulated for the present study:

1. There is no significant difference between differentiated instruction-based content and traditional content in EVS for Grade V students in inclusive classrooms.
2. There is no significant relationship between learner's readiness level and learner performance.
3. There is no significant relationship between learner's interest level and learner performance.
4. There is no significant relationship between learner's learning profile and learner performance.

5. There is no significant improvement in the performance of children with typically developing through differentiated instruction-based content.
6. There is no significant improvement in the performance of children with special needs through differentiated instruction-based content.

1.11 Variables of the Study

Variables are the measurable characteristics that are studied in research. In the present study, the variables are categorized as follows:

Independent Variables

- Differentiated Instruction (DI)-Based Content
- Traditional Content

Dependent Variable

- Student performance in Environmental Science (EVS) among Grade
- V students in inclusive classrooms.

1.12 Operational Definitions

Operational definitions are provided to explain how specific terms are used and measured in the context of the present study.

1.12.1 Differentiated Instruction (DI)-Based Content Adaptation

In the present study, differentiated instruction refers to the adaptation of Environmental Science (EVS) content for Grade V students, based on the SCERT syllabus of Karnataka, according to learners' readiness, interests, and learning

profiles.

Learner Readiness

In the present study, learner readiness refers to the student's ability to understand and respond to Environmental Studies (EVS) concepts according to his or her current level of knowledge and understanding. It was represented by the scores obtained by the students on the Differentiated Instruction-Based Test (DIT) constructed by the researcher. Learner readiness was assessed through activities that required students to identify and interpret information presented through pictures and text.

Learner Interest

In the present study, learner interest refers to the student's inclination and willingness to engage in learning activities that are meaningful and relevant to his or her experiences. It was represented by the scores obtained by the students on the Differentiated Instruction-Based Test (DIT) constructed by the researcher. Learner interest was assessed through real-life situation-based questions and choice-based activities that allowed students to select and respond according to their preferences.

Learning Profile

In the present study, learning profile refers to the student's preferred way of understanding and processing information. It was represented by the scores obtained by the students on the Differentiated Instruction-Based Test (DIT) constructed by the researcher. Learning profile was assessed through activities that required students to compare and relate their prior knowledge with scientific knowledge related to Environmental Studies concepts.

1.12.2 Traditional Content

Traditional content refers to the uniform delivery of Environmental Science (EVS) content directly from the Grade V textbook through lecture method and textbook reading, without any modification or adaptation based on learner differences. In the present study, learner readiness, learner interest, and learning profile in traditional content were assessed through the scores obtained by the students on the Differentiated Instruction-Based Test (DIT) constructed by the researcher.

1.12.3 Performance

Performance refers to the measurable academic achievement of Grade V students in Environmental Science. It was assessed through scores obtained in a researcher-developed pre-test and post-test based on the selected chapter.

1.12.4 Inclusive Classroom

An inclusive classroom refers to a learning environment where both typically developing students and students with at least one single disability learn together at the Grade V level, with equal opportunities for participation and learning.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Theoretical Foundations of Differentiated Instruction

Differentiated instruction is supported by different learning theories which explain that students differ in their abilities, learning styles, pace of learning, and ways of understanding concepts. These theories emphasize that all learners cannot be taught effectively through the same teaching method. Because classrooms consist of students with varied educational needs and backgrounds, teachers need to use flexible instructional approaches that can support diverse learners.

Different educational theories support the idea behind differentiated instruction and explain why students need different kinds of learning experiences in the classroom. Theories such as constructivist theory, socio-cultural theory, and Gardner's theory of Multiple Intelligences all point towards one common understanding that students do not learn in exactly the same way.

These theories explain that learning becomes more effective when students actively participate in classroom activities instead of only listening to the teacher. They emphasize the value of interaction, discussion, personal experiences, and the fact that learners are different from one another. Some students learn best when they receive support from others, while some understand concepts more effectively through hands-on activities, visual materials, or language-based experiences.

Together, these ideas highlight the need for flexible teaching practices in the classroom. When teachers consider students' needs, strengths, ability levels, and preferred ways of learning while planning lessons, students are more likely to feel

connected to the learning process. This not only improves understanding but also encourages greater participation and confidence. As a result, the classroom becomes more inclusive and supportive for a wide range of learners.

2.1.1 Constructivist Perspective (Piaget)

One of the important bases of differentiated instruction is Piaget's theory regarding the construction of knowledge. According to Piaget (1977) when children actively participate in their environment, they can construct knowledge from their experiences. Children do not simply listen to, or memorize, explanations and information from others in order to learn; they construct meaning for the things they experience, through building cognitive links between their previous knowledge and experiences and new ideas that they are encountering.

Furthermore, Piaget stated that children progress through different stages of cognitive development; therefore, even if all children are the same age, they may not all understand concepts similarly. Some children may easily understand new ideas; others may require more examples, guidance, explanations, or hands-on experience with a concept before they fully understand it.

The above discussion supports the use of differentiated instruction by providing insight into how children do not learn at the same pace, nor do they learn in the same manner. Thus, teachers should provide students with multiple types of learning opportunities; in order to meet the individual learning needs and the level of understanding of all of their students.

In classroom situations, some students may respond better to pictures, simple explanations, and activity-based learning. Others may feel comfortable with detailed explanations and extended discussions. Differentiated instruction allows teachers to

respond to these differences and make learning more accessible and meaningful for all learners.

2.1.2 Socio-Cultural Theory (Vygotsky)

Vygotsky's socio-cultural theory provides a basis for differentiated instructional practices. Vygotsky (1978) stated that students learn better when they interact with others during the learning process. Vygotsky believed that children are often able to better comprehend a concept when they have some guidance or support from either a teacher, parent or peer.

One of Vygotsky's principal concepts is the Zone of Proximal Development (ZPD). ZPD represents the distance between what a learner is capable of accomplishing independently and what can be accomplished when provided assistance. Vygotsky also introduced the concept of scaffolding, which allows a learner to receive temporary support while acquiring new information. As the learner gains confidence and understands the material, this support is gradually removed until the learner can complete the task independently.

These concepts relate closely to differentiated instruction because differentiated instructional settings also provide students with support based on their needs and ability levels. Some learners may require additional explanation, visual aids, step-by-step directions or simplified activities; whereas, some of the learners who grasp the concept quicker may have the opportunity to move ahead independently and take on more challenging work.

Differentiated instruction also promotes group work, peer interaction, and collaborative learning. These classroom practices reflect Vygotsky's belief that learning grows through communication and social interaction. In this way, teachers

can support learners according to their individual needs and help them progress at a comfortable pace.

2.1.3 Theory of Multiple Intelligences (Gardner)

The theory of Multiple Intelligences developed by Howard Gardner is a strong advocate for the concept of differentiated learning or instruction. Gardner has asserted that intelligence is more than just academic and standardized test scores, and encompasses many different components of how an individual learns. It has also been shown that each individual possesses different abilities, or strengths, and methods on how he/she interprets and understands the world around him/her. Some individuals have excellent language and communication skills while others might display their strength in logic, in music, through athleticism, via the ability to interact socially, through the use of self-awareness or through their ability to comprehend and explain nature. The development of this theory establishes that all students do not learn in the same way.

The application of differentiated learning can be seen in the daily classroom environment through the use of an understanding of the theory of Multiple Intelligences. Educators using differentiated instruction understand and appreciate individual diversity and plan their instruction using this understanding of students as a guide to comprehensively plan and structure his/her beliefs about individual learning styles in a way in which he/she can incorporate the same style for each student. Some learners may feel comfortable with reading and writing tasks, whereas others may understand concepts more effectively through discussions, role play, observation, experiments, visual materials, music, or practical activities. Because of

these differences, relying on only one teaching method may not meet the needs of every learner.

Differentiated instruction aligns well with this view because it encourages teachers to use a variety of teaching approaches based on students' strengths, interests, and learning preferences. Rather than expecting all students to learn through a single method, teachers provide different learning experiences that allow learners to engage with concepts in ways that work best for them.

For example, in Environmental Studies (EVS), the same topic can be explored through stories, charts, diagrams, discussions, projects, experiments, role play, or activity-based learning. Some students may understand concepts more clearly through visual resources, while others may benefit more from discussion, listening, or hands-on experiences.

Using a range of teaching approaches helps students remain engaged and interested in classroom learning. It also creates a learning environment where students feel comfortable, supported, and confident while participating in different learning activities.

2.1.4 Importance of These Theories in Differentiated Instruction

The theories discussed above remind us of a simple but important fact: no two learners are exactly the same. Students differ in their abilities, learning preferences, pace of understanding, interests, and the kind of support they need during learning.

These theories also suggest that students learn more effectively when teaching connects with their individual needs and learning experiences. Learning becomes

more meaningful when teachers consider students' strengths, current understanding, and preferred ways of learning while planning lessons. When learners are given opportunities to learn in ways that suit them, they tend to participate more actively, stay engaged, and develop a clearer understanding of concepts.

The Piagetian concept of readiness indicates that students will learn more effectively when the teaching and instruction is geared towards an understanding by the student/learner. Vygotsky's theory highlights the importance of teacher support, peer interaction, and guided learning. These ideas can be seen in differentiated classrooms where teachers use group activities, flexible grouping, and supportive learning tasks. In the same way, Gardner's theory explains that students have different strengths and abilities. Because of this, teachers need to use different teaching methods and activities so that all learners get a chance to understand and participate according to their strengths.

Together, these theories give strong support to the idea of differentiated instruction in inclusive classrooms. They show that students do not all learn in the same way or at the same speed. Because of this, classroom teaching should be flexible and focused on learners' needs. When teachers use different teaching methods and provide support according to students' abilities, all learners get a better chance to take part in classroom learning in a meaningful way.

2.2 Effectiveness of Differentiated Instruction

Indian Studies

Thakur (2014) discussed differentiated instruction as an important approach for addressing learner diversity in inclusive classrooms in the Indian context. The

study explained that teachers can modify content, process, and product according to learners' readiness, interests, and learning styles. The author highlighted that differentiated instruction helps students with different ability levels learn together more effectively in the same classroom. The study further emphasized that differentiated instruction promotes inclusive classroom practices and supports meaningful participation of learners. However, the study was theoretical in nature and did not include classroom-based experimental evidence.

Sankardas (2021) examined teacher and parent perspectives regarding differentiated instruction for the inclusion of children with autism in Indian schools. The study adopted a mixed-method approach involving teachers, parents, and special educators. The findings revealed that differentiated instructional strategies improved classroom participation, learner engagement, and support for children with autism. Teachers reported that differentiated instruction helped in addressing individual learner needs and created a more inclusive learning environment. At the same time, the study also identified challenges such as lack of teacher training, limited classroom resources, and insufficient support for implementation.

Vartak (2025) carried out a study to explore how differentiated instruction can support learning in Indian classrooms. The main objective of the study was to understand whether adapting teaching according to students' learning needs could improve their engagement, comprehension, and academic performance. The qualitative approach used by the researcher involved collecting data from 30 teachers via interviews. Using a snowball sampling method, the researchers gathered data that suggested that positive outcomes could result from using differentiated instruction (DI) as a strategy to improve student engagement and understanding of material in

classrooms. The research indicated that teachers reported increased levels of student interest, involvement, and comprehension of the content when DI was used, compared to when traditional methods of instruction were implemented. However, the researchers also reported barriers to effective implementation of DI, including a rigid (fixed) curriculum, insufficient professional development opportunities for teachers, and large class sizes. The researchers pointed out the need for improved preparation for teachers in delivering differentiated instruction, greater flexibility in the use of curricula, and greater use of technology to support differentiated instruction in classrooms.

Research conducted by Ghosh and Siva Sankar in 2025 focused on the role of teachers in promoting DI within inclusive classrooms, with the primary purpose being to determine the impact of DI on teachers' ability to meet the diverse learning needs of their students and promote inclusive classrooms. The research found that differentiated instruction has a significant effect on improving learners' engagement, academic achievement and equality in access to education for students of different abilities. The authors found that strategies such as flexible grouping, learning through activity, and tiered instruction resulted in increased student engagement in classroom activities leading to improved academic performance. The researchers also found that differentiated instruction allowed teachers to be more responsive to the individual differences among learners than a one size fits all approach to teaching.

Therefore, the authors concluded that differentiated instruction is a beneficial way to create more inclusive and learner-friendly classrooms.

In Singh & Ram Pyara (2025), the researchers investigated the impact of differentiated instruction and Teaching at the Right Level (TaRL) strategies on student learning outcomes in multi-grade classrooms. The main purpose of their study

was to compare differentiated instructional practices against conventional instructional methods with consideration to their effects on student learning.

According to the study the use of TaRL strategies and differentiated instruction in the classroom, showed significant improvement in students' academic performance, classroom participation, and levels of comprehension.

Students were engaged with the learning tasks more so than the students who were taught using traditional teaching methods and were able to demonstrate a better understanding of the concepts being taught. Based on these findings, the researchers concluded that differentiated instruction allows teachers to better meet the diverse learning needs of their students, and positively impacts students' overall learning outcomes in multi-grade classroom environments.

International Studies

Subban (2006) investigated differentiated instruction as an approach to help teachers accommodate the diversity of current learners in the classroom. The main purpose of Subban's study was to describe how differentiated instruction allows teachers to better support their students' different levels of readiness, interest, learning styles and learning needs.

According to Subban (2006), all students in a classroom have varying ways of learning and different speed of learning and using a single teaching style may not address the learning needs of every student. Differentiated instruction provides teachers with the ability to make careful adjustments in the content, methods of delivering instruction, and types of activities that all students will be able to fully engage in meaningful learning experiences. Additionally, Subban (2006) highlights that there is a need to provide additional theoretical understanding and practical

support to assist teachers in implementing differentiated instruction successfully in an inclusive education environment.

The impact of differentiated instruction on student achievement has also been studied by Muthomi and Mbugua who conducted a study to explore how effective differentiated instruction is at improving students' performance in mathematics at secondary schools in Kenya. The main purpose of this research was to examine the difference between how effective differentiated instruction is compared to using traditional teaching styles on students' performance in the subject of mathematics.

The researchers used a quasi-experimental design for their study, which included a sample of 374 students from eight secondary schools who took part in the Mathematics Achievement Test. The results indicated that students who received differentiated instruction had significantly better results than those who were taught by conventional means. Therefore, the research team concluded that differential teaching methods are a successful way to assist students in improving their academic performance and recommended greater application within normal instructional practice.

The authors of the study, Safawi and Akay (2022), performed a meta-analysis of previously published studies regarding the effectiveness of differentiated instruction as a method of improving students' academic success and their attitudes toward learning. The primary goal of their work was to investigate if differentiated instructional delivery methods would achieve improved student achievement and enhance the level at which students are engaged in the learning process.

To accomplish this task, the researchers completed reviews and analyses of previously published research that addressed differentiated instruction for the years of 2010-2021. The results of the analyses indicated that differentiated instruction

positively influenced the academic performance and the level of involvement in classroom learning of students. The analyses also indicated the benefits to be more significant the longer the differentiated strategies were implemented. Students demonstrated improved achievement levels; higher levels of engaged participation in classroom activities; and improved learning experiences. The researchers concluded that differentiated instruction yields meaningful learning experiences due to addressing the diverse needs, abilities, and interests of learners.

Agato, Sitompul, and Firdaus (2025) conducted a study to determine the effectiveness of using differentiated instruction combined with Problem-Based Learning in teaching physics to VIII grade students. The purpose of the study was to determine if combining differentiated instruction with an active learning approach increased the academic performance and engagement of students.

The study followed a pre-test and post-test research design and involved 36 students. During the intervention, learning activities and classroom tasks were planned according to students' learning styles and individual educational needs. The findings showed a clear improvement in students' academic achievement after the implementation of the programme. Students also participated more actively in classroom activities, demonstrated a better understanding of concepts, and showed greater involvement in the learning process. Based on these findings, the researchers concluded that differentiated instruction, when used along with active teaching approaches such as Problem-Based Learning, can effectively enhance both learning outcomes and student engagement in the classroom.

A meta-analytic synthesis study performed by Manuel and Mempin (2025) sought to review and investigate the effectiveness of using differentiated instruction practices to promote increased student achievement in mathematics. The researchers

wanted to know what impact using different differentiated instructional approaches had on student learning; including student's academic achievement, critical thinking, and engagement in the classroom. In order to do this, the researchers examined various studies that investigated the effectiveness of differentiated instruction. The synthesis showed that the use of differentiated instruction positively impacted student achievement while developing critical thinking skills. The result was also that through the use of practices such as flexible grouping, tiered activities (based on students' readiness), and content modifications based on learner differences, students became more engaged in learning in a classroom setting.

Therefore, because of these differentiated instructional approaches, more inclusive and learner centered (student focused) classrooms were created. Additionally, the researchers found that some challenges could impact the successful implementation of differentiated instruction, including a lack of student resources, overcrowding in the classroom., and insufficient teacher training. Despite these obstacles, differentiated instruction was found to be an effective method of providing support for students with varied learning needs and improving academic outcomes.

Magableh and Abdullah (2020) conducted research on Using Differentiated Instruction to Improve the English Learning of Students in Jordan. The primary goal of the research was to compare the learning outcomes of students taught using differentiated methods with those taught using traditional methods. The study's methodology consisted of a quasi-experimental design and sample size of 60 eighth-grade students were divided into two groups (30 experimental/30 control). The experimental group received differentiated instruction using strategy or instructional method (group or cross-group instruction), tiered assignments/exercises, and modifications in content, process and product for instruction. The control group

received typical instruction in a traditional classroom setting. Results revealed significant differences between the two groups with the experimental group demonstrating significantly higher performance on English assessments than the control group. The researchers concluded that differentiated instruction can positively affect academic performance in English and aid teachers in meeting student differences in their classrooms.

2.3 Studies Related to Inclusive Education and Differentiated Instruction

International Studies

A study was undertaken by Liou Cheng Chu Chang Liu to find out how effective differentiated instruction is in evidence-based nursing education. They were investigating whether differentiated instruction improved student learning and the satisfaction of students with their education in undergraduate nursing education. The researchers' research method was a one-group pretest, post-test (pre-experimental). The sample comprised 98 undergraduate nursing students who participated in the study. During the intervention, each student completed different learning activities and received different instructional opportunities based on their academic strengths and individual abilities. Findings indicated that differentiated instruction positively impacted the students' learning experience. Students had an increased interest in learning; they were involved in class activity more than before and showed an increase in independent thinking. Improvement was also found in academic performance, satisfaction with learning, attitudes toward evidence-based practice, and subject matter knowledge. The researchers concluded that differentiated instruction promotes a positive learning environment and supports students in meeting their diverse learning needs.

Muslimov, Goyibova, Kadirova, Sabirova, and Samatova conducted a systematic review study to investigate the use of differentiated instruction as a way to provide support for students with differing learning needs. The purpose of the systematic review was to examine how differentiated instruction will help improve student engagement, motivation and academic success by tailoring instruction to the individual student's abilities, interests, and learning needs. To achieve this goal, the researchers completed a systematic review of existing literature regarding differentiated instruction and outlined a number of strategies for differentiated instruction in the classroom, such as flexible groupings; differentiated tasks; and utilizing Multiple Intelligences in the classroom.

The systematic review also provided specific examples from foreign language classrooms that demonstrate how teachers modified their instructional strategies based on the various learning needs of their students. The results of the review supported the idea that differentiated instruction has a positive influence on the academic performance of students, as well as their motivation and level of participation in the classroom. In addition, the systematic review indicated that differentiated instruction supports both inclusion and personalized learning by recognizing that all students learn in different ways and have varying strengths and interests.

The studies discussed above clearly show that differentiated instruction helps teachers respond to the differences that exist among learners in the classroom. When teaching methods, classroom activities, and learning materials are adjusted according to students' abilities, interests, and learning needs, students tend to participate more actively in the learning process. The studies also reported improvement in students'

academic performance, classroom involvement, motivation, and overall learning experiences after the use of differentiated instructional practices.

Another important point reflected in these studies is that differentiated instruction supports inclusive classroom practices by giving learners opportunities to learn according to their own strengths and pace. Instead of following a single method of teaching for all students, differentiated instruction allows teachers to provide multiple ways of learning and participation, which helps create a more supportive and learner-friendly classroom environment.

At the same time, the studies also pointed out that effective implementation of differentiated instruction is not free from challenges. Teachers require proper planning, professional preparation, classroom support, and suitable learning resources to apply differentiated practices successfully. Therefore, along with its educational benefits, the studies also emphasize the importance of teacher training and supportive school practices for the effective use of differentiated instruction in classrooms.

Indian Studies

Sharma (2024) explained differentiated instruction as an important teaching approach for creating inclusive learning environments in classrooms. The study discussed that in inclusive education, teachers are required to address the different learning needs, abilities, and learning styles of students studying together in the same classroom. According to the author, differentiated instruction helps teachers support learner diversity by modifying teaching methods, classroom activities, and instructional materials according to the needs of individual learners. The paper also explained different strategies of differentiated instruction and showed how adapting

content, process, and product can make classroom learning more accessible and engaging for students with different learning needs. The study highlighted that differentiated instruction contributes towards creating supportive and equitable classroom environments where learners feel included and encouraged to participate.

At the same time, the author also pointed out certain difficulties in implementing differentiated instruction, such as inadequate teacher preparation, diverse classroom needs, and shortage of classroom resources. The study concluded that proper use of differentiated instructional practices can improve learning outcomes and strengthen inclusive educational practices in schools.

Sen discussed differentiated instruction as an effective approach for supporting inclusive education in the Indian classroom context. The study explained that differentiated instruction helps teachers address learner diversity by modifying curriculum, instructional practices, and classroom activities according to students' readiness levels, interests, and learning needs. The author highlighted that differentiated instruction increases learner participation and helps teachers teach students according to their individual learning levels and abilities. The paper further explained that teachers can modify content, process, and product on the basis of learners' ability levels, learning patterns, interests, and classroom environment. The study also discussed that the idea of differentiated instruction is supported by various learner-centered theories such as Thorndike's readiness theory, Gardner's theory of multiple intelligences, different learning styles, and Vygotsky's Zone of Proximal Development. The author concluded that differentiated instruction is one of the useful approaches for supporting inclusive classrooms and providing meaningful learning opportunities to learners with diverse educational needs.

Devi (2023) presented a conceptual study titled “Differentiated Instruction in Special Education: Meeting Diverse Needs in the Classroom” to explain the importance of differentiated instruction in special and inclusive classrooms. The study focused on how teachers can address the different learning needs, abilities, interests, and learning styles of students through flexible teaching practices. The author explained that differentiated instruction is a learner-focused approach in which teachers make changes in classroom teaching, learning activities, and instructional materials according to the needs of students rather than teaching all learners in the same way. The study further discussed that such instructional practices help in creating a classroom environment where students feel comfortable, supported, and actively involved in learning activities. The author also highlighted that differentiated instruction contributes not only to academic learning but also to the social and emotional development of learners. The study concluded that differentiated instruction is an effective way to support learner diversity and improve teaching-learning experiences in special and inclusive education settings.

The studies reviewed above show that differentiated instruction has an important role in helping teachers manage learner diversity within classrooms. Different researchers pointed out that students differ in their learning pace, interests, understanding levels, and ways of learning, and therefore classroom teaching should also be flexible enough to address these differences. The studies indicated that when teachers adapt content, teaching methods, and classroom activities according to students’ readiness levels and learning needs, learners participate more actively and show better involvement in classroom learning. The findings also suggest that differentiated instruction helps in creating inclusive classrooms where learners with different abilities can learn together more effectively. In addition, the studies

highlighted that learner-centered theories such as Multiple Intelligence Theory and Zone of Proximal Development support differentiated instructional practices because these theories recognize that every learner understands and learns differently.

2.4 Studies Related to EVS and Grade 5

International Studies

This research was conducted by Kurniawan and Puspita (2024) to investigate how differentiated instruction impacts science performance of Grade V students on a topic called Food Chain. The purpose of the study was to determine if differentiated instruction can improve student's outcomes when compared to typical teaching methods used by teachers in classrooms. An experiment using a pre-test/post-test control group design was utilized to conduct the study using two Grade V classes. One class used differentiated teaching methods to receive instruction as the experimental group while the other class received instruction using regular classroom methods and served as the control group. Achievement of each group was measured with a validated multiple-choice test. Results indicated the experimental group achieved greater than the control group and had a better understanding of science concepts than their peers in the control group. Based on these findings the authors concluded that differentiated instruction is a proven method for improving science achievement among Grade V students.

Putri, Yantoro, and Rosmalinda (2024) examined the use of differentiated instruction in Grade V IPAS classrooms. The objective was to explore the ways teachers responded to learners' varying readiness levels, interests, and learning preferences during the planning, implementation, and evaluation of instruction under the Merdeka Curriculum. The researchers used a descriptive qualitative method for

the study. Data were collected through classroom observation, interviews, and documentation involving the Grade V teacher and students of an elementary school named SDN 198/I Pasar Baru. The findings revealed that the teacher used different forms of content, process, and product differentiation during classroom teaching. Diagnostic assessment was conducted to identify learners' readiness levels and preferred learning styles such as visual, auditory, and kinesthetic learning. Students were grouped according to their abilities, and formative assessment along with classroom reflection was used to evaluate learning progress. The study found that differentiated instruction increased students' classroom participation, confidence, and understanding of concepts. However, the teacher also experienced certain difficulties such as shortage of time and challenges in preparing different learning materials for students. The study concluded that differentiated instruction supports flexible and student-centered learning at the elementary level.

Masyeni, Lestari, and Astuti (2025) carried out a study to explore the effect of differentiated instruction on the achievement of Grade V students in the IPAS subject. The study objective was to find out whether adapting instruction to students' varying readiness levels, interests, and learning preferences could lead to better academic performance. A quantitative approach was followed using a quasi-experimental pretest–posttest control group design. Data were gathered through achievement tests and observation sheets. The findings showed a noticeable difference between students who learned through differentiated instruction and those who were taught using conventional classroom methods. Students who received differentiated instructional support demonstrated better academic performance and improved understanding of the subject. The researchers concluded that differentiated

instruction is effective in improving learning outcomes among Grade V students and helps teachers address individual learner differences within the classroom.

Najeh Rajeh Alsalhi et al. conducted a study and objective was to examine the impact of differentiated instruction strategy on students' achievement and attitudes in science subjects at the intermediate level. The study followed a quasi-experimental design with 483 students divided into experimental and control groups. Achievement tests and questionnaires were used for data collection. The findings showed that students who were taught through differentiated instruction performed better than the control group and also developed positive attitudes towards learning. The study suggested that differentiated instruction can improve students' achievement and engagement in science-related subjects.”

Lakshnarayan Kumar Bhagarathi et al. (2025) explored the study differentiated instruction and traditional teaching methods among Grade 8 students in Integrated Science in Region 6, Guyana. The objective of the study was to compare differentiated instruction and traditional teaching methods among Grade 8 students in Integrated Science in Region 6, Guyana. The study included 40 students who were divided into control and experimental groups. The control group was taught through the regular traditional method, while the experimental group was taught using differentiated instruction strategies. After completing three science lessons, both groups were given a test based on different levels of Bloom's taxonomy. The findings showed that students in the experimental group performed slightly better than those in the control group. Even though the difference was not found to be statistically significant because of the small sample size, the study still showed that differentiated

instruction had a positive effect on students' learning and classroom performance in science-related subjects.

Indian Studies

NCERT (2005, 2019), through the development of the Grade 5 EVS textbook *Looking Around*, emphasized activity-based and experiential learning approaches at the elementary level. The main objective of the curriculum was to help students learn through real-life experiences, classroom discussions, observation, and hands-on activities rather than rote memorization. The curriculum framework supports learner-centered and flexible teaching practices, which are closely related to differentiated instruction. It encourages teachers to address the diverse needs, interests, and learning abilities of students through interactive and meaningful learning experiences. However, despite these recommendations, many classrooms still continue to use traditional lecture-based teaching methods, limiting opportunities for individualized and active learning among students.

The review of related literature showed that differentiated instruction has been widely recognized as an effective approach for addressing learner diversity in classrooms. Different studies reported that differentiated instructional practices help improve students' academic achievement, classroom participation, motivation, engagement, and overall learning experiences. The studies also showed that differentiated instruction supports inclusive classroom practices by adjusting teaching methods, content, and learning activities to match students' readiness levels, interests, and learning profiles.

The review also indicated that although differentiated instruction has been widely studied in subjects such as mathematics, language, science, and higher

education, relatively few studies have focused on Environmental Studies at the primary level, particularly in inclusive classroom settings. It was further observed that research comparing differentiated instruction with traditional teaching practices in the Indian educational context remains limited. In view of these gaps, the present study was undertaken to examine the effectiveness of differentiated instruction in teaching Environmental Studies among Grade V learners in an inclusive classroom setting .

CHAPTER -3

METHOD

3.1 Research Design

The present study employed quasi-experimental research. Specifically, a **pre-test and post-test control group design** was used to examine the effectiveness of differentiated instruction-based content in comparison to traditional content in Environmental Studies (EVS) among Grade V students in inclusive settings.

Since random assignment of participants to groups was not fully feasible in natural classroom settings, the quasi-experimental design was considered appropriate. This design enabled the researcher to compare the learning outcomes of students before and after the intervention in both experimental and control groups.

3.2 Participants:

The participants of the study were Grade V students from an inclusive school and a special school in Mysore.

Table 3.1 Distribution of Participants

Sl.NO.	Types of School	Control Group	Experimental Group	Total
1	Inclusive School	11	11	22
2	Special School	4	5	9
	Total	15	16	31

Initially, the study was planned to be conducted in an inclusive school setting. However, due to the non-availability of sufficient students with special educational needs in the selected inclusive school, the researcher further extended the

administration of tools to a special school to ensure appropriate representation of diverse learners in the study.

3.3 Sampling Technique

The participants were selected using a purposive sampling technique. The students were assigned to control and experimental groups within their respective classroom settings.

Inclusion Criteria

- Grade appropriateness of the students will be considered.
- At least one student with single disability should be there in the inclusive classroom.

Exclusion Criteria

- Student with associated condition / additional disabilities.
- Students with severe disabilities.
- Students absent during either the pre-test or post -test.

3.4 Development of Tool

To prepare the tools for the present study, a series of carefully planned steps were followed.

3.4.1 Selection of content

The first step in tool development was the selection of a suitable chapter from the Grade V Environmental Science textbook prescribed by SCERT, Karnataka. For the present study, the chapter “The Sky” was selected as it was

appropriate for developing differentiated instruction-based content. The chapter provided scope for adapting the content according to students' readiness, interests, and learning profiles. It was also suitable for assessing the effectiveness of differentiated instruction in an inclusive classroom setting.

3.4.2 Development of Learning Profile Checklist

Before preparing the differentiated instruction-based content, the researcher developed a learning profile checklist to collect information about the individual learning characteristics of Grade V students. The checklist was prepared with the purpose of understanding students' readiness level, interests, learning preferences, strengths, and difficulties in the classroom.

The checklist was filled with the support of the respective class teachers based on their classroom observations and regular interaction and regular performances with the students. Based on the responses collected through the checklist, students were broadly identified as below average, average, and above average learners. This information helped the researcher plan and adapt the instructional content according to the needs of the learners.

The checklist includes the following domains.

Table 3.2 Domain Included in the Learning Profile Checklist

S.NO.	Domain Covered in the Checklist
1	Demographic details of the child
2	Language of instruction
3	Socio-economic background
4	Parental education
5	Learning style
6	Preferred learning activities
7	Strengths in learning
8	Challenges or difficulties observed
9	Overall academic performance
10	Readiness level of learners
11	Interests of learners
12	Learning preferences

3.4.3 Development of Pretest material

Before constructing the pre-test, a blueprint was prepared based on the selected chapter “The Sky” from the Grade V Environmental Science textbook prescribed by the Karnataka State Board (KSEEB). The blueprint was developed to organize the questions systematically across different cognitive levels and learning areas. It also helped in maintaining appropriate distribution of question types and weightage throughout the pre-test.

The pre-test was developed to assess the prior knowledge and understanding of Grade V students regarding the selected chapter before the administration of the intervention. The questions included in the pre-test were prepared according to the learning objectives and different cognitive domains of Bloom’s Taxonomy. The pre-test was designed to assess students across different cognitive levels, including

knowledge, understanding, and application. It consisted of multiple-choice questions, matching-type questions, short answer questions, and long answer questions to cover a range of learning outcomes. This structure helped in evaluating students' learning in a balanced and comprehensive manner. Overall, the blueprint was used as a guiding framework to ensure that the pre-test was prepared in a systematic and well-organized way. The pre-test Blueprint enclosed in Appendix 1.

Table: 3.3 Weight-age and Distribution of Marks in the Pre-Test

Component	No. of Question	Marks	Percentage
Knowledge	5	5	20%
Understanding	10	15	60%
Application	1	5	20%
Total	16	25	100%

The table 3.3 presents how marks are distributed across different cognitive levels. The weight-age for different domains were distributed as per the importance of the content provided in text.

3.4.4 Validity and Reliability of Pretest

The pre-test developed by the researcher was reviewed and checked by the research guide to make sure that all the test items were appropriate for Grade V students. This process helped in ensuring that the questions were suitable in terms of difficulty level, clarity, and relevance to the content. The guide reviewed the questions with respect to clarity of language, relevance to the selected chapter, difficulty level, and alignment with the objectives of the study. Based on the suggestions provided, necessary corrections and modifications were made before finalizing the pre-test. Thus, face validity of the pre-test was established.

3.4.5 Development of Differentiated Instruction-Based Content

Differentiated instruction-based content was developed for the experimental group based on the information collected through the learning profile checklist. The checklist was completed with the support of the respective class teachers, and it provided information regarding students' readiness level, interests, learning preferences, strengths, classroom participation, and difficulties observed during the teaching-learning process. Based on the responses obtained through the checklist, the learners were broadly categorized into three levels, namely below average, average, and above average learners. The content was then adapted according to the learning needs and performance level of each group of learners.

3.4.5.1 Guidelines Followed for Developing Differentiated Instruction-Based Content:

- Learners' readiness level was considered while adapting the content.
- Students' interests and learning preferences were considered during content preparation.
- Simple to complex presentation of concepts was followed.
- Visual and pictorial supports were included according to learner needs.
- Vocabulary support was provided at all levels.
- Activity-based learning tasks were incorporated.
- Content was adapted without changing the learning objectives of the chapter.
- Different difficulty levels were maintained for below average, average, and above average learners.
- Classroom participation and learner engagement were considered during content development.

Based on the above guidelines, the differentiated instruction-based content was prepared separately for below average, average, and above average learners according to their individual learning needs and classroom performance.

3.4.5.2 Development of Content for Below Average Learners

The following adaptations were made while developing the content for below average learners:

- Simplified vocabulary and easy language were used throughout the content.
- The content was presented in short and simple points instead of lengthy paragraphs.
- Concrete pictorial representations were included to support understanding of concepts.
- Important keywords and meanings were highlighted separately for better comprehension.
- More activity-based tasks and simple exercises were included.
- Examples from students' day-to-day life were incorporated to make the content relatable.
- Simple and direct questions were included to improve understanding and participation.
- Additional visual support was provided to maintain attention and engagement.

3.4.5.3 Development of Content for Average Learners

The following adaptations were made while developing the content for average learners:

- Moderately simplified language was used while presenting the content.
- The content was organized in short paragraphs along with point-wise explanations.
- Relevant pictures and supportive illustrations were included.
- Structured classroom activities were incorporated to improve participation.
- Vocabulary support was provided wherever necessary.
- Questions based on understanding and application were included.
- Daily life-related examples were used to connect the concepts with students' experiences.

3.4.5.4 Development of Content for Above Average Learners

The following adaptations were made while developing the content for above average learners:

- The content was presented in comparatively detailed paragraph form.
- Relatively advanced vocabulary and concept explanations were included.
- Abstract pictorial representations and higher-level illustrations were used.
- Higher-order thinking activities and analytical questions were incorporated.
- Opportunities for independent learning and reasoning were included.
- Application-based and critical thinking questions were provided.
- Learners were encouraged to relate concepts with real-life environmental situations.

- Additional enrichment activities were included to challenge learners according to their ability level.

For all the three levels, suitable vocabulary support and different learning activities were included to improve understanding, classroom participation, and engagement of the learners during the teaching-learning process.

3.4.6 Development of Post-test (DIT - Differentiated Instruction Test Grade V EVS).

Preparation of Blueprint:

After the development of differentiated instruction-based content, a **post-test** (DIT Differentiated Instruction Test Grade V EVS) blueprint was prepared based on the same learning objectives and domains as the pre-test.

The post-test was developed to assess the learning outcomes of Grade V students after the intervention. Separate post-test papers were prepared for below-average, average, and above-average learners based on their learning levels. The questions were designed with reference to the learning objectives, content areas, and differentiated instructional levels.

The post-test included questions from knowledge, understanding, and application domains to assess students' achievement in a comprehensive way. Along with this, the questions were also framed by considering the three learner characteristics used in the study, that is readiness, interest, and learning profile. In this way, the test was not only based on cognitive levels but also reflected learner differences while preparing the assessment.

Table 3.4 Weight-age Distribution of Post-test Items for Below Average Learners

Cognitive Level	No.of Items			Total Items	Total Marks	Percentage
	LR	LI	LP			
Knowledge Level	(1m) 10	-	-	10	10	33.33%
Understanding Level (2M)	(2m) 2	(2m) 3	-	5	10	33.33%
Application Level (5M)	-	-	(5m) 2	2	10	33.33%
Total	12	2	2	17	30	100%

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 3.4 shows the post-test for below-average learners with equal weight-age in all three cognitive levels—knowledge, understanding, and application (10 marks each). The questions were also prepared by considering learner readiness, interest, and learning profile, so that the test remains simple and suitable for their learning level. Overall, the paper is balanced and designed according to the needs of below-average learners. The post-test Blueprint enclosed in Appendix 3.

Table 3.5 Weight-age Distribution of Post-test Items for Average Learners

Cognitive Level	No.of Items			Total Items	Total Marks	Percentage
	LR	LI	LP			
Knowledge Level	(1m) 8	-	-	8	8	26.67%
Understanding Level (2M)	(2m) 3	(2m) 2	(2m) 1	6	12	40%
Application Level (5M)	(5m) 1	-	(5m) 1	2	10	33.33%
Total	12	2	2	16	30	100%

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 3.5 shows the weight-age distribution of the post-test prepared for average learners. The table indicates that the highest weightage is given to the understanding level (40%), followed by application (33.33%) and knowledge (26.67%). This shows that the focus of the test is mainly on building conceptual clarity, along with the ability to apply concepts in simple situations.

Along with cognitive levels, the questions were also framed by considering learner readiness, interest, and learning profile. This helped in making the test more suitable and meaningful for average learners. Overall, the paper is balanced and designed according to the learning needs of average learners. The pre-test Blueprint enclosed in Appendix 4.

Table 3.6 Weight-age Distribution of Post-test Items for Above Average Learners

Cognitive Level	No.of Items			Total Items	Total Marks	Percentage
	LR	LI	LP			
Knowledge Level	(1m) 12	-	-	12	12	40%
Understanding Level (2M)	(1m) 2	(3m) 4	-	6	14	46.67%
Application Level (5M)	-	-	(4m) 1	1	4	13.33%
Total	12	2	2	19	30	100%

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 3.6 shows the weight-age distribution of the post-test prepared for above-average learners. The table indicates that the highest weight-age is given to the understanding level (46.67%), followed by knowledge level (40%), while the

application level has a smaller weight-age (13.33%). This shows that the test mainly focuses on deeper conceptual understanding along with strong basic knowledge.

Along with cognitive levels, the questions were also designed by considering learner readiness, interest, and learning profile. This helped in providing appropriate challenge and flexibility for above-average learners. Overall, the test is designed in a way that supports higher understanding and suits the learning capacity of above-average learners. The pre-test Blueprint enclosed in Appendix 5.

3.4.7 Validation of Differentiated Instruction (DI) Based Content and Test material.

The differentiated instructional (DI) content was validated by six experts, including four special educators, one Associate Professor, and one Assistant Professor. The experts reviewed the content in terms of clarity, language appropriateness, presentation, and suitability for learners with hearing impairment. Most of the experts agreed that the content was appropriate and did not require any modification, indicating satisfactory face validity of the developed material.

For content validity, a validation sheet was prepared and provided to all six experts. The experts verified the instructional content in relation to the stated learning objectives, relevance of content, and appropriateness for the target learners.

The experts confirmed that the content was aligned with the objectives of the study. Based on their review, suggestions were invited from the experts for improvement and refinement of the DI content.

A decision rule of 80% agreement among experts was considered for inclusion of suggestions. Only those suggestions that were commonly agreed upon were considered for incorporation, while suggestions without consensus were not included.

In the present study, suggestions were received only from two special educators, while the remaining experts did not report any major modifications. As the suggestions were limited and did not reflect 80% consensus among experts, they were considered as minor recommendations and were selectively incorporated where appropriate.

Table 3.7 Expert Suggestions

Suggestion No.	Expert Suggestions	Decision	Justification
1	Inclusion of pictorial support in glossary for better understanding of vocabulary, especially for learners with hearing impairment	Not Incorporated (planned for future improvement)	Due to time constraints, however considered pedagogically relevant for visual support.
2	Difficult technical terms should be defined in brackets within the content for immediate understanding.	Incorporated	Improves conceptual clarity and supports comprehension of learners

3	General approval of content with no additional changes suggested by remaining experts	Not Applicable	Indicates overall adequacy of DI content.
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3.4.8 Pilot Study of Post-test

A pilot study was conducted to examine the clarity, suitability, and reliability of the post-test items prepared for below average, average, and above average learners. The post-test was administered to Grade V students of inclusive school who possessed characteristics similar to the actual sample of the study.

Separate post-test papers prepared for different learner levels were administered according to students' readiness levels. After administration, students' responses were carefully analyzed to identify unclear, difficult, or inappropriate items. Based on the responses obtained during the pilot study, certain questions were modified and re-framed to improve clarity, language, and suitability according to learners' levels and understanding.

3.4.8.1 Analysis of Post-Test Items Based on Difficulty index

Table 3.8 Item analysis for below average post -test tool

Item No.	R	T	P
1	12	12	1
2	12	12	1
3	12	12	1
4	12	12	1
5	7	12	0.58
6	12	12	1

7	8	12	0.67
8	11	12	0.92
9	12	12	1
10	12	12	1
11	7	12	0.58
12	7	12	0.58
13	10	12	0.83
14	0	12	0
15	4	12	0.33
16	6	12	0.5
17	6	12	0.5

Note. *R- The number correct response for the items, T- Total number of respondent, P -Difficulty Index*

Table 3.8 Shows that most of the test items were very easy, as a majority of students answered them correctly. A few items such as 5, 11, 12, and 16 showed moderate difficulty and were able to differentiate students to some extent. Item 14 was found to be very difficult, as none of the students could answer it correctly. Based on the pilot study findings, certain modifications were made in the post-test. The items were not removed completely instead it got re-framed with moderately difficult language. In some items, the options were also adjusted to make them more learner-friendly and easier to understand.

Table 3.9 Reliability Analysis of Post-test for Below Average Learners

Reliability Measure	Value
Cronbach's Alpha	0.663
Cronbach's Alpha Based on Standardized Items	0.726
Number of Items	9

Table 3.9 Shows the reliability result which is lower alpha value (.663) for the below average group. The researcher analyzed the difficult items, and felt that the concepts involved in the questions were important for the study. Therefore, the questions were retained with necessary modifications.

Table 3.10 Item analysis for average post- test tool

Item	R	T	P
1	12	20	0.6
2	12	20	0.6
3	12	20	0.6
4	12	20	0.6
5	7	20	0.35
6	12	20	0.6
7	8	20	0.4
8	11	20	0.55
9	12	20	0.6
10	12	20	0.6
11	7	20	0.35
12	7	20	0.35
13	10	20	0.5
14	0	20	0
15	4	20	0.2
16	6	20	0.3

Note. R- The number correct response for the items, T-Total number of respondents, P -Difficulty Index

Table 3.10 Showed based on the pilot study of the post-test, minor modifications were made in the question paper. In a few items, options were slightly modified and choices were added to ensure better participation of students and to make the test more learner-friendly. This was done to support students' engagement during the assessment. Apart from this, no major changes were made in the structure

or content of the test items, and the overall format of the tool was kept the same to maintain its consistency and validity.

Table 3.11 Reliability Analysis of Post-test for Average Learners

Reliability Measure	Value
Cronbach's Alpha	0.799
Cronbach's Alpha Based on Standardized Items	0.834
Number of Items	14

Table 3.11 shows the reliability result of the average learner group. The obtained alpha value (0.799) indicates satisfactory reliability of the question paper. However, a few items were found to be difficult. The researcher felt the importance of the concepts involved in the questions and therefore retained the questions with necessary modifications.

Table 3.12 Item analysis for above average post- test tool.

Item	R	T	P
1	10	10	1
2	8	10	0.8
3	0	10	0
4	3	10	0.3
5	9	10	0.9
6	8	10	0.8
7	9	10	0.9
8	9	10	0.9
9	6	10	0.6
10	10	10	1
11	9	10	0.9
12	6	10	0.6
13	9	10	0.9
14	10	10	1
15	8	10	0.8
16	4	10	0.4

17	4	10	0.4
18	5	10	0.5
19	5	10	0.5

Note. *R- The number correct response for the items, T-Total number of respondent, P -Difficulty Index*

Table 3.12 Based on the pilot study of the post-test, the item-wise analysis was carried out to check the suitability of the questions. In this set of items, no major structural changes were required. Only minor modifications were made in a few questions by providing additional choices within the items so that students could respond more comfortably. This was done to support better participation and reduce difficulty in understanding the response pattern. Apart from this, the overall content and structure of the test were found appropriate and no further external changes were needed.

Table 3.13 Reliability Analysis of Post-test for Above Average Learners

Reliability Measure	Value
Cronbach's Alpha	0.745
Cronbach's Alpha Based on Standardized Items	0.827
Number of Items	15

Table 3.13 shows the reliability result of the above average learner group. The obtained alpha value (.745) indicates satisfactory reliability of the question paper. However, a few items were found to be difficult. The researcher felt the importance of the concepts involved in the questions and therefore retained the questions with necessary modifications.

3.4.9: Data Collection Procedure

Step 1 Selection of Schools

Initially, the researcher planned to conduct the study in an inclusive school. However, during the selection process, no students with special needs were found in the selected inclusive school. Therefore, in order to obtain the required sample for the study, it became necessary to separately select one general school and one special school for data collection.

Step 2 Permission and School Approval

Before conducting the study, permission and approval were obtained from the concerned school authorities. The researcher explained the purpose and procedure of the study to the school administration and received their consent for carrying out the data collection process. Cooperation from the schools was also ensured throughout the study.

Step 3 Selection of Sample

For the present study, purposive sampling technique was used for the selection of the sample. Initially, the researcher interacted with the class teacher of Grade V to obtain information regarding the academic performance of the students. Based on the teacher's observations, students were identified as below average, average, and above average learners.

After identifying the students, they were divided into two groups, namely Group A (control group) and Group B (Experimental group). The grouping was done in such a way that both groups included students from all three performance levels. For example, one below average learner was placed in Group A and another in Group B. Similarly, average and above average learners were also distributed equally

between the two groups. In the general school, the total number of students was 22, and they were divided equally into two groups consisting of 11 students each.

The same procedure was followed in the special school as well. In the special school, there were 9 students in total. Out of these, 4 students were included in the control group and 5 students were included in the experimental group.

Step 4 Pre-test Administration

After the selection of the sample, the pre-test was administered to both the control group and the experimental group. The same pre-test was provided to both groups in order to assess the existing level of knowledge and understanding of the students before the intervention. The administration of the pre-test was carried out under similar conditions for both groups.

Step 5 Intervention Phase

- Planning

During the intervention phase, lesson plans were prepared separately for the general school and the special school. The lesson plans were also designed group-wise, with separate plans for the control group and the experimental group. While preparing the plans, the learning level and needs of the students were taken into consideration so that the activities and objectives could be suited to the learners accordingly.

- Preparation of Materials

For the intervention programme, different teaching and learning materials were prepared according to the needs of the learners. These included picture charts, word

cards for difficult and unfamiliar vocabulary, and PowerPoint presentations (PPTs). The materials were prepared to make the teaching process more interactive, understandable, and suitable for the students during the intervention session.

Duration of pre -test and post -test - 1 week

Duration for classroom teaching - 3 week

- Instruction Delivery

General School

In the general school, the intervention sessions were conducted using the lecture method and role play activities. The prepared teaching materials such as picture charts, word cards, and PPTs were used during the teaching sessions. The same materials and methods were followed for both the control group and the experimental group but the content used for reading the lesson varies for both the groups.

Special School

In the special school, the same teaching materials and instructional methods were used during the intervention sessions. The lessons were taught through lecture method and role play activities with the support of sign language. The researcher conducted the sessions with the assistance of the Grade V class teacher, who helped in communicating the content through sign language according to the needs of the students. The same materials were used for both the control group and the experimental group in the special school as well.

- Evaluation

After the completion of each lesson and sub-topic during the intervention sessions, evaluation of the students was carried out. The evaluation was conducted at the end of every class to check the students' understanding of the taught content. Different methods such as quizzes, exercises, match the following, fill in the blanks, and verbal questioning were used for assessment. The same evaluation procedures were followed in both the general school and the special school.

Step 6 Post-test Administration

General School

In the general school, different levels of question papers were administered according to the learning level of the students. Separate post-tests were used for below average, average, and above average learners. The post-test material used for all the learner levels was DIT- Differentiated Instruction Test Grade V EVS.

Special School

In the special school, only the below average level question paper was administered to all the students. The post-test material used was DIT Differentiated Instruction Test Grade V EVS. This was done because the deaf students had limited vocabulary and lower language abilities, due to which the below average level question paper was considered more suitable for assessing their understanding and learning outcomes.

Step 7 Data Analysis

For the analysis of the collected data, different statistical techniques were used in the study. Initially, descriptive statistics were used to understand the overall pattern and distribution of the data. After that, a normality test was conducted through skewness and kurtosis to examine whether the data followed normal distribution or not. Based on the nature of the data, non-parametric tests were used for further

analysis. The Mann–Whitney U test and Wilcoxon Signed Rank test were used to analyze the differences between and within the groups.

CHAPTER 4

RESULT

In this study, the data were analyzed using statistical techniques that matched the nature of the data collected. Since the sample size was relatively small and the data did not meet the assumption of normal distribution, non-parametric statistical tests were considered more appropriate than parametric tests.

To get an overall picture of students' performance, descriptive statistics were first calculated. The mean and standard deviation of both pre-test and post-test scores were computed. These measures helped in understanding the performance levels of students in the experimental and control groups.

Before selecting the statistical tests, the normality of the data was examined using the Shapiro–Wilk test. The results indicated that the data were not normally distributed.

Based on this finding, non-parametric methods were chosen for further analysis.

The Mann–Whitney U test was used to compare the performance of students in the experimental and control groups. This test helped determine whether there were significant differences between the two groups in both general and special school settings. It was also useful in assessing the effectiveness of differentiated instruction in comparison with traditional teaching methods.

To examine changes within the same group, the Wilcoxon Signed Rank test was applied. By comparing pre-test and post-test scores, this test helped identify the extent of improvement in students' performance following the intervention.

Together, these statistical procedures provided a clear and dependable way of

analyzing the data and understanding the impact of differentiated instruction in the present study.

4.1 Details of Data

The data for the present study were collected from students studying in both general and special schools. In each school, students were divided into an experimental group and a control group so that the effectiveness of differentiated instruction-based content could be compared with that of traditional teaching methods. In the general school, both the experimental and control groups consisted of 11 students each. In the special school, the experimental group included 5 students, while the control group consisted of 4 students. Thus, the overall sample represented learners from both general education and special education settings.

The data included students' pre-test and post-test scores in Environmental Studies (EVS). The pre-test was administered before the intervention to understand students' initial level of knowledge, whereas the post-test was conducted after the intervention to assess changes in learning outcomes.

Separate pre-test and post-test question papers were prepared according to the learning levels of the students. The distribution of marks across readiness, interest, and learning profile components differed for below-average, average, and above-average learners. As a result, the total marks and weightage of different components were not the same across all learner groups.

To make the scores comparable, the marks obtained in both the pre-test and post-test were converted into percentages. This ensured uniformity in the data and made the analysis and interpretation of results more meaningful.

The data collected were then analyzed using appropriate statistical techniques. The findings presented in the following section compare the effectiveness of differentiated instruction-based content with traditional content.

4.2 Hypothesis-wise Analysis and Interpretation

Hypothesis 1 There is no significant difference between DI-based content and traditional content in EVS subject for Grade 5 students in inclusive classroom.

Objective 1 To compare the effectiveness of Differentiated Instruction-based content and traditional content in EVS subject.

Statistical Test Used For achieving Objective 2 of the study, descriptive and inferential statistical analyses were carried out to examine the effectiveness of the intervention among the control and experimental groups. Initially, descriptive statistics such as mean and standard deviation were computed to understand the overall performance of the participants in the pre-test and post-test across different learning domains, namely LR, LI, LP, and total scores. Thereafter, the Mann–Whitney U test was employed to compare the performance of the control and experimental groups.

Table 4.1 Comparison of performance between DI-based content and traditional content:

Group		LR- PRE%	LR- POST%	LI- PRE%	LI- POST %	LP- PRE%	LP- POST%	PRE- TOTAL %	POST- TOTAL%
Control	Mean	65.33	68.3853	47.50	58.891	28.576	32.5913	49.33	57.1147
	N	15	15	15	15	15	15	15	15
	Std. Deviation	23.56	19.4706	23.24	24.494	24.147	23.916	19.751	16.51712
Experimental	Mean	68.75	81.7675	51.56	89.585	43.751	70.848	56.25	79.5838
	N	16	16	16	16	16	16	16	16
	Std. Deviation	22.77	14.8766	15.72	9.8590	24.170	17.8225	19.403	13.32557
Total	Mean	67.10	75.2923	49.59	74.733	36.408	52.3368	52.90	68.7116
	N	31	31	31	31	31	31	31	31
	Std. Deviation	22.83	18.2698	19.49	23.910	24.973	28.3454	19.561	18.61143

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 4.1 Shows Following the intervention, the post-test mean scores of the experimental group increased noticeably across all domains. The experimental group obtained higher post-test mean scores in LR (Mean = 81.77), LI (Mean = 89.59), LP (Mean = 70.85), and total score (Mean = 79.58), whereas the control group obtained comparatively lower mean scores in LR (Mean = 68.39), LI (Mean = 58.89), LP (Mean = 32.59), and total score (Mean = 57.11). Its shows a noticeable difference between the post-test mean scores of the control group and the experimental group. The higher achievement scores of the experimental group indicate that the

differentiated instruction-based content was effective in improving students' readiness, learning interest, and learning profile compared to the control group.

Results based on Mann- Whitney U test for comparison of DI based content and traditional content:

To examine whether these differences were statistically significant, the Mann–Whitney U test was conducted. $p < 0.05$ was considered for the analysis of the pre-test and post-test result.

Table No 4.2 Mann- Whitney U test result for comparison of DI based content and traditional content

Variable	Z	p (2-tailed)	Significance
Lr-pre%	-0.241	.809	Not Significant
Lr-post%	-2.092	.036	Significant
Li-pre%	-0.484	.629	Not Significant
Lp-pre%	-1.698	.090	Not Significant
Lp-post%	-4.131	< .001	Significant
Pre-total %	-1.077	.282	Not Significant
Post-total %	-3.426	.001	Significant

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 4.2 shows that the pre-test results revealed no statistically significant differences between the control group and the experimental group in lr-pre ($p = .809$), li-pre ($p = .629$), lp-pre ($p = .090$), and Pre-total scores ($p = .282$), as all the p-values

were greater than 0.05. This indicates that both groups were similar before the intervention.

However, significant differences were observed in the post-test scores. The experimental group performed better than the control group in lr-post ($p = 0.036$), li-post ($p = 0.000$), lp-post ($p = 0.000$), and post-total scores ($p = 0.001$), as the obtained p-values were less than .05. These findings show that the intervention had a positive effect on the performance of students in the experimental group across all the assessed areas.

Hypothesis 2 There is no significant relationship between learner's readiness level and learner's performance.

Hypothesis 3 There is no significant relationship between learner's interest level and learner's performance.

Hypothesis 4 There is no significant relationship between learner's profile and learner's performance.

Objective 3 To compare the effectiveness of learner's readiness of control group and experimental group.

Objective 4 To compare the effectiveness of learner's interest of control group and experimental group.

Objective 5 To compare the effectiveness of learner's learning profile of control group and experimental group.

Statistical test used

For achieving Objective 3, Objective 4, and Objective 5, the Wilcoxon Signed Rank Test was used to compare the pre-test and post-test performance of the participants within the experimental group and within control group. The test was

employed to examine whether there was a significant difference in learners' performance after the implementation of the intervention programme with respect to learner's readiness, learner's interest, and learner's learning profile. The Wilcoxon Signed Rank Test helped in determining the effectiveness of the intervention by analysing the changes in participants' performance before and after the intervention.

Results based on Wilcoxon Signed Rank test for comparison of performance within the Control group

Below table indicating how how control group are performing after intervention.

Table 4.3 Wilcoxon Signed Rank test result for comparison of performance within the Control group (group 1)

Variable Comparison	Z	p (2-tailed)	Significance
Lr-post% – lr-pre%	-1.023	.307	Not Significant
Li-post% – li-pre%	-1.605	.108	Not Significant
Lp-post% – lp-pre%	-1.068	.286	Not Significant
Post-total% – pre-total%	-2.102	.036	Significant

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 4.3 shows that there was no statistically significant difference between the pre-test and post-test scores in learner's readiness ($p = .307$), learner's interest ($p = .108$), and learner's learning profile ($p = .286$), as the obtained p-values were greater than .05. This indicates that the control group did not show much improvement in these specific domains after the intervention period.

However, a overall statistically significant difference was observed in the total performance score ($p = .036$), as the obtained p-value was less than .05. This indicates that there was some improvement in the overall performance of the control group between the pre-test and post-test. Overall, the findings show limited improvement in the control group after the intervention period. Overall, the findings indicate that the control group showed limited improvement across the specific learning domains after the intervention period.

Results based on Wilcoxon Signed Rank test for comparison of performance within the Experimental group.

Below table is showing how experimental group performed after intervention

Table 4.4 Wilcoxon Signed Rank test result for comparison of performance within the Experimental group for (group-2)

Variable Comparison	Z	p (2-tailed)	Significance
Lr-post% – lr-pre%	-2.387	.017	Significant
Li-post% – li-pre%	-3.522	< .001	Significant
Lp-post% – lp-pre%	-3.261	.001	Significant
Post-total% – pre-total%	-3.517	< .001	Significant

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 4.4 shows that there was a statistically significant difference between the pre-test and post-test scores in learner's readiness ($p = .017$), learner's interest ($p = .000$), learner's learning profile ($p = .001$), and total performance score ($p = .000$). Since all the obtained p-values were less than .05, it indicates that the experimental group showed significant improvement after the intervention. The findings suggest

that the differentiated instruction-based intervention was effective in improving students' readiness, learning interest, learning profile, and overall achievement.

Hypothesis 5 There is no significant difference between children with typically developed children performance and Differentiated instruction-based content.

Objective 6 To analyze the performance of grade 5th student with typically developing for the Differentiated instruction-based content.

Statistical test used

For achieving Objective 6, descriptive statistics were used to analyse the performance of Grade 5 students with typically developing learners for the differentiated instruction-based content separately in special schools and inclusive schools. Descriptive statistics helped in understanding the overall performance of the students by presenting the mean scores, standard deviation, and overall distribution of scores in the pre-test and post-test. This analysis enabled the researcher to observe the level of improvement and compare the performance patterns of students in different school settings after the implementation of the differentiated instruction-based content.

Result based on the Descriptive Statistics of Pre-test and Post-test Scores of children with typically developing in the Experimental Group.

Below table is showing how experimental group performed in general school.

Table 4.5 Descriptive Statistics result of Pre-test and Post-test Scores of children with typically developing in the Experimental Group in general school.

Variable	Mean (%)	N	SD
Lr-pre%	72.73	11	26.49

Variable	Mean (%)	N	SD
Lr-post%	85.17	11	16.27
Li-pre%	52.27	11	18.39
Li-post%	93.94	11	7.53
Lp-pre%	48.05	11	27.31
Lp-post%	77.60	11	17.44
Pre-total%	59.27	11	22.83
Post-total%	84.24	11	13.42

Note. *LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile*

Table 4.5 shows the post-test mean scores were higher than the pre-test mean scores across all domains. In learner's readiness (LR), the mean score increased from 72.73 in the pre-test to 85.17 in the post-test. Similarly, learner's interest (LI) improved from 52.27 to 93.94, while learner's learning profile (LP) increased from 48.05 to 77.60. The overall performance score also showed noticeable improvement, with the mean increasing from 59.27 in the pre-test to 84.24 in the post-test.

These findings indicate that the differentiated instruction-based content had a positive effect on the performance of Grade 5 students in the general school setting. The increase in post-test scores suggests improvement in learners' readiness, interest, learning profile, and overall academic performance after the intervention.

Hypothesis 6 There is no significant difference between of children with special needs performance and Differentiated instruction-based content.

Objective 7 To analyze the performance of grade 5th student with special needs for the Differentiated instruction-based content.

Statistical test used Descriptive Statistics

Result based on the Descriptive Statistics of Pre-test and Post-test Scores of the children with special needs in Experimental Group.

This result is based on how experimental group performed in special school.

Table 4.6 Descriptive Statistics result of Pre-test and Post-test Scores of the children with special needs in Experimental Group in special school.

Variable	Mean (%)	N	SD
Lr-post%	74.28	5	8.14
Li-pre%	50.00	5	8.84
Li-post%	80.00	5	7.45
Lp-pre%	34.29	5	12.78
Lp-post%	56.00	5	5.48
Pre-total%	49.60	5	5.37
Post-total%	69.34	5	4.94

Note. LR- Learner's readiness, LI- Learner's interest, LP- Learner's learning profile

Table 4.6 shows the post-test mean scores were higher than the pre-test mean scores in all the assessed domains. In learner's readiness (LR), the mean score increased from 60.00 in the pre-test to 74.28 in the post-test. Similarly, learner's interest (LI) improved from 50.00 to 80.00, while learner's learning profile (LP) increased from 34.29 to 56.00. The overall performance score also improved from 49.60 in the pre-test to 69.34 in the post-test.

These findings indicate that the differentiated instruction-based content had a positive effect on the performance of students in the special school setting. The increase in post-test scores suggests improvement in learners' readiness, interest, learning profile, and overall academic performance after the intervention.

Table 4.7: Overall Performance of Below average, average and above average learners.

Level of learners	Average pre -test %	Average post - test %
Below average	35%	53%
Average	48%	77%
Above average	65%	95%

The table 4.7 shows that all three groups of learners improved after the intervention. Below-average learners showed a clear increase in their post-test scores compared to the pre-test, which indicates improvement in their understanding and participation. Average learners showed the highest improvement among the three groups, with a noticeable rise in performance after the intervention. Above-average learners also showed improvement in their post-test scores, although the increase was comparatively moderate because their pre-test performance was already higher than the other groups. Overall, the findings indicate that differentiated instruction helped improve the performance of learners across different ability levels.

CHAPTER 5

DISCUSSION

The findings of the present study show a clear difference between the experimental and control groups in both inclusive and special schools. It was observed that students who were taught through differentiated instruction performed better in the post-test compared to those who were taught through the traditional method. This improvement was observed in both school settings, showing that differentiated instruction worked effectively across different learning environments.

The study examined school types to look at student progress. Overall, students from both general and special schools made progress, but experimental groups performed better than control groups in different settings. The findings indicate that differentiated instruction-based approaches helped students achieve understanding of the content based on their school type.

Upon closer inspection of the data, positive trends were exhibited across all three components measured (learner readiness, interest, learning profile). The post-tests outperformed the pre-tests in learner readiness, interest, and learning profile. Therefore, when instruction was designed for students according to their readiness level(s), interests and preferred method(s) of learning, students were able to learn concepts more effectively and achieve higher results during assessments.

The findings of this study can be utilized to conclude that the use of differentiated instruction for teaching primary level Environmental Studies is effective for increasing academic success and providing greater levels of engagement within the classroom and assisting all students in inclusive practices

Based on Three component

Among the three components, each one contributed to learning in its own way. Readiness helped in matching the difficulty level of the content with students' understanding. Interest increased student attention and involvement in classroom activities. Learning profile allowed students to learn in ways that suited their personal learning styles. Together, these components made the learning process more effective and meaningful for students.

The findings related to learners' readiness, interests, and learning profiles in the present study are supported by Carol Ann Tomlinson and Marcia Imbeau (2010), who explained that differentiated instruction becomes more effective when teaching is planned according to students' readiness, interests, and learning profiles. Similar findings were also reported by Magableh and Abdullah, who found that students showed better learning outcomes after receiving differentiated instruction instead of traditional teaching. In the present study also, students from below average, average, and above average learner groups showed improvement after learning through differentiated instruction-based content. The improvement was especially noticeable among below average and average learners, showing that adapting content according to learner needs helped students understand the concepts more clearly and participate more actively in learning.

Based on the school

The findings of the present study showed that students in the experimental groups of both general school and special school performed better than the students in the control groups after learning through differentiated instruction-based content. Improvement was observed in both settings during the post-test, which indicates that

differentiated instruction-based content was more effective than traditional content for enhancing students' learning in EVS.

These findings are supported by the study conducted by Muksalmina and colleagues, who reported that differentiated instruction helps improve the learning of students with special needs in inclusive classrooms. Similar to their findings, the present study also showed that when content is adapted according to learners' needs and learning levels, students are able to understand concepts better and participate more actively in the classroom.

Overall, the findings of this study show that differentiated instruction works well for teaching Environmental Studies at the primary level. It not only helps in improving students' academic performance but also makes the classroom more engaging and supports inclusive learning for all students.

CHAPTER - 6

SUMMARY AND CONCLUSION

6.1 Summary of the Study

The present study was conducted to examine the effectiveness of differentiated instruction-based content vs traditional content in teaching Environmental Studies (EVS) among Grade V learners in inclusive classrooms. The study was mainly undertaken because, during the review of related literature, it was observed that although many studies are available on differentiated instruction, only limited studies focused specifically on EVS at the primary level, especially in the Indian classroom context. Most of the earlier studies were related to subjects like mathematics, language learning, science, or higher education. Very few studies examined differentiated instruction among Grade V learners in inclusive classrooms.

Environmental Studies is an important subject at the primary level because it helps children understand their surroundings and daily life experiences through observation, activities, and practical learning. At the same time, learners in inclusive classrooms differ in their readiness levels, interests, and learning profiles. Because of these learner differences, the researcher felt the need to prepare differentiated instruction-based EVS content that could support diverse learners more meaningfully.

Aim of the study

The main aim of the study was to compare the effectiveness of differentiated instruction-based content and traditional content among Grade V learners. The study also focused on learner readiness, learner interest, and learner learning profile as important components of differentiated instruction.

Method

Research Design

The study followed a quasi-experimental pre-test post-test control group design. The research was conducted in both general school and special school settings in Mysore. Experimental and control groups were included in both settings. The experimental groups were taught through differentiated instruction-based EVS content, while the control groups were taught through traditional content.

Participants

The study was conducted with a total of 31 participants from both general and special schools. In the general school, 11 students were included in the control group and 11 students were included in the experimental group. In the special school, 4 students were included in the control group and 5 students were included in the experimental group. Thus, the control group consisted of 15 students and the experimental group consisted of 16 students in total.

Development of Tool and test material

Before developing the content, information related to learners' characteristics, classroom participation, strengths, previous academic performance, interests, and learning preferences was collected with the support of teachers and school records. A checklist and learner profile details were used to understand learner differences properly.

Based on learner readiness, learner interest, and learner learning profile, differentiated instruction-based content was prepared for the experimental groups. Separate learning materials and question papers were prepared for below average,

average, and above average learners according to their learning levels. The pre-test and post-test included questions from knowledge, understanding, and application domains. Blueprint and weightage distribution tables were also prepared to maintain proper balance among cognitive levels and differentiated instruction components.

Data collection

First, the general school and special school were selected for conducting the study. After selecting the schools, permission and approval were taken from the respective school authorities. Then the participants were divided into control and experimental groups. After group formation, lesson plans, teaching-learning materials, pre-test, and post-test materials were prepared for the intervention process.

Intervention

The same teaching methods and classroom materials were used for both experimental and control groups. The main difference was only in the content. In the general school setting, teaching was carried out through lecture method and role play activities. In the special school setting, teaching was conducted through role play and with the support of sign language assistance provided by the teachers. Thus, the method of teaching and classroom materials remained similar, while the content for the experimental group was modified according to differentiated instruction principles.

Administration of post- test

After the intervention, post-tests were administered to both groups. The collected data were analyzed using descriptive and inferential statistics. Statistical

techniques such as t-test, Mann–Whitney U test, and Wilcoxon test were used for analyzing the obtained scores and comparing the performance of different groups.

Result

The findings of the study showed that the performance of the experimental groups was better than the control groups in both general school and special school settings. The differentiated instruction-based content helped learners improve their understanding and classroom performance in EVS. Improvement was also observed in all three components, namely learner readiness, learner interest, and learner learning profile.

The study further showed that below average and average learners demonstrated considerable improvement after the intervention. Above average learners also showed progress, although the improvement level was comparatively lower because their pre-test performance was already higher. Overall, the differentiated instruction-based content supported meaningful participation and better learning experiences among diverse learners.

The findings of the study indicate that differentiated instruction-based content can be an effective approach for teaching EVS at the Grade V level in inclusive classrooms. The study highlights the importance of addressing learner differences and providing flexible learning opportunities according to students' educational needs.

Table 6.1 Time Schedule

Sl.NO.	Activity	0-2month	2-4month	4-6month	6-8month	8-9month
1	Introduction & Review of literature	•Identification of research problem - Review of related literature •Identification of research gap •Preparation of objectives and hypothesis				
2	Development of Tool	I	•Preparation of checklist •Collection of learner information •Development of DI-based content •Preparation of pre-test and post-test •Preparation of blueprint and weightage table •Validation of tools and content Conducting pilot study			

			•Modification and finalization of tool			
3	Data collection			Seeking schools permission •Administration of pre-test •Intervention for experimental and control groups •Administration of post-test		
4	Data Analysis and Interpretation				•Scoring and tabulation of data •Statistical analysis using •Interpretation of results	
5	Report Writing					• Writing summary and conclusion •Preparation of final report

6.2 Conclusion

The findings of the present study showed that differentiated instruction-based content was more effective than traditional content in teaching Environmental Studies among Grade V learners in inclusive classrooms. Improvement was observed among

learners of all levels, including below average, average, and above average learners. However, the improvement was found to be more noticeable among below average and average learners after the intervention. The results also indicated positive changes in learner readiness, learner interest, and learner learning profile in both general and special school settings. When the content was adjusted according to students' different learning needs, they took part more actively in class and were able to understand EVS concepts in a much better and meaningful way.

Overall, the study suggests that differentiated instruction can be an effective and supportive approach for improving learning experiences and classroom participation among diverse learners in inclusive classrooms.

6.3 Limitations of the Study

- Preparation of differentiated content for below average, average, and above average learners was very time-consuming.
- Separate modification of text, pictures, and activities had to be done according to learners' readiness, interest, and learning profile.
- Managing all three learner levels together in the same classroom was difficult during the intervention.
- Content designed for below average learners appeared too easy for above average learners, while higher-level content became difficult for below average learners.
- Maintaining equal classroom engagement for all learners at the same time was challenging.
- Explaining the same concept at different learner levels within one classroom session required continuous adjustment by the teacher.

- Limited classroom time of 45 minutes made it difficult to complete the syllabus while addressing the needs of all learners properly.
- Similar challenges were also reported by Sérgio Gaitas and Margarida Alves Martins, who found that teachers often face difficulties in adapting activities, materials, and classroom instruction according to students' readiness, interests, and learning profiles.

6.4 Implications for Further Studies

The present study focused mainly on differentiated instruction-based content in EVS for Grade V learners. Future studies can be conducted on other elements of differentiated instruction such as process and product to understand their effectiveness in inclusive classrooms. Researchers can also apply learner readiness, learner interest, and learning profile components while designing classroom activities, teaching methods, and assessment tasks.

Further research may be conducted in different subjects, grade levels, and school settings with larger sample sizes and longer intervention periods. Similar studies can also be carried out with different categories of children with special needs to understand how differentiated instruction supports diverse learners in various classroom situation.

References

- Bhagarathi, L. K., Indardat, A., De France, N., Baksh, A., Ally-Charles, B. R., & Cossiah, C. (2025). Comparing the effectiveness of differentiated instruction versus conventional (traditional) instruction on the performance of Grade 8 integrated science students at a secondary school in Region 6, Guyana: A preliminary study. *International Journal of Advanced Academic Studies*, 7(3), 103–113. <https://doi.org/10.33545/27068919.2025.v7.i3b.1402>
- Dixon, F. A., Yssel, N., McConnell, J. M., & Hardin, T. (2014). *Differentiated instruction, professional development, and teacher efficacy*. *Journal for the Education of the Gifted*, 37(2), 111–127. <https://doi.org/10.1177/0162353214529042>
- Ferlazzo, L. (2017). *Differentiated instruction doesn't have to be so hard*. Education Week. <https://www.edweek.org/>
- Gaitas, S., & Martins, M. A. (2017). *Teacher perceived difficulty in implementing differentiated instructional strategies in primary school*. *International Journal of Inclusive Education*, 21(5), 544–556.
- Ghosh, S., & Sankar, C. S. (2025). Teacher as facilitator for differentiated learning in inclusive setting. *Archives of Educational Studies*. <https://doi.org/10.25215/9141001575.20>
- Kalpana, T. (2014). Differentiated instruction in the inclusive classroom. *Research Journal of Educational Sciences*, 2(7), 10–14. https://www.isca.me/EDU_SCI/Archive/v2/i7/2.%20ISCA-RJEduS-2014-025.php
- Kurniawan, P. F., & Puspita, R. D. (2024). *Effectiveness of differentiated instruction on Grade 5 students' learning outcomes in science*. *Pendas: Jurnal Ilmiah Pendidikan Dasar*. <https://doi.org/10.23969/jp.v10i2.25649>

- Langelaan, M., van Geel, M., Keuning, T., & Visscher, A. J. (2024). *Teacher preparation and development for differentiated instruction: A systematic review*. *Frontiers in Education*, 9, Article 1356675.
<https://doi.org/10.3389/feduc.2024.1356675>
- Liou, S.-R., Cheng, C.-Y., Chu, T.-P., Chang, C.-H., & Liu, H.-C. (2023). *Effectiveness of differentiated instruction on learning outcomes and learning satisfaction in the evidence-based nursing course: Empirical research quantitative*. *Nursing Open*, 10(10), 6794–6807.
<https://doi.org/10.1002/nop2.1926>
- Magableh, I. S. I., & Abdullah, A. (2020). *On the effectiveness of differentiated instruction in the enhancement of Jordanian students' overall achievement*. *International Journal of Instruction*, 13(2), 533–548.
<https://doi.org/10.29333/iji.2020.13237a>
- Manuel, P. J., & Mempin, J. R. (2025). *A meta-synthesis of the effectiveness of differentiated instruction strategies on students' academic performance in mathematics*. *International Journal of Research and Innovation in Social Science*, 9(8), 1767–1775. <https://doi.org/10.47772/IJRISS.2025.908000148>
- Masyeni, R. N. K., Lestari, N. A. P., & Astuti, N. M. I. P. (2025). *Pengaruh model pembelajaran berdiferensiasi pada hasil belajar IPAS siswa kelas V Gugus 5 Sudirman*. *Jurnal BELAINDIKA: Pembelajaran dan Inovasi Pendidikan*, 7(2), 388–397. <https://doi.org/10.52005/belaindika.v7i2.393>
- Muksalmina, M., Istiarsyah, I., Kamarullah, K., & Sabaruddin, S. (2024). *Effectiveness of differentiated instruction model for special needs students in inclusive classrooms*. In *Proceedings of the International Conference on Special Education in Southeast Asia Region (ICSAR 2024)* (pp. 220–226).
- Muthomi, M. W., & Mbugua, Z. K. (2014). *Effectiveness of differentiated instruction on secondary school students' achievement in mathematics*. *International Journal of Applied Science and Technology*, 4(1), 116–122.
<https://karuspace.karu.ac.ke/handle/20.500.12092/1684>

- National Council of Educational Research and Training. (2005). *National curriculum framework 2005*. NCERT.
- National Council of Educational Research and Training. (2019). *Looking around: Environmental studies textbook for Grade 5*. NCERT.
- Putri, F. R., Yantoro, & Rosmalinda, D. (2024). *Analisis pembelajaran berdiferensiasi pada mata pelajaran IPAS kelas V sekolah dasar*. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(2).
<https://doi.org/10.23969/jp.v10i2.25273>
- Reis, S. M., & Renzulli, J. S. (1995). *Curriculum compacting: A systematic procedure for modifying the curriculum for above average ability students*. The National Research Center on the Gifted and Talented, University of Connecticut.
- Reis, S. M., & Renzulli, J. S. (2016). The Schoolwide Enrichment Model: A focus on student strengths and interests. In S. M. Reis (Ed.), *Reflections on gifted education: Critical works by Joseph S. Renzulli and colleagues* (pp. 251–269). Prufrock Press.
- Safawi, S. S., & Akay, C. (2022). The effect of differentiated instruction approach on students' academic achievement and attitudes: A meta-analysis study. *African Educational Research Journal*, 10(4), 413–422.
<https://doi.org/10.30918/AERJ.104.22.099>
- Sankardas, S. A. (2021). Parent and teacher perspectives on differentiated instruction for inclusion of children with autism in India. *Asian Journal of Inclusive Education*, 9(1), 53–85. <http://www.ajie-bd.net>.
- Sen, S. (2021). *Differentiated instructions in Indian inclusive education*. *International Journal of Creative Research Thoughts*, 9(6), 832–842.
<https://www.ijcrt.org>

- Sharma, B. U. (2024). Differentiated instruction for inclusive learning environments. *International Journal of Creative Research Thoughts*, 12(6), a135–a140. <https://www.ijcrt.org>
- Singal, N. (2019). Challenges and opportunities in efforts towards inclusive education: Reflections from India. *International Journal of Inclusive Education*, 23(2), 1–14.
<https://doi.org/10.1080/13603116.2019.1624845>
- Singh, A. C., & Pyara, R. (2025). *Teaching at the right level and inclusion study*. ResearchGate.
- Subban, P. (2006). Differentiated instruction: A research basis. *International Education Journal*, 7(7), 935–947. <http://iej.com.au>
- Tomlinson, C. A. (1999). *The differentiated classroom: Responding to the needs of all learners*. ASCD.
- Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms* (2nd ed.). ASCD.
- Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners* (2nd ed.). ASCD.
- Tomlinson, C. A., & Imbeau, M. B. (2010). *Leading and managing a differentiated classroom*. ASCD.
- Unal, A., Unal, Z., & Bodur, Y. (2022). Differentiated instruction and kindergarten through 5th grade teachers. *Georgia Educational Researcher*, 19(2), 1–24.
<https://doi.org/10.20429/ger.2022.190202>
- Vartak, P. (2025). *Tailoring education for diverse learners: A study on differentiated instruction*. *Scholarly Research Journal for Interdisciplinary Studies*, 13(87), 82–88. https://www.srjis.com/issues_data/246

APPENDIX - 1

Blueprint of the Pretest based on Bloom's Taxonomy

Sl.No	Title	Knowledge(1m)		Understanding (2m Short Q)	Application (5m LongQ)	Total Question	Total Marks
		Mcq	Match				
1	The Solar System	1	-	-	-	1	1
2	The Sun	1	1	1	-	3	4
3	Shape of Earth	1	1	-	-	2	2
4	Planets	2	2	1	-	5	6
5	Moon	-	1	1	-	2	3
6	Natural Satellite	-	-	1	-	1	2
7	Rotation of Earth	-	-	1	-	1	2
8	Day & Night	-	-	-	-		
9	Sun vs Stars	-	-	-	-		
10	Asteroids & Comets	-	-	-	1	1	5
11	Total	5	5	5	1	16	25

APPENDIX- 2**PRE TEST SCORING SHEET**

Sl.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 5 = 5$	
2	Match of the following	$1 \times 5 = 5$	
3	Write a short note	$2 \times 5 = 10$	
4	Long question	$5 \times 1 = 5$	
5	Total Score	25	

APPENDIX-3

Blueprint of the post-test based on Bloom's Taxonomy for Below Average learners

Sl.No	Title	Knowledge (1m mcq)	Understanding (2m Short Q)	Application (5m LongQ)	Total Question	Total Mark
1	The Sun and its family	3	-	-	3	3
2	The sun	1	1	-	2	3
3	Ancient idea about sun	-	1	-	1	2
4	Planets	1	-	-	1	1
5	Earths	1	-	-	1	1
6	Movement of the Earth	1	1	-	2	3
7	Day and Night	1	-	1	2	6
8	Earth has life	-	1	-	1	2
9	Planets and its characteristics	1	-	1	2	6
10	Asteroids & Comets	-	1	-	1	2
11	The Moon	1	-	-	1	1
12	Total	10	5	2	17	30

APPENDIX- 4

Blueprint of the post-test based on Bloom's Taxonomy for Average learners

Sl.No	Title	Knowledge (1m mcq)	Understanding (2m Short Q)	Application (5m LongQ)	Total Question	Total Marks
1	The Sun and its family	1	-	-	1	1
2	The sun	1	1	-	2	3
3	Ancient idea about sun	1	1	-	2	3
4	Planets	1	1	-	2	3
5	Earths	1	-	-	1	1
6	Movement of the Earth	1	1	1	3	8
7	Day and Night	-	-	1	1	5
8	Earth has life	-	1	-	1	2
9	Planets and its characteristics	1	-	-	1	1
10	Asteroids & Comets	1	-	-	1	1
11	The Moon	-	1	-	1	2
12	Total	8	6	2	16	30

APPENDIXS - 5

Blueprint of the post-test based on Bloom's Taxonomy for Above Average learners.

Sl.No	Title	Knowledge		Understanding		Application		Total Question	Total Marks
	THE SKY	Mcq (1m)	Fill in the blanks (1m)	Mcq (1m)	S. Q (3m)	T. Q (3m)	L. Q (4m)		
1	The Sun and its family	1	-	-	-	-	-	1	1
2	The sun	1	-	-	-	-	-	1	1
3	Ancient idea about sun	1	-	-	1	-	-	2	4
4	Planets	-	1	1	1	-	-	3	6
5	Earths	1	1	-	-	-	-	2	2
6	Movement of the Earth	-	1	-	-	-	-	1	2
7	Day and Night	-	-	1	-	-	-	1	1
8	Earth has life	-	1	-	1	-	-	2	4
9	Planets and its characteristic	1	-	-	-	-	1	2	5
10	Asteroids & Comets	1	-	-	1	-	-	2	4
11	The Moon		2	-	-	-	-	2	2
12	Total	12		6		1		19	30

APPENDIX - 6**POST TEST SCORING SHEET**

Below average level			
Sl.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 10 = 10$	
2	Write a short note	$2 \times 5 = 10$	
3	Long question	$5 \times 2 = 10$	
4	Total Score	30	
Average level			
Sl.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 8 = 8$	
2	Write a short notes	$2 \times 6 = 12$	
3	Long question	$5 \times 2 = 10$	
4	Total Score	30	
Above average level			
Sl.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 8 = 8$	
2	Match the following	$1 \times 6 = 6$	
3	Write a short notes	$3 \times 4 = 12$	
4	Long question	$4 \times 1 = 4$	
5	Total Score	30	

APPENDIXS- 7

School Permission Letter for Data Collection from general school.

Date: 22/01/26

From,
Ankita Suman
Student, M.Ed. Special Education(Hearing Impairment)
Department of Special Education, AIISH, Mysuru

To,
The Acme School, Rotary Sudarshini Building,
Nivedithangar, Mysuru

Through Guide and HoD - Special Education

Sub : Permission to administer the research tool and to collect data from Grade 5 students.

Respected Sir/Madam,

With respect to the above subject, the All India Institute of Speech and Hearing is conducting a two-year Master Of Special Education (Hearing Impairment) program . As part of my Master's dissertation, I am conducting a study titled **"Effectiveness of Differentiated Instruction-Based Content vs Traditional Content on Environmental Science of Grade V Inclusive Classroom"**

For the purpose of this research, I have developed an adapted content as per the differentiated instruction principle for Grade 5 EVS subject at three different levels such as Easy, Moderate and Difficult. In this regard, I wish to do teaching for Grade V students with the adapted content in your esteemed institution as a data collection.

The classroom will be divided into two sections as control group and experimental group. 20 students from each group will be involved for the study. Prior concern from the students and respective teachers will be taken to meet the ethical consideration. The collected data will be used solely for academic purposes and will be kept strictly confidential. The study will be carried out without disturbing the regular academic schedule of the school.

In this regard, I Kindly request your permission for the same. Your cooperation and support in facilitating this research will be highly appreciated.

Thanking you in anticipation of your kind consideration.

9709732689

Ankita
Yours faithfully,
Ankita Suman
M.Ed.Spl.Ed (Hearing Impairment)

D. Dhivya
21/01/2026
Guide- Ms.Dhivya D
Lecturer- Special Education,
AIISH, Mysuru

Dr. Jayashree C. Shanbal
Dr. Jayashree C. Shanbal
Professor & HOD -Special Education,
AIISH, Mysuru

Given Permission
CB. Sridhar
23/01/2026

APPENDIX - 8

School Permission Letter for Data Collection from Special School

Date: 5-03-2026

From,
Ankita Suman
Student, M.Ed. Special Education(Hearing Impairment)
Department of Special Education, AIISH, Mysuru

To,
Seventh Day Adventist School for Speech and Hearing,
kollegal.

Through Guide and HoD - Special Education

Sub: Permission to administer the research tool and to collect data from Grade 5 students.

Respected Sir/Madam,

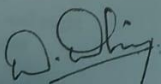
With respect to the above subject, the All India Institute of Speech and Hearing is conducting a two-year Master Of Special Education (Hearing Impairment) program . As part of my Master's dissertation, I am conducting a study titled **"Effectiveness of Differentiated Instruction-Based Content vs Traditional Content on Environmental Science of Grade V Inclusive Classroom"**

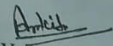
For the purpose of this research, I have developed an adapted content as per the differentiated instruction principle for Grade 5 EVS subject at three different levels such as Easy, Moderate and Difficult. In this regard, I wish to do teaching for Grade V students with the adapted content in your esteemed institution as a data collection.

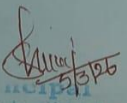
The classroom will be divided into two sections as control group and experimental group. 20 students from each group will be involved for the study. Prior concern from the students and respective teachers will be taken to meet the ethical consideration. The collected data will be used solely for academic purposes and will be kept strictly confidential. The study will be carried out without disturbing the regular academic schedule of the school.

In this regard, I Kindly request your permission for the same. Your cooperation and support in facilitating this research will be highly appreciated.

Thanking you in anticipation of your kind consideration.


 Guide- Ms.Dhivya D
 Lecturer- Special Education,
 AIISH, Mysuru


 Yours faithfully,
Ankita Suman
 M.Ed.Spl.Ed (Hearing Impairment)


 Seventh Day Adventist School for
 Speech and Hearing
 Siddalahnapura Post
 Kollegal - 571 440

APPENDIX - 9**Photographs of Data Collection Process**

MATERIAL - 1

Checklist for Identifying Students' Readiness, Interests, and Learning Profiles

Sr. No	Information Area	Details																												
1	School ID																													
2	Age	____ Years ____ Months																												
3	Grade	V																												
4	Approximate Grade Level																													
5	Language of Instruction	Kannada ☐ Hindi ☐ English ☐ Other ☐																												
6	Region / Locality	Urban ☐ Semi-urban ☐ Rural ☐																												
7	Socio-economic Background	Low ☐ Middle ☐ High ☐																												
8	Parental Education	Illiterate ☐ Primary ☐ Secondary ☐ Graduate ☐ Postgraduate ☐																												
9	Learning Style	Visual ☐ Kinesthetic ☐ Auditory ☐ Multimodal ☐																												
10	Preferred Learning Activities	Reading ☐ Writing ☐ Listening ☐ Hands-on learning ☐ Group activity ☐																												
11	Strengths in Learning	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th><th style="width: 15%;">Below average</th><th style="width: 15%;">Average</th><th style="width: 30%;">Above average</th></tr> </thead> <tbody> <tr> <td>Academic</td><td></td><td></td><td></td></tr> <tr> <td>Cognitive</td><td></td><td></td><td></td></tr> <tr> <td>Emotional and Social</td><td></td><td></td><td></td></tr> <tr> <td>Co-curricular (Eassy , poem , Science exhibition etc.)</td><td></td><td></td><td></td></tr> <tr> <td>Extra curricular (sports , painting , music, dance etc)</td><td></td><td></td><td></td></tr> <tr> <td>Others (specify)</td><td></td><td></td><td></td></tr> </tbody> </table>		Below average	Average	Above average	Academic				Cognitive				Emotional and Social				Co-curricular (Eassy , poem , Science exhibition etc.)				Extra curricular (sports , painting , music, dance etc)				Others (specify)			
	Below average	Average	Above average																											
Academic																														
Cognitive																														
Emotional and Social																														
Co-curricular (Eassy , poem , Science exhibition etc.)																														
Extra curricular (sports , painting , music, dance etc)																														
Others (specify)																														
12	Challenges / Difficulties Observed	Academic Coginitive																												

		Emotional and social
13	Overall academic performance of the child .	
Chapter name		
Readiness of learners		
Intreset of learnerns		
Learning preferences		

MATERIAL 2

Pre -Test

Total : 25marks

PART A

Multiple Choice Questions (MCQs) –

5 marks

1. **How many planets are there in the Solar System?**

- a) 7
- b) 8
- c) 9
- d) 6



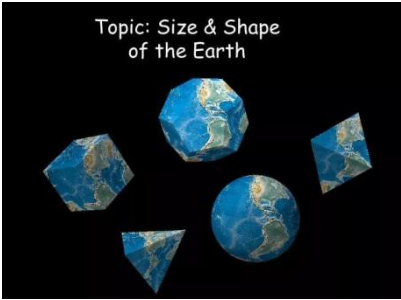
2. **The Sun appears to rise in the _____.**

- a) North
- b) South
- c) East
- d) West



3. **The shape of the Earth is called _____.**

- a) Sphere
- b) Circle
- c) Geoid
- d) Cube



4. Which planet is known as the Red Planet?

- a) Venus
- b) Jupiter
- c) Mars
- d) Mercury



5. The Moon shines because it _____.

- a) Has its own light
- b) Burns gases
- c) Reflects Sun's light
- d) Produces fire



Match the following :

(5marks)

1	Sun	Natural satellite of Earth
2	Moon	Spins on its axis
3	Earth	A star

4	Mars	Shape of Eath
5	Geoid	Red Planet

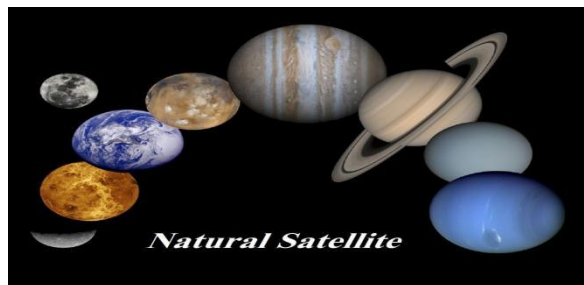
PART B

Short Questions –

5 *2 = 10 marks

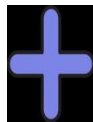
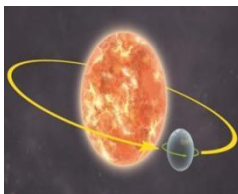
Q11. Attempt any ONE:

- Name the natural satellite of the Earth.
- What is a natural satellite?
- Describe the Moon as Earth's natural satellite using a daily life example (e.g., night sky, stories, or observation).



Q12. Attempt any ONE:

- How many hours does the Earth take to complete one rotation?
- What is meant by rotation of the Earth?



13. a) Which is the largest planet in the Solar System?
 b) Name any one planet of the Solar System.
 c) Write one interesting fact about any planet of your choice (you may imagine or recall from stories/books).



14. What is the causes of day and night?



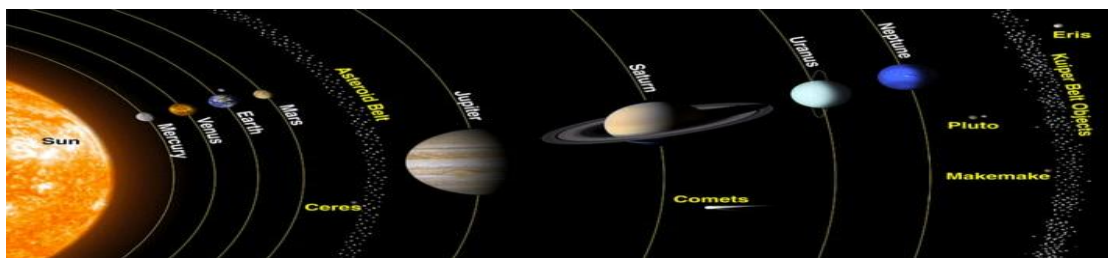
- Q15. a) Why does the Sun look bigger and brighter than other stars?



PART - C

Long question answer
(5marks)

Q.16 Answer any ONE based on the given picture:



- Describe comets and asteroids and write their position in the Solar System.
- Using the picture, compare comets and asteroids in a table (any 3 points).

MATERIAL 3

PRE TEST SCORING SHEET

Sl.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 5 = 5$	
2	Match of the following	$1 \times 5 = 5$	
3	Write a short notes	$2 \times 5 = 10$	
4	Long question	$5 \times 1 = 5$	
5	Total Score	25	

MATERIAL 4

DIFFERENTIATED INSTRUCTION BASED CONTENT

BELOW AVERAGE LEARNER

THE SKY

THE SUN AND ITS FAMILY

- THE Sun has a big family.
- This family is called the **Solar System**.
- It has **8 planets**.
- It has many **moons**, **asteroids**, **meteoroids**, **comets**. Stars make their own light.
- The **Sun is also a star**.
- Our Solar System is in the **Milky Way**

Activity :

- Make a sun and its family on the chart paper



THE SUN

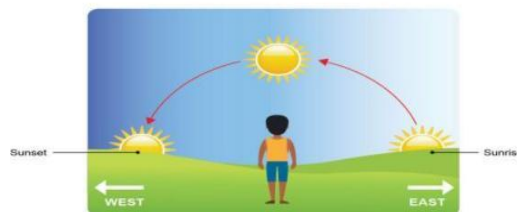
- The **Sun is a star**.
- The Sun is **closest to Earth**.
So it looks **big** and **bright**.
- The Sun is in the **centre** of the Solar System.
- All planets go around the Sun.
- The Sun gives us **light** and **heat**
- It looks like it rises in the **east** and sets in the **west**.
- Sunlight is important for **people, plants, animals**

Activity :

- Draw the sun on the chart paper and show the direction of the sun rises and sun set.

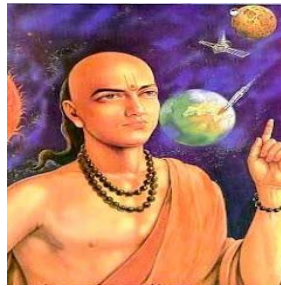
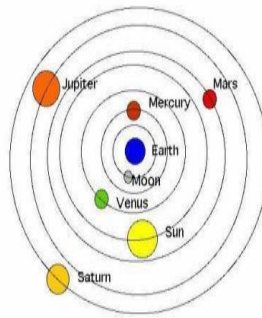


Sunrise and Sunset



Ancient ideas about sun

- Long ago, people thought the **Sun, Moon and planets** went around the **Earth**. This idea was called the **Geo-centric model**.
- A man named **Ptolemy** said this. Later, **Aryabhata** said that the **Earth and planets go around the Sun**.
- This idea was called the **Heliocentric model**.
- Other great thinkers like **Copernicus, Kepler, and Galileo** agreed
- Galileo made a **telescope** to study the sky.
- **Activity :**



1. Who gave Heliocentric model?
2. Who made telescope?

THE PLANETS

- A **planet** goes around the **Sun**. It moves in a **round path** called an **orbit**.
- The Earth also has its **own orbit**.
- Planets do **not have their own light** (non-luminous).
- They get **light and heat** from the **Sun**.



THE EARTH

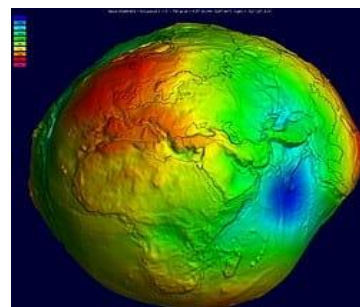
Earth is our home.- It is the 3rd planet from the Sun.- Life is possible on Earth because of air, water, and right temperature.

- Earth is not fully round.
- It is a little flat at the top and bottom.- The Earth is big.
- Its size is different at the middle and at the poles.

Activity:

1. Match words:

- | | | |
|-----------|---|-------|
| A. Earth | — | Life |
| B. . Sun | — | Home |
| C. Water— | | Light |

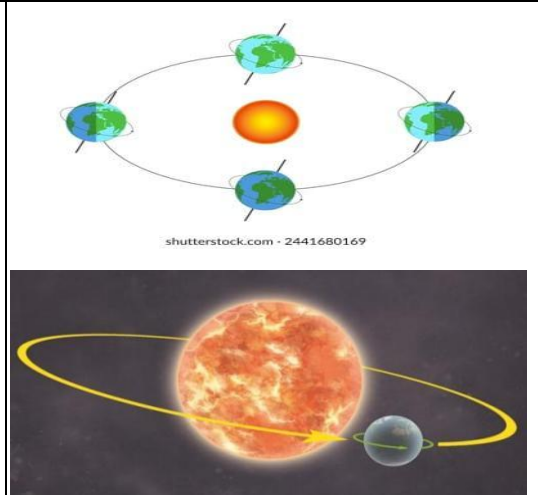


Water and air on Earth



Movement of Earth

- The Earth moves in **two ways**:
- **Rotation** – Earth **spins** like a top.
- **Revolution** – Earth **goes around the Sun**.
- Earth spins from **west to east**.
- Earth keeps spinning **while** going around the Sun.
- **ACTIVITY :**
Draw revolution and rotation .

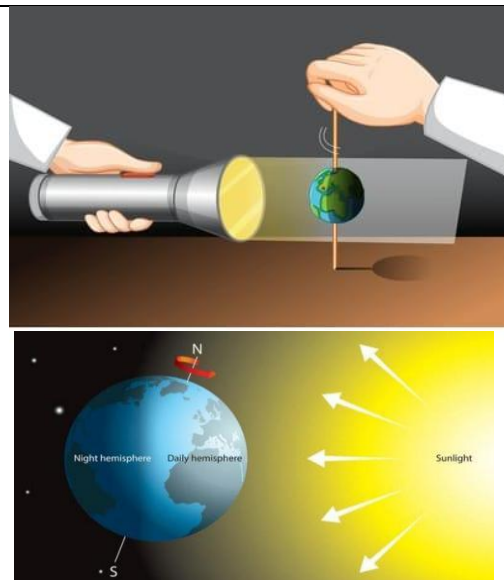


Day and night

- Day comes when Earth faces the Sun.- Night comes when Earth turns away from the Sun.-
- Earth turns (rotates) from west to east.- Sun looks like rising in east and setting in west.-
- Earth takes 24 hours = 1 day.-
Earth takes 365 days = 1 year.

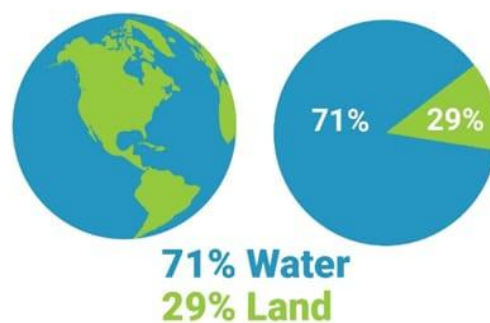
Activities:

Torch and ball activity to show day and night.



Earth Has Life

- Earth has life.- Earth has air, water, and land.- 71% of Earth is water.- 29% is land.-
- Air has oxygen for breathing.- Plants need air and water.- Earth has good climate.
- **Activity:**



1. Tick the things needed for life:
(Air, Toys, Water, Food, Soil).
2. Draw: Water–Land on Earth

Planet and its characteristic

- There are 8 planets around the Sun.- Order: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.- Pluto is not a planet now. It is a dwarf planet.
- **Planet Facts :- Mercury:** nearest to Sun, very hot, no water.-
- **Venus:** brightest planet, morning/evening star.-
- **Mars:** red planet, looks dusty.-
- **Jupiter:** biggest planet, has red spot.-
- **Saturn:** beautiful rings.
- **Uranus:** blue-green planet.
- **Neptune** is the 8th planet from the Sun.- It is bright blue in colour.- It is very cold because it is very far from the Sun.

Rotation = time to spin once.

Revolution = time to go around Sun.

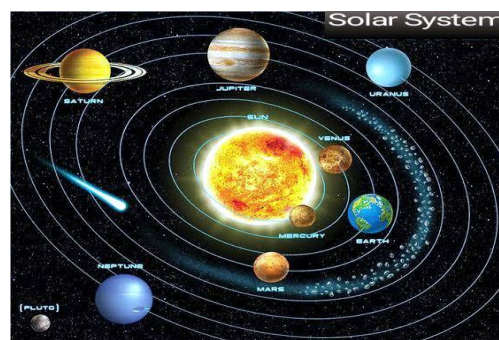
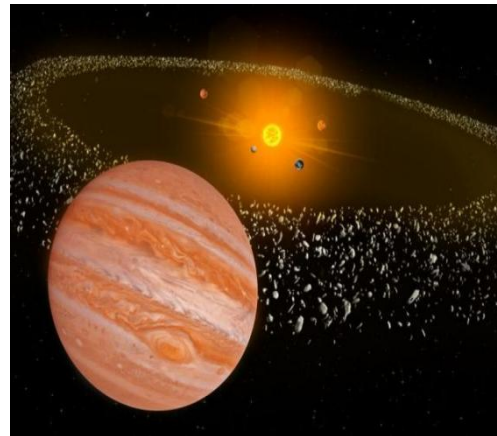
Activities:

1. Arrange planets in order.



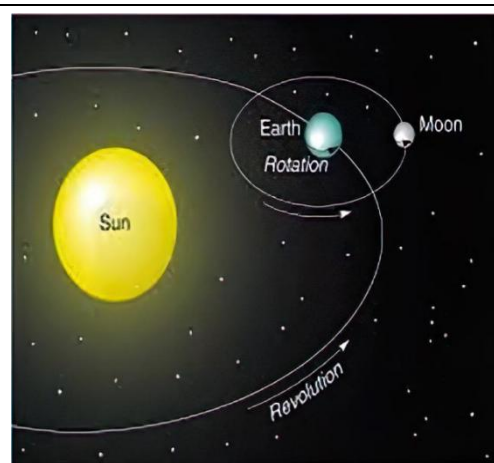
Asteroids & Comets

- Asteroids are small rocky bodies that go around the Sun. They are found mostly between **Mars and Jupiter**.
- **Orbit** means the path in which a planet or object moves around the Sun.
- **Comets** are ice balls that give out gas and dust. They look bright when they come near Earth and have a **long tail** near the Sun.
- **Activity:**
 1. Draw a Sun and show small stones (asteroids) going around it.



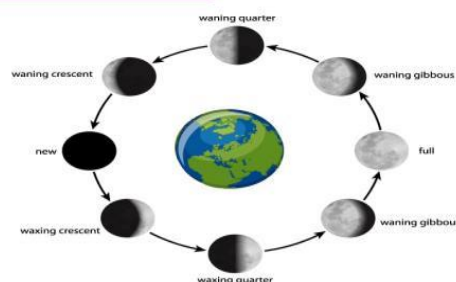
The moon

- The moon is the Earth's **only natural satellite**. It goes around the Earth.
- The Moon does not have its own light. We see it at night because it **reflects sunlight**. The Moon moves in two ways: it **rotates** and it **revolves** around Earth.
- It looks different every night—these changes are called **phases of the Moon**.
- A fully dark Moon is **New Moon** and a fully bright Moon is **Full Moon**.



PHASES OF THE MOON

BYJU'S



Activity:

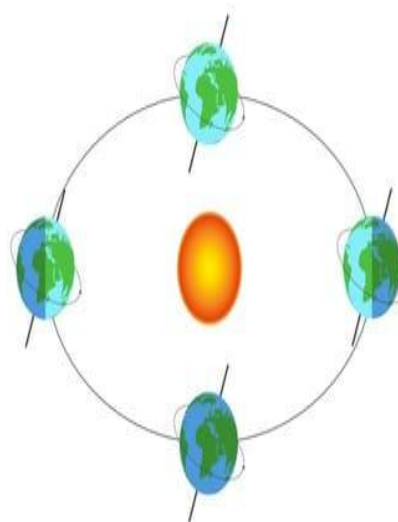
Draw the Moon and shade half to show where sunlight falls.

Question:

Does the Moon have its own light?

A DAY ,MONTH , YEAR

- A day is the time Earth takes to turn once on its axis.
- A **year** is the time Earth takes to go around the Sun once.
- A **month** is the time the Moon takes to go around the Earth. In a dark room, when we shine a torch on a big ball and a small ball, light falls on one side and **shadow** forms on the other side.
- **Activity:**
 1. Draw Earth turning once (day). Draw Moon going once around Earth (month).



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SUMMARY

- The **Sun and all planets** make the Solar System. Mars has two moons—**Phobos and Deimos**.
- Jupiter has many moons. Earth is the only planet with **life**. Some satellites are made by humans like **Aryabhata**.
- The first man to walk on the Moon was **Neil Armstrong**.



- Big planets like Jupiter, Saturn, Uranus, and Neptune are called **Gas Giants**

GLOSSARY

Sky

Meaning: Space above the Earth
Synonyms: *Heaven, Open sky*
Sentence: *Birds fly in the sky.*

Heaven

Meaning: Place above the sky
Synonyms: *Sky, Paradise*
Sentence: *People believe heaven is peaceful.*

Meteor

Meaning: Space rock burning in sky
Synonyms: *Fire rock, Shooting star*
Sentence: *A meteor moves fast.*

Rainy Season

Meaning: Time of heavy rain
Synonyms: *Wet season, Monsoon*
Sentence: *We wear raincoats in rainy season.*

Wind

Meaning: Moving air
Synonyms: *Air, Breeze*
Sentence: *Wind is blowing*

Storm

Meaning: Bad weather
Synonyms: *Heavy rain, Strong wind*
Sentence: *Storm damaged houses.*

Rain

Meaning: Water from clouds
Synonyms: *Shower, Drizzle*
Sentence: *Rain fills rivers.*

Day

Meaning: Time of sunlight
Synonyms: *Daytime, Morning time*
Sentence: *School is in the day.*

Star

Meaning: Bright object in the night sky
Synonyms: *Light, Shining body*
Sentence: *Stars shine at night.*

Shooting Star

Meaning: A rock burning in the sky
Synonyms: *Meteor, Falling star*
Sentence: *I saw a shooting star.*

Monsoon

Meaning: Rainy season in India
Synonyms: *Rain season, Wet time*
Sentence: *Monsoon helps crops grow.*

Thunder

Meaning: Loud sky sound
Synonyms: *Boom, Loud noise*
Sentence: *Thunder makes noise.*

Lightning

Meaning: Bright sky light
Synonyms: *Flash, Bright light*
Sentence: *Lightning looks scary.*

Air

Meaning: Gas we breathe
Synonyms: *Wind, Atmosphere*
Sentence: *Air is important.*

Land

Meaning: Ground
Synonyms: *Soil, Earth*
Sentence: *We live on land.*

Shadow

Meaning: Dark shape
Synonyms: *Dark part, Shade*
Sentence: *Shadow forms behind us*

West

Meaning: Sunset side

Night Meaning: Time of darkness Synonyms: <i>Dark time, Nighttime</i> Sentence: <i>We sleep at night.</i> Solar System Meaning: Sun and its family Synonyms: <i>Sun family, Space system</i> Sentence: <i>Earth is in solar system.</i> Planets Meaning: Bodies moving around Sun Synonyms: <i>Worlds, Space bodies</i> Sentence: <i>Earth is a planet.</i> Worlds Meaning: Other planets Synonyms: <i>Planets, Places</i> Sentence: <i>Mars is another world.</i> Moon Meaning: Earth's natural satellite Synonyms: <i>Satellite, Natural body</i> Sentence: <i>Moon shines at night.</i> Natural Satellite Meaning: Body moving around planet Synonyms: <i>Moon, Satellite</i> Sentence: <i>Moon is natural satellite.</i> Asteroids Meaning: Space rocks Synonyms: <i>Rocky bodies, Space stones</i> Sentence: <i>Asteroids move in space.</i> Meteoroids Meaning: Small space rocks Synonyms: <i>Tiny rocks, Space dust</i> Sentence: <i>Meteoroids are small.</i> Comets Meaning: Ice rocks in space Synonyms: <i>Ice balls, Space ice</i> Sentence: <i>Comets have tails.</i> Milky Way Galaxy Meaning: Our galaxy Synonyms: <i>Star group, Galaxy</i> Sentence: <i>We live in Milky Way.</i>	Synonyms: <i>Left side, Evening side</i> Sentence: <i>Sun sets in west.</i> Earth Meaning: Our home planet Synonyms: <i>World, Planet</i> Sentence: <i>Earth is our home.</i> Life Meaning: Living things Synonyms: <i>Living beings, Animals</i> Sentence: <i>Earth has life.</i> Heat Meaning: Warmth Synonyms: <i>Hotness, Warmth</i> Sentence: <i>Fire gives heat.</i> Warmth Meaning: Feeling of heat Synonyms: <i>Heat, Comfort</i> Sentence: <i>Sun gives warmth.</i> Rises Meaning: Comes up Synonyms: <i>Appears, Goes up</i> Sentence: <i>Sun rises in east.</i> Sets Meaning: Goes down Synonyms: <i>Disappears, Goes down</i> Sentence: <i>Sun sets in west.</i> East Meaning: Sunrise side Synonyms: <i>Right side, Morning side</i> Sentence: <i>Sun rises in east</i> Orbit Meaning: Path around something Synonyms: <i>Path, Track</i> Sentence: <i>Earth follows an orbit.</i> Go Around Meaning: Move in circle Synonyms: <i>Revolve, Move around</i> Sentence: <i>Earth goes around Sun.</i> Group of Stars Meaning: Many stars together
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	Synonyms: <i>Galaxy, Star family</i> Sentence: <i>Galaxy has many star</i>
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MATERIAL 5

DIFFRENCIATED INSTRUCTION BASED CONTENT

AVERAGE LEARNER

CHAPTER - THE SKY

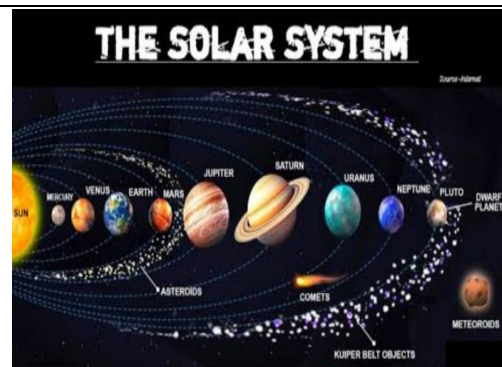
THE SUN AND ITS FAMILY

The Sun and its family together are called the Solar System. It has 8 planets, 173 satellites, and many asteroids, meteoroids and comet. Stars makes their own light, and the Sun is also a star. Our Solar System is a small part of a big galaxy called the **Milky Way**.

Activity

Match the words:

- | | |
|----------------|------------|
| 1. Sun — | (a) Galaxy |
| 2. Milky Way — | (b) Star |
| 3. Earth — | (c) Planet |



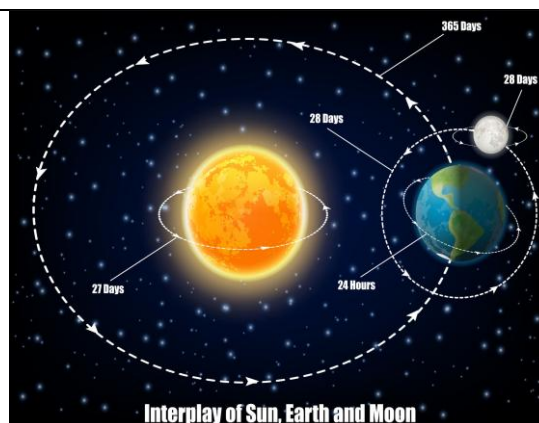
THE SUN

The Sun is a star and it is the closest star to the Earth. This is why it looks bigger and brighter than all other stars. It is the centre of the Solar System and all planets orbit around it due to its gravitational pull. The Sun gives us heat and light. It seems to rise in the east and set in the west, although the Earth is actually moving. Sunlight is very important for humans, plants and animals.

Activity

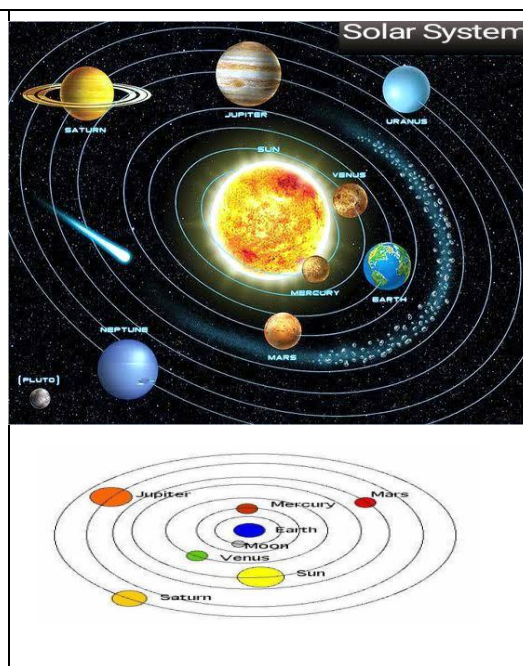
Fill in the blanks:

1. The Sun is a _____.
2. The Sun gives us _____ and _____.
3. It appears to rise in the _____



ANCIENT IDEA ABOUT SUN

In ancient times, people believed that the Sun, Moon and planets moved around the Earth. This was known as the **Geo-centric model**, explained by Ptolemy. Later, Aryabhata said that the Earth and other planets actually revolve around the Sun. This was the **Helio-centric model**, also supported by Copernicus and Kepler. Galileo invented a telescope and used it to prove that the Helio-centric model was correct.



Activity :

Match the scientist with the idea:

- | | |
|----------------|-------------------|
| 1. Ptolemy — | (a) Helio-centric |
| 2. Aryabhata — | (b) Telescope |
| 3. Galileo — | (c) Geo-centric |

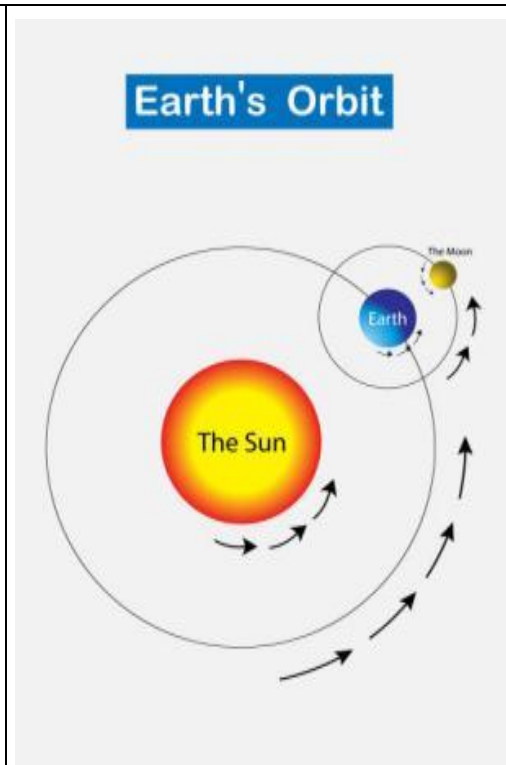
THE PLANET

A planet is a celestial body that moves around the Sun in an elliptical path called an **orbit**. Each planet has its own orbit, and the Earth also moves in its own orbit. Planets do not have their own light; they are **non-luminous**. They receive both light and heat from the Sun.

Activity:

Tick () the correct statements:

1. Planets have their own light. ()
2. Planets move around the Sun. ()
3. The path of a planet is called an orbit. ()

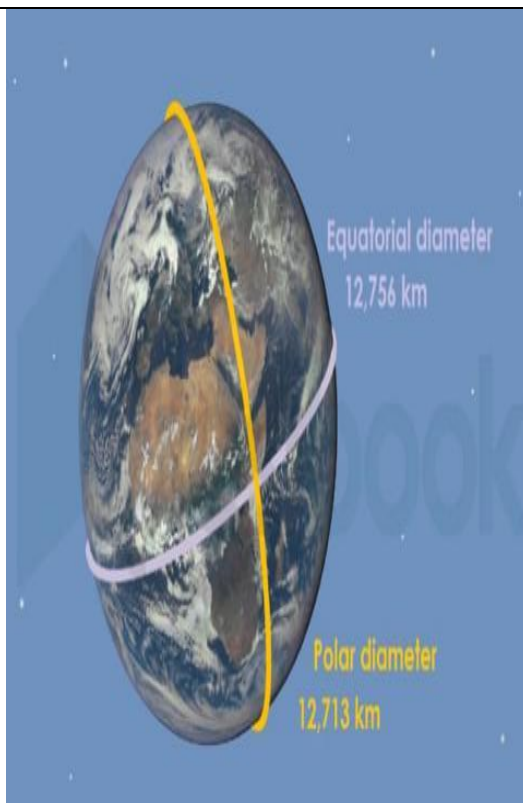


THE EARTH:

The Earth is our home and the only planet where life exists because it has air, water, and a suitable temperature. It is the third planet from the Sun. The Earth is not a perfect round shape; it is slightly flat at the poles and bulged at the equator. This shape is called a **Geoid**. The equatorial diameter of Earth is 12,757 km and the polar diameter is 12,714 km, which shows the Earth is spherical. The total area of the Earth is 510 million sq. km.

Activities:-

Make a diagram of Earth on chart paper and label it (Equator, Poles)



Movement of the earth

The Earth has two types of movements: **rotation** and **revolution**. Rotation means the Earth spins on its axis from west to east. Revolution means the Earth moves around the Sun along its orbit. The Earth rotates on its axis while it also revolves around the Sun at the same time.

Activity

Write 'R' for Rotation and 'Rev' for Revolution:

1. Earth spins on its axis — ____
2. Earth goes around the Sun — ____
3. Movement from west to east — ____

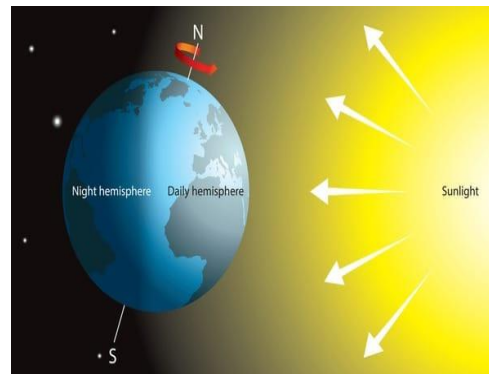


DAY AND NIGHT

The Earth rotates from west to east. The side facing the Sun has day, and the side away from the Sun has night. Because of this rotation, the Sun appears to rise in the east and set in the west. The Earth completes one rotation in 24 hours, which makes one day. It takes 365 days for one revolution around the Sun, which is called a year.

Activities:- Label diagram: Day side and Night side.-

Short Q&A(Why do we have day and night?).



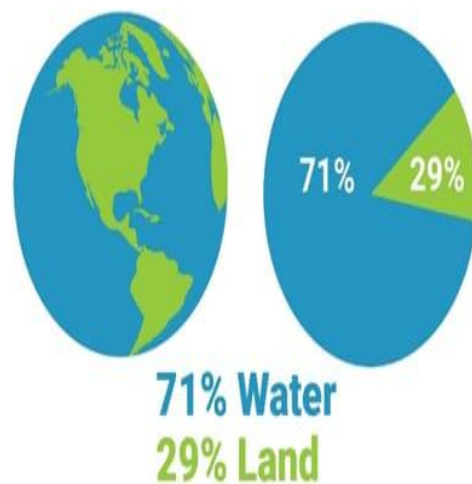
EARTH HAS LIFE:

Earth is a marvelous planet because it supports life. About 71% of its surface is covered with water and 29% with land. The atmosphere around Earth contains oxygen for breathing, nitrogen and carbon dioxide for plants. Water becomes available through the water cycle. Earth has the right distance from the Sun, suitable climate, and different types of soils that help plants grow. These conditions make life possible.

Activities:-

Label: Water, Land, Atmosphere on a diagram.-

List 3 factors needed for life on Earth ?

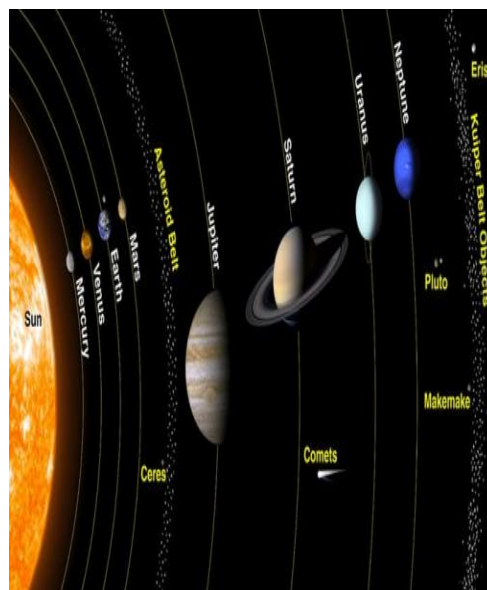


THE PLANET :

There are eight planets in the Solar System arranged in order from the Sun. They are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto was once considered the ninth planet but is now a dwarf planet. Mercury is the closest to the Sun and very hot. Venus is bright and called the morning or evening star. Mars is known as the Red Planet. Jupiter is the largest planet and Saturn has beautiful rings. Uranus looks blue-green and is made of gases like Jupiter and Saturn. Neptune is the eighth and farthest planet from the Sun. It looks bright blue and is one of the coldest planets because it is very far from the Sun. Each planet has different rotation and revolution periods. Rotation is the time a planet takes to spin on its axis, while revolution is the time it takes to orbit the Sun. For example, Earth takes 24 hours to rotate and 365 days to revolve around the Sun, but Neptune takes 16 hours 23 minutes to rotate and 165 years to revolve.

Activities:-

Draw the solar system model and mention one feature of each planet.



ASTERIODS

Asteroids are rocky objects revolving around the Sun, mostly found between the orbits of **Mars and Jupiter**. An **orbit** is the elliptical path of any object moving around the Sun. Comets are icy bodies that release gas and dust. They form a tail when they come close to the Sun,

Activity:

Draw an orbit of a comet and label its **tail** and **nucleus**.

Think about these question:

Why do comets have a tail near the Sun?



THE MOON

The moon is Earth's natural satellite and revolves around our planet. It does not have its own light; it shines because it reflects the Sun's light. The Moon rotates on its axis (27.3 days) and revolves around Earth (29.5 days). Its position changes daily, causing **phases of the Moon**. New Moon occurs when it is dark, and Full Moon when we see the whole bright side.

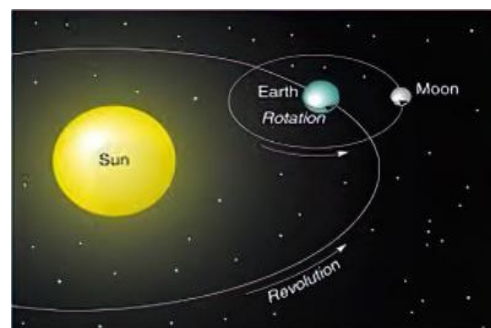
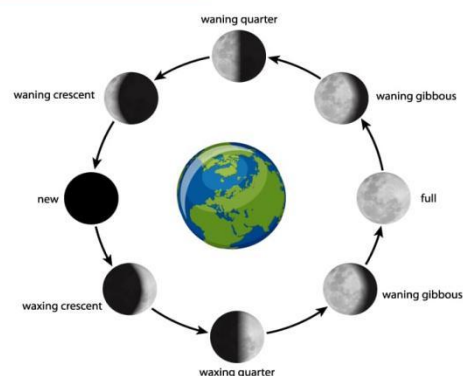
Activity:

Make a Moon-week chart and draw what you see for 7 nights.

Question:

Why do we see only reflected sunlight from the Moon?

PHASES OF THE MOON



A DAY, MONTH, YEAR

DO U KNOW ?

A **day** is formed when Earth completes one rotation (spins once).

A **year** is formed when Earth completes one revolution around the Sun.

A **month** is the duration the Moon takes to revolve around Earth. revolve around Earth. revolve around Earth.

Activity : In the light-shadow activity (torch + balls), the sunlight is the torch, the Earth is the big ball. Light falling on one side and a shadow on the other explains how phases and shadows form.

Activity: Place balls and shine torchlight AND identify lights and shadow side .

The Solar System includes the Sun and all celestial bodies that orbit it. Mars has two natural satellites: **Phobos** and **Deimos**. Jupiter has more than 67 moons, Saturn over 62, Uranus 27, and Neptune 14. Mercury and Venus have **no moons**. Earth supports life. Artificial satellites like **Aryabhata** help in communication and research. Neil Armstrong was the first human to walk on the Moon. The outer planets are called **Gas Giants**.

GLOSSARY

Shooting Star

Meaning: Loud sound in the sky

Synonyms: *Boom, Loud noise*

Sentence: *Thunder made a loud sound.*

Satellite

Meaning: Object going around a planet

Synonyms: *Moon, Space object*

Sentence: *The Moon is a satellite.*

Thunder

Meaning: Loud sound in the sky

Synonyms: *Boom, Loud noise*

Sentence: *Thunder made a loud sound.*

Satellite

Meaning: Object going around a planet

Synonyms: *Moon, Space object*

Sentence: *The Moon is a satellite*

Moon

Meaning: Earth's natural satellite
 Synonyms: *Satellite, Space body*
 Sentence: *The Moon shines at night.*

Asteroid

Meaning: Rock in space
 Synonyms: *Space rock, Rocky body*
 Sentence: *Asteroids move in space.*

Meteoroid

Meaning: Very small space rock
 Synonyms: *Tiny rock, Space dust*
 Sentence: *A meteoroid is very small.*

Comet

Meaning: Ice rock in space
 Synonyms: *Ice ball, Space ice*
 Sentence: *A comet has a long tail.*

Galaxy

Meaning: Group of stars
 Synonyms: *Star group, Star system*
 Sentence: *We live in the Milky Way galaxy.*

Orbit

Meaning: Path of movement
 Synonyms: *Path, Track*
 Sentence: *Earth moves in an orbit.*

Believed

Meaning: Thought to be true
 Synonyms: *Thought, Trusted*
 Sentence: *People believed Earth was still.*

Geo-centric Model

Meaning: Earth-centered idea
 Synonyms: *Earth model, Old idea*
 Sentence: *Ptolemy gave the geocentric model.*

Ptolemy

Meaning: Ancient astronomer
 Synonyms: *Scientist, Thinker*
 Sentence: *Ptolemy supported Earth-centered idea.*

Gravitational Pull

Meaning: Force of attraction
 Synonyms: *Pull, Attraction*
 Sentence: *Earth's gravity pulls us down.*

Heat

Meaning: Warmth
 Synonyms: *Hotness, Warmth*
 Sentence: *Fire gives heat.*

Copernicus

Meaning: Scientist who supported Sun-centered idea
 Synonyms: *Scientist, Thinker*
 Sentence: *Copernicus studied planets.*

Kepler

Meaning: Astronomer who studied orbits
 Synonyms: *Astronomer, Scientist*
 Sentence: *Kepler explained planet paths.*

Galileo

Meaning: Scientist who used telescope
 Synonyms: *Scientist, Observer*
 Sentence: *Galileo observed the sky.*

Ancient Times

Meaning: Very old times
 Synonyms: *Old days, Past times*
 Sentence: *People lived simply in ancient times.*

Aryabhata

Meaning: Indian astronomer
 Synonyms: *Scientist, Thinker*
 Sentence: *Aryabhata said Earth rotates.*

Telescope

Meaning: Tool to see far objects
 Synonyms: *Viewing tool, Space tool*
 Sentence: *Telescope helps see stars.*

Celestial Body

Meaning: Object in space
 Synonyms: *Space object, Heavenly body*
 Sentence: *The Moon is a celestial body.*

Revolve Meaning: Go around Synonyms: <i>Move around, Circle</i> Sentence: <i>Earth revolves around the Sun.</i> Helio-centric Model Meaning: Sun-centered idea Synonyms: <i>Sun model, New idea</i> Sentence: <i>Heliocentric model says Sun is at center.</i> Spherical Meaning: Round shape Synonyms: <i>Round, Ball-shaped</i> Sentence: <i>Earth looks spherical.</i> Area Meaning: Surface Synonyms: <i>Surface, Space</i> Sentence: <i>Earth has large area.</i> Movements of the Earth Meaning: Motion of Earth Synonyms: <i>Earths motion, Movement</i> Sentence: <i>Earth has two movements.</i> Rotation Meaning: Spinning Synonyms: <i>Turning, Spinning</i> Sentence: <i>Earth rotates daily.</i> Axis Meaning: Imaginary line Synonyms: <i>Invisible line, Center line</i> Sentence: <i>Earth spins on its axis.</i> Revolution Meaning: Going around Synonyms: <i>Orbiting, Moving around</i> Sentence: <i>Earth revolves around the Sun.</i> Occurs Meaning: Happens Synonyms: <i>Takes place, Happens</i>	Elliptical Path Meaning: Oval path Synonyms: <i>Oval shape, Curved path</i> Sentence: <i>Planets move in elliptical paths.</i> Non-luminous Meaning: Does not make its own light Synonyms: <i>No light, Dark object</i> Sentence: <i>The Moon is non-luminous.</i> Receive Meaning: Get Synonyms: <i>Take, Accept</i> Sentence: <i>The Moon receives sunlight.</i> Bulged at the Equator Meaning: Wider at the middle Synonyms: <i>Thick middle, Wide center</i> Sentence: <i>Earth is bulged at the equator.</i> Geoid Meaning: True shape of Earth Synonyms: <i>Earth shape, Real shape</i> Sentence: <i>Earth is a geoid.</i> Equatorial Diameter Meaning: Width at middle Synonyms: <i>Middle width, Center width</i> Sentence: <i>Equatorial diameter is larger.</i> Polar Diameter Meaning: Width from top to bottom Synonyms: <i>Pole width, Vertical width</i> Sentence: <i>Polar diameter is shorter.</i> Month Meaning: 29 – 30 days Synonyms: <i>Moon month, Time period</i> Sentence: <i>A month has about 30 days.</i> Marvelous Meaning: Wonderful Synonyms: <i>Amazing, Beautiful</i> Sentence: <i>Earth is marvelous.</i> Surface Meaning: Outer part
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Sentence: <i>Day occurs due to rotation.</i> Simultaneously Meaning: At the same time Synonyms: <i>Together, At once</i> Sentence: <i>Rotation and revolution occur together.</i> Year Meaning: 12 months Synonyms: <i>Year time, Annual time</i> Sentence: <i>One year has 12 months.</i> Nitrogen Meaning: Main air gas Synonyms: <i>Air gas, Major gas</i> Sentence: <i>Nitrogen is in air.</i> Carbon Dioxide Meaning: Gas used by plants Synonyms: <i>Plant gas, CO₂</i> Sentence: <i>Plants use carbon dioxide.</i> Water Cycle Meaning: Movement of water Synonyms: <i>Water process, Water flow</i> Sentence: <i>Water cycle brings rain.</i> Suitable Climate Meaning: Good weather Synonyms: <i>Good climate, Pleasant weather</i> Sentence: <i>Earth has suitable climate.</i> Release Meaning: Give out Synonyms: <i>Let out, Send</i> Sentence: <i>Comets release gas.</i>	Synonyms: <i>Top layer, Outside</i> Sentence: <i>We live on Earth ' s surface.</i> Atmosphere Meaning: Air layer Synonyms: <i>Air cover, Gas layer</i> Sentence: <i>Atmosphere protects Earth.</i> Oxygen Meaning: Gas for breathing Synonyms: <i>Life gas, Air gas</i> Sentence: <i>We need oxygen to live.</i> Tail Meaning: Long trail Synonyms: <i>Long line, Trail</i> Sentence: <i>A comet has a tail.</i> Revolves Around Earth Meaning: Moves around Earth Synonyms: <i>Circles Earth, Goes around</i> Sentence: <i>Moon revolves around Earth.</i> Reflects Sun' s Light Meaning: Shines using sunlight Synonyms: <i>Bounces light, Shows light</i> Sentence: <i>Moon reflects sunlight.</i> Phases of the Moon Meaning: Changing shapes of Moon Synonyms: <i>Moon shapes, Moon stages</i> Sentence: <i>Moon phases change monthly.</i> Shadow Meaning: Dark spot Synonyms: <i>Shade, Dark part</i> Sentence: <i>Shadow forms behind objects.</i>
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MATERIAL 6

DIFFRENCIATED INSTRUCTION BASED CONTENT

ABOVE AVERAGE LEARNER

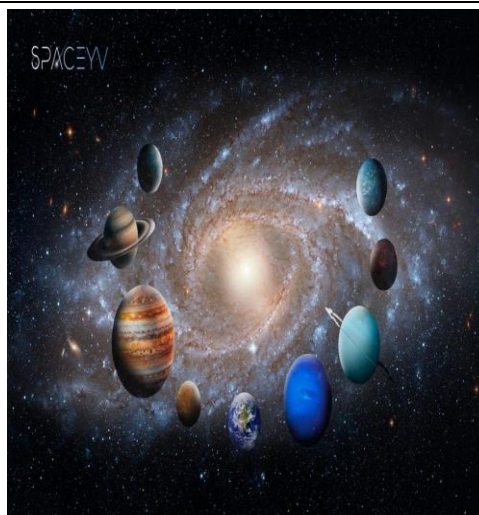
CHAPTER - THE SKY

THE SUN AND ITS FAMILY

The Sun along with all the celestial bodies that revolve around it forms the Solar System. This includes 8 planets, 173 known satellites, and numerous asteroids, meteoroids and comets. Stars are self-luminous objects, meaning they emit their own light. The Sun is also a star. The entire Solar System lies within a larger system of millions of stars known as the **Milky Way galaxy**.

Thinking Questions ?

1. Why is the Sun called a self luminous body?
2. How is the Solar System a part of the Milky Way?
3. Why do planets revolve around the Sun?



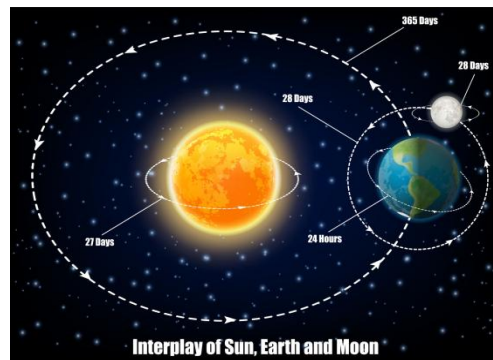
THE SUN

The Sun is a self-luminous star and is much closer to the Earth than any other star, which makes it appear larger and brighter in our sky. Positioned at the centre of the Solar System, it exerts a powerful gravitational force that keeps all planets and other celestial bodies in orbit around it.

The Sun provides essential heat and light, supporting life on Earth. Although it appears to rise in the east and set in the west, this is due to the Earth's rotation, not the Sun's movement. The Sun's energy is vital for humans, plants and animals to survive.

ACTIVITY:

Why does the Sun appear bigger than other stars?
2. How does the Sun's gravity control the Solar System?



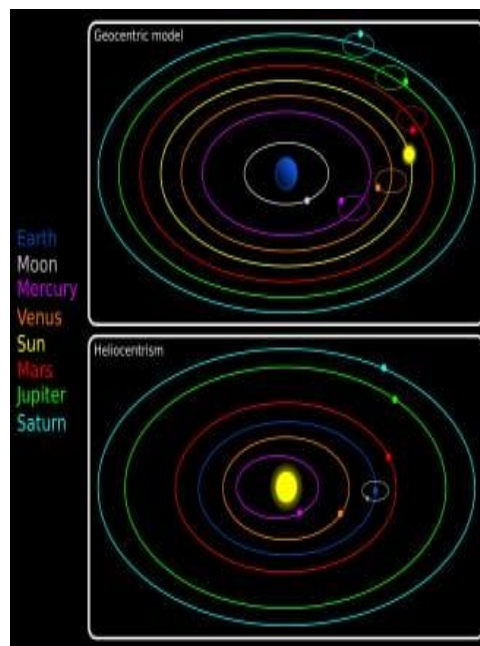
ANCIENT IDEA ABOUT THE SUN

In earlier times, people believed that the Earth was the centre of the universe and that the Sun, Moon and planets revolved around it. This concept, known as the **Geo-centric model**, was systematized by Claudius Ptolemy. Later, Aryabhata, the first Indian astronomer and mathematician, proposed that the Earth and other planets actually revolved around the Sun. This is called the **Helio-centric model**.

The model gained strong support from European scientists such as Nicolaus Copernicus and Johannes Kepler. Galileo Galilei further strengthened this theory by inventing the telescope and using it to observe celestial bodies, providing scientific evidence for the Helio-centric view.

THINKING QUESTION :

1. Why do you think people first believed in the Geo-centric model?
2. How did the invention of the telescope help prove the Helio-centric model?
3. What role did Aryabhata play in changing scientific thinking?



THE PLANETS

A planet is a celestial body that orbits the Sun in an elliptical path known as an **orbit**. Each planet follows its own unique orbital path. The Earth too revolves around the Sun along its specific orbit. Planets are **non-luminous bodies**, meaning they do not produce their own light. Instead, they receive light and heat from the Sun, which is their primary source of energy. Their motion and energy depend on their position within the Solar System.

Thinking Questions

2. How does an orbit help a planet stay in motion around the Sun?
3. What would happen if planets had their own light?



Image Credit: Goodlife Studio from Getty Images via canva.com

THE EARTH

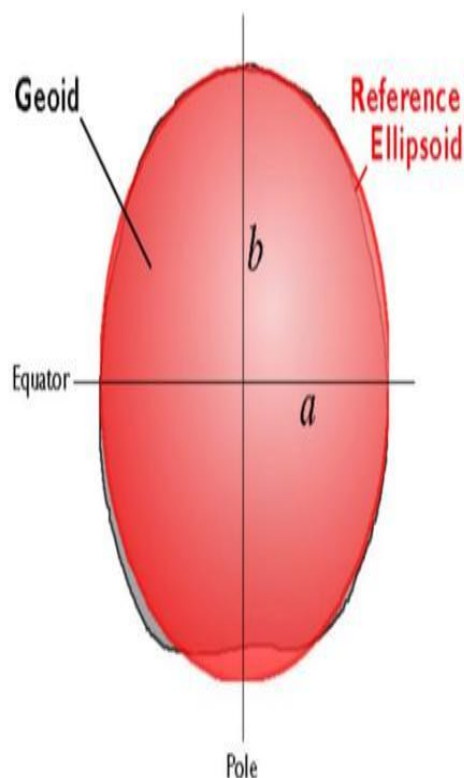
THE EARTH is a unique planet in the Solar System because it supports life. Positioned third from the Sun, it provides ideal conditions such as moderate temperature, water in all three forms, and an atmosphere rich in life-supporting gases.

Modern scientific studies confirm that the Earth's shape is not perfectly round; instead, it is a **Geoid**, flattened at the poles and bulging at the equator. This is evident from the difference between its equatorial diameter (12,757 km) and polar diameter (12,714 km). These measurements help scientists understand Earth's rotation and gravitational variations.

Questions:

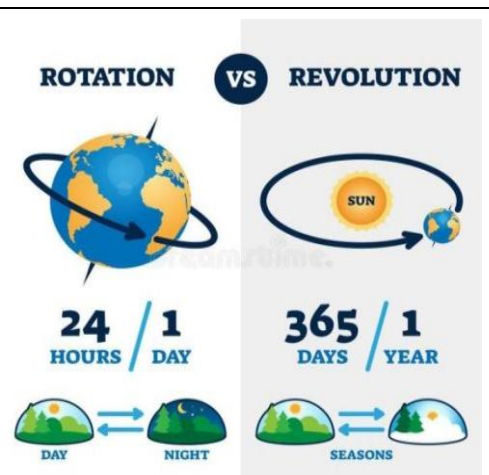
1. Why does Earth support life while other planets do not?

How does the Geoid shape affect Earth's gravity?



Earth's movement

The Earth performs two major movements: **rotation** and **revolution**. Rotation refers to the spinning of the Earth on its own axis, a movement that occurs from west to east. This spinning motion is responsible for the cycle of day and night. Revolution refers to the movement of the Earth around the Sun in a fixed elliptical orbit. Throughout



its revolution, the Earth continues to rotate on its axis. These two movements occur simultaneously and are essential in determining daily and yearly changes on Earth.

JUST THING :

How does rotation help in creating day and night?

2. Why is revolution important for seasonal changes?

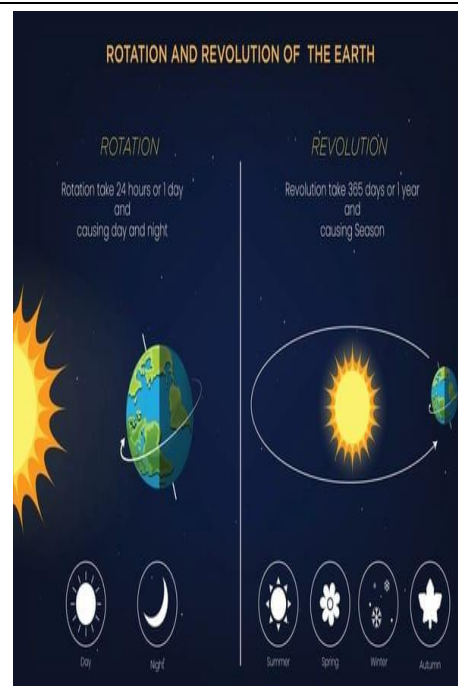
3. What would happen if the Earth stopped rotating but continued revolve.

DAY AND NIGHT

Day and night occur because the Earth rotates on its axis. As it rotates from west to east, sunlight falls on one half of the Earth, creating daytime. The other half remains in darkness, creating night. This rotation causes the Sun to *appear* to move across the sky. A full rotation takes 24 hours. The Earth's revolution around the Sun, completed in 365 days, determines one year.

Activity:-

Questions: 1. What would happen if Earth stopped rotating?
2. Why does the Sun appear to rise and set?



EARTH HAS LIFE

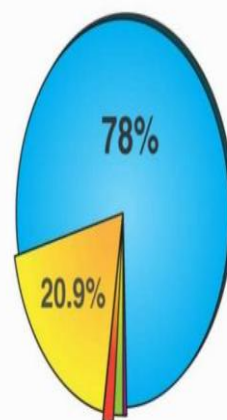
Earth is truly a marvelous planet because it uniquely supports life among all known planets. Nearly 71% of Earth is covered by water, while the remaining 29% is land. The surrounding atmosphere contains essential gases—oxygen for respiration, nitrogen for plant growth, and carbon dioxide for photosynthesis. The water cycle ensures continuous water availability. Life thrives due to Earth's optimal distance from the Sun, stable climate, diverse soils, and a balanced environment. These interconnected systems create a self-sustaining habitat, making Earth extraordinary.

2. Earth is truly a marvelous planet because it uniquely supports life among all known planets. Nearly 71% of Earth is covered by water, while the remaining 29% is land. The surrounding atmosphere contains essential gases—oxygen for respiration, nitrogen for plant growth, and carbon dioxide for photosynthesis. The water cycle ensures continuous water availability. Life thrives due to Earth

Questions:

1. How do the atmosphere and water cycle work together to support life?
3. Why is Earth's distance from the

COMPOSITION OF AIR



- Nitrogen - 78%
- Oxygen - 20.9%
- Other Gases - >0.17%
- Argon - >0.90%
- Carbon Dioxide - 0.03%

ROTATION AND REVOLUTION OF THE EARTH

ROTATION

Rotation take 24 hours or 1 day and causing day and night



REVOLUTION

Revolution take 365 days or 1 year and causing Season



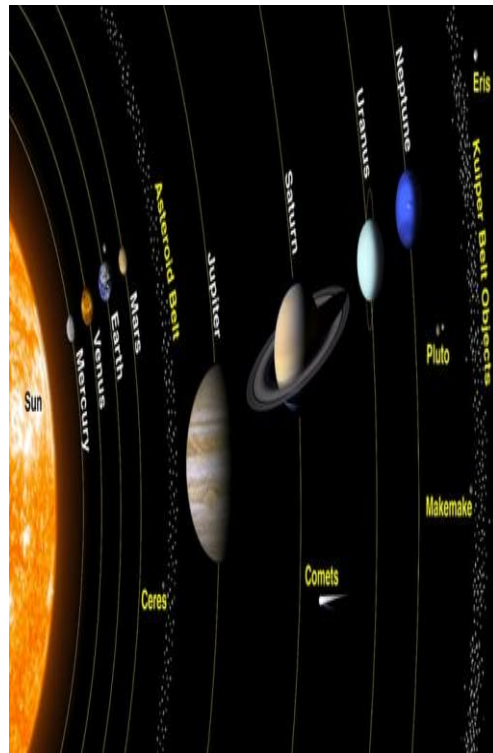
Sun so important?	
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PLANETS

The Solar System consists of eight planets that orbit the Sun in increasing distance: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto, once considered the ninth planet, was reclassified as a dwarf planet in 2005 because it lacks the characteristics required to be a full planet. Mercury, closest to the Sun, has no water and extreme temperatures. Venus is the brightest object after the Moon. Mars, with iron oxide-rich soil, appears red. Jupiter, the largest planet, holds the Great Red Spot—an enormous storm. Saturn's thousands of icy rings make it visually striking. Uranus rotates on its side and appears blue-green due to methane gas. Neptune, the eighth planet from the Sun, has a composition similar to Uranus but stands out because of its bright blue colour due to methane in its atmosphere. Being extremely far from the Sun, it is among the coldest planets in the Solar SYSTEM.

Questions:

1. Why was Pluto reclassified as a dwarf planet?



2. Compare gaseous and rocky planets with examples. 3. How does distance from the Sun affect temperature on planets?

ASTEROIDS

Asteroids are remnants of early solar system formation, mainly located in the asteroid belt between Mars and Jupiter. A **celestial orbit** is an elliptical path governed by gravitational forces. Comets, made of ice, dust, and rock, become spectacular when heated by the Sun, forming glowing comas and long dust tails. **Halley's Comet**, appearing every 76 years, was last seen in 1986 and will next appear in **2062**.

Activity:

Create a short diagram showing: asteroid belt, comet tail formation, and orbital path.

Thinking Question:

If a comet takes 76 years to complete one orbit, how does its path help scientists predict its next appearance? Explain using orbit concept.



THE MOON

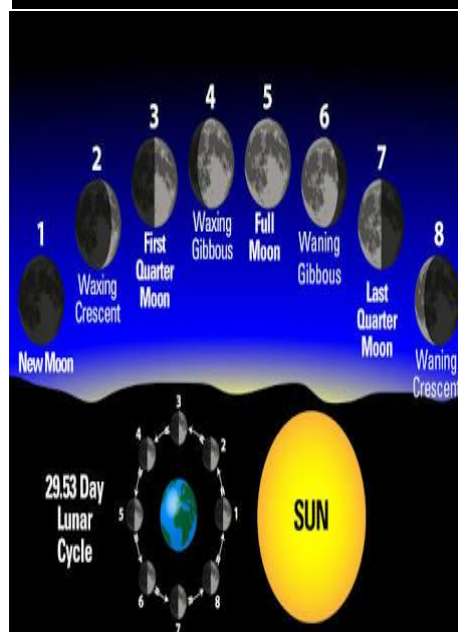
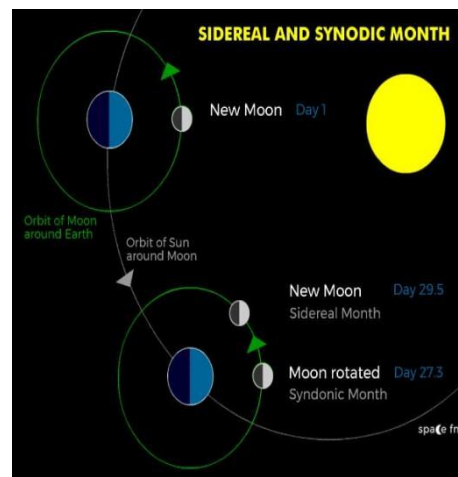
The moon Earth's only natural satellite, reflects sunlight but does not produce its own. It completes one rotation in **27.3 days**, while its revolution around Earth takes **29.5 days**, causing a shift in the angle between the Earth, Moon, and Sun. These changes create the **phases of the Moon**, observed as New Moon, Crescent, Half Moon, Gibbous, and Full Moon. If a person lived on the Moon, Earth would appear in phases just like the Moon does from Earth—because both bodies reflect sunlight similarly.

Activity:

Create a labeled diagram showing Moon's rotation vs. revolution. Add arrows and day counts .

Question:

If the Moon takes 27.3 days to rotate but 29.5 days to revolve, how does this cause phases? Explain in 3–4 lines.



A DAY, MONTH , YEAR

The moon Earth's only natural satellite, reflects sunlight but does not produce its own. It completes one rotation in **27.3 days**, while its revolution around Earth takes **29.5 days**, causing a shift in the angle between the Earth, Moon, and Sun. These changes create the **phases of the Moon**, observed as New Moon, Crescent, Half Moon, Gibbous, and Full Moon. If a person lived on the Moon, Earth would appear in phases just like the Moon does from Earth—because both bodies reflect sunlight similarly.

Activity:

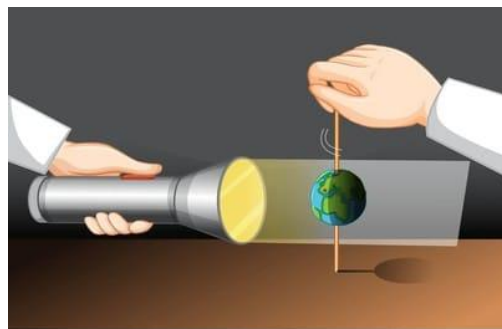
Create a labeled diagram showing Moon's rotation vs. revolution. Add arrows and day counts .

Question:

If the Moon takes 27.3 days to rotate but 29.5 days to revolve, how does this cause phases? Explain in 3–4 lines.

A DAY, MONTH , YEAR

A day results from Earth's **rotation** on its axis, while its **revolution** around the Sun creates a year. The Moon's revolution around Earth determines a **month**. In the model activity, the torch (Sun) casts light on Earth (big ball) and Moon (small ball). By changing the angle of light, students can observe illuminated portions and shadows, showing how solar and lunar shadows form and how relative positions create phenomena like phases, eclipses, and varying shadow lengths on Earth



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Activity:

Create a labelled diagram showing how changing angles of torchlight cause shadow size changes on both balls.

Explain light-blocking and light-receiving zones.

Questions: If Earth did not rotate, would we still have day and night? Explain.

The Solar System is a gravitation-ally bound system of the Sun, eight planets, moons, and other bodies. Mars has two small moons—**Phobos and Deimos**, possibly captured asteroids. Jupiter (67+) and Saturn (62+) possess complex satellite systems, while



SUMMARY

Uranus (27) and Neptune (14) show diverse moon compositions. Mercury and Venus lack any natural satellites. Earth uniquely sustains life. Artificial satellites like **Aryabhata** serve scientific, communication, and navigation purposes. Neil Armstrong's Moon landing marked a major milestone. The outer planets—**Jupiter, Saturn, Uranus, Neptune**—are termed Gas Giants due to their thick gaseous atmospheres.

GLOSSARY

Scattered

Meaning: Spread out in different places
 Synonyms: *Spread, Dispersed*
 Sentence: *Clouds were scattered in the sky.*

Hazy

Meaning: Not clear to see
 Synonyms: *Blurred, Foggy*
 Sentence: *The mountains looked hazy.*

Shooting Star

Meaning: A small rock burning in the sky
 Synonyms: *Meteor, Falling star*
 Sentence: *A shooting star crossed the sky.*

Cyclonic Winds

Meaning: Very strong circular winds
 Synonyms: *Storm winds, Violent winds*
 Sentence: *Cyclonic winds cause damage.*

Self-luminous

Meaning: Gives its own light

Atmosphere

Meaning: Layer of air around Earth
 Synonyms: *Air cover, Gas layer*
 Sentence: *The atmosphere protects Earth.*

Natural Events

Meaning: Events that happen in nature
 Synonyms: *Natural happenings, Nature events*
 Sentence: *Earthquakes are natural events.*

Observations

Meaning: Things carefully noticed
 Synonyms: *Noticing, Watching*
 Sentence: *Astronomers make observations.*

Celestial Bodies

Meaning: Objects found in space
 Synonyms: *Space objects, Heavenly bodies*
 Sentence: *Stars are celestial bodies*

Telescope

Meaning: Tool to see far objects
 Synonyms: *Viewing tool, Optical*

Synonyms: <i>Shining, Light-giving</i> Sentence: <i>The Sun is self-luminous.</i> Gravitational Force Meaning: Force that pulls objects Synonyms: <i>Pulling force, Attraction</i> Sentence: <i>Gravity keeps us on Earth.</i> Orbit Meaning: Fixed path in space Synonyms: <i>Path, Track</i> Sentence: <i>Each planet has an orbit.</i> Earth' s Rotation Meaning: Earth spinning on its axis Synonyms: <i>Earth ' s spin, Turning</i> Sentence: <i>Earth ' s rotation causes day and night.</i> Vital Meaning: Very important Synonyms: <i>Essential, Necessary</i> Sentence: <i>Water is vital for life.</i> Model Meaning: Explanation of an idea Synonyms: <i>System, Idea</i> Sentence: <i>Scientists use models to explain.</i> Nicolaus Copernicus Meaning: Astronomer who proposed Sun-centered system Synonyms: <i>Astronomer, Scientist</i> Sentence: <i>Copernicus supported heliocentric model.</i> Johannes Kepler Meaning: Scientist who studied planet paths Synonyms: <i>Astronomer, Researcher</i> Sentence: <i>Kepler discovered elliptical orbits.</i> Galileo Galilei Meaning: Scientist who improved telescope use Synonyms: <i>Scientist, Observer</i>	<i>instrument</i> Sentence: <i>The telescope shows distant stars.</i> Evidence Meaning: Proof or support Synonyms: <i>Proof, Sign</i> Sentence: <i>Experiments give evidence.</i> Universe Meaning: Everything in space Synonyms: <i>Cosmos, Space</i> Sentence: <i>The universe is very large.</i> Geo-centric Model Meaning: Earth-centered idea Synonyms: <i>Earth model, Old theory</i> Sentence: <i>Ptolemy supported the geocentric model.</i> Claudius Ptolemy Meaning: Greek astronomer Synonyms: <i>Scientist, Thinker</i> Sentence: <i>Ptolemy believed Earth was at center.</i> Aryabhata Meaning: Indian astronomer Synonyms: <i>Mathematician, Scientist</i> Sentence: <i>Aryabhata said Earth rotates.</i> Helio-centric Model Meaning: Sun-centered idea Synonyms: <i>Sun model, Modern theory</i> Sentence: <i>Heliocentric model is correct.</i> Elliptical Path Meaning: Oval-shaped path Synonyms: <i>Oval orbit, Curved path</i> Sentence: <i>Planets move in elliptical paths.</i> Unique Orbit Meaning: Special path Synonyms: <i>Own path, Fixed orbit</i> Sentence: <i>Each planet has a unique orbit.</i>
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Sentence: <i>Galileo studied the sky</i> Ideal Meaning: Perfect or best Synonyms: <i>Perfect, Suitable</i> Sentence: <i>Earth has ideal conditions.</i> Modern Scientific Studies Meaning: New research methods Synonyms: <i>Recent studies, New research</i> Sentence: <i>Modern studies use technology.</i> Polar Diameter Meaning: Width from pole to pole Synonyms: <i>Vertical width, Pole diameter</i> Sentence: <i>Polar diameter is shorter.</i> Diameters Meaning: Measurements across Synonyms: <i>Widths, Sizes</i> Sentence: <i>Earth has two diameters.</i> Characteristics Meaning: Special features Synonyms: <i>Qualities, Features</i> Sentence: <i>Each planet has characteristics.</i> Extreme Meaning: Very strong Synonyms: <i>Severe, Very high</i> Sentence: <i>Neptune has extreme cold.</i> Asteroid Belt Meaning: Area with asteroids Synonyms: <i>Asteroid zone, Rock belt</i> Sentence: <i>Asteroid belt lies between planets.</i> Celestial Orbit Meaning: Path in space Synonyms: <i>Space path, Heavenly orbit</i> Sentence: <i>Planets follow celestial orbits.</i> Spectacular Meaning: Very beautiful	Earth' s Orbit Meaning: Path of Earth around Sun Synonyms: <i>Earth' s path, Revolution path</i> Sentence: <i>Earth' s orbit is elliptical.</i> Produce Meaning: Make or create Synonyms: <i>Create, Form</i> Sentence: <i>Plants produce oxygen.</i> Bulging at the Equator Meaning: Wider at middle Synonyms: <i>Swollen middle, Thick center</i> Sentence: <i>Earth is bulging at the equator.</i> Equatorial Diameter Meaning: Width at Earth' s middle Synonyms: <i>Middle width, Center diameter</i> Sentence: <i>Equatorial diameter is larger</i> Variations Meaning: Changes Synonyms: <i>Differences, Changes</i> Sentence: <i>There are temperature variations</i> Determines Meaning: Decides Synonyms: <i>Fixes, Controls</i> Sentence: <i>Rotation determines day and night.</i> Marvelous Planet Meaning: Wonderful planet Synonyms: <i>Amazing planet, Beautiful planet</i> Sentence: <i>Earth is a marvelous planet.</i> Surface Meaning: Outer part Synonyms: <i>Outer layer, Top part</i> Sentence: <i>We live on Earth' s surface.</i>
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Synonyms: <i>Amazing, Stunning</i> Sentence: <i>The night sky is spectacular.</i> Reflects Sunlight Meaning: Shines using Sun' s light Synonyms: <i>Bounces light, Shows light</i> Sentence: <i>Moon reflects sunlight.</i> Eclipse Meaning: Shadow event Synonyms: <i>Shadow cover, Blocking</i> Sentence: <i>Eclipse occurs rarely.</i> Solar Eclipse Meaning: Moon' s shadow on Earth Synonyms: <i>Sun eclipse, Shadow event</i> Sentence: <i>Solar eclipse happens in daytime.</i> Lunar Eclipse Meaning: Earth' s shadow on Moon Synonyms: <i>Moon eclipse, Night eclipse</i> Sentence: <i>Lunar eclipse occurs at night.</i>	Natural Satellite Meaning: Space body moving around planet Synonyms: <i>Moon, Satellite</i> ,Sentence: <i>Moon is Earth ' s natural satellite.</i> Rotation Meaning: Spinning Synonyms: <i>Turning, Spin</i> Sentence: <i>Moon rotates slowly.</i> Revolution Meaning: Moving around Synonyms: <i>Orbiting, Circling</i> Sentence: <i>Moon revolves around Earth.</i> Shift in Angle Meaning: Change in position Synonyms: <i>Tilt change, Angle change</i> Sentence: <i>Moon ' s angle changes.</i> Illumination Meaning: Lit part Synonyms: <i>Lighting, Bright part</i> Sentence: <i>Illumination changes daily.</i>
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MATERIAL 7

DIT-Differentiated Instruction Test Grade v EVS

EASY LEVEL TEST MATERIAL

DURATION:45 MIN

MAXIMUM
MARKS :30

Instruction : Read the question carefully and attempt all questions

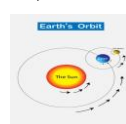
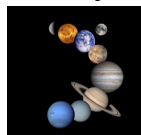
SECTION A

MULTIPLE CHOICE QUESTION:

10marks

Q1. The Sun has a big family called the _____.

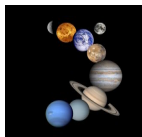
- a) Galaxy b) Solar System c) Universe d) Orbit



Q2. How many planets are there in the Solar System?

- a) 7 b) 8 c) 9 d) 10

Q3. The Sun is also a _____.

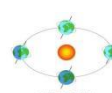
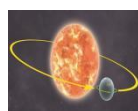
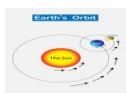


- a) planet b) moon c) star d) satellite

Q4. Our Solar System is in the _____ galaxy.

- a) Andromeda
b) Orion
c) Milky Way
d) Pole Star

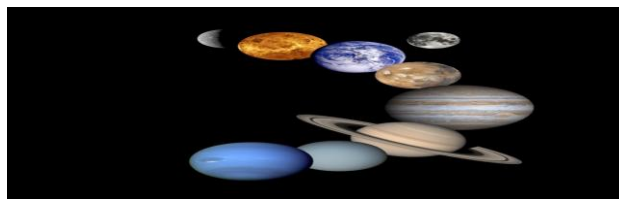
Q5. The path in which a planet moves around the Sun is called:



- a) orbit b) rotation c) revolution

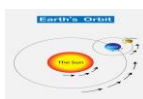
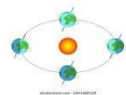
Q6. Which planet is our home?

- a) Mars
- c) Earth



- b) Venus
- d) Jupiter

Q7. Which movement of the Earth causes day and night?



- a) Revolution
- b) Rotation
- c) Orbit
- d) Motion

Q8. Which planet is known as the Red Planet?

- a) Venus
- b) Mars
- c) Jupiter
- d) Saturn

Q9. The Moon does not have its own light. It shines because it:

- a) produces light
- b) reflects sunlight
- c) burns gases
- d) is very hot

Q10. Earth takes _____ hours to complete one rotation.

- a) 12
- b) 24
- c) 30
- d) 365

SECTION B

Short Answer Questions
marks

2 × 5 = 10

Q11. Attempt any ONE:

Why does the Sun look big and bright to us? Think about when you go outside during daytime.

Q12. What is meant by rotation of the Earth? Think about what happens from morning to night in your daily life.

Q13. Attempt any ONE:

- a) Write any two reasons why life is possible on Earth.
- b) Why is Earth called a unique planet?

Q14. What is a heliocentric model? Who gave it?

Q15. Read the passage and answer:

“Asteroids are small rocky bodies found between Mars and Jupiter. They revolve around the Sun.”

What are asteroids? Where are they found?

SECTION C

Long Answer Questions**(5 × 2 = 10 marks)**

Q16. Explain with the help of a neat diagram how **day and night** occur on the Earth.

Q17. Attempt any ONE:

- a) Choose one planet and explain how it is different from Earth and why life is not possible there.
- b) Arrange the eight planets in correct order from the Sun and write any four suitable facts to show how planets are different from each other.

MATERIAL 8

DIT-Differenciated Instruction Test Grade v EVS

MODERATE LEVEL TEST MATERIAL

DURATION:45 MIN

MAXIMUM MARKS :30

Instruction : Read the question carefully and attempt all questions

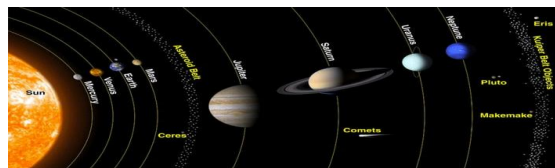
Section A

Multiple Choice Questions

(8 × 1 = 8 marks)

Q1. The Sun and its family together are called the _____.

- a) Galaxy
- c) Solar System



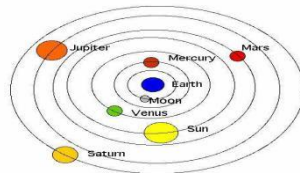
- b) Universe
- d) Orbit

Q2. The Sun looks big and bright because it is _____ to the Earth.

- a) far
- b) closest
- c) smallest
- d) cold

Q3. The idea that the Sun and planets move around the Earth is called the _____ model.

- a) Heliocentric
- b) Geocentric
- c) Galaxy
- d) Orbit



Q4. Planets do not have their own light. They get light from the _____.

- a) Moon
- b) Stars
- c) Sun
- d) Earth

Q5. Earth is the _____ planet from the Sun.

- a) first
- b) second
- c) third
- d) fourth

Q6. Rotation of the Earth causes _____.

- a) seasons
- b) year
- c) day and night
- d) eclipse

Q7. Which planet is known as the Red Planet?

- a) Venus
- b) Earth
- c) Mars
- d) Jupiter

Q8. Asteroids are mostly found between the orbits of _____ and _____.

- a) Earth and Mars
- b) Mars and Jupiter
- c) Jupiter and Saturn
- d) Venus and Earth

Section B:

Short Answer Questions

(6 × 2 = 12 marks)

ATTEMPT ANY ONE :

Q9. A) Why is the Sun called a star?

B) If you look at the sky at day, how would you describe the Sun in your own words?

Q10. What do we understand by the Helio-centric model? Why was it considered correct later? Explain with diagram.

Q11. Read the passage and answer:

“Planets move around the Sun in a fixed path called an orbit. This movement helps them stay in their path due to gravitational force.”

- a) What is an orbit?
- b) How does it help a planet move around the Sun?
- c) Explain orbit using a real-life example like a playground circular track or a race path.

Q12. Attempt any ONE:

- a) Write any two reasons why life is possible on Earth.
- b) Draw Earth and show any two features that support life.

Q13. What is the difference between rotation and revolution of the Earth?

Q14. Why does the Moon shine at night?

Section C

Long question answer

(2*5=10)

Q15. Ravi notices that when it is morning in India, it is night in America.

- a) Which movement of the Earth causes this difference?
- b) Why do different places on Earth have day and night at the same time?

Q16. Attempt any ONE:

a) Two students are arguing... Who is correct? Give one reason.

Student A says: "*The Sun moves from east to west.*"

Student B says: "*The Earth moves from west to east.*"

b) Explain the correct movement of Earth with a simple diagram

MATERIAL 9

DIT - Differentiated Instruction Test Grade v EVS

DIFFICULT LEVEL TEST MATERIAL

DURATION: 45 MIN

MAXIMUM MARKS : 30

Instruction : Read the question carefully and attempt all questions

Section A:

Multiple Choice Questions

(8 × 1 = 8 marks)

Q1. The Sun is called a self-luminous body because it

a) reflects Moon's light

b) produces its own light

c) is very big

d) moves around Earth



Q2. The Solar System is a part of the

a) atmosphere

b) orbit

c) Milky Way galaxy

d) Earth

Q3. The idea that Earth moves around the Sun is known as the

a) Geo-centric model

b) Helio-centric model

c) Lunar model

d) Orbital model

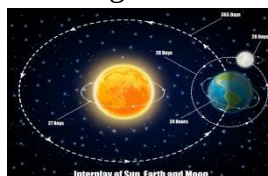
Q4. Which force keeps planets moving in their orbits around the Sun?

a) Magnetic force

b) Muscular force

c) Gravitational force

d) Frictional force



Q5. Earth is the _____ planet from the Sun.

a) first

b) second

c) third

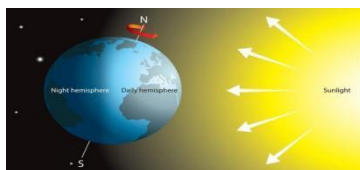
d) fourth

Q6. Day and night occur because of

a) revolution of Earth

b) rotation of Earth

d) movement of Sun



c) phases of Moon

Q7. Which of the following is found between Mars and Jupiter?

a) Rings

b) Comets

c) Asteroid belt

d) Gas clouds

Q8. The Moon shines because it

a) produces light

b) reflects sunlight

c) is a star

d) has fire

Section B

Fill in the Blanks
marks)

(6 × 1 = 6

Q9. The path followed by a planet is called an _____.

Q10. Earth takes _____ hours to complete one rotation.

Q11. The Earth's shape is called a _____.

Q12. Nearly _____ percent of Earth is covered with water.

Q13. A fully bright Moon is called a _____ Moon.

Q14. One year is completed when Earth goes once around the _____.

Section C:

Short Answer Questions
marks)

(4 × 3 = 12

Q15. Attempt any ONE:

a) Why is Earth able to support life while other planets cannot? Write any three reasons.

b) Imagine you are an astronaut visiting space. Explain why Earth looks special compared to other planets.

Q16. Attempt any ONE:

- a) Earlier people believed that the Sun moves around the Earth. Later this idea was changed. Name the correct model and one scientist.
- b) If you were a scientist, how would you explain the movement of planets to your classmates?

Q17. Attempt any ONE:

- a) Why are planets called non-luminous bodies?
- b) Imagine the Sun, Moon, and planets are talking. How would they explain who produces light and who does not?

Q18. Attempt any ONE:

- a) Asteroids are small rocky bodies. Write any two differences between asteroids and planets.
- b) Imagine you are on a space mission. What would you see between Mars and Jupiter?

Section D**Long Answer Question****(1 × 4 = 4 marks)**

Q19. A planet that is very far from the Sun receives very little heat and light. Based on this situation, write how distance from the Sun can affect with diagram.

- Temperature
- possibility of life

MATERIAL 10

POST TEST SCORING SHEET

Below average level			
SI.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 10 = 10$	
2	Write a short notes	$2 \times 5 = 10$	
3	Long question	$5 \times 2 = 10$	
4	Total Score	30	
Average level			
SI.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 8 = 8$	
2	Write a short notes	$2 \times 6 = 12$	
3	Long question	$5 \times 2 = 10$	
4	Total Score	30	
Above average level			
SI.NO.	Particulars of test items	Maximum scores	Score obtained
1	Multiple choice question	$1 \times 8 = 8$	
2	Match the following	$1 \times 6 = 6$	
3	Write a short notes	$3 \times 4 = 12$	
4	Long question	$4 \times 1 = 4$	
5	Total Score	30	