

Understanding the Concept of Time



At a Glance

- **Age Level:** 8-11 years old
- **Subjects:** Science, Math, English, Music
- **Time Needed:** 4 weeks

Background/Context

The understanding of the natural phenomena of day and night remains a fundamental factual phenomena which children at this age need to understand. The concept of understanding day and night, varying seasons leading humans to eat or dress according to seasonal changes is directly related to the major concept of Time itself. Time being the term in relation to day and night in mathematical interpretation finds meaning as children being able to read time, and apply time.

In terms of developing core human values it becomes essential to inculcate in children the essence of time to be able to prioritize and manage time.

Environmental Studies

Children will learn:

- Concept of day and night
- Earth's movements--Rotation and Revolution of the Earth

Mathematics

Children will learn:

- To read time in terms of 12 hour clock (day/night)
- To relate time in relation to tables of 5
- To relate time reading to the concept of fractions--quarter past, half past, one whole

English

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Children will learn:

- To read a poem and follow rhyme, rhythm, meter in a poem

Music

Children will learn:

- Beat and rhythm in a musical piece
- Beat in an instrument after a periodic interval of time

Learning Objectives:

After completion of the lesson, learners will be able to:

Environmental Studies

- Distinguish between the effects of day and night
- Categorize the daily activities as related to the impact of day and night
- Classify the needs of food and clothing as the result of seasonal changes impacted by the movement (rotation and revolution of the Earth)
- Demonstrate and relate to the impact day and night and seasonal changes make in our lives
- Order the sequence of events in a day and night

Mathematics

- Distinguish between the reading of time between the minutes, hours, and the seconds hands
- Identify and read the 12 hour clock in relation to hours, minutes, and seconds
- Apply the hours clock to the concept of time as a.m. and p.m. in relation to day and night
- Estimate the time duration in terms of minutes and hours

(How much time would it take to complete a task at hand?)

(How long would this match be for?)

(How long does it take for an e-mail to reach from the sender?)

(How much time do I spend watching TV?)

- Interpret the reading of the time in relation to fractions as:

half past = 30 minutes - half of one whole

quarter past = 15 minutes - quarter of one whole

three quarter = 45 minutes to/ 45 minutes past - three quarters of one whole

- Reading expiry dates on labels of food times
- Calculating the time duration in terms of calendar months and days to see the expiry dates and deciding the usability of the product

English

- Listen to poems and identifying the rhyming words in a poem
- Count the frequency of the alliterations in a poem
- Understand and compose a poem with similar rhyming patterns

Music

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- Listen and estimate the beat of a musical number
- Using some sound creating items create a beat pattern after a certain time interval

Standards Alignment

Based on Next Generation Science Standards (NGSS)

Environmental Studies

- 2. D. 2. a.: Students will describe the rotation of the planet Earth on its axis.
- 2. D. 1. b.: Students will recognize and describe that the rotation of Earth produces observable effects such as day and night.
- 2. D. 2. c.: Students will describe the revolution of planet Earth around the sun.
- 2. D. 2. d.: Students will recognize and describe that the revolution of Earth produces effects such as the four seasons.

Technology

- 3. A. 1. a.: Students will use technology tools, including software and hardware, from a range of teacher-selected options to learn new content or reinforce skills.
- 3. A. 1. c.: Students will assess the use of the selected technology for individual learning for a specific task.

Standards as per the NCERT elementary syllabus

Learners will:

- Computes the number of weeks in a year
- Correlate the number of days in a year with the number of days in each month
- Justifies the reason for the need of a leap year
- Reads clock time to the nearest hours and minutes
- Expresses time using the terms "a.m." and "p.m."
- Estimates the duration of familiar events
- Finds approximate time elapsed by (to the nearest hour)
- Computes the number of days between two dates

Inquiry Process

Investigating:

The students will fill in the first column of the KWL chart to share what they already know about movements of earth. They will be asked probing questions (who, what, when, where, why, how) to encourage inquiry.

Next, the students will fill in the second column of the KWL chart, stating what they want to know about the movements of earth.

They will make a list of the activities they perform at day and at night to analyze why certain activities are done at day and vice versa.

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They will also inquire why we use a calendar and pictures in a calendar show pictures of different seasons.

Students will categorize and inquire as to why we wear different types of clothing in different climates.

They will read Branley's *What Makes Day and Night* and make note of important vocabulary (sunrise, day, noon, sunset, and night) as they encounter them in the reading.

- After reading and discussing the book, review questions on the KWL chart and ask if anyone can answer some of the questions now.

The students will add all the new vocabulary words to the "Science Word Wall," which will be an ongoing activity (e.g., night). Add the new vocabulary to your "Science Word Wall."

The students will review the vocabulary (sunrise, day, noon, sunset, night, spin, and rotation) prior to the next session.

They will be involved in the

1. Darken room and turn on lamp. Explain that the lamp represents the Sun.
2. Ask a student to be the Earth. Place the wrap-around map around the student so that your town is on his/her chest. Make sure he or she can be seen by all students.
3. Mark your town with a sticker and ask students to focus on it as the Earth rotates.
4. Have the student begin with his/her back to the lamp (night). Ask students if they think it is day or night in their town.
5. Have the student rotate slowly in a counterclockwise fashion, until his/her left arm is pointed to the Sun. Ask students if they think it is sunrise or still night.
6. Student continues the counterclockwise rotation until he/she faces the Sun directly. Ask students what time it is now in their town. Students can see that it is noon, the middle of the day, when we get the most light from the Sun. You may need to prompt with additional questions.
7. Ask the student to rotate a little more. Have him/her stop when his/her right arm is pointed toward the Sun. Ask students what time of day it is. They should be able to tell you that it is sunset.
8. Complete the day/night cycle by having the student return to his/her original position, with his/her back to the Sun. Students should be able to tell you that is midnight.
9. Ask students to notice what time of day it is on the other side other Earth (student's back is facing the Sun and it is noon). Explain that one half of the Earth is always light while the other is dark. Emphasize that it is the Earth's own shadow that makes the night side of the Earth dark.
10. Repeat this demonstration. Select other students volunteers so that students will get a chance to view the day and night cycle several times. Explain that it takes 24 hours for the Earth to rotate completely.
11. Return to the KWL chart, review students' questions and place any new answers in the final column, what we Learned. If there are still unanswered questions, decide with the class how you will research them further.

Globe Demonstration

1. Another way to illustrate and reinforce the day/night concept is with a globe. Locate your city, state, or country on the globe and place a sticker with your school name on it to mark the spot. Then using the lamp as the Sun, slowly rotate the globe and show students how the Earth rotates, resulting in day and night.
2. Using the globe you can identify which countries are in daylight while your city is in darkness and vice versa.

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Transdisciplinary Math:

As an extension of the above learning engagement, the students will learn the difference between 12-hour and 24-hour clock time and practice conversions.

Measurement of time such as years, seasons, months, weeks, days, and hours and minutes.

They will learn to read the 12-hour clock in terms of a.m., p.m., hours, and minutes.

They will be given tasks to find the duration of time in different applications.

Transdisciplinary English:

A poem on earth's rotation and revolution will be introduced to the students. They will observe that the words in stanzas rhyme, and follow a pattern. This will introduce them to features of a repeated patterns of day and night, phases of moon, occurrence of leap year in every four years, the order of four seasons, etc.

Students will work in different groups and create or write a poem using the given set of words. They will come up with a list of rhyming words for the given words in order to write their poem.

Transdisciplinary Music:

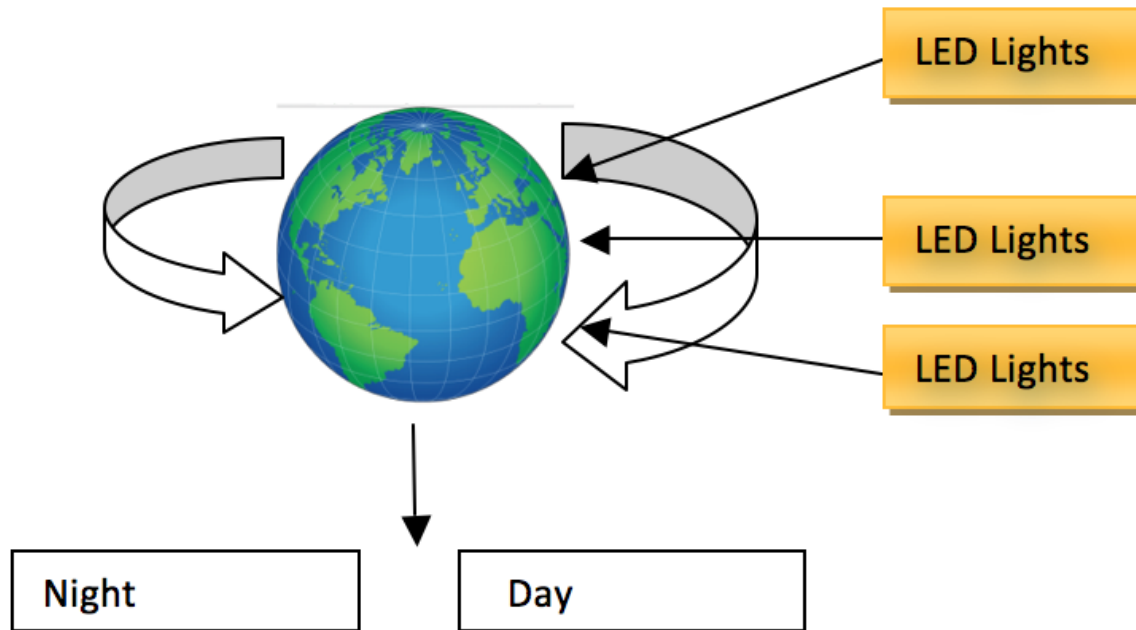
They will be asked where else they have observed repeated patterns, rhythm, rhyme, etc. The students will relate to music. They will be working in a group setting to compose a piece of music with their choice of instruments to exhibit their understanding of rhythm and beats.

Genuino 101 board project no 1: Showing the Rotation of Earth.

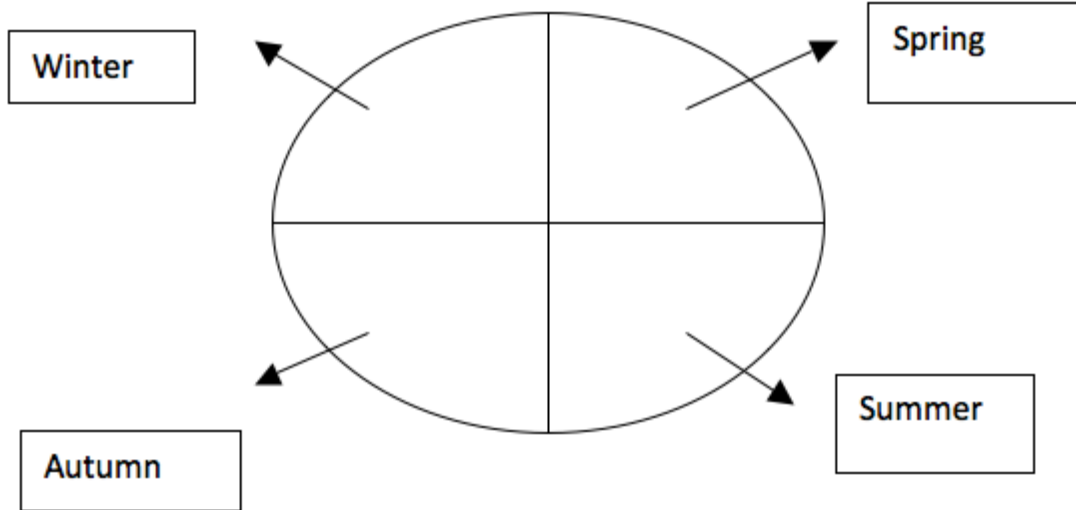
EVS

1. A globe made with a ball that rotates on its axis to show the concept of day and night
2. A stationary Sun with the planets going around in the orbit to show the concept of seasons

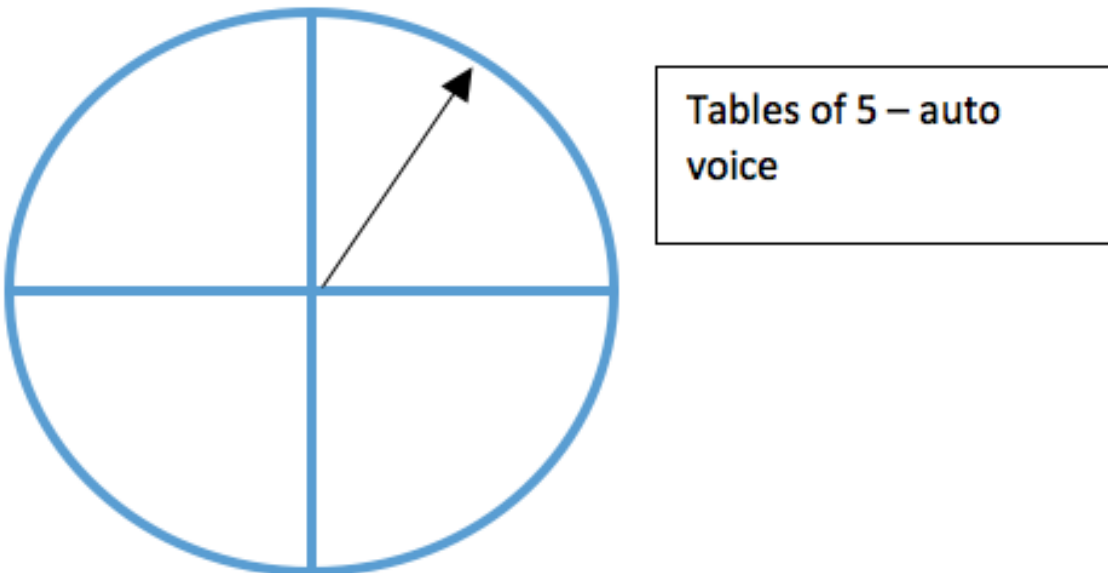
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Mathematics:



1. A clock that chimes and blinks after every hour and in an automatic voice reads the time and tells the tables of 5
2. A flash of different colour led lights to show the concept of quarter past, half past and quarter to along the surface area of the clock
3. Timer that works on voice command/Automatic Shower timer (to save water)
4. A time table recorder to record your daily activities and assess the time you have spent the entire day with a chart with three or four variables like:

Genuino 101 Board Project no 2: Smiley Time Tracker and Assessor

Time spent doing homework

Time spent watching TV

Time spent helping my family (on any chores/with siblings)

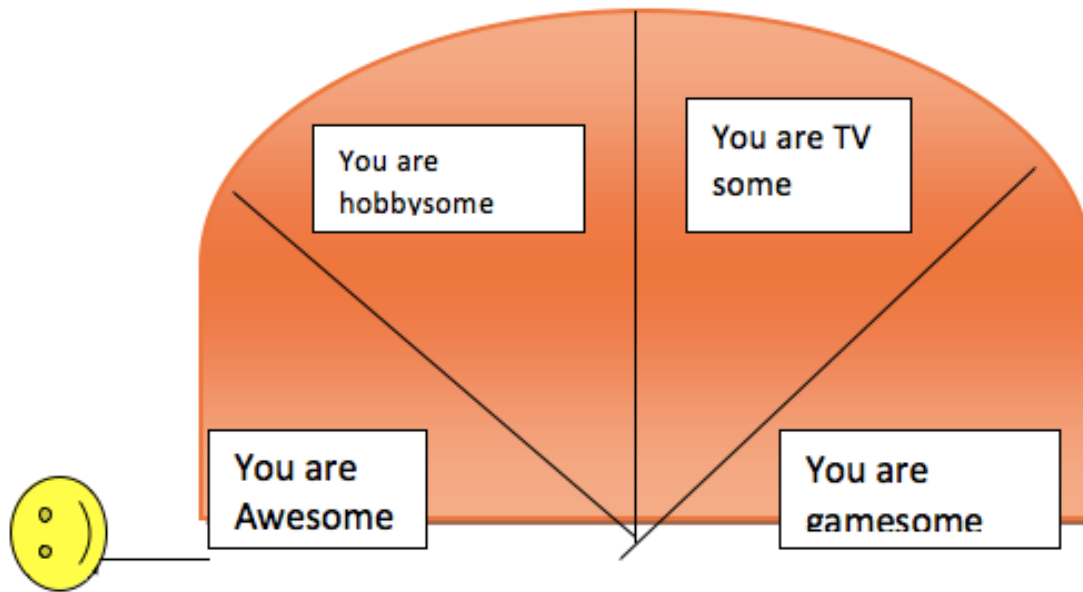
Time spent playing outdoor games

In the time table tracker--the child will have to feed in the time spent on the various task

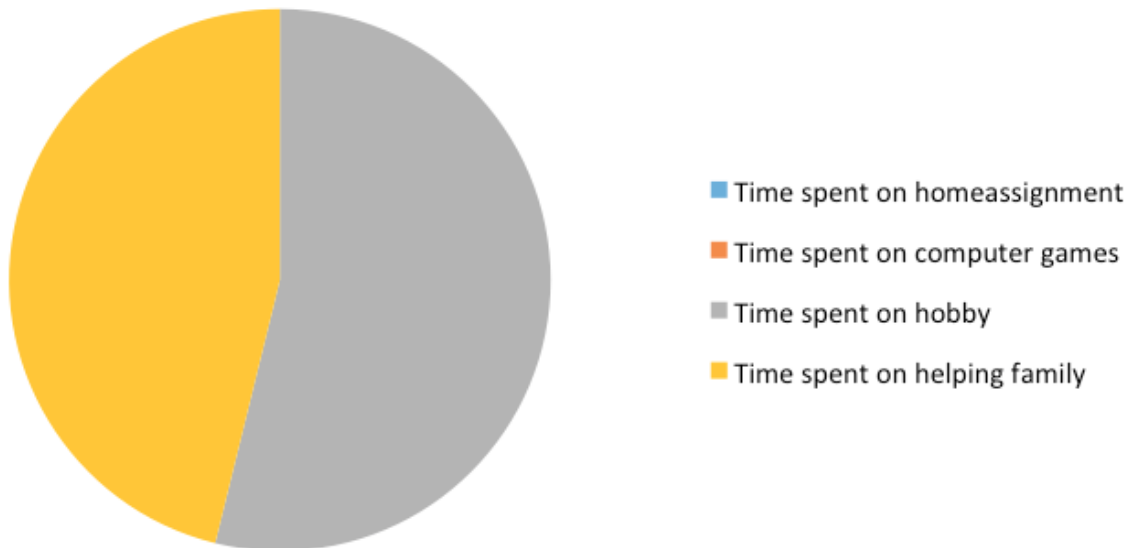
Time spent	Monday	Tuesday	Wednesday	Thursday	Friday
Time spent watching TV					
Time spent homework					
Time spent helping my family (on any chores/with siblings)					
Time spent playing outdoor games					
Time spent learning a hobby/game/instrument/device (besides studying)					
Time spent helping someone					

Total calculation of time spent on various activities in a week:

Display through a chart--graphics/pie chart



Smilie Time Tracker



Have a smiley pop up and say: "Cool! Well done, You are awesome" if you have managed your timing well.



Have a smiley pop up and say: "Well I guess I will just have to do better. OK. I will rock!"



Genuino 101 Board: Project no 3 - Making an Expiry date Reader.

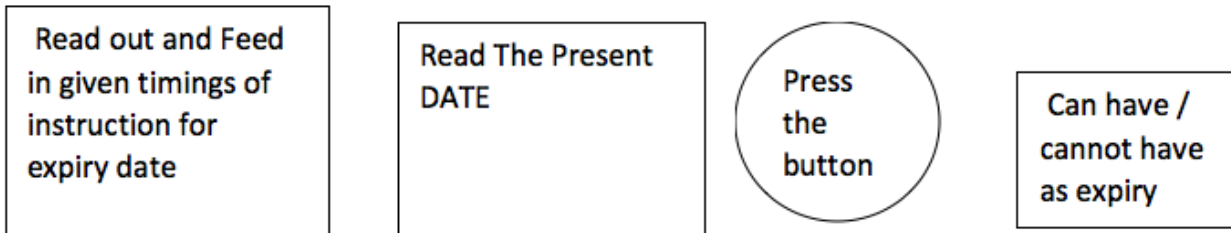
Creating an expiry date reader for various items--food items that are packaged or medicines (could be useful for old people who cannot read without glasses) or for small children who are not able to understand the time limit.

(In this project you have to feed in the date given up to expiry in relation to the current date and year.

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Subtract the same and arrive at an understanding whether the packaged item is fit for consumption or not.)

Create an algorithm in which the board is able to read this.



Prerequisite Skills for Lesson

The students should understand the following vocabulary words:

- cardinal directions - North, South, East, and West
- axis - an imaginary line around which earth spins
- equator - an imaginary circle around the earth that is the same distance from the north and south poles
- degrees - measurement of an angle
- clockwise - motion that occurs in the same direction as the clock's hands
- counterclockwise - motion that occurs in the opposite direction of the clock's hands
- orbit - curved path of an object around a point in space
- knowledge of seasons

Modifications/Accommodations

We will be using sound and light simulation to facilitate the learning needs of our special learners

Technology and Resources

Use the Audio video recordings, use of smart phone devices, use of visualizer to demonstrate

Activity

- Using a movable globe to show rotation and revolution
- Marking your city/location on the globe
- Making a seasons picture pastes/cut outs
- Making a clock that shows tables 5
- Making fractions cut outs to show half, quarter past, quarter to
- Making a time table chart to enter time for various activities
- Using a song and clapping every time there is a rhyming word

Assessment

Students will be given:

- Concept maps to fill
- MCQ
- Sharing the concept learned
- Application by reading time and calculating it
- Problem solving questions
- Quiz on time conversions, making model of clocks, poems on time, paper pen test
- Poster making on Earth and its changes

Additional Tips and Information

- Using videos on formation of day and night
- Using the Arduino101/Genuino 101 board links for studying the hardware and software components

Source

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This project uses the mathematical interpretation of time to help students find meaning in reading, applying, and prioritizing time.