Perceptions of Time: Cultures and Calendars

☺+☺ Envisioning the idea of communities of practice between students and also teachers to share resources, best practices, ideas, and building wider networks, eTwinning can help students in different parts of the world to do this activity together (through a blog for example). It could allow students to experience different perceptions of time, different calendars (example of lunar or Chinese) and discuss with students from diverse contexts their perspectives of time and its cultural relevance. In addition, it allows teachers and practitioners from different countries to be able to work together and develop projects amongst them.

Description

In this activity, students will explore human perception of time through the exploration of different calendars. Using philosophical questioning regarding the idea of time, and its measurement, they will be encouraged to research and compare the solar (Gregorian) and the lunar (Hijri) calendars, as well as other calendars used by different traditions and civilizations. In addition, students are likely be challenged to use mathematical skills and problem solving to convert dates using these different calendars, and lead to discuss the notion and idea of time in theoretical terms, as well as its contemporary relevance.

Global citizenship competences addressed

- capacity to examine global issues
- appreciate different perspectives & world views
- positive interactions with people who are different
- analytical & critical thinking skills
- communication & co-operation skills

Global citizenship content

Defined simply, pluralism is an ethic of respect for diversity. Whereas diversity is a fact, pluralism is a choice. Pluralism results from the daily decisions taken by state institutions, by civil society actors and associations and by individuals to recognize and value human differences.

Pluralist societies are not accidents of history. They require continuous investment and decision-making across many different sectors — economic, political and social. Although every society must define its own path, comparative experiences can be studied to better understand different possible outcomes.

An education rooted in pluralism cultivates empathy, collaboration, self-knowledge and an understanding of diverse perspectives. It equips learners to engage with people who are different from them. Education for pluralism does not avoid contentious issues – rather, it encourages critical thinking and experiential and enquiry-based learning. These lifelong skills can help shape learners into responsible and empathetic adults who value diversity and contribute actively towards an inclusive society.

Through the exploration of these different perceptions of time and ways to represent it by different calendars, we aim to raise awareness in students regarding this notion of pluralism and respect for the other, and utmost to develop a sense of empathy for different perspectives of life and its understanding.

In addition, throughout human evolution, there was a gradual growing need for using and understanding time measurement for different reasons: to interpret nature, to understand religion, and to interpret and gain knowledge about the universality of time-bounded phenomena.

Mathematical approaches

- looking for patterns and connections
- asking yourself questions
- being organised and systematic
- conjecturing and checking things out
- using representation and symbolism
- using argumentation and reasoning
- recognising the political and ethical dimensions of mathematics
- questioning the use of mathematics in structuring experience of the world

Mathematical content

Elementary arithmetic calculations: multiplication and division; mathematics as universal language; mathematical bases (decimal; sexagesimal), rotation, cycles.

Traditions on time calculation
as human necessity

Resources required

Calendars of different places and times; SI-units - (the second); introduction to calendars.
(Be free to join calendar examples with the children in the classroom). Calculators and internet connection…

Time needed (in and out of the classroom)

Approximately eight hour's (8h) curriculum time

Organization and practical issues

This activity requires a project based approach. After an initial discussion about time perception and time calculation, it is suggested that different groups share their findings and also contribute to each other's learning.

Suggested plan for teaching

This activity was designed by AKF-Portugal through the lenses of the paradigm of the relation between teachers and scholars. This is seen as a global relationship between learners, embedded in an educative communication paradigm consistent with socio historical and socio cultural approaches (Vygotskian approach). Therefore, we suggest exploring the content through co-constructed activities in a trans-disciplinary approach.

Although some of the content suggested is suitable to be draw through a didactic transposition (educative instruction paradigm), we suggest the planning of the exploration as part of the process.

NOTE: This activity can be challenging for less familiarised teachers with an educative communication paradigm.

Overall goals:

1. Deepen students awareness of cultural and historical diversities through the exploration of different calendars;
2. Encourage and promote the use of mathematical skills for problem solving in practical examples;
3. Help students to make connections between different subjects such as history, math's, religion, language and others;
4. Inspire students to explore different traditions on time calculation and appreciate underlying cultural aspects;

Arithmetic activity

Activity steps

1. Example of a Reflection Question:
   1.1. What is time? – In small groups discuss this idea of time and share;
   1.2. Have you ever imagined a world without time? – How would it looked? - In small groups discuss this idea of time and share;

Awareness cultural diversity through calendar analysis

Time tables and era counting

2. Examples of Leading questions:
   2.1. Why did people need to measure time?
   2.2. Why did people invented Calendars?
   2.3. What is the relation between planet earth, moon and sun, expressed in "mathematical formulas" (calendars)?

   (*As a group lead the discussion about calendars and why did people created this system to measure time; if possible, connect to older calendars as shown in the extended learning section, or others to link to history and how civilisation evolved*)

3. Example of Exploration questions:
   3.1. Explore the Lunar Calendar - Ex. - Which countries use the Lunar Calendar/Why?
   3.2. Do you know relevant or important celebrations regarding this Calendar? (*Example of Ramadan and Fasting*).
   3.3. Are there any other Calendars you know? (*Example of Chinese Calendar*).

4. Example of Activity opportunities - We have chosen a simple conversion between dates in different calendars, as these are the most basic notions to help us think about the volatility of time calculation, which is usually based on local cultural agreements.

Group discussions

   4.1. As an example to better perceive the difference in time, let's convert a date from a solar calendar to a lunar calendar:

   <u>Important Notes</u>

   – Remember that one solar year = 365 days; one lunar year = 354 days.
   – Using the number of days in a solar year, calculate the number of years that have passed between the years 622 and 2018 CE. Convert this figure into days.

Cultural and religion bounded aspects

   – How many times has the moon rotated around the earth during that time?
     The answer will provide the lunar year in the Hijri calendar for 2018 CE.

   Example:
   The United States' Apollo 11 was the first manned mission to land on the Moon, on 20 July 1969 CE.

   By following the above steps, we can convert 1969 into the Hijri calendar:

   1. The number of solar years between 622 and 1969 CE is 1347 (1969 - 622).
   2. The number of days in 1347 solar years is 491 655 (1347 x 365).
   3. 491 655 days is equal to 1389 lunar years (491 655 ÷ 354).

   Hence, ***1969 CE*** *is the Hijri year* ***1389 AH***.

   Students should be able to reflect and discuss on this perception of time and raise questions regarding this subject.

   4.2. Discuss the perceptions of time amongst these different people to became aware of different cultures, realities, religions and others;
   4.3. Ask students to convert other important dates in History (relevant to your context) from one system to the other – present with a brief presentation of the importance of the chosen date;

5. **<u>Research opportunities – we would like to emphasize that this area of the activity is very likely to be used as ideas for projects, and also as an opportunity to build a narrative with other activities of PiCaM, available for download</u>**:

   See other resources further

   5.1. Other Calendars and different Celebrations;

   5.2. Connect with people from different backgrounds and explore the similarities and differences regarding the Calendars and traditions;

   5.3. Discuss the perceptions of time amongst these different people to became aware of different cultures, realities, religions and others;

   Separated research in little groups for posterior presentation

   5.4. Explore the notion of time and the relevance in personal interests – examples: Birthdays, Weddings, Relevant Events, Music, Dance, Etc.

   5.5. Ask students to convert other important dates in History (relevant to your context) from one system to the other – present with a brief presentation of the importance of the chosen date;

   5.6. Ask students to imagine a calendar system on a planet different from the earth after defining:

   – Rotation around its star
   – Rotation around itself
   – Rotation of a moon around the planet / two moons / without a moon

6. Presentation opportunities

   Promote presentations / photo descriptions/artworks/videos/etc. regarding these findings.

Extending the learning

1. Explore different Calendars: (Hijri/Lunar) Calendar (Example)

   The year of the hijra – pilgrimage from Mecca to Medina made by Prophet Muhammad, the last Prophet for the Muslims, became year 1 of the Muslim or hijri calendar. This coincides with the year 622 of the Christian Gregorian calendar. The calendar introduced during Hazrat Umar's caliphate is still used by Muslims throughout the world today.

   This information can be used for suggested group work

   The new hijri calendar continued the ancient tradition of marking time by making observations of the moon. A year in the new lunar (moonbased) calendar contains 12 months, each with 29 or 30 days. The length of a month is based on the time it takes the moon to orbit the earth, which is 29.5 days. A year has 12 months and around 354 days.

   A year in the Muslim calendar is 11 or 12 days shorter than a year in Ancient Roman, Christian, and modern (Gregorian) calendars – which are based on the movement of the earth around the sun. It takes 365.25 days for the earth to make one complete evolution around the sun. A solar (sun-based) year is 365 days long, with an extra day added every fourth, or leap, year.

The Christian calendar begins with the year in which Jesus Christ (known as Hazrat Isa for the Muslims) was believed to have been born. In this system, that year was 1 AD, standing for Anno Domini, Latin for 'in the year of our Lord'. The year before that was 1 BC, an abbreviation for 'before Christ'. Today, it is customary to use the letters CE rather than AD. These letters stand for 'common era'. The letters BCE ('before the common era') are also used. As we count backwards in time, the numbers that represent BCE years increase. For example, 2000 BCE was the year before 1999 BCE. The Muslim calendar uses a different abbreviation. Muslim dates are followed by the letters AH, which refer to Anno Hegirae – Latin for 'in the year of the hijra'. The letters BH are sometimes used to refer to the time before the hijra.

Other resources (material and human resources)

1. Newcomb tables of the sun
2. Evolution of the definition of a second (earth-bound measurement of time):

Name	Symbol	Dimension symbol	Quantity name	Definition
second	s	T	time	• **Prior**: 1/86400 of a day of 24 hours of 60 minutes of 60 seconds • **Interim** (1956): 1/31556925.9747 of the tropical year for 1900 January 0 at 12 hours ephemeris time • **Current** (1967): The duration of 9192631770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium-133.

3. Australian Academy of Science - calendars

   https://www.science.org.au/curious/everything-else/calendars

4. Evolution of the Roman Calendar

   Rómulo's Calendar:

1º *Martius* (31 days)	6º *Sextilis* (30 days)
2º *Aprilis* (30 days)	7º *September* (31 days)
3º *Maius* (31 days)	8º *October* (31 days)
4º *Junius* (30 days)	9º *November* (31 days)
5º *Quintilis* (31 days)	10º *December* (30 days)

   Nuno's Pompilo Calendar:

Month	**Cycle**			
	01	***02***	***03***	***04***
1º *Martius*	31	31	31	31
2º *Aprilis*	29	29	29	29
3º *Maius*	31	31	31	31
4º *Junius*	29	29	29	29
5º *Quintilis*	31	31	31	31
6º *Sextilis*	29	29	29	29

7º *September*	29	29	29	29
8º *October*	31	31	31	31
9º *November*	29	29	29	29
10º *December*	29	29	29	29
11º *Januarius*	29	29	29	29
12º *Februarius*	29	23	28	24
13º *Mercedonius*	22	---	23	---
Resto de *Februarius*	---	05	---	04
Total in days	355	377*	355	378*

* The last two four weeks in a 24 year cycle, their peers of 19 years and 372 days, respectively.

Juliano, Augustiano's Calendar

Juliano Calendar/days	**Juliano Calendar after *Augustus*/days**
1º *Januarius* 31	Iº *Januarius* 31
2º *Februarius* 29 ou 30	2º *Februarius* 28 ou 29
3º *Martius* 31	3º *Martius* 31
4º *Aprilis* 30	4º *Aprilis* 30
5º *Maius* 31	5º *Maius* 31
6º *Junius* 30	6º *Junius* 30
7º *Quintilis* 31	7º *Julius* 31
8º *Sextilis* 30	8º *Augustus* 31
9º *September* 30	9º *September* 30
10º *October* 31	10º *October* 31
11º *November* 30	11º *November* 30
12º *December* 31	12º *December* 31

Gregorian calendar: days

Latin	**Spanish***	**French***	**Saxon****	**English**	**German**
Solis dies	*Domingo*	*Dimanche*	*Sun's day*	*Sunday*	*Sonntag*
Lunae dies	*Lúnes*	*Lundi*	*Moon's day*	*Monday*	*Montag*
Martis dies	*Martes*	*Mardi*	*Tiw's day*	*Tuesday*	*Dienstag*
Mercurie dies	*Miercoles*	*Mercredi*	*Wonden's day*	*Wednesday*	*Mittwoch*
Jovis dies	*Juéves*	*Jeudi*	*Thor's day*	*Thursday*	*Donnerstag*
Veneris dies	*Viernes*	*Vendredi*	*Friga's day*	*Friday*	*Freitag*
Saturni dies	*Sábado*	*Samedi*	*Saterne's day*	*Saturday*	*Samstag*

* In Spanish and French the Sunday and Saturday nomenclature was changed; the justification is the same as in the Portuguese language (see below).

** In the Saxon language, Tiw, Wonden, Thor and Friga represent the corresponding gods in Norse mythology to Mars, Mercury, Jupiter and Venus. This language influenced the English and German languages.

Emperor Flavius Constantine (280-337 AD), after converting to Christianity, replaced the denomination of Dies Solis or Fair for Dominica (day of the Lord), which in turn was adopted by Latin peoples:

Liturgical Latin	Portuguese
Dies Dominica	Domingo
Feria Secunda	Segunda-feira
Feria Tertia	Terça-feira
Feria Quarta	Quarta-feira
Feria Quinta	Quinta-feira
Feria Sexta	Sexta-feira
Sabbatum	Sábado

4. Example of Activity opportunities - We have chosen a simple conversion between dates in different calendars, as these are the most basic notions to help us think about the volatility of time calculation, which is usually based on local cultural agreements.

Group discussions

5. Calendar conversation

   Very complete information about calendar equivalences: https://calendar.zoznam.sk

6. Islamic Calendar

   Islamic Calendar: https://calendar.zoznam.sk/islamic_calendar-en.php

Months in the Muslim calendar

1. Muharram
2. Safar
3. Rabi' al-Awwal
4. Rabi' al-Akhir
5. Jumada'l-Ula
6. Jumada'l-Akhira
7. Rajab
8. Sha'ban
9. Ramadan
10. Shawwal
11. Dhu'l-Qa'da
12. Dhu'l-Hijja

fig 3 Muslim calendar -

7. Gregorian-Lunar Calendar (Chinese)

   http://www.hko.gov.hk/gts/time/conversion.htm

   Observe similitudes regarding monthly periods with the decimal calendar, introduced in France, after the French revolution.

8. Decimal Calendar

   The year begins at the autumnal equinox (22 September, in the northern hemisphere), the date of the proclamation of the French Republic. It consisted of 12 months of 30 days, spread over three decades. The day was divided into 10 hours of 100 minutes, each minute with 100 seconds.

   At 360 days, five complementary days were added annually, and one sixth every four years, devoted to the celebration of republican festivals.

The names of the months were inspired by the aspects of the seasons in France:

Vendémiaire	setembro-outubro
Brumaire	outubro-novembro
Frimaire	novembro-dezembro
Nivôse	dezembro-janeiro
Pluviôse	janeiro-fevereiro
Ventôse	fevereiro-março
Germinal	março-abril
Floréal	abril-maio
Prairial	maio-junho
Messidor	junho-julho
Thermidor	julho-agosto
Fructidor	agosto-setembro

The months are subdivided into three periods of ten days, called "decades". The days of each decade are named *primidi, duodi, tridi, quartidi, quintidi, sextidi, septidi, octidi, nonidi and decadi*.

Ethical issues or dilemmas

Compromise is Essential - In diverse societies, people with different identities and multiple viewpoints must find ways to live together. The work of pluralism is to find a balance between competing values and then to live with the results. Institutional mechanisms help to choose between competing values, but pluralism is not created by institutions alone. The content of those choices is important. Without the right “software,” the “hardware” (institutions) of pluralism will not work.

Recognition is the Baseline, Belonging is the Goal - Belonging is supported by decisions made in every domain of society — economic, political and social — about how to treat people who are different from ourselves. These decisions stem from empathy for other perspectives and experiences. Pluralism seeks to bridge rather than erase human differences and in this way fosters belonging.

Source: Global Centre for Pluralism