

CONNECTING CLASSROOMS

Teaching topic:

Rotation and Revolution of the Earth

Focused core skill:

Critical Thinking and Problem Solving

Teacher:

Lokendra Subedi

School:

Shree Amar Jyoti Secondary School

Lesson Plan

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| Subject: Science | Class: 9 | No. of Students: 50 | Time: 45 mins |
| Teaching topic Rotation and Revolution of the Earth | | | |
| Focussed Core Skill Critical Thinking and Problem Solving | | | |
| (Expected) Learning outcomes By the end of this period the students will be able to: <ol style="list-style-type: none"> 1. Define axis, orbit, rotation and revolution 2. Demonstrate how the earth moves round the sun 3. Explain how and why the seasons change | | | |
| Required materials torch lights and globes, a projector and laptop | | | |
| Teaching learning activities | | Time division | |
| Warm up Divide students in groups Teacher asks the following questions and uses the think-pair-share technique <ul style="list-style-type: none"> • Do you know how many seasons we have in a year? (Answer: 6 in Nepali, 4 in English) • Teacher asks “<i>Why do you think we have seasons?</i>”. Students think for 1 minute and write what they thought of. • Students discuss their answers in pairs. • Teacher takes whole class feedback. | | 5 mins | |
| Activity Teacher turns on the fan and ask students the following questions: <ul style="list-style-type: none"> • What is happening to the fan? • How would you describe the way it is moving? • What are some other things that move in similar way? Teacher moves a ball around inside a tyre\tube and asks students <ul style="list-style-type: none"> • How is the ball moving? • What are the similarities and differences between the movement of the fan and the ball? • Have you seen any other things that move in a similar way to the ball around the tyre? Teacher clarifies that the fan moves on an axis and this sort of movement is called rotation; the ball on the other hand moves around an orbit and this type of movement is called revolution. | | 15 mins | |

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| <p>Teacher asks students</p> <ul style="list-style-type: none"> • How do the movements of the fan and the ball relate to the Earth's movement? • How does the movement of the Earth influence season change? <p>Teacher summarizes that the Earth moves both on its axis like a fan and on its path like a ball.</p> <p>Teacher asks students to define the terms axis, orbit, rotation and revolution in their own words. Students then share answers in pairs and shares with the whole class.</p> | |
| <p>Video demonstration</p> <p>Teacher gives students a worksheet with the following questions:</p> <ul style="list-style-type: none"> • What do we call the imaginary line that passes through the north pole to the south pole of the Earth? • The Earth spins about itself. What is this movement called? • What causes day and night on the Earth? • What would happen if Earth doesn't rotate? • When we are facing towards the Sun (Eastern hemisphere), what do we have? Day or night? Guess? At the same time do peoples from the US (western hemisphere) have the same that we have? • The Earth's axis is tilted by A. 0° B. 90° C. 23.5° D. 22.5° • What would happen if the Earth didn't revolve around the Sun? • What would happen if the Earth wasn't tilted? • Which seasons do we have at the time when the part we live leans towards the sun? <p>Students find the answers to these questions while watching the video that the teacher is going to show.</p> <p>Students then compare answers in pairs and teacher takes whole class feedback.</p> | 10 mins |
| <p>Demonstration</p> <p>Teacher distributes the torch lights and globes to each group and asks them to do the following:</p> <ul style="list-style-type: none"> • To identify the axis on the globe. • To demonstrate how the Earth moves around the sun. • To demonstrate about the occurrence of day and night. • When the northern hemisphere (where your country lies) leans towards the sun, which season occurs there? • During June/July month, the southern hemisphere leans away from the sun. which season could it form in the southern hemisphere? How do you say that? Please demonstrate. • What would happen if the Earth was revolving around the sun without its inclination by 23.50 • To demonstrate when the sunlight directly falls on the southern hemisphere and what would be its effects. • Talk about the main causes of season change and let them demonstrate to justify causes. | 10 mins |

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| <p>Student evaluation</p> <p>Three facts and a fib Teacher asks all students to write three facts and a fib about the topic they just learned. Teacher has students take turns sharing their three facts and a fib with their partner in their group. For this, each group selects their leader. Then teacher gets students to play this between groups.</p> | <p>5 mins</p> |
| <p>Teacher Review</p> <p><i>Teaching is a constant cycle of planning, teaching, reflecting and revising. One of the most important professional habits we can cultivate is reflective practice. It is by looking back on lessons that we have taught and assessing them objectively that we develop as teachers. Here Lokendra Subedi reflects on what went well and how he might amend things were he to teach this lesson to another class in the future.</i></p> <p>Overall, I was satisfied and happy with today’s lesson and felt that the learning objectives were achieved.</p> <p>In terms of what went well, the students were asked to show how the position of globe results in day and night and were able to answer. I also enjoyed the game at the end that I conducted called 3 facts and a fib which was a fun way of testing understanding and applying their learning.</p> <p>The key challenge was time management and keeping to time. As a result, I couldn’t evaluate all the students enough as we added more information. In particular, the experiment was longer than expected. In the future, I would write the set of instructions and distribute it first in pairs and they would be able to do the experiment a bit faster.</p> | |
| <p>Student Review</p> <p>As teachers it benefits us to understand the students’ perspectives. The more aware we are of their perceived needs and of how they are experiencing the lessons we teach, the better able we will be to modify and improve our approach. Here Lokendra Subedi’s students provide their feedback:</p> <p>The class was fantastic and it felt like the period finished very fast. I liked the demonstration of tube with ball moving and the experiment with torch and globe. I really enjoyed the game to find the false statement of my friends. I learned the two types of movement of the earth, how the earth is tilted and how it causes the change of seasons. It is really applicable in our daily life.</p> <p>One thing that could have been improved was the YouTube video that I showed them. If it was in Nepali or played at a slower speed, it would be easier to understand.</p> | |

The teacher trainer's review on the lesson and how it might be further developed

Lokendra is seeking to incorporate critical thinking and problem solving into a science lesson and does so by using practical science demonstrations to both teach and support student learning. He is able to both provide new information to students as well as provide opportunity to experiment with real life application of the concept.

From the training on Critical Thinking and Problem solving we learned that there are three key teaching practices that support this skill which are:

- Asking good, open questions
- Modelling how to think critically and solve problems
- Providing effective feedback and corrections

We see this progression in Lokendra's lesson.

- Asking Open Questions: It begins with an opportunity for students to address a general question "what causes the four seasons" that will be the subject of the lesson. This open-ended Think-Pair-Share exercise provides a foundation for students to layer additional knowledge on to.
- Modelling how to Think: Lokendra then presents the class with a physical example of the phenomenon using easy to find resources available in any community, an example of the teacher himself problem solving.
- Providing Effective Feedback: The main student led activity using globes and torch lights promotes critical thinking and problem solving by allowing groups of students the opportunity to engage directly with the learning objectives. By structuring this around key questions for them to answer, they are able to think through the implication of the principles that they have just learned and he is able to provide feedback as the activity progresses.

The session does have challenges around time, language, and class size which will be looked at in the reflection activity next.

Wrap Around and Reflection Activity

Lokendra's lesson was quite good and there is much to learn from it. If you were to do a similar lesson, consider the following points:

- How to prioritize different teaching talking time and student talking time when promoting learning and core skills in a class.
- Strategies that can be used to manage large class sizes when lesson activities require student engagement and involvement
- Creation of low cost learning aids like the ones that Lokendra has used in the video.