

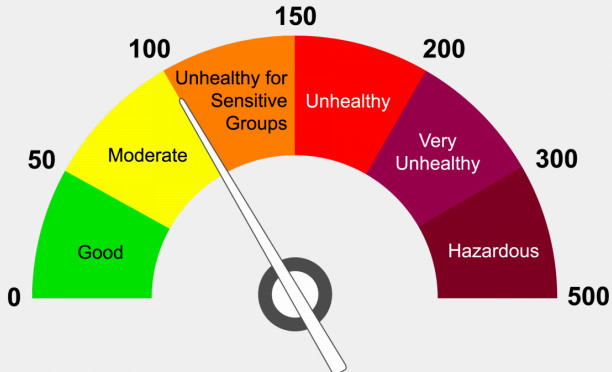



Mini-PBL project	
Student data sheet: Learning Guide	
Title	Air Quality Index
SDG attended	 
Content units	real numbers, real line, intervals, lines, scale change
Sessions	
Hours of autonomous work	
ICT tools to be used	
Context: project estatement	<p>The Air Quality Index (AQI) is a numerical measure that represents the level of air pollution in a specific location. It is designed to be easily understood by the public, with higher values indicating poorer air quality and potential health risks.</p> <p>Here's the AQI scale:</p>  <ul style="list-style-type: none"> ● Good (0-50): Air quality is considered satisfactory and poses little risk to health. ● Moderate (51-100): Air quality is acceptable for most people, but may cause minor breathing discomfort for some individuals, particularly those with respiratory problems. ● Unhealthy for Sensitive Groups (101-150): Members of sensitive groups may experience health effects. The general public is unlikely to be affected.

- **Unhealthy (151-200):** Everyone may begin to experience health effects; measures may be needed to reduce exposure.
- **Very Unhealthy (201-300):** Health warnings of serious effects are likely.
- **Hazardous (301+):** There is a serious health risk, and everyone may experience health effects.

The key air pollutant monitorized, all around the world, with the range of concentrations corresponding to each index level is in the following table:

AQI intervals	Concentrations	
Partículas menores a 10 micrómetros (PM₁₀)		
PM₁₀		
	IMECA	µg/m ³
0-50	0-50	0-60
51-100	51-100	61-120
101-150	101-150	121-220
151-200	151-200	221-320
>200	>200	>320
Partículas menores a 2.5 micrómetros (PM_{2.5})		
PM_{2.5}		
	IMECA	µg/m ³
0-50	0-50	0-15.4
51-100	51-100	15.5-40.4
101-150	101-150	40.5-65.4
151-200	151-200	65.5-150.4
>200	>200	>150.4
Ozono (O₃)		
O₃		
	IMECA	ppm
0-50	0-50	0-0.055
51-100	51-100	0.056-0.110
101-150	101-150	0.111-0.165
151-200	151-200	0.166-0.220
>200	>200	>0.220
Dióxido de Nitrógeno (NO₂)		
NO₂		
	IMECA	ppm
0-50	0-50	0-0.105
51-100	51-100	0.106-0.210
101-150	101-150	0.211-0.315
151-200	151-200	0.316-0.420
>200	>200	>0.420
Dióxido de Azufre (SO₂)		
SO₂		
	IMECA	ppm
0-50	0-50	0-0.065
51-100	51-100	0.066-0.130
101-150	101-150	0.131-0.195
151-200	151-200	0.196-0.260
>200	>200	>0.260
Monóxido de Carbono (CO)		
CO		
	IMECA	ppm
0-50	0-50	0-5.50
51-100	51-100	5.51-11.00
101-150	101-150	11.01-16.50
151-200	151-200	16.51-22.00
>200	>200	>22.00

The situation at real time all around the World can be checked in these links:

	<ul style="list-style-type: none"> • https://aqicn.org/map/world/ • https://www.igair.com/world-air-quality-ranking
<p>Tasks and problems</p>	<p>On SDG dimension: <i>Activity 1:</i> <i>What are the most hazardous zones on the Planet right now? And which one is closer to your location?</i></p> <p><i>Activity 2:</i> <i>What are the most significant impacts on health of the different levels of the AQI?</i></p> <p>On mathematical dimension: Find the mean per Continent, plus the standard deviation error</p> <p><i>Activity 3 (Sweden):</i> Assignment:</p> <ul style="list-style-type: none"> - Select a number of cities in Sweden to examine the AQI. - Collect daily AQI data over a period of one month from various sources such as environmental authorities, meteorological institutes or official measuring stations. - Organize and analyze data to identify patterns and variations in air quality. Use statistical models to help you analyze sets of data. <p>Questions:</p> <ul style="list-style-type: none"> - Are there any clear patterns or trends in the AQI over the selected time period? Explain. - Are there differences in air quality between different cities or regions? Reflect. - Is there a relationship between air quality and specific meteorological conditions or geographic factors? Reflect. <p>To do:</p> <ul style="list-style-type: none"> - Present your results graphically, e.g. with diagrams or maps. - Draw conclusions about the air quality in the selected areas and any factors that may affect it. - Discuss possible causes of observed variations in AQI. - Discuss the relevance of the results to public health and environmental protection. <p><i>Activity 3</i> </p>
<p>Outcomes expected</p>	
<p>Guide for learning</p>	
<p>Assessment</p>	
<p>Others: References</p>	

ANNEX 1: RUBRIC

Category	4=Excellent	3=Good	2=Low	1=Poor
Mathematical Concepts	Explanation shows complete understanding of the mathematical concepts used to solve the problem(s).	Explanation shows substantial understanding of the mathematical concepts used to solve the problem(s).	Explanation shows some understanding of the mathematical concepts needed to solve the problem(s).	Explanation shows very limited understanding of the underlying concepts needed to solve the problem(s) OR is not written.
Mathematical Terminology and Notation	Correct terminology and notation are always used, making it easy to understand what was done.	Correct terminology and notation are usually used, making it fairly easy to understand what was done.	Correct terminology and notation are used, but it is sometimes not easy to understand what was done.	There is little use, or a lot of inappropriate use, of terminology and notation.
Strategy/Procedure	Typically, uses an efficient and effective strategy to solve the problem(s).	Typically, uses an effective strategy to solve the problem(s).	Sometimes uses an effective strategy to solve problems, but does not do it consistently.	Rarely uses an effective strategy to solve problems.
Completion	All problems are completed.	All but one of the problems are completed.	All but two of the problems are completed.	Several of the problems are not completed.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors.	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors.

Sources Checking				
Working with Others	Student was an engaged partner, listening to suggestions of others and working cooperatively throughout lesson.	Student was an engaged partner but had trouble listening to others and/or working cooperatively.	Student cooperated with others, but needed prompting to stay on-task.	Student did not work effectively with others.
Neatness and Organization	The work is presented in a neat, clear, organized fashion that is easy to read.	The work is presented in a neat and organized fashion that is usually easy to read.	The work is presented in an organized fashion but may be hard to read at times.	The work appears sloppy and unorganized. It is hard to know what information goes together.
Diagrams and Sketches	Diagrams and/or sketches are clear and greatly add to the reader's understanding of the procedure(s).	Diagrams and/or sketches are clear and easy to understand.	The work is presented in an organized fashion but may be hard to read at times.	Diagrams and/or sketches are difficult to understand or are not used.
ICT tools used				