Liceo Scientifico-Sportivo-Musicale Attilio Bertolucci

Address: via Toscana 10/A, 43122, Parma - Italy
e-mail:: prps05000e@istruzione.it

SCENARIO TITLE

Making Equity and Distribution of Wealth Visible

SUBJECT

Civic Education

[2]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

The present lesson scenario has been developed within the framework of a European Erasmus+ KA201 Strategic partnership project entitled "SHAPE the future teacher", Reference code: 2020-1-EL01-KA201-079206.

The following partner organizations are involved in the project:

a) Scientific Association for the Promotion of Lifelong Learning, Trikala - Greece

b) 1st EPAL Kalampakas, Kalampaka - Greece

c) Liceo Attilio Bertolucci, Parma - Italy

d) Lycée Polyvalent Clos Maire, Beaune - France

e) FORAVE - Associação para a Educação Profissional do Vale do Ave, Lousado - Portugal

f) Colegio Nuestra Señora de Monte-Sión Torrent - Spain

Project coordinator is Scientific Association for the Promotion of Lifelong Learning, Trikala - Greece

[3]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

1. Title

IN-Equity Made Visible

2. Estimated duration

The estimated duration of the scenario is 4 teaching hours

3. Inclusion in the curriculum

The present teaching scenario can be used in secondary education. According to the present Italian Civic Education curriculum this scenario can be used in every class of the liceo, the ideal would be from first to third year.

This scenario uses some tech tools, as mind mapping software and teachers can choose between implementing it with a laser cutter or a 3D printer depending on their availability.

Building real objects helps the student to visualize and compare data directly and add some fun in the process.

4. Aims and objectives

Through the implementation of this scenario, students are introduced to some important aspect of equity in global economics, but they will also learn to use some sites to reach trustful information about their own and other countries.

Students should be able to:

A. Regarding the subject (Civic Education):
- Analise data about poverty and economical equity in the world.
- Learn facts about national official statistical sites.

[4]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

- Compare indices between different countries to evaluate equity.

- Evaluate equity and poverty in their own country

- Understand ways to make visible and communicate Statistical data

- Handle some basic Statistical data

B. Regarding the ICT use:

- Draw objects with Inkscape

- Laser cutting objects having a project

- Represent relevant Statistical data using a Mind-mapping software (as Mindomo)

- Surf official national statistical sites and hdr.undp.org site

C. Regarding the learning process:

- collaborate and work as a team with the aim of completing their work

- experiment, evaluate and come to conclusions by choosing the appropriate solution to the problem they are studying

- organize their work autonomously and propose solutions

- participate actively in the process of learning and building new knowledge

- utilize the possibilities provided by New Technologies to understand the new knowledge in an attractive and innovative way

5. Brief description of the scenario

Since September 2020, Civic Education is a transversal discipline that affects all school grades, starting from kindergarten to secondary school.

[5]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

The course covers three main thematic cores:

1. CONSTITUTION, law (national and international), legality and solidarity
2. SUSTAINABLE DEVELOPMENT, environmental education, knowledge and protection of heritage and territory
3. DIGITAL CITIZENSHIP

The UN 2030 Agenda has set the 17 objectives to be pursued by 2030 to safeguard the coexistence and sustainable development. The objectives are not only about protecting the environment and the natural resources, but also the construction of living environments, cities, the choice of ways of life inclusive and respectful of the fundamental rights of individuals, first of all health, psychophysical well-being, food security, equality between subjects, decent work, quality education, protection of the tangible and intangible assets of communities. In this nucleus, which still finds provision and protection in many articles of the Italian Constitution, may include issues concerning health education, environmental protection, respect for animals and common goods, civil protection and defence.

"There are wide varieties of economic inequality, most notably income inequality measured using the distribution of income (the amount of money people are paid) and wealth inequality measured using the distribution of wealth (the amount of wealth people own). Besides economic inequality between countries or states, there are important types of economic inequality between different groups of people." (From Wikipedia)

"Important types of economic measurements focus on wealth, income, and consumption. There are many methods for measuring economic inequality, the Gini coefficient being a widely used one. Another type of measure is the Inequality-adjusted Human Development Index, which is a statistic composite index that takes inequality into account. Important concepts of equality include equity, equality of outcome, and equality of opportunity." (From Wikipedia).

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

In this scenario, students will explore these aspects and learn facts about their own countries and other countries in the world.

1st Teaching hour

In the 1st hour students will explore their National Statistic Site to find reliable information about their country. In the first part of the activity, they will work individually or in small groups, depending on how many PC the school have at disposal for the activity. They will surf the national statistic site in order to find out:

a) The total population, male/female population, foreigners/citizens population;
b) The subdivision into age groups;
c) The average life expectancy, male/female average life expectancy.

In the second part of the activity, they will work in small groups and will create a conceptual/mind map to summarize the information collected. Possible software can be Mindomo (http://www.mindomo.com) or Cmap (https://cmap.ihmc.us/).

2nd Teaching hour

In the 2nd hour, students will explore the HDR.UNDP site to find out information about inequality in different countries. They will learn to compare equity in different countries and inside their own country using two indices: Gini coefficient and GNI (Gross National Income).

Students will search Gini Coefficient and GNI:

a) for their country;
b) for the countries participating in SHAPE;
c) for some poor countries;
d) for some emerging countries;
e) for some rich countries.

[7]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Students will insert this data in a spreadsheet and process it, so to be able to use it in the next phase.

They will convert:

a)   GNI index in a number so to represent it as an area

b)   GINI coefficient in a number so to represent it as a length

3rd and 4th Teaching hours

In the 3rd and 4th and hour, the students will build their model that represent economic inequality. In this part of the scenario, students will work in groups of 4/5 students. Using the collected data processed in the spreadsheet, students will draw using Inkscape picture for different countries, varying the size depending on the areas and lengths calculated. Finally they will insert the project into the laser cutter to be carved, and then assemble the pieces to build the final set-up. To identify the various countries among the carved shapes, students will draw small coloured flags, or at their choice, also representative images of the countries. In the event that the laser cutter is not available, the teacher can adapt the project to use a 3D printer, or rely on a local FabLab.

6. Scientific approach and conceptual analysis

Statistic data and analysis is mathematically difficult for many students. Moreover, many young people don't realize that given that a country is rich, this does not guarantee that such wealth is also distributed equally. Visualize the information help students to become aware of the differences between different countries while learning the meaning of a couple of indexes often used to this purpose.

The use of a spreadsheet allows you to speed up the calculations and automate them, decreasing the complexity of the task. The possibility of inserting a creative element, through the use of shapes in the final project, allows students to express themselves and inserts the ART element in the STEM of the activity.

[8]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Students become an active part in the task, taking responsibility and becoming aware of being able to understand the world around them, and of being able to act personally taking charge of the future of their country.

7. Extensions / interfaces of concepts or activities

From the teacher's point of view, the scenario can be extended by making it a software learning path for the spreadsheet, or for Inkscape and vector graphics.

For students in a Statistics course, these concepts can be applied in these kind of scenarios, so this specific scenario can be used as a part of a combined pathway of statistics, mathematics and civics. In particular, the statistical indices can be the subject of many disciplinary investigations.

Other possibilities for in-depth analysis can be identified directly from the exploration of the hdr.undp.org site, which allows you to explore various topical issues both as regards the objectives of the 2030 agenda on equitable and sustainable human development, and as regards specific global problems of your country. Each teacher will be free to investigate the aspects that they deem most relevant in their classroom context and important for their school and civil community.

On the other hand, students will have the opportunity to give free rein to their imagination and creativity, using more fully the possibilities of Inkscape to decorate the project they will create, or using other creative means, including manual means to be integrated with specific tools and methods of ICT.

Information on the economic equity of countries can be moving for the students and thought-provoking, leading them to think critically about what is happening in our countries and in other, making also them aware of some big issues in the global situation.

8. Multiple representations - multiple approaches - prediction of difficulties

Wealth, poverty, equity and inequality are in some ways abstract concepts, which children struggle to visualize. That is why multiple representations become very important in this context. To become

[9]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

aware of the situation, children must be guided to understand the statistical indices and the use that is made of them to describe poverty and inequality. While the GNI provides information about a country's wealth, it does not say how this wealth is distributed within the population. Moreover, if a country is very poor, the fact that wealth is distributed "better" than in other countries, does not mean that people live in a comfortable way or can access services and goods. The distinction between rich and poor countries is therefore not adequate to describe the situation really well. Through the concrete and material representation of the indices, pupils can instead visualize differences and meaning of statistical indices. Mathematical representation, moreover, allows the transfer of a percentage number to an extent that can be used in the construction of objects. It is therefore a question of many different representative levels, all useful to provide an overview of economic equity. At the same time, the exploration of statistical data collector sites, both national and worldwide, allows pupils both to find reliable information about their own country and others, and to have a key to understanding these. For a complete understanding of the activity, it should be taken into account that the explicit teaching of civic education brings pupils closer to concepts that are actually very complex, with non-trivial aspects, not easy to interpret, and that are based on difficult mathematical tools that are generally not taught in this level of school.

9. Is there an additional value in using the computer?

The scenario will require an IT lab with internet access for students, to access the different sites they will explore, to build their maps with an online software. They will need PCs with Excel or a similar software (or an internet connection to use a software online) and with Inkscape.

The scenario will also require a laser cutter machine.

The use of a software tool allows to simplify the calculation and is therefore important to speed up the transformation of data into areas or lengths automatically, in order to leave more time for

[10]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

students to process the creative part of the final product. The use of ICT also allows to approach the topic in question from different points of view, using different software, as well as, of course, to access the enormous amount of statistical data available online in a safe and reliable way.

10. Didactic noise

"Didactic noise" is a term that refers to the unwanted side activities (e.g. too long calculations), which can completely overshadow the real objects of the course. In the case of this scenario, some didactic noise can be reduced by eliminating some of the many calculations that need to be done, and having them automatically done by an appropriate software. This will allow students to focus on the new concepts of the scenario. In addition, working in small groups should allow pupils to divide up their tasks, thus optimising working time and reducing the functional but not objective activities of the project that each individual pupil has to carry out, such as the creation of shapes to be cut with laser.

11. Use of external sources.

1) National institutes of Statistics:
   a. Portugal: INE Statistics Portugal
      https://www.ine.pt
   b. Spain/Catalonia: INE España / IDESCAT
      https://ine.es/
      https://www.idescat.cat/
   c. France: INSEE
      https://www.insee.fr/en/accueil
   d. Italia : ISTAT
      https://www.istat.it/

[11]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

e. Greece : Hellenic Statistical Authority

https://www.statistics.gr/el/home

2) UNITED NATIONS DEVELOPMENT PROGRAMME - Human Development Reports

https://www.hdr.undp.org/

3) Inkscape https://inkscape.org

4) Mindomo https://www.mindomo.com/

5) Inkscape Tutorial:

a. https://inkscape.org/it/learn/tutorials/ (teachers should take a look at this before starting the activity)

b. Inkscape Video tutorial (teachers may want to choose another tutorial in their own language, or asking an expert technician to teach the students and guide them during the activities, instead of using this video tutorial)

12. Learning theory (or underlying theories)

The discovery learning model integrates the following principles: problem solving, student management, connection and integration, information analysis and interpretation, and error management.
Opposed to what happens in other forms of knowledge acquisition, in learning by discovery the role of teachers is not to provide students with all the data they should learn. On the contrary, they should help them explore on their own, with the aim of solving the problems they encounter in the process. In this way, the main goal of teachers in discovery learning is to encourage students to take an active role in their own process.
Another of the most important features of discovery learning is that the mental and emotional state of students has a great influence on their results. That is why teachers must be able to create a suitable environment for the process to run smoothly.
In discovery-based learning, it is considered that the acquisition of knowledge does not occur only

[12]

Co-funded by the
Erasmus+ Programme
of the European Union

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

when students find the correct answers. Therefore, failure is seen as a fundamental part of the process of exploring and developing one's own ideas.

Learning by discovery is not about finding the right end result, but about everything that is learned during the process.

ICT is increasingly present in our lives, but it changes very quickly. Therefore, in order to learn how to use it, students need to familiarize themselves with it by using it, and understand the principles behind its most common uses.

13. Highlighting small changes in the organization of the course and the meaning of the concepts

Small variations in the scenario may be necessary if students need more in-depth study to understand the concepts to be learned, such as the statistical indices they are exploring. In addition, some data may not be available directly on national statistical sites and therefore the activity must necessarily change.

14. Teaching and learning contract

It is the set of teacher behaviors expected of the student and the corresponding set of student behaviors expected of the teacher. There is a possibility that at some point in the course of the activity the teaching contract will be overturned. This contract is not explicitly expressed and is understood every time it is somehow overturned. This should be noted.

Teachers should guide students throughout the process, without giving them explicit answers or solving directly their problems. Students are expected to ask for suggestions and confirmation during the activities, but they should not ask the teacher to intervene directly in the activity or to supersede them in case of difficulty.

15. Classroom organization - feasibility of design

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Since group work is planned, the setting of the classroom or laboratory should allow students to move easily, to interact in a positive and active way and make it possible to change the number students per group during the activities.

16. Description and analysis of worksheets (or other teaching material)

First worksheet – WEB QUEST – Information & Statistics about my Country (and other)

The first worksheet contains operational indications for the development of the web quest. Students will find some guidance on sites to explore and information to look for. They will also find instructions for drawing a conceptual (or mental) map in which to report the information and data obtained during the online exploration. The research activity will be guided through some specific questions about your country.

The intervention of the teacher in the initial exploration phase should be as low as possible. In the output construction phase, the teacher monitors the work of the small groups checking that the connections and the relevance of the data are appropriate to the context and age of the students.

Browsing the official statistics website of their country, the students, divided into very small groups (possibly in pairs), will look for information about population:

- ratio of men/women, foreigners/compatriots
- subdivision into age groups, age groups may vary depending on the availability of data offered by the national site
- average life expectancy (total, men, women)

For the sites to be used, consult section 11 of this scenario, they are enlisted there for each country. Students should try and find the sites without the teachers' help. The teachers, though, can provide some of the information (e.g. the name of the national statistical office in their country) in case pupils find themselves stuck during this part of the activity and they must always monitor that the site identified by the pupils is the correct one.

[14]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Working time: 1 hour

Tools:

- PC with internet access
- Mind mapping software

OUTPUT: the expected output is the drawing of a concept map, to be carried out in small groups (of two or three students)

Second worksheet – EXPLORATION & PROCESSING – Income and Inequality in the World

In the second activity, students explore another site, which is important for finding correct and validated information about human development: https://hdr.undp.org/

In the first part of the activity the students will explore some aspects of the site, to try to understand what kind of information is available there. However the worksheet will then guide them to select only a few particular data that is the subject of this scenario. The data that students will have to look for on the site is related to the wealth of a country and its distribution: the GNI index (gross national income) and the Gini index (index that measures the disparity in the distribution of wealth, 1 = total disparity, that is, all wealth is owned by a single citizen, 0 = perfect equity, that is, every citizen has exactly as much wealth as any other). The data identified by the pupils are then processed using software such as a spreadsheet. At this stage, the teacher checks the correct use of the spreadsheet and the downloaded data.

Students should find the data without the teacher's help, but the teacher must know exactly where to find the correct data, so that they can check their students work:

- GNI is in this excel document online (link to the document), in the Table 1 sheet, column K
- GINI Coefficient is in the same document, in Table 3 sheet, column AE

[15]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Pupils will look for these indices for all countries participating in the Erasmus SHAPE project, in addition to:

- one of the most populous developing countries
- one to choose from a selection of poor countries (identified on the basis of the significance of the data)
- one to choose from a selection of richer countries

If the class does not yet know how to use the spreadsheet, you can proceed in two different ways: to preface this activity with a lesson on the use of the spreadsheet software (for example Excel), or alternatively to use an already prepared sheet in which the students will only have to enter the data. This second option, however, deprives students of an important active part in the scenario and should therefore be used only in case of actual need or lack of time. A prepared spreadsheet will be available in the teaching materials.

The spreadsheet is needed to transform the data needed for the last task. More in detail, the Gini index is transformed into a height in centimetres, suitable for visualizing economic inequality in a direct way (greater height, greater inequality), while the GNI index is transformed into an area, in order to visualize the economic availability of a country, that is, its wealth, regardless of how it is distributed (greater area, greater wealth of the country).

Working time: 1 hour (or 2 hours if the class need to be prepared on the use of Excel or similar software)

Tools:

- PC with internet access
- Spreadsheet software

OUTPUT: the output will be the excel table with the data on heights and areas

[16]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Third worksheet – VISUALIZE – Income and Inequality in the World

The last activity is the one in which the students prepare the file for laser cutting, proceed with the cutting using the laser cutter machine, build the installation of the project and decorate it. This is the most creative part of the scenario, but for reasons of time, the templates to be used are provided, modifying them appropriately students will create their own Inkscape project. Before this activity, the teacher will invite the students to watch the tutorial on the Inkscape software. It is possible that at this stage pupils need more control and guidance, especially from an operational point of view. The actual laser cutting part requires the presence of a technician or personnel able to use the machine.

The worksheet guides students to modify the preset model, to make it suitable for the data as processed in the previous activity. In order to work productively, it is possible to reform groups with more pupils. Each group can customize its project using figures, drawings or other, to be inserted using laser cutting, decorated paper, compositions with other materials or anything else the imagination and creativity of the students can suggest.

Working time: 2 hour

Tools:

- PC with internet access
- Inkscape software
- the excel table produced in the previous activity
- Laser cutter machine

OUTPUT: the output of this activity also constitutes the final output of the scenario and is the construction of the project, assembled and decorated.

[17]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

17. Evaluation

The teacher can use the usual and reliable open source software such as e.g. the classic hot potatoes or Google forms in order to create a self-assessment test (closed type), crossword puzzles, cryptowords etc. but also quizzes, flashcards etc.

Co-funded by the
Erasmus+ Programme
of the European Union

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Worksheet 1

WEB QUEST - Information & Statistics About My Country

Team members

_____

_____

_____

1. First of all, enter your names in the worksheet, which will be the output of the first activity together with a concept map that you will create.

    In this activity, work in pairs is expected. If this is not possible, groups of three can be formed.

    If you are working in pairs, one of you will have to browse online and the other will gradually write on the worksheet the required information.

    If you are working in groups of three, then two of you will search for the information online and the rest will fill out the spreadsheet. One of you three will also have to check the progress of the work and possibly exchange views with the other groups.

    In the second part of the activity, you'll work together to draw a maps that show all the data retrieved in the first part. You need to discuss and share your idea of the map, choose the colours, the forms, and personalize as much as you can. Try and make a beautiful map!!

    You need a PC with an internet connection.

2. Find the National Statistics Site of your country.

    Ask your teacher in case you can't find it or you're not sure about it.

    Write down the name of the National Statistics Site of your country and its URL:

    _____

[19]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

3. Browsing the site, find out the requested data and answer the following questions.

    What is the total population currently living in your country?

    _____

    In what page of the site did you find this information?

    _____

    What is the total male population and the total female population?

    _____

    What is the total number of foreigners and what is the total number of citizens with the

    nationality of your country currently residing in your country?

    _____

4. Browsing the site, divide the population currently residing in your country into age groups.
    As an example, you can divide into three groups: from 0 to 14 years, from 15 to 64 years and
    over 64 years. But these age groups can change depending on what you find on the site.

Age groups					
Residing people					

Briefly describe by what criteria you chose the age grouping.

_____

_____

_____

_____

_____

5. Browsing the site, find out what is the average life of a citizen of your country, then find this
    data based on gender, that is, the average life of a man and that of a woman, in your
    country. Fill in the following table.

[20]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

	Total population	Men	Women
Average life			

6. Go to the site: https://www.mindomo.com/

   Plan how you want your map to look, what data you want it to contain, and how you want it to be connected to each other. Make sure that it is clearly visible what your country is.

7. The output of this activity is this worksheet duly filled out in all its parts and the map you have drawn. Print the map in pdf, take a screenshot or deliver it to your teacher in digital format.

[21]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Worksheet 2

EXPLORATION & PROCESSING - Income & Inequality in the World

Team members

_____

_____

_____

1. First of all, enter your names in the worksheet, which will be the output of the first activity along with the Excel file you will create.

   In this activity, work in pairs is expected. If this is not possible, groups of three can be formed.

   As with the first activity, organize your work so that you all can learn and understand the data you get and how it should be used.

   You need a PC with an internet connection. You need also a spreadsheet program, such as Microsoft Excel.

2. Go to the site https://hdr.undp.org/.

   Browse the site and find out:

   What is the title of this site? How does it translate into your language?

   _____

   _____

   What does this site do and who manages it?

   _____

   _____

   Enter the section that contains the data. What does this section contain? What kind of data does it collect?

[22]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

_____

_____

_____

_____

3. Go to the page https://hdr.undp.org/data-center/human-development-index#/indicies/HDI,

   and find out:

   What is HDI? How does it translate into your language?

   _____

   _____

   What are dimensions and indicators for the HDI?

Dimensions	Indicators

4. Go to the data centre in the site and find the link at all the data and documentation.

   https://hdr.undp.org/data-center/documentation-and-downloads

   Open the file *"2020 Human Development Data: All Tables and Dashboards"*

   Select the "Table1" sheet and find out the GNI index for the requested countries, then fill in

   the following table.

Country	1. France	2. Greece	3. Italy	4. Portugal	5. Spain	6.	7.	8.
GNI								

For the last three columns select ONE from the following:

column 6: China, India, Nigeria, Brazil;

column 7: Niger, Liberia, Bangladesh, Cambodia

column 8: United States, Saudi Arabia, Ireland, United Arab Emirates

[23]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

What is the GNI? How does it translate into your language?

_____

_____

Observe that in the table1 online, in the header row you can read "2017 PPP $". This means that a given sum of money, when converted into US dollars at the PPP exchange rate (PPP dollars), will buy the same basket of goods and services in all countries. If the meaning of this is not clear enough for you, ask your teacher for further explanations.

Select the "Table3" sheet and find out the GINI coefficient for the requested countries, then fill in the following table. For the last three columns you must use the same countries used in the previous table.

Country	1. France	2. Greece	3. Italy	4. Portugal	5. Spain	6.	7.	8.
GINI Coefficient								

What is the Gini coefficient? Try to understand what the Gini coefficient tells us about a country, by surfing the Wikipedia site.

_____

_____

_____

_____

5. According to some authors, the Gini coefficient is considered high when it exceeds the value 32. According to these scholars, which are among the countries examined, those that have an unacceptable economic inequity (i.e. too high)?

_____

6. Think about the data you have found on this site.

Your working group must now try to explain why it is important to use these two indices

[24]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

together and what important information they give us in relation to the countries you have examined. Also try to understand if in this way it is possible to compare the various countries with each other. Then decide in which countries you would absolutely not want to go and live based on what you have seen with these data.

We should use the two indices together, because…

_____

_____

_____

_____

We can/cannot compare different countries, using this information, because

_____

_____

_____

_____

We agreed that we would not want to live in

_____

because (the reason must be related to the information you have learned during this activity)

_____

_____

_____

_____

[25]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

7. Create your new spreadsheet and insert a title in the first row. Save your spreadsheet document with an appropriate name, such as: Country_Class_StudentsNames.xlsx
   Remember to save your work frequently.
   In this Worksheet you will insert the data collected in the previous part of this activity, so make sure that you have it.
   In the final set-up of the project, you will build circular platforms (or other shapes of your choice), the area of which will represent a measure of the wealth available to the population. Such platforms will be mounted on pedestals whose height will represent the inequity in the distribution of wealth.

8. In your group, choose whether you want your final product to be composed of circular or squared shapes. If you know how to use geometric shapes, arithmetic and you have enough time, you can also choose other different geometric shapes. The only important thing is that the figures you build have as an area the one calculated in the spreadsheet and in order to have a precise area it will be appropriate to use geometric shapes.
   In the spreadsheet, then insert the table header, as in the following example:
   Row 1: title
   Row 2: six columns titles as in the example, so the country will be in column A, the GNI in column B and GINI in column C. Then if you want, you can leave a free column and insert in column E, F and G the area, radius and heights.

Income & Inequality in the World

Country	GNI (PPP $)	GINI Coefficient	Area (in mm²)	Radius (in mm)	Height (in mm)

9. Now insert your data in the columns GNI and GINI, for each country. The Gini Coefficient is a percentage, but DO NOT use the percentage format, because you will need it as a normal number to do the next part of the activity. (i.e. if Gini Coefficient is 32.1%, you need to insert

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

only 32.1, as it is)

In the other columns you will need to insert the formulas to find out the radius (if you want circles) of the platforms and their heights.

10. The GNI will be converted in an area in mm squared by your spreadsheet, then in another column you will need to insert a formula to calculate the radius of the circle (or the size of the square, or whatever you need depending on the shape you chose).

    In the first row of the table (Row 3) in the column of the area (column E), you need to insert the formula:

    `=B3/50`

    This division by 50 is to reduce proportionally the area to rescale the dimensions of the final output setup. If you want something bigger or smaller, you will need to change this number. Do not change anything without consulting your teacher.

    Copy and past your formula all along the column E.

    To calculate the radiuses you will need to insert the following formula in cell F3:

    `=SQRT(E3/PI())`

    SQRT(<NUM>) is the command for the square root, check if in your country the name is different (it can be, if you are using Excel in your own language).

    PI() (with nothing in the brackets) is the command for the number π, precise to 15 significant figures, as for SQRT, check if it changes in your software.

    Then copy and past this formula all along the column F.

11. The GINI coefficient will be transformed into a measure of length in millimetres. To rescale the coefficient in order to acquire an adequate scale for the final product, you will need to multiply the GINI coefficient by three. So in the cell G3 (or if you want leave a free column, in the cell H3), you need to insert the formula:

    `=C3*3`

    Then copy and past the formula all along the column.

[27]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

12. Format your table and deliver it in xls format to your teacher.

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Worksheet 3

EXPLORATION & PROCESSING - Income & Inequality in the World

Team members

_____

_____

_____

1. In this activity, work in groups of 4/5 students is expected. So you can combine two pairs of previous activities to form a new single group of four students, or otherwise, depending on how the groups of the previous activities were formed.

    To complete this last task, you will need:

    - PC with internet connection (preferably two per group)

    - Software Inkscape installed on your PC

    - This worksheet with the instructions

    - The file ready for drawing the platforms and their supports (your teacher has to give you that file, and each group will work with the same preset model)

    - a laser cutter machine with appropriate software and the presence of a technician able to use it and make it work using the files you will create

    - the excel file you prepared in the previous activity.

    Since you have joined two groups to form a larger one, you will have two excel documents, your group will then have to choose which one to use for the final product, also agreeing on any changes. But don't change anything without first asking your teacher.

2. Open the software Inkscape using two or more different PC. Using multiple PCs, the students in the group will be able to create the files needed for laser cutting much faster, sharing the

[29]

**KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices**
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

work and helping each other. Each student will be able to create a platform and support related to two specific countries among those examined, so that the group of four students generates all the supports and platforms for the eight countries.

Open up the file already prepared for you.

You will find three shapes already given, check that the unit is in cm or mm in the top toolbar:
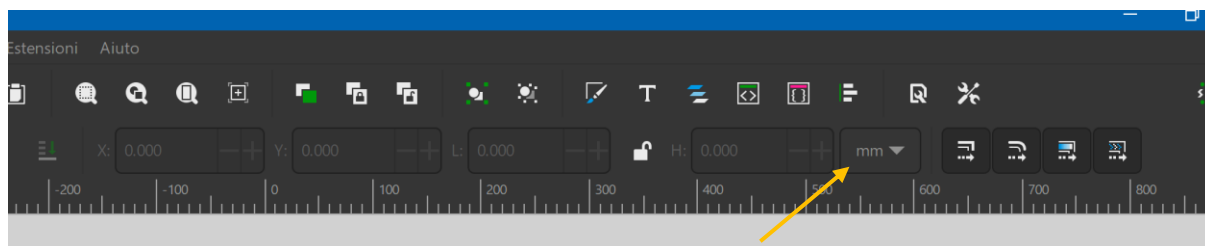
Now you need to change the shapes so that you get circles with the desired area and supports of the desired height for each country. Pay special attention during this process! The width of the support slot must absolutely never change and must always remain exactly 4 millimeters, even if you change the size of the support.

In Inkscape there will be no problem to resize the column IN HEIGHT (stretch it in height does NOT change the section of the slot: 4mm).
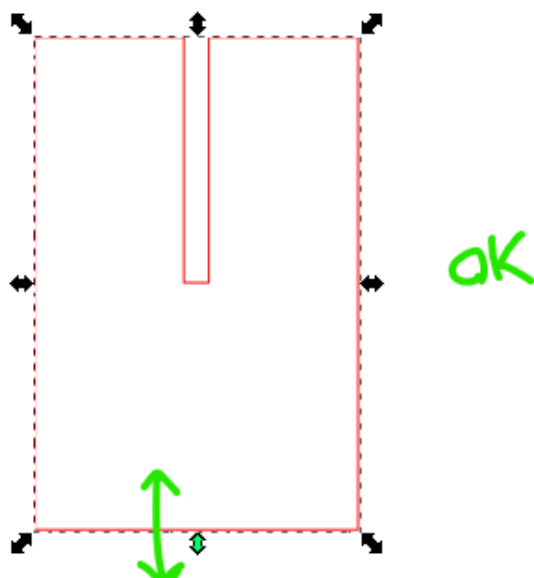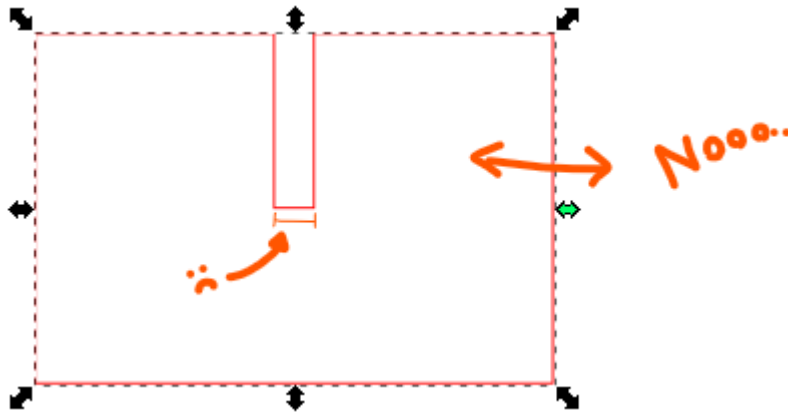

[30]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Stretching it IN WIDTH instead, changes the section of the slot, and the interlocking no longer fits very well.

One way to avoid this problem is to manage size using nodes.

With the "small arrow" tool, select several nodes (selection window), and then move them together: The column will be wider, respecting the interlocking section.

TIP: To move nodes perfectly horizontally (or vertically), hold down CTRL while dragging.

You can find an animated gif in the scenario materials that shows you how to do this procedure. If something goes wrong, restart from the beginning with an untouched preset file.

3. When your files are ready, one for each country, with a technician help, save them and use them in the laser cutter to cut the shapes.

   If you already know how to use the laser cutter or if you have a lab technician available to explain how to do it or help you do it, you can add images (flags or symbols) on the platform of the various countries, to represent the different nationalities. Or you can put the name of the country or both image and name. In this case, remember that usually:

   - Colour BLUE is for linear incision not too deep, without cut;

   - Colour BLACK is for engraving surfaces;

   - Colour RED is for cutting.

[31]

KA2 - Strategic Partnership for Innovation and the Exchange of Good Practices
"SHAPE the future teacher" project
Ref. Number: 2020-1-EL01-KA201-079206

Otherwise, decorate the platforms using tempera or coloured paper or handmade drawings, or any other technique that your imagination suggests. The goal is to ensure that for each platform it is easy to identify the country to which it refers.

4. The final step consists in the preparation, assembly and decoration of the platforms of the eight countries. When you're done, take a nice picture of your platform. What do you think? Does this visualization of the data you have worked on make the idea for the observer? When assembling the platform, you could provide a panel with explanations, so that observers can understand your work and its meaning.