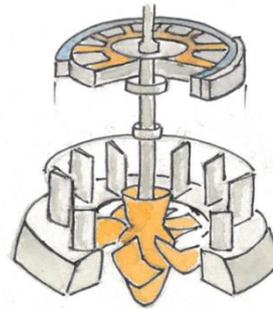
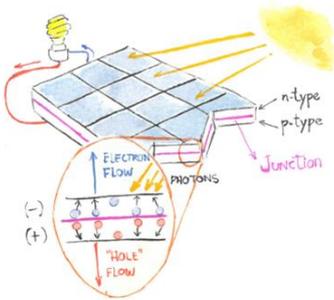
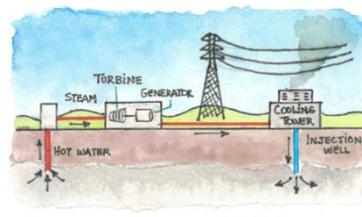
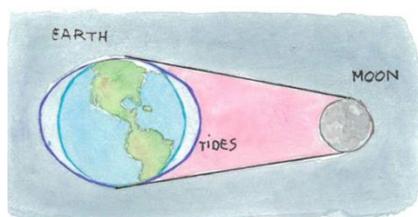


LET'S TALK ABOUT ...



ENERGY RESOURCES



SCRIPT AND TEACHING MATERIALS

The driving question: "WHAT ENERGY RESOURCES ARE?"

The scenario will need 6 hours (including the building activity). Teacher could adapt the activities (order and number) according to the deeper study of the scenario. Some activities could be done and not others (for example, I propose to do at home the activities about the videos, it is optional). The same for the activities proposed to do at home (scale-up or summarize activities) and the building activity.

Activities can be done in groups (pairs ) or individual . Teacher could propose the way of work.

All the videos from YouTube are consulted in February 2021.

In case teacher wants to follow the entire scenario, the activities proposed for each session will be the below:

Scenario Overview

Session	Activities	Content-obligatory Language// Solving equations	Timing	Skills Reading Writing Listening Speaking Interaction Drawing ICT Calculating Underlining Constructing	Interaction T-S S-S	Assessment Peer assessment Self-assessment Teacher assessment ...
1	Introducing the scenario; read/explain "introductory text". Solving doubts.	Energy resources (electricity, solar energy, wind, fossil fuels, nuclear energy, etc.)	5'	L/S/IN	T-S	
	Activity 1. If necessary, explain how to write definitions and relations cause-effect.	Energy, uses of energy	5'	R/S/IN/W	S-S	T A
	Activity 2. Students can underline the required or build a mind map.	Energy resources (conventional, alternative, primary, secondary, renewable, non-renewable energy resources).	15'	R/IN/W/UN/S	S_S	T A P A*
	Activity 3. Students have to put the words in the box in the table. Some words can be putted in more than one column.	Energy resources (conventional, alternative, primary, secondary, renewable, non-renewable energy resources). Energy resources examples (electricity, oil, butane, natural gas, wind energy, geothermal energy, gasoil, coal, nuclear energy, bio fuel, sunflower oil, hydropower, petrol, wood).	15'	R/W/S/IN	S-S	T A P A*
	Activity 4. Students have to draw three energy resources	Energy resources examples (electricity, oil, butane, natural gas, wind energy, geothermal	15'	D/IN/S	S-S	T A

	pictures.	energy, gasoil, coal, nuclear energy, bio fuel, sunflower oil, hydropower, petrol, wood) .				
	Summarize contents. Discussion in class. Solving doubts.	Energy resources (conventional, alternative, primary, secondary, renewable, non-renewable energy resources). Energy resources examples (electricity, oil, butane, natural gas, wind energy, geothermal energy, gasoil, coal, nuclear energy, bio fuel, sunflower oil, hydropower, petrol, wood) .	5'	L/S/IN	T-S S-S	
2	Review things studied first day.	Energy resources classifications and examples.	5'	S/IN/L	T-S S-S	
	Read/Explain the text "Fossil fuels" and watch the video "fractional distillation. The chemistry journey. The fuse school": https://www.youtube.com/watch?v=alzTofTj7CQ : I propose to do at home the activities about the video (optional). Discussion in class. Solving doubts.	Fossil fuels, coal, oil, natural gas, uses of fossil fuels, atmospheric pollution due to the use of fossil fuels (global warming, acid rain, etc.), oil fractional distillation and products obtained from it.	10'	IN/S/R/L (W)	T-S S-S	TA (if optional activities are done)
	Activity 5. After read the text "Fossil fuels" students have to answer the questions.	Fossil fuels, coal, oil, natural gas, uses of fossil fuels, oil fractional distillation and products obtained from it, fossil fuels formation.	10'	R/W/IN	S-S	T A
	Read/Explain the text "Nuclear energy" and watch the video "Fission vs fusion. What is the difference?" https://www.youtube.com/watch?v=2W-GEE6YU4M I propose to do at home the activities about the video (optional). Discussion in class. Solving doubts.	Nuclear energy. Nuclear reactions (fission and fusion). Uses of nuclear energy.	10'	IN/S/R/L (W)	T-S S-S	TA (if optional activities are done)
	Activity 6. Students have to match pictures with nuclear reactions.	Nuclear reactions (fission and fusion)	3'	W/IN/S/R	S-S	T A P A*
	Read/Explain the text "To know more about nuclear energy" Discussion in class. Solving doubts.	Nuclear fusion. The CERN.	5'	IN/S/R/L	T-S S-S	
	Read/Explain the text "Renewable energy resources". Discussion in class.	Renewable energy resources (solar, wind, hydropower, wave's, tidal, geothermal, biofuel, waste)	5'	IN/S/R/L	T-S S-S	

	Solving doubts.					
	Activity 7. Students have to look at the graph “renewable electricity production in the E.U.”. If necessary, teacher can explain the graph. After that students have to answer the questions about the graph.	Electricity, hydropower, geothermal, solar, marine, wind and biomass energies.	12'	IN/S/R/W	S-S	TA
3	Revise “renewable energy resources”. Possible discussion. Solving doubts.	Renewable energy resources (solar, wind, hydropower, wave's, tidal, geothermal, biofuel, waste)	5'	IN/S/L	T-S S-S	
	Activity 8. Put pictures in the correct column (renewable, fossil fuels or nuclear energy)	Renewable energy resources (solar, wind, hydropower, wave's, tidal, geothermal, biofuel, waste), Nuclear energy. Nuclear reactions (fission and fusion). Uses of nuclear energy. Fossil fuels, coal, oil, natural gas, uses of fossil fuels.	10'	IN/S/W	S-S	TA PA*
	Activity 9. Choose the correct answer.	Renewable energy resources (solar, wind, hydropower, wave's, tidal, geothermal, biofuel, waste), Uses of nuclear energy. Fossil fuels, coal, oil, natural gas, uses of fossil fuels.	5'	IN/S/W	S-S	TA PA*
	Explain/Read text “Solar energy”. Watch the videos “solar thermal” in “https://www.youtube.com/watch?v=FqjfJGfugdE “and “solar photovoltaics” in “https://www.youtube.com/watch?v=gl5tY5Noacc “from YouTube. I propose to do at home the activities about the video (optional). Possible discussion. Solving doubts.	Solar energy, photo thermal use, photovoltaic use. Examples of both.	10'	R/IN/L/S (W)	T-S S-S	TA (if optional activities are done)
	Activity 10. Students have to answer the questions about the previous text.	Solar energy, photo thermal use, photovoltaic use. Examples of both.	5'	IN/S/W/R	S-S	TA PA*
	Activity 11. Students have to put pictures in the correct column (Photo thermal or photovoltaic use)	Solar energy, photo thermal use, photovoltaic use. Examples of both.	5'	IN/S/W	S-S	TA PA*
	Activity 12. Students have to draw three			D	S-S	TA

	devices that work with solar energy. I propose to do this activity individually at home.					
	Explain/Read text "Wind energy". Watch the video "wind power" in " https://www.youtube.com/watch?v=Z5c50-hcD0 " from YouTube. I propose to do at home the activities about the video (optional). Possible discussion. Solving doubts.	Wind energy, wind turbine, wind farms, electricity, blades, and problems due to the use of wind energy.	10'	IN/S/R/L (W)	T-S S-S	TA (if optional activities are done)
	Activity 13. Students have to match a text, with a title and with two sentences (each text).	Wind energy, wind turbine, wind farms, electricity, blades, and problems due to the use of wind energy.	10'	R/S/W/IN	S-S	T A P A*

4	Explain/Read text "Hydropower". Watch the video "Hydropower" in " https://www.youtube.com/watch?v=q8HmRLCgDAI " from YouTube. I propose to do at home the activities about the video (optional). Possible discussion. Solving doubts.	Hydropower, electricity, dam, wind turbine, ways to use the energy for the water, types of hydropower stations	7'	L/S/IN/R (W)	T-S S-S	TA (if optional activities are done)
	Activity 14. Match sentences with the correct endings.	Hydropower station, water turbines, generator, dam, water conductions.	5'	R/S/IN/W	S-S	T A P A*
	Explain/Read text "Wave's energy". Watch the video "wave energy" in " https://www.youtube.com/watch?v=sZuc4LMtHoY " from YouTube. I propose to do at home the activities about the video (optional). Possible discussion. Solving doubts.	Wave's energy, wave's uses, wave's devices.	7'	R/S/IN/L (W)	T-S S-S	TA (if optional activities are done)
	Explain/Read text "Tidal energy". Watch the video "Tidal power" in " https://www.youtube.com/watch?v=VkTRcTyDSyk " from YouTube. I propose to do at home the	Tides (the moon), tidal energy, devices used to uses tidal energy	7'	R/S/IN/L (W)	T-S S-S	TA (if optional activities are done)

	activities about the video (optional). Possible discussion. Solving doubts.					
	Explain/Read text "Geothermal energy". Watch the video "Geothermal" in " https://www.youtube.com/watch?v=DFQrE91kZwk " from YouTube. I propose to do at home the activities about the video (optional). Possible discussion. Solving doubts.	Geothermal energy, uses of solar energy	7'	R/S/IN/L (W)	T-S S-S	TA (if optional activities are done)
	Activity 15. According to the text "Geothermal energy" answers the questions.	Geothermal energy, geothermal uses.	5'	R/IN/S/W	S-S	TA
	Explain/Read text "Waste energy". Possible discussion. Solving doubts.	Waste, uses of waste (pellets, biogas, recycle, incineration)	5'	R/IN/S	T-S S-S	TA PA*
	Explain/Read text "Bio fuel and biomass". Watch the videos "Biomass" in " https://www.youtube.com/watch?v=yHWcdU35s ", and "Biofuels" in " https://www.youtube.com/watch?v=ZGmwDffc74 " from YouTube. I propose to do at home the activities about the video (optional). Possible discussion. Solving doubts.	Biofuels, biomass, biodiesel, ethanol, biogas, and uses of biomass.	10'	R/L/S/IN (W)	T-S S-S	TA (if optional activities are done)
	Activity 16. Match pictures and words.	Hydropower, tidal energy, waste energy, geothermal energy, wave's energy.	2'	R/IN/W/S	S-S	TA PA*
	Activity 17. Match words with related aspects.	Renewable energy resources and their uses, acid rain, sulphur oxides, fossil fuels, carbon dioxide, nuclear energy, radioactivity.	5'	R/IN/S/W	S-S	TA PA*
5	Activity 18. Match energy with the correct sentence about it.	Renewable energy resources, uses and descriptions.	5'	R/IN/S/W	S-S	TA PA*
	Activity 19. Complete the grid with the name of the energy resource that appears in the picture.	Oil, natural gas, waves, nuclear energy, wind energy, coal, geothermal energy, solar energy, solar cells, waste, dam, hydropower.	4'	R/IN/S/W	S-S	TA PA*
	Activity 20. Complete the word search (6	Wind, sun, tides, oil, coal, biogas, waste, waves, hydropower,	10'	R/IN/S/W	S-S	TA PA*

	renewable energy resources from the box. The other renewable energy resource that doesn't appear in the word search has to be written in the question.	butane, natural gas, nuclear energy.				
	Activity 21. Solve the crossword. Summarize activity.	Energy resources.	20'	R/IN/S/W	S-S	T A P A*
	Activity 22. Individual activity to do at home . Fill in the gaps activity. Summarize activity.	Energy resources.		R/W	S	T A P A*
	Activity 23. Individual activity to do at home . Fill in the gaps activity. Summarize activity.	Energy resources.		R/W	S	T A P A*
	Activity 24. Explain to students how to build a solar oven. Solar oven can be finished next day. They have to look for materials, and they can do some work at home. Students can watch the videos: "How to make a simple solar cooker to understand the use of solar energy" in: https://www.youtube.com/watch?v=v5CdNH3sQT0 , and "How to make a solar oven, easy" in: https://www.youtube.com/watch?v=UqmqU2L7kek Discussion in class. Solving doubts.	Solar energy, solar oven, how to build a solar oven.	21'	R/W/S/IN/L	T-S S-S	T A
6	Correct activities 22 and 23.	Energy resources.	10'	S/IN/R/W	T-S S-S	T A P A*
	Finish the construction of the solar oven. Solving doubts.	Solar energy, solar oven, how to build a solar oven.	40'	IN/S/R/CONS	T-S S-S	T A
	Revise the main aspects about the topic.	Energy resources.	10'	IN/S	T-S S-S	

T = Teacher

S = Student

T A = Teacher assessment.

P A* = All the activities in pairs are assessed in **peer assessment (corrected by different partners/groups in class. A group corrects the work done by other group, following the teacher instructions). For example, teacher can project the answers in a PowerPoint (or similar) and each group assesses the work done by other group.**

S A* = All the activities are assessed in **self-assessment**

Activities can be done in pairs or individually.

Comments:

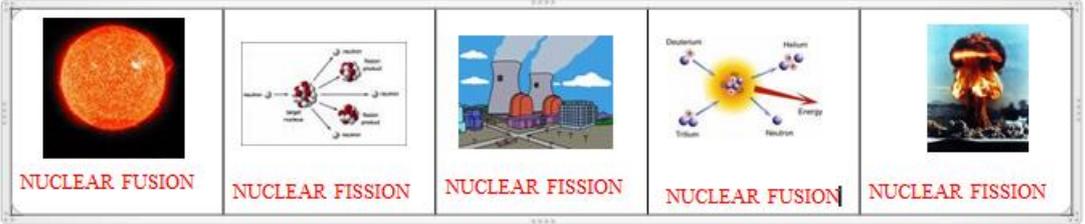
- Form heterogeneous groups to observe diversity.
- Foment team work (cooperative work)
- Foment creative thinking.
- Encourage and promote students to express themselves and their ideas.
- Introduce texts and activities positively.
- Provide positive feedback during the student' learning process.
- Provide grammar help (scaffolding) and examples.
- Promote student' critical thinking when offering a solution/answer to a problem (by asking questions about the solution proposed).
- Teacher should help students trying not to use the L1.
- Teacher should provide additional resources, solutions or options to students, if needed.
- Teacher should propose scaled activities according to the student' typology. Important is to proposed scale-up activities.
- Teacher should use a language understandable for students, using words, sentences and constructions according to the student's level (content and language).
- Optional to change partners day by day. It could help students to work with different kind of people. In this case, students will need one "peer assessment table" for each partner.
- Videos can help students to understand better the topics.
- Building activity can complement the learnt process and could encourage students to do another type of activity.

ACTIVITIES RESOLUTION

Each activity has the punctuation (For teacher assessment)

Activity	Instructions	Solutions
Introducing the scenario; read/explain "introductory text". Solving doubts.	Read/Explain the text and solve doubts. Possible discussion.	
<p>FROM ACTIVITY 1 UNTIL ACTIVITY 20, WORK IN PAIRS (POSSIBLE INDIVIDUAL WORK ACCORDING TO THE TEACHER). TEACHER COULD MAKE THE GROUPS (MIXING STUDENTS WITH DIFFERENT ENGLISH AND/OR TECHNOLOGY LEVELS (HETEROGENEOUS GROUPS))</p> <p>ACTIVITIES 20, 21, 22, 23 (SUMMARIZE ACTIVITIES) COULD BE INDIVIDUALLY OR IN PAIRS.</p> <p>ACTIVITY 24 (BUILDING ACTIVITY) COULD BE DONE INDIVIDUALLY OR IN PAIRS.</p>		
Activity 1.	Write three uses of energy resources. If necessary, explain how to write definitions and relations cause-effect.	Lots of possible answers.
Activity 2 Read/Explain text "Energy resources". Solving doubts. Possible discussion.	Students can underline the text or fill the mind map.	<p style="text-align: center;">MIND MAP ACTIVITY 2</p> <pre> graph TD A[ENERGY RESOURCES CLASSIFICATIONS] --> B[According the use in a country] A --> C[For the way to be obtained] A --> D[For the possibility to be reused] B --> E[Conventional] B --> F[Alternative] C --> G[Primary] C --> H[Secondary] D --> I[Renewable] D --> J[Non-renewable] </pre>

<p>Activity 3</p>	<p>Put the words in the box. Some words can be putted in more than one column.</p>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="6">ENERGY RESOURCES CLASSIFICATIONS</th> </tr> <tr> <th colspan="2">For its use in a country</th> <th colspan="2">For the way to be obtained</th> <th colspan="2">For its possibility to be re-used</th> </tr> <tr> <th>Conventional</th> <th>Alternative</th> <th>Primary</th> <th>Secondary</th> <th>Renewable</th> <th>Non-renewable</th> </tr> </thead> <tbody> <tr> <td>Electricity*</td> <td>Solarenergy</td> <td>Solarenergy</td> <td>Electricity*</td> <td>Solarenergy</td> <td></td> </tr> <tr> <td>Oil</td> <td></td> <td>Oil</td> <td>Butane</td> <td></td> <td>Oil</td> </tr> <tr> <td>Butane</td> <td></td> <td></td> <td></td> <td></td> <td>Butane</td> </tr> <tr> <td>Natural gas</td> <td></td> <td>Natural gas</td> <td></td> <td>Wind energy</td> <td>Natural gas</td> </tr> <tr> <td>Wind energy</td> <td>Geothermal energy</td> <td>Wind energy</td> <td></td> <td>Geothermal energy</td> <td></td> </tr> <tr> <td></td> <td></td> <td>Geothermal energy</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gasoil</td> <td></td> <td>Coal</td> <td>Gasoil</td> <td></td> <td>Gasoil</td> </tr> <tr> <td>Coal</td> <td></td> <td>Nuclear energy</td> <td></td> <td></td> <td>Coal</td> </tr> <tr> <td>Nuclear energy</td> <td>Biofuels</td> <td></td> <td>Biofuels</td> <td>Biofuels</td> <td>Nuclear energy</td> </tr> <tr> <td></td> <td>Sunfloweroil</td> <td></td> <td>Sunfloweroil</td> <td>Sunfloweroil</td> <td></td> </tr> <tr> <td>Hydropower</td> <td></td> <td>Hydropower</td> <td></td> <td>Hydropower</td> <td></td> </tr> <tr> <td>Petrol</td> <td></td> <td>Wood</td> <td>Petrol</td> <td></td> <td>Petrol</td> </tr> <tr> <td>Wood</td> <td></td> <td></td> <td></td> <td>Wood</td> <td></td> </tr> </tbody> </table>	ENERGY RESOURCES CLASSIFICATIONS						For its use in a country		For the way to be obtained		For its possibility to be re-used		Conventional	Alternative	Primary	Secondary	Renewable	Non-renewable	Electricity*	Solarenergy	Solarenergy	Electricity*	Solarenergy		Oil		Oil	Butane		Oil	Butane					Butane	Natural gas		Natural gas		Wind energy	Natural gas	Wind energy	Geothermal energy	Wind energy		Geothermal energy				Geothermal energy				Gasoil		Coal	Gasoil		Gasoil	Coal		Nuclear energy			Coal	Nuclear energy	Biofuels		Biofuels	Biofuels	Nuclear energy		Sunfloweroil		Sunfloweroil	Sunfloweroil		Hydropower		Hydropower		Hydropower		Petrol		Wood	Petrol		Petrol	Wood				Wood	
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<p>Activity 4</p>	<p>Students have to draw three of the energies that appear in activity 3.</p>	<p>Lots of possible answers.</p>																																																																																																
<p>Read/Explain text "Fossil fuels". Solving doubts. Possible discussion. Watch the video from YouTube "Fractional distillation. The chemistry journey. The fuse school"</p>	<p>Solving doubts. Possible discussion. Optional activities about the video.</p>	<p>If optional activities:</p> <ol style="list-style-type: none"> Consists in separate crude oil into different fractions by heating the crude. Molecule based in chains of carbon and hydrogen 8possible others substances) It's a mixture of hydrocarbons with different chain lengths. (Write 3) Bitumen, gasoil (diesel), kerosene, naphtha, petrol, gas (LPG) Gas (LPG) (With three is enough): petrol (cars), naphtha (manufacture of chemicals), bitumen (cover roads), kerosene (aircrafts, planes), diesel (cars, lorries, heat). 																																																																																																
<p>Activity 5</p>	<p>According to the text "Fossil fuels", fill in the gaps activity.</p>	<ol style="list-style-type: none"> (3 P) Which are the most usual fossil fuels? COAL, OIL and NATURAL GAS. (3 P) Write three uses of these fossil fuels: HEAT, LIGHT and COOK (PRODUCE ELECTRICITY) (1 P) How were the fossil fuels formed? Fossil fuels were formed FROM PLANTS AND ANIMALS THAT LIVED MILLIONS OF YEARS AGO. (2 P) Which is the main difference between the formation of coal and natural gas or oil? Coal is made from THE REMAINS OF PLANTS and natural gas and oil were formed WHEN MARINE ORGANISMS DIED AND SANK TO THE BOTTOM OF THE SEA. (3 P) What are the three causes that converted some fossil fuels in oil or natural gas? PRESSURE, TEMPERATURE and CHEMICAL CONDITIONS. (1 P) What happens when the coal or the natural gas are burnt? When the coal or the natural gas are burnt THE ENERGY STORED BY THEM IS RELEASED. (1 P) Which is the composition of oil? Oil is a mixture of DIFFERENT HYDROCARBONS. (3 P) Write three products obtained from the oil fractional distillation: ASPHALT, FUEL, KEROSENE, PETROL, GASOIL, BUTANE, PROPANE, ETHANE (WRITE 3) 																																																																																																
<p>Read/Explain text "Nuclear energy". Solving doubts. Possible discussion. Watch the video from YouTube</p>	<p>Solving doubts. Possible discussion. Optional activities about the video.</p>	<p>If optional activities:</p> <ol style="list-style-type: none"> A nuclear reaction in which splits a larger atom into 2 or more smaller ones. A nuclear reaction in which is joining 2 or more lighter atoms into a larger one. Uranium, plutonium. Hydrogen. Nuclear fusion (3-4 greater than fission). 																																																																																																

<p>"Fission vs fusion. What is the difference?"</p>										
<p>Activity 6</p>	<p>Match pictures with the correct nuclear reaction.</p>									
<p>Read/Explain text "To know more about nuclear energy". Solving doubts. Possible discussion.</p>										
<p>Read/Explain text "Renewable energy resources". Solving doubts. Possible discussion.</p>	<p>If necessary, explain how to understand graphs.</p>									
<p>Activity 7</p>	<p>Answer questions about the graph "Renewable electricity production in EU"</p>	<ol style="list-style-type: none"> 1. Hydropower 2. Wind energy. Promotion of this energy from the EU. Lots of advantages. 3. Wind energy. The slope of the lines (curves) 4. Don't have lots of fossil fuels (not dependence from other countries), reduce pollution, advantages. 5. Lots of possible answers 								
<p>Activity 8</p>	<p>Put pictures in the correct column.</p>	<table border="1" data-bbox="427 1406 1161 1594"> <thead> <tr> <th rowspan="2">Renewable energy resources</th> <th colspan="2">Non-renewable energy resources</th> </tr> <tr> <th>Fossil fuels</th> <th>Nuclear energy</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2, 3, 4, 5, 7, 10, 11, 13, 14</td> <td style="text-align: center;">1, 12, 15</td> <td style="text-align: center;">6, 8, 9</td> </tr> </tbody> </table>	Renewable energy resources	Non-renewable energy resources		Fossil fuels	Nuclear energy	2, 3, 4, 5, 7, 10, 11, 13, 14	1, 12, 15	6, 8, 9
Renewable energy resources	Non-renewable energy resources									
	Fossil fuels	Nuclear energy								
2, 3, 4, 5, 7, 10, 11, 13, 14	1, 12, 15	6, 8, 9								
<p>Activity 9</p>	<p>Complete sentences.</p>	<p>a) Coal, natural gas and oil are NON-RENEWABLE (renewable / non-renewable / nuclear fuels) energy resources. They release HEAT (heat / electricity / radioactivity) when they are burned.</p> <p>b) Wind and solar energy are RENEWABLE (renewable / non-renewable) energy resources because they CAN (can / cannot) be replaced by the nature.</p> <p>c) Coal, natural gas and oil are called FOSSIL FUELS (nuclear fuels / fossil fuels / renewable sources).</p> <p>d) Two more examples of renewable energies are And HYDROPOWER, WAVES ENERGY. (MORE POSSIBLE ANSWERS: TIDAL ENERGY, GEOTHERMAL ENERGY, BIOFUELS, WASTE ENERGY, BIOGAS, ...)(TWO)</p>								
<p>Read/Explain text "Solar energy". Solving doubts. Possible discussion. Optional activities about the video. Watch the</p>	<p>Solving doubts. Possible discussion. Optional activities about the video.</p>	<p>If optional activities:</p> <ol style="list-style-type: none"> 1. It's used to describe the group of technologies that capture the heat of the Sun and use it to warm things or to produce electricity. 2. Active need mechanical components like pumps to circulate water and the installation of any solar device such as solar cells or collectors. Passive are more basics and not need moving parts (solar oven, solar orientations, big windows, etc.) 3. Advantages: It's a clean and renewable energy resource, most have low maintenance (use simply technologies), can produce lot of electricity (CSP). 								

<p>videos from YouTube "Solar thermal" and "Solar photovoltaics"</p>		<p>Disadvantages: Need a large area, Sun is intermittent (not at night or in cloudy days), CSP use to be built in deserts (not easy the water access), transmission of electricity very long distances (expensive and lead to distribution losses), capital costs.</p> <p>4. Photo thermal: uses heat of the Sun to heat something, and sometimes to produce electricity (CSP for example) Photovoltaic: Transform directly solar energy into electricity.</p> <p>5. It's a technology that converts the Sun energy directly into electricity.</p> <p>6. Semiconductors.</p>															
<p>Activity 10</p>	<p>According to the text "Solar energy" answer the questions</p>	<p>a) (1 P) Where does solar energy come from? <i>The solar energy comes from THE SUN.</i></p> <p>b) (2 P) Solar energy can be converted into HEAT and LIGHT.</p> <p>c) (2 P) Which is the name of the solar energy used to heat something? PHOTOTHERMAL. This kind of way to use the solar energy sometimes needs COLLECTORS (collectors / cells).</p> <p>d) (3 P) Photovoltaic use of solar energy converts directly SOLAR energy into ELECTRICITY. This kind of way to use the solar energy needs CELLS (collectors / cells).</p>															
<p>Activity 11</p>	<p>Put pictures in the correct column.</p>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 50%;">Photo thermal use of the solar energy</th> <th style="width: 50%;">Photovoltaic use of the solar energy</th> </tr> </thead> <tbody> <tr> <td>2, 3, 7, 9</td> <td>1, 4, 5, 6, 8, 10</td> </tr> </tbody> </table>	Photo thermal use of the solar energy	Photovoltaic use of the solar energy	2, 3, 7, 9	1, 4, 5, 6, 8, 10											
Photo thermal use of the solar energy	Photovoltaic use of the solar energy																
2, 3, 7, 9	1, 4, 5, 6, 8, 10																
<p>Activity 12</p>	<p>Draw three devices that use solar energy.</p>	<p>Lots of possible answers.</p>															
<p>Read/Explain text "Wind energy". Solving doubts. Possible discussion. Optional activities about the video</p>	<p>Solving doubts. Possible discussion. Optional activities about the video</p>	<p>If optional activities:</p> <ol style="list-style-type: none"> Wind is produced for the differences in the atmospheric pressure. Was used to moiling grain, pumping water. 3 No, because don't produce any combustion reaction. Problems in bird migrations, noise, land uses (reduce) 															
<p>Activity 13</p>	<p>Match a text with a title and with 2 sentences (each text)</p>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 33%;">TEXT</th> <th style="width: 33%;">TITLE</th> <th style="width: 33%;">SENTENCE</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Text 1</td> <td rowspan="2">Title: 1</td> <td>Sentence: 2</td> </tr> <tr> <td>Sentence: 4</td> </tr> <tr> <td rowspan="2">Text 2</td> <td rowspan="2">Title: 2</td> <td>Sentence: 3</td> </tr> <tr> <td>Sentence: 6</td> </tr> <tr> <td rowspan="2">Text 3</td> <td rowspan="2">Title: 3</td> <td>Sentence: 1</td> </tr> <tr> <td>Sentence: 5</td> </tr> </tbody> </table>	TEXT	TITLE	SENTENCE	Text 1	Title: 1	Sentence: 2	Sentence: 4	Text 2	Title: 2	Sentence: 3	Sentence: 6	Text 3	Title: 3	Sentence: 1	Sentence: 5
TEXT	TITLE	SENTENCE															
Text 1	Title: 1	Sentence: 2															
		Sentence: 4															
Text 2	Title: 2	Sentence: 3															
		Sentence: 6															
Text 3	Title: 3	Sentence: 1															
		Sentence: 5															
<p>Read/Explain text "Hydropower". Solving doubts. Possible discussion. Optional activities about the video</p>	<p>Solving doubts. Possible discussion. Optional activities about the video</p>	<p>If optional activities:</p> <ol style="list-style-type: none"> It's a renewable energy resource that converts flowing water into electricity. Because the water cycle is renovated with the sun. Ones need dam, and the others are in the run of a river. Cost competitive, reliable, base-load power, flood controls, water supply, free CO₂. Local impact in environment (change habitats), problems with fishes, sometimes force people to move their houses, maybe catastrophic in case of accident. 															
<p>Activity 14</p>	<p>According to the text "Hydropower", match sentences with endings.</p>	<p>1. C 2. A 3. E 4. F 5. B 6. D</p>															
<p>Read/Explain text "Wave's energy". Solving doubts. Possible discussion. Optional activities about the</p>	<p>Solving doubts. Possible discussion. Optional activities about the</p>	<p>If optional activities:</p> <ol style="list-style-type: none"> Attenuators, over toppers, point absorbers. 															

Watch the video from YouTube "Wave energy"	video	
Read/Explain text "Tidal energy". Solving doubts. Possible discussion. Watch the video from YouTube "Tidal power"	Solving doubts. Possible discussion. Optional activities about the video	<p>If optional activities:</p> <ol style="list-style-type: none"> (2 Points) Are produced by the moon influence (Sun as well). (3 points) Tidal barrages, tidal fences, tidal turbines.
Read/Explain text "Geothermal energy". Solving doubts. Possible discussion. Watch the video from YouTube "Geothermal"	Solving doubts. Possible discussion. Optional activities about the video	<p>If optional activities:</p> <ol style="list-style-type: none"> The internal heat of the Earth. The underground water reservoir. To heat, to produce electricity. In the volcanically and tectonically active regions of the world.
Activity 15	According to the text "Geothermal" answer the questions.	<ol style="list-style-type: none"> Around 3000 °C. Iceland, New Zealand, Parts of North America. (Two) To heat water, to produce electricity. Iceland.
Read/Explain text "Waste energy". Solving doubts. Possible discussion.	Solving doubts. Possible discussion.	
Read/Explain text "Bio fuels and biomass". Solving doubts. Possible discussion. Watch the videos from YouTube "Biomass", and "Biofuels"	Solving doubts. Possible discussion. Optional activities about the video	<p>If optional activities:</p> <ol style="list-style-type: none"> It's a combustible fuel created from biomass. Ethanol and biodiesel. By fermentation. It's a fuel produced by natural products such as sunflower, olives, etc.
Activity 16	Match pictures with the correct energy.	1. D 2. A 3. E 4. C 5. B
Activity 17	Match the words related.	1. C 2. G 3. F 4. H 5. I 6. J 7. K 8. B 9. E 10. A 11. D
Activity 18	Match energies with correct	1. D 2. G 3. H 4. A 5. F 6. I 7. C 8. E 9. B

Activity 19

Put the name of the energy in the draws.

	OIL, FOSSIL FUEL		WIND ENERGY, WIND TURBINES		SOLAR CELLS, SOLAR ENERGY
	NATURAL GAS, FOSSIL FUEL		COAL, FOSSIL FUEL		WASTE ENERGY
	WAVES ENERGY		GEOTHERMAL ENERGY, GEYSER		HYDROPOWER, DAM
	NUCLEAR ENERGY, NUCLEAR FISSION				

Activity 20

Solve the word search. In the box there are 7 renewable energy resources, 6 are in the word search and the other should be written down.

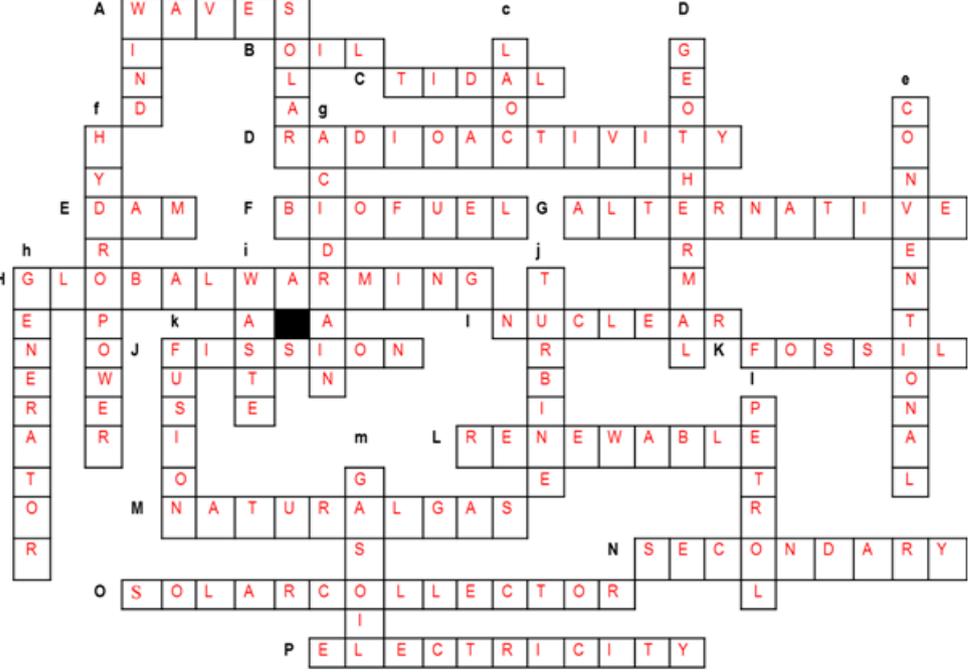
W	P	R	R	N	N	U	S
T	I	D	E	S	M	I	A
U	O	N	E	S	N	L	G
S	N	W	D	N	I	A	O
E	Z	B	M	T	R	S	I
V	H	K	L	O	R	P	B
A	D	V	B	N	J	A	K
W	A	S	E	T	S	A	W

Wind Sun Tides Oil Coal Biogas Waste Waves
Hydropower Butane Natural gas Nuclear energy

Which is the renewable energy resource that doesn't appear? **HYDROPOWER**

Activity 21

Solve the crossword.



The crossword puzzle contains the following words:

- Across: WAVES, OIL, TIDAL, RADIOACTIVITY, BIOMASS, ALTERNATIVE, GLOBAL WARMING, NUCLEAR, FISSILE, FOSFILL, NATURAL GAS, SOLAR COLLECTOR, ELECTRICITY
- Down: DAM, FUELS, WIND, COAL, BIOMASS, WASTE, WAVES, HYDROPOWER, BUTANE, NATURAL GAS, NUCLEAR ENERGY

Activity 22

Fill in the gaps activity, with the words from the box. There are more words than gaps.

a) Energy resources that are very used in a country are called **CONVENTIONAL ENERGY RESOURCES**, and the energy resources that are not very used in a country are called **ALTERNATIVE ENERGY RESOURCES**.

b) Energy resources that can be directly obtained from nature are called **PRIMARY ENERGY RESOURCES**, and energy resources that have to be changed to be used are called **SECONDARY ENERGY RESOURCES**.

c) Energy resources renovated directly by nature (so we can use its energy forever) are called **RENEWABLE ENERGY RESOURCES**, and energy resources that cannot be renovated by nature (so we can not use it forever because it has finished) are called **NON-RENEWABLE ENERGY RESOURCES**.

d) **FOSSIL FUELS** were formed from tiny plants and animals that lived millions of years ago and there are three main groups of this kind of energy resources: **COAL** that is solid, **OIL** that is liquid and **NATURAL GAS** that is a gas.

e) There are two types of **NUCLEAR** reactions: **NUCLEAR FUSION** (two small nuclei combine to form a larger one) and **NUCLEAR FISSION** (the nucleus of an atom is bombarded with neutrons; nucleus splits open, releasing neutrons and large amounts of energy).

f) **SOLAR ENERGY** (energy from the Sun) can be used in two different ways: to heat water using **SOLAR COLLECTORS** or using **SOLAR CELLS** (photovoltaic use) to obtain directly electricity.

g) The name usually used for turning water energy into electricity is **HYDROPOWER**, sometimes we need a dam in these constructions.

h) **WAVES** are created by the wind blowing across the surface of the sea.

i) The **TIDES** move a huge amount of water each day (by sky's bodies influence (attraction) as the moon).

Activity 23

Match a text, with a title and with a picture.

Text	Title	Picture
Text 1	Title: 3	Picture: 4
Text 2	Title: 11	Picture: 9
Text 3	Title: 9	Picture: 8
Text 4	Title: 1	Picture: 3
Text 5	Title: 6	Picture: 10
Text 6	Title: 4	Picture: 5
Text 7	Title: 10	Picture: 1
Text 8	Title: 12	Picture: 7
Text 9	Title: 2	Picture: 11
Text 10	Title: 7	Picture: 12
Text 11	Title: 5	Picture: 6
Text 12	Title: 8	Picture: 2

Activity 24

OPTIONAL. Scale-up activity. Writing, drawing and calculating activities

Questions 1, 2 and 3, different possible answers.
Question 4:

Data:

$E = 450 \text{ Kw/h 1 month}$

$T = 210 \text{ h a month}$

$P/S = 1000 \text{ w/m}^2$

Resolution:

a) $P = E/t$
 Pass Kw/h to joules: $450 \text{ Kw/h} \cdot \frac{3600000 \text{ J}}{1 \text{ Kw/h}} = 1620000000 \text{ J} = 1.62 \cdot 10^9 \text{ J}$
 $P = \frac{1620000000}{210 \cdot 3600} = 2142.86 \text{ w} = P_{\text{useful}}$

b) $P_{\text{useful}} = 2142.86 \text{ w}$
 $\eta = \frac{P_{\text{useful}}}{P_{\text{produced}}} \cdot 100 \rightarrow P_{\text{produced}} = \frac{P_{\text{useful}} \cdot 100}{\eta} = \frac{2142.86 \cdot 100}{30} = 7142.86 = P_{\text{solar}}$

Area needed: $7142.86 \text{ w} \cdot \frac{1 \text{ m}^2}{1000 \text{ w}} = 7.14 \text{ m}^2$
 Solar cells needed, $S_{\text{solar cell}} = 1 \text{ m}^2$; $7.14 \text{ m}^2 \cdot \frac{1 \text{ solar cell}}{1 \text{ m}^2} = 7.14 \text{ solar cells}$
 So we will need 8 solar cells

Question 5:

		<p>Data:</p> <p>$\varnothing_{\text{blades}} = 2 \text{ m}$</p> <p>$v_{\text{wind}} = 40 \text{ m/s}$</p> <p>$C_p = 0.30$</p> <p>$\rho_{\text{air}} = 1.225 \text{ Kg/m}^3$</p> <p>Resolution:</p> <p>$P = 0.5 \cdot (\pi \cdot 2^2) \cdot 40^3 \cdot 1.225 \cdot 0.30 = 147780.52 \text{ w} = P_{\text{wind turbine}}$</p>	
<p>Activity 25 Watch the videos about solar ovens.</p>	<p>Build the solar oven following the instructions of the videos proposed.</p>	<p>Lots possible solar ovens.</p>	

TEACHING ACTIVITIES' ASSESSMENT (RUBRIC)

Activities

Activity	Punctuation
1	/3
2	/9
3	/45
4	/3
5	/17
6	/5
7	/11
8	/15
9	/7
10	/8
11	/10
12	/3
13	/9
14	/6
15	/5
16	/5
17	/11
18	/9
19	/10
20	/7
21	/29
22	/19
23	/24
24 (OPTIONAL)	/60
25 (Solar oven)	/50
TOTAL	/ 330 / 320

Optional activities (from videos)

Activity	Punctuation
1	/12
2	/10
3	/12
4	/10
5	/10
6	/3
7	/5
8	/8
9	/8
10	/8
TOTAL	/ 86

TEACHING SPEAKING ASSESSMENT (RUBRIC)

What to assess (student :)	1	2	3	4
Interacts with partners and in class				
Proposes solutions				
Gives ideas/opinions				
Respects the ideas proposed by partners				
Good level of English				
Good level of contents (in speaking activities)				
Follows the rules				
Cooperates in activities (working in groups)				
Facilitates conversations				
Brings material				
TOTAL (Final punctuation)	/40			

FINAL ASSESSMENT

I suggest as a final assessment: 70% T.A. (Teacher assessment) + 20% S.A. (Self-assessment) + 10% P.A. (Peer assessment)

Suggestion for future development and expansion of the future

I suggest expanding the scenario introducing different uses and manifestations of energy (electricity, sound, nuclear energy, electromagnetism, chemical energy, etc.), and the environmental problems due to the uses of energy, the rational use/consumption of energy and resources (materials, etc.). About electricity (transport distribution, transformation, production, uses, etc.), how a power station works (different power stations), environmental problems due to the use of the energy.