



Teaching Unit

Title	Descriptive Statistics
Age of students/grade	12-13 years (2 nd or 3 rd year in Lower Secondary School)
Length of the unit	2-3 lessons (<i>45-50 minutes each</i>)
Mathematical topic	Dive into and use the main concepts of descriptive statistics
Prerequisite knowledge	<ul style="list-style-type: none">• Know the meaning of some recurring terms in statistical surveys such as "statistical population" (all entities to which the survey refers), statistical and variable unit, sample, representative sample• Know the concept of ratio between two quantities (to calculate the "absolute, relative and percentage frequency")• Know various types of graph (ideogram, orthogram, circular/pie areogram, Cartesian diagrams) and know how to derive information from them.
Materials needed	<ul style="list-style-type: none">• Piece of paper or booklet to solve the tasks if there is not enough space on the information sheet• Stationery• Calculator• PC with Excel calculation software if the teacher wishes to achieve even goals related to computer skills
Objectives	<ul style="list-style-type: none">• Students learn about statistical indicators such as mean, mode and median and learn how to use them.• They apply mathematical content to everyday problems.• They improve their reading comprehension.• They get to know different ways of presenting data.• They improve their team skills.

<p>Notes on work with migrant students</p>	<ul style="list-style-type: none"> • The teacher can prepare material to improve the understanding and memorization of some terms (print out terms wrapped in foil, create a worksheet) • At the first brainstorming, the teacher can choose to provide short mathematical input or the correct mastery of statistical terms prerequisites • If there are migrant pupils, cooperative work in pairs is certainly more suitable because it allows a continuous activation of students and the overcoming of any difficulties of linguistic understanding that the teacher alone cannot foster. • Applying statistical survey to real-life contexts improves understanding of statistical concepts for all students • Articles may be written in a language that is difficult for students. In addition, they contain a wealth of new words and expressions, which should be discussed with the learners in advance. Pupils in particular, for whom the text was not written in their mother tongue, could have major problems here. However, this linguistic hurdle can also arise for students whose mother tongue corresponds to the language in the text. Many expressions are rarely used in everyday life and are therefore often unfamiliar. The teacher will be careful to choose articles suitable for age and language level.
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LESSON PLAN

Step 1

Types of representation

The teacher at the beginning of the lesson distributes some newspapers and places terms such as “bar chart”, “pie chart” and “boxplot” on a table. The students have the task of cutting out different types of representation of data from the newspapers and assigning them to the terms.

After that, all the types of representation mentioned will be discussed and reproduced using an example they have chosen. In this phase, the students themselves are active.

Step 2

Analysing a set of data

The coming phase is designed more as frontal teaching. For the self-chosen example, data related to the body (e.g. the shoe size, eyes colour, height) could also be used but

we do not recommend it if the class is turbulent and at risk of teasing; it is better to provide exercises with a set of similar data that saves the time of data collection itself. The term "original list" can be discussed and this list can be sorted. Here it is particularly suitable to address the terms "minimum", "maximum", "range", "mode", "median" and "arithmetic mean". This exercise can be complemented by the notion of a quartile and the creation of an associated boxplot.

In order to take up the presentation of data again, the absolute frequencies of the individual values are first found out with a tally and noted as a number. After that, these values can be grouped. This grouping results in new absolute frequencies. Based on this, a pie chart, a histogram and a column chart are now created.

Here are some exercises that can be used as an example:

Exercise n° 1

The P.E. teacher took a test run with the pupils of the first classes, measuring the time taken to walk 30 m.

He/she obtained the following data in seconds:

4,3 4,7 5,2 5,1 4,4 4,2 4,4 4,8 4,9 5,0 4,6 4,5 4,5
5,1 5,3 5,0 4,3 4,8 4,9 4,2 4,7 5,2 4,5 4,8 5,0 5,1
4,4 4,9 4,5 4,8 4,2 4,4 4,6 4,9 5,0 4,1 4,3 4,4 4,8

- ❖ The teacher would like to group the data in a chart by grouping them into level bands, help him/her....
- ❖ And now he/she wants to evaluate the three statistical indicators of MODE, MEAN and MEDIAN. What would he/she calculate?
- ❖ A colleague from another school asks him/her: "What was the FIELD OF VARIATION of your tests?" What should he/she answer?

Exercise n° 2

The Maths teacher wants to organize afternoon classes and asks his/her students about a preference for the day they are free. Then he/she collects these choices:

<i>Day</i>	<i>Preferences</i>
Monday	Ayesha, Luca, Francesco, Aurora
Tuesday	Anita, Andrea, Sofia, Laura, Paolo, Camila
Wednesday	Amir, Christian, Natalia, Stefano
Thursday	Gemma, Ali, Claudia, Simone
Friday	Matteo, Sara

- ❖ The teacher wants to calculate the ABSOLUTE and RELATIVE FREQUENCY and the PERCENTAGE of this situation.

Exercise nº3

The following table gathers the data of the RELATIVE FREQUENCY of the votes obtained in the third year. Taking into consideration that 90 students have taken the exam, fill the empty cells in the table.

<i>Mark</i>	<i>Absolute frequency</i>	<i>Relative frequency</i>	<i>%</i>
6		0,1	
7		0,4	
8			
9		0,2	
10		0,1	
<i>Total 90</i>			

Step 3

Assessment of achieved competences

At the end of the activity, to verify the achievement of the teaching objectives, a survey/interview can be proposed by the students on their classmates or other students. The topic will be chosen by them (practised sports, number of books read in a month, owned pets,...) and the interview can be oral or by means of a table as in the exercises proposed above. The students will then process the collected data by calculating some statistical parameters and creating a suitable graph.