

LET'S TALK ABOUT ... ENERGY

TEACHING MATERIALS

The driving question: "WHAT ENERGY IS?"

Scenario Overview

Session	Activities	Content-obligatory Language// Solving equations	Timing	Skills Reading Writing Listening Speaking Interaction Drawing ICT Calculating	Interaction T-S S-S S-Expert S-World	Assessment Peer assessment Self-assessment Teacher assessment ...
1	Introducing topic	Introducing the topic (Energy)	10'	L	T-S	
	Read introductory text. Solving doubts.	Energy.	5'	R/S/L/IN	T-S	
	Previous activity	Energy resources and uses.	10'	R/W	S	S A
	Read text "What energy is?", and example. Solving doubts.	Energy, work, heat, electricity, force and distance. Units in the SI. Solving work equation.	15'	R/S/L/IN	T-S	
	Activity 1	Work, force and distance. Solving work' equation. Units of energy.	10'	R/W/IN/L/S/C	T-S S-S	T A S A
	Read text "More things about energy". Solving doubts.	Energy resources	5'	R/L/S/IN	T-S S-S	
	Summarize contents. Discussion in class.	Energy, energy resources, work, force, distance, units of energy, work equation.	5'	L/S/IN	T-S S-S	
2	Review things studied first day.	Energy	5'	S/IN/L	T-S S-S	
	Activity 2	Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass), solar cells, solar collector, global warming, greenhouse effect, acid rain, heat, thermometer, CO ₂ , radioactivity.	15'	IN/S/R/L	S-S	T A P A*
	Activity 3	Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass), solar cells, solar collector, global warming, greenhouse effect, acid rain, heat, thermometer, CO ₂ , radioactivity.	10'	R/W/IN/S/L	S-S	T A P A*
	Activity 4	Renewable energy, coal, oil, natural gas, acid rain, global warming, wind energy, solar cell, solar collector.	10'	W/IN/S/L	S-S	T A P A*

	Activity 5	Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass), solar cells, solar collector, wind turbines, dam.	5'	IN/S/W/R/L	S-S	T A P A*
	Activity 6	Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass), solar cells, solar collector, wind turbines, dam.	15'	IN/S/D/W/L	S-S	T A P A*
3	Review things studied previous days.	All the previous language.	5'	IN/L/S	T-S S-S	
	Activity 7	Giving opinions language. Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass), solar cells, solar collector, wind turbines, dam.	15'	IN/S/W/L	S-S	T A P A*
	Activity 8	Giving opinions language. Electricity, heat, Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass), solar cells, solar collector, wind turbines, dam.	5'	IN/S/W/L	S-S	T A P A*
	Read text "Energy usage", solving doubts	Energy resources and energy consumption (for countries and per capita). Developed, developing and underdeveloped countries.	5'	R/S/IN/L	S-S T-S	
	Activity 9	Energy resources	5'	IN/S/W/L	S-S	T A P A*
	Activity 10	Energy resources (fossil fuels (coal, oil, natural gas), solar energy, waste, waves, tidal energy, hydropower, electricity, nuclear energy, biofuels, wind energy, biomass). Diagram sector. Transform % into °.	15'	S/W/IN/ICT/D/C/L	S-S	T A P A*
	Activity 11	Energy resources. Write comparisons.	5'	W/S/IN/L	S-S	T A P A*
	Activity 12	Energy consumption per capita. Developed, developing and underdeveloped countries.	5'	IN/S/W/L	S-S	T A P A*
4	Review things studied previous days.	Energy.	5'	IN/S/L	S-S T-S	
	Read text "Fossil fuels and pollution" solving doubts	Fossil fuels (coal, oil and natural gas), environmental pollution caused by fossil fuels combustion	5'	IN/R/S/L	S-S T-S	
	Activity 13	Environmental problems. Sector diagram. Compare countries.	5'	S/IN/W/L	S-S	T A P A*
	Read text "Taking	Energy. Rational use of energy	10'	R/IN/S/L	S-S	

Let's talk about energy

Technology

	<i>care of our world</i> , solving doubts.	and water. Renewable energy resources. Environmental pollution.			T-S	
	Activity 14	Energy resources. Sector diagrams. Comparisons.	15'	IN/S/W/L	S-S	T A P A*
	Activity 15	Rational use of energy and water. Giving opinions.	15'	IN/S/W/L	S-S	T A P A*
	Activity 16	Energy vocabulary	5'	S/W/L	S	T A
Optional Home	Activity 17 SCALE-UP Activity Homework	Energy resources and consumption, pollution, climate change, Giving opinions.		R/W/ICT		T A
5	Review things studied previous days.	Energy, rational use. Pollution	5'	IN/S/L	S/S T/S	
	Activity 18	Energy vocabulary.	18'	W/ICT/L	S	T A
	Activity 19	Energy vocabulary	9'	W/R/L	S	T A
	Activity 20 Summarize activity	Energy vocabulary	13'	W/R/L	S	T A
	Peer assessment	Vocabulary learnt	10'	W/R/L	S	P A*
	Self-assessment				S	S A*
	Final discussion about topic.	Energy vocabulary	5'	IN/L/S	S-S T-S	

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**

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's learning process.
- Provide grammar help (scaffolding) and examples.
- Promote student's 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's typology. Important is to propose 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.

ACTIVITIES RESOLUTION

Each activity has the punctuation (For teacher assessment)

Activity	Instructions	Solutions
Read text "Let's talk about energy"	Read/Explain the text and solve doubts. Possible discussion.	
Previous activity	Each student has to answer the questions in order the teacher to know the previous knowledge about energy of each of them.	Given in the student' worksheet. Self-assessment.
Read text "What energy is?"	Read/Explain the text and solve doubts. Possible discussion.	
1	Solve problems using work equation	$W = F \cdot d = 3.000 \cdot 250 = 750.000 \text{ J}$ $750.000 \text{ J} \cdot \frac{1 \text{ cal}}{4,18 \text{ J}} = 179.425,84 \text{ cal}$ $750.000 \text{ J} \cdot \frac{1 \text{ Kwh}}{3.600.000 \text{ J}} = 0,21 \text{ Kwh}$
Read text "More things about energy"	Read/Explain the text and solve doubts. Possible discussion.	
FROM ACTIVITY 2 UNTIL ACTIVITY 15, WORK IN PAIRS. TEACHER COULD MAKE THE GROUPS (MIXING STUDENTS WITH DIFFERENT ENGLISH AND/OR TECHNOLOGY LEVELS (HETEROGENEOUS GROUPS))		
2	Group students in pairs. Give student 1 and student 2 pieces of paper to one of the students. Explain the activity. Students have the same sentences with gaps in different positions; by asking to the partner, each student has to find the suitable word to write in the gap. Student 1 and 2 piece of paper are below the table.	
3	Match words with pictures.	1.h 2.k 3.n 4.a 5.p 6.l 7.b 8.o 9.m 10.c 11.f 12.j 13.i 14.g 15.e 16.d
4	Write definitions. Students can use the previous activities and the <i>HELP</i> : "HOW TO WRITE DEFINITIONS?"	Multiple possible answers.
5	Students have to imagine they live in a house in the middle of a forest and they have to propose three solutions to obtain hot water and/or electricity (in the case in which they don't have electricity grid). They have to use expressions using the help from the example (one word from each block of the box)	Multiple possible answers.
6	Students have to draw the house they have imagined in	Multiple possible answers.

	activity 5. Students can assess the solutions proposed by other groups.															
7	Students have to talk to other groups explaining the solutions proposed in activity 5 and 6, giving their opinions. At the end they have to write five possible options given by other groups.	Multiple possible answers.														
8	In class, all students have to discuss about the different options given by the rest of the class. At the end each group has to write the 3 best options given in the class discussion, using the expressions as the example (giving opinions).	Multiple possible answers.														
Read text “Energy usage”	Read/Explain the text and solve doubts. Possible discussion.															
9	Students have to write three opinions according to the energy consumption in U.S.A in 2017. The % indicates if the energy resource is very used or not. They have to write expressions following the example.	Multiple possible answers.														
10	Students have to draw a sector diagram in the worksheet (making calculations to pass from % to °, and using the angle conveyor) or they can draw the diagram using Excel or a similar software.	<p style="text-align: center;">SPAIN ENERGY CONSUMPTION BY ENERGY RESOURCES IN 2018</p> <table border="1"> <caption>Spain Energy Consumption by Energy Resources in 2018</caption> <thead> <tr> <th>Energy Resource</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Oil</td> <td>47%</td> </tr> <tr> <td>Natural gas</td> <td>19%</td> </tr> <tr> <td>Coal</td> <td>8%</td> </tr> <tr> <td>Nuclear energy</td> <td>9%</td> </tr> <tr> <td>Hydropower</td> <td>6%</td> </tr> <tr> <td>Other renewable energies</td> <td>11%</td> </tr> </tbody> </table>	Energy Resource	Percentage	Oil	47%	Natural gas	19%	Coal	8%	Nuclear energy	9%	Hydropower	6%	Other renewable energies	11%
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11	Students have to compare and write 3 comparisons between the sector diagram from activities 9 (U.S.A.) and 10 (Spain). They have to use the expressions given in “Help: How to compare?”, following the example.	Multiple possible answers.														
12	Students have to compare the energy consumption per capita in 2016. Then, they have look at Germany, Brazil and Ethiopia bar diagrams	Developed countries: (U.S.A), Germany . Developing countries: Brazil . Underdeveloped country: Ethiopia .														

	and they have to write 1 developed country, 1 developing country and 1 underdeveloped country according the criteria (developed country/energy consumption per capita), giving the reasons. Each correct country 1 point. Each correct reason 2 points.	Reasons: Quantity of energy consumption per capita.
Read text “ <i>Fossil fuels and pollution</i> ”	Read/Explain the text and solve doubts. Possible discussion.	
13	Students have to observe the coal consumption/total energy sector diagram, and they have to decide which country produces more pollution according to the coal consumption, giving the reason.	According to the previous text, coal is the fossil fuel that produces more pollution gases. In the sector diagram, we can observe that China consume a huge coal quantity (65,5% of energy consumption comes from coal), so China is the country that produces more atmospheric pollution (according to the criteria proposed)
Read text “ <i>Taking care of our World</i> ”	Read/Explain the text and solve doubts. Possible discussion.	
14	Students have to compare the four bar diagrams (consumption of energy resources in different countries) and decide which country use more on type of energy resource, trying to explain the reasons. Scale-up activity.	Multiple possible answers.
15	Students have to classify in two columns some sentences according if is a good or a bad use of energy or water. (10 points). After that, they have to write the reasons for their chose (10 points)	Being energy (water efficient): 1, 4, 5, 8, 9 Bad use of the energy (water): 2, 3, 6, 7, 10
16	Students have to write five words (related to the topic) learned doing these activities and five more words they Knew before	Multiple possible answers.
17	Scale-up activity. I propose to do this activity at home. Students have to look for some information about Paris and Madrid agreements, focusing in EU and U.S.A. decisions. They have to write their opinions about the agreements and about the climate change.	Multiple possible answers.
18	Students have to build a word search with 10 words about the topic. To find the words, students should write the definitions Teacher has the rules in the activity.	Multiple possibilities.

19	Students have to solve the word search made by another student. Teacher should give the word search from each student and then, assign to another student.	
20	<p>Summarize activity: Students have to solve the hieroglyphics. Answering the questions, they will find the letter that represents each draw. At the end they have to find a sentence by substituting the letters that represent each draw. 12 points questions. 5 points final sentence.</p>	<ol style="list-style-type: none"> 1. Oil 2. Coal 3. Natural gas 4. Global warming 5. Acid rain 6. Solar cells 7. Solar collectors 8. Waste 9. Tides 10. Waves 11. Hydropower 12. Wind turbines <p>FINAL SENTENCE: <i>"Energy cannot be created or destroyed it can just be transformed"</i></p>
Peer assessment	Students have to assess the work made by partners in the activities done in pairs (from 2 to 15), putting a cross according to the partner's work.	
Self-assessment	Students have to assess themselves answering the questions proposed.	
Final discussion	Discuss with all the class the main ideas about the topic. Teacher should encourage students to participate. If not, teacher should propose ideas.	

TEACHING ACTIVITIES' ASSESSMENT (RUBRIC)

Activity	Punctuation
1	/10
2	/14
3	/15
4	/18
5	/6
6	/5
7	/5
8	/3
9	/3
10	/10
11	/6
12	/9
13	/5
14	/10
15	/20
16	/10
17 OPTIONAL	/20
18	/10
19	/5
20	/17
TOTAL	/181 or /201

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 recommend as a final assessment: 70% T.A. (Teacher' assessment) + 20% S.A. (Self-assessment) + 10% P.A. (Peer assessment)

Activity 2

TEACHER'S MATERIAL FOR ACTIVITY 2

STUDENT 1

Ask your partner and fill in the gaps with the correct word (each gap needs a word). All of them are about energy resources and their influence. You can use questions as the one below:

What is the name of a (thing that) ?

- _____ is a solid **fossil fuel** usually black.
- _____ is a liquid **fossil fuel** used to obtain petrol.
- _____ _____ supposes to increase the Earth **temperature** (by CO₂ emissions for example).
- _____ _____ destroys **trees** and **buildings**.
- _____ _____ are used in **solar calculators**.
- _____ _____ are used to **heat a liquid**.
- _____ is the **refuse materials** that we don't need.
- With _____ a huge amount of water, in the seas and the oceans, is moved (going up and down) by the sky body attractions like the **moon**.
- _____ are created by the **wind** blowing across the surface of the sea.
- _____ is common in countries with mountains and high rainfall where water going down to the sea can be dammed and used to turn **turbines**.
- _____ is used to charge the mobile phones, or to light **bulbs**.
- _____ _____ use **Uranium** as a fuel.
- _____ can be measured by a **thermometer**.
- _____ are fuels produced from **biomass**.

STUDENT 2

Ask your partner and fill in the gaps with the correct word (each gap needs a word). All of them are about energy resources and their influence. You can use questions as the one below:

What is/are ...?

What is the physical state of ...?

What do/does (destroy, supposed to increase ...) ...?

Which is the use of ...?

Which is the cause that produces ...?

- **Coal** is a solid _____ usually black.
- **Oil** is a liquid _____ used to obtain petrol.
- **Global warming** supposes to increase the Earth _____ (by CO₂ emissions for example) .
- **Acid rain** destroys _____ and _____.
- **Solar cells** are used in _____.
- **Solar collectors** are used to _____ a _____.
- **Waste** is the _____ that we don't need.
- With **tides** a huge amount of water, in the seas and the oceans, is moved (going up and down) by the sky body attractions like the _____.
- **Waves** are created by the _____ blowing across the surface of the sea.
- **Hydropower** is common in countries with mountains and high rainfall where water going down to the sea can be dammed and used to turn _____.
- **Electricity** is used to charge the mobile phones, or to light bulbs.
- **Nuclear energy** use Uranium as a fuel.
- **Heat** can be measured by a thermometer.
- **Biofuels** are fuels produced from biomass.