4. Measurement in Geography

Pronunciation
In pairs, read these words correctly.

|			
surface	*povrch*	approximately	*přibližně*
equidistant	*ve stejné vzdálenosti*	equal	*stejný*
perpendicular	*kolmý*	parallel	*rovnoběžka*
measure	*měřit*	axis, *pl* axes	*osa*
celestial	*nebeský, astronomický*	incline	*naklonit*

Definitions
Read the definitions and discuss which terms they describe.
Kelly, Keith: Geography, Macmillan

1. …………………The imaginary great circle around the earth's surface, equidistant from the poles and perpendicular to the earth's axis of rotation

2. …………………The angular distance north or south of the earth's equator, measured in degrees

3. …………………Either of the two times during a year when the sun crosses the celestial equator and when the length of day and night are approximately equal

4. …………………Either the northern or southern half of the earth as divided by the equator or the eastern or western half as divided by a meridian

5. …………………Either of two parallels on the earth, one north of the equator and the other south of the equator, representing the points farthest north and south at which the sun can shine directly overhead

6. …………………either of the two points on the ecliptic at which the sun is overhead at the tropic of Cancer or Capricorn

7. …………………to incline or cause to incline at an angle

8. …………………Orbital motion about a point, especially as distinguished from axial rotation

9. …………………one of the imaginary lines joining the north and south poles at right angles to the equator

10. …………………Angular distance on the earth's surface, measured east or west from the prime meridian at Greenwich, England, to the meridian passing through a position

Describing the Earth
What terminology is needed? Mark the model with your terms.
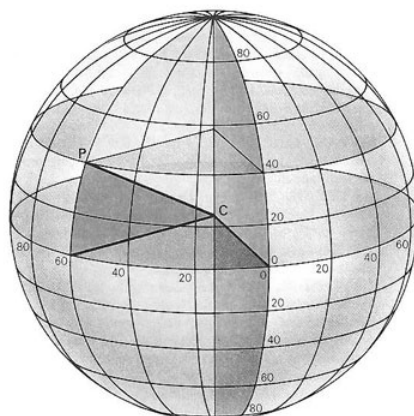
READING

Words with cohesive function
Complete the gaps in the text with the right word.

1. A This
   B Its
   C It

2. A any
   B each
   C every

3. A also
   B like
   C both

4. A virtually
   B respectively
   C similarly

5. A that
   B this
   C thus

6. A all
   B also
   C every

The equator is located at zero degrees latitude. **1**_____ runs through Indonesia, Ecuador, northern Brazil, the Democratic Republic of the Congo, and Kenya, among other countries. It is 40,075.16 kilometres long. On the equator, the sun is directly overhead at noon on the two equinoxes - near March and September 21. The equator divides the planet into the Northern and Southern Hemispheres. On the equator, the length of day and night are equal every day of the year - day is always twelve hours long and night is always twelve hours long.

The Tropic of Cancer and the Tropic of Capricorn **2**_____ lie at 23.5 degrees latitude. The Tropic of Cancer is located at 23.5° North of the equator and runs through Mexico, the Bahamas, Egypt, Saudi Arabia, India, and southern China. The Tropic of Capricorn lies at 23.5° South of the equator and runs through Australia, Chile, southern Brazil (Brazil is the only country that passes through **3**_____ the equator and a tropic), and northern South Africa.

The tropics are the two lines where the sun is directly overhead at noon on the two solstices - near June and December 21. The sun is directly overhead at noon on the Tropic of Cancer on June 21 (the beginning of summer in the Northern Hemisphere and the beginning of winter in the Southern Hemisphere) and the sun is directly overhead at noon on the Tropic of Capricorn on December 21 (the beginning of winter in the Northern Hemisphere and the beginning of summer in the Southern Hemisphere).

The reason for the location of the Tropic of Cancer and the Tropic of Capricorn at 23.5° north and south **4**_____ is due to the axial tilt of the Earth. The Earth is titled 23.5 degrees from the plane of the Earth's revolution around the sun each year.

The area bounded by the Tropic of Cancer on the north and Tropic of Capricorn on the south is known as the "tropics." This area does not experience seasons because the sun is always high in the sky. Only higher latitudes, north of the Tropic of Cancer and south of the Tropic of Capricorn, experience significant seasonal variation in climate.

While the equator divides the Earth into Northern and Southern Hemispheres, it is the Prime Meridian at zero degrees longitude and the line of longitude opposite the Prime Meridian (near the International Date Line) at 180 degrees longitude **5**_____ divides the Earth into the Eastern and Western Hemispheres. The Eastern Hemisphere consists of Europe, Africa, Asia, and Australia while the Western Hemisphere includes North and South America. Some geographers place the boundaries between the hemispheres at 20° West and 160° East so as to not run through Europe and Africa. The Prime Meridian and **6**_____ lines of longitude are completely imaginary lines and have no significance with regard to the Earth or to its relationship with the sun.

http://geography.about.com/od/learnabouttheearth/a/The-Equator-Hemispheres-Tropic-Of-Cancer-And-Tropic-Of-Capricorn.htm

Tasks

1. Explain what the following terms mean   *equinox*   *equator*   *solstice*

2. Is there a difference in what *solstice* means for astrologers and astronomers?

3. Explain the difference between *rotation* and *revolution.*

4. Which areas on the Earth experience great seasonal variations in climate?

5. Has the characteristics of seasons in our latitudes changed recently?

6. Which lines divide the Earth into the Eastern and Western Hemispheres?

LISTENING
LATITUDE AND LONGITUDE   https://www.youtube.com/watch?v=swKBi6hHHMA

1. **Pre-listening questions**

a) What is the purpose of coordinates?

b) What information do you need to get coordinates?

c) What are Brno's coordinates?

2. Listen and complete the information from the video.

1. the earth's circumference in miles	…
2. what kind of construction in San Diego is talked about	…
3. invisible net of parallels and meridians is called	…
4. vegetation type in the tropics	dense …
5. the areas between 66.5° and 23.5° have distinct	…
6. where meridians intersect	…
7. zero degree longitude is called	…

NUMBERS AND CALCULATIONS

1. How do you read these signs?
What are the arithmetical symbols and
operations called?

$$= \quad + \quad - \quad \times \quad \div \quad \sqrt{\ }$$

2. Read aloud:
a) 23-6=17   b) 32÷8=4   c) 8×9=72   d) $^3\sqrt{9}=3$ e) -5¼   f) 2^4

3. Now solve these problems:
1. Take the square root of 36. Add 14. Multiply by 5. Subtract 1.
2. Take the average of 20, 24, 26 and 30. Multiply by 10.
3. Take 50% of the students in your class. Multiply by 2. Divide by 4.
4. Multiply 7 by 9. Add 9. Divide by 6. Subtract 3.

4.Percents: Describe chemical composition of the air.
http://www.aga.com/international/web/lg/aga/like35agacom.nsf/docbyalias/career_gas_school

0,93
20,95
78,08
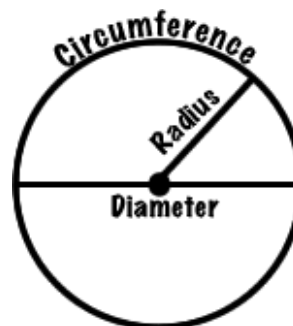0,04 Other gases
Nitrogen
Oxygen
Argon
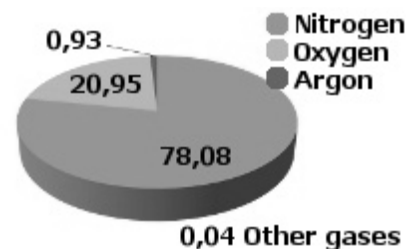
5. Diameter, radius, circumference

Once the circumference of the Earth was known, other measurements could be calculated by using mathematical formulas.

How do you calculate

- *the radius*

- *the surface area*

- *the volume of the Earth?*

QUANTITIES AND UNITS

- What are some quantitative properties that can be measured in this classroom?

1.Complete the missing names of units and number symbols for prefixes:

SI quantity		unit	symbol		*factor*	*prefix*		*factor*	*prefix*
Length		…….	m		…….	*tera*		…....	*deci*
Mass		…….	kg		…….	*giga*		…....	*centi*
Time		…….	s		…….	*mega*		…....	*milli*
Electric current		…….	A		…….	*kilo*		…....	*micro*
Thermodynamic temperature	…….		K		…….	*hecto*		…....	*nano*
Amount of substance		…….	mol		…….	*deka*		…....	*pico*

       Units outside SI system   °C   (*degree centigrade / degree Celsius*)
                                               l   (*litre*)

2. In pairs, make a few sentences according to the example:
One kilometre equals ten to the power of three meters.

3.Derived units.
Put these names of quantities in the right place: *acceleration, volume, velocity, area, density*

Quantity	unit	unit symbol
1. ……………………	Square meter	m2
2. ……………………	Cubic meter	m3
3. ……………………	Meter per second	m/s
4. ……………………	Meter per second squared	m/s2
5. ……………………	Kilogram per cubic meter	kg/m3

4. Say whether the following statements are true or false. Correct the false statements.

    a)   Duration is measured in degrees Centigrade   T/F
    b)   The second is a unit of time   T/F
    c)   Speed is measured in kilograms per hour.   T/F
    d)   The watt is a unit of electrical resistance.   T/F
    e)   Density is measured in grams per metre squared.   T/F
    f)   The gram is a unit of mass.   T/F
    g)   Liquid measurements are made in litres, or cubic decimetres.   T/F