ENERGY WORLD: Electricity around us

Teaching Notes

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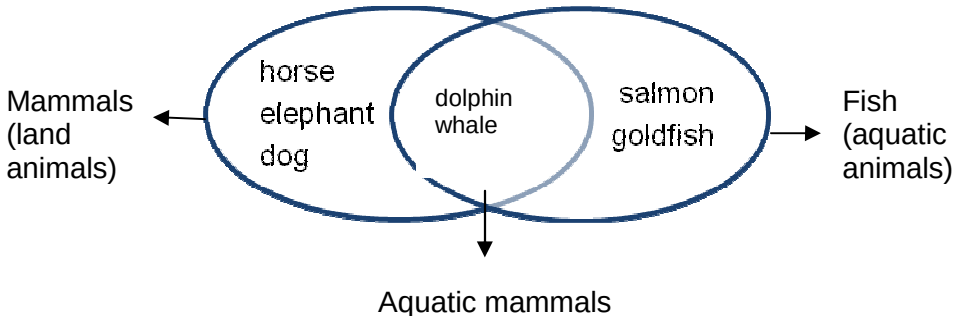
UNIT 1. WHAT IS ELECTRICITY?

SESSION 1. INTRODUCTION TO ELECTRICITY

ACTIVITY 1.	**HULA HOOP CLASSIFICATION**
GROUPING	Threes/fours
MATERIALS	☐ 4/5 Bags with real electrical and non electrical appliances and pictures (e.g. real: sock, torch, leaf, toothbrush, book, school diary ... pictures: washing machine, computer, toaster, door, tree, mp4...). ☐ Pictures (support teaching resources 1). ☐ Some hula hoops (two per group).
EXPLANATION	- Make groups of three/four students. - Give each group a bag and two hula hoops. - Ask them to put the hula hoops on the floor to make a Venn diagram. - Ask them to classify the objects in three groups: two different groups with objects that share characteristics in each hula hoop, and objects that share characteristics with both groups in the middle*. - Each group decides on its own criteria to make the classification. - When all the groups finish, share the results. **If students don't understand how to classify using a Venn diagram, give them an example.* *E.g. Ask them to classify animals like dog, elephant, dolphin, goldfish, horse, whale and salmon in a Venn diagram. The classification could be:* 
LANGUAGE SUPPORT	We classified natural-manufactured electrical- non electrical pale-dark coloured ... objects

ACTIVITY 2.	**WHAT CAN YOU SEE?**
GROUPING	Individual /pairs
MATERIALS	☐ Flashcards (supplementary material 1).
EXPLANATION	- Give a letter to each student/pair. - Ask: ***What can you see in your picture?* - Ask: ***Can you recognise a letter in your picture? Which one?*

- Stick the letters on the board and ask students to make a word.

- When they make the word ELECTRICITY, give the letters back to each student/pair and ask which objects are electrical and non-electrical in their pictures.
- Ask how electrical objects in the pictures work.

*** With mains or batteries. Mains bring the electricity from the power station (the place where electricity is made) to our homes through cables. Batteries store little amounts of electricity.*

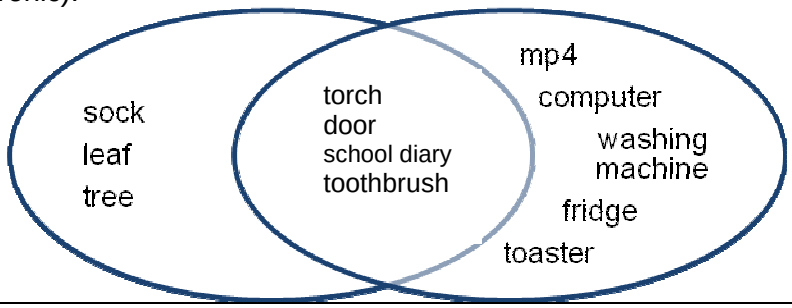
- *Ask:*

***What can we use electricity for?*

LANGUAGE SUPPORT

.....is	electrical non electrical	because it	needs doesn't need	mains batteries	to work

ACTIVITY 3.	**HULA HOOPING AGAIN!!**
GROUPING	Whole group
MATERIALS	☐ Two hula hoops. ☐ One bag with objects (from acvt.1).
EXPLANATION	- If students did not classify objects into electrical/non-electrical/both in the first activity, ask them to classify objects again in these three groups. - The objects that can be electrical and not electrical and go in the middle of the Venn diagram are: the toothbrush, the torch (there are torches that work without batteries and you have to shake them to produce light), the door (it can be automatic), the book (there are e-books) and the school diary (it can be electronic).



LANGUAGE SUPPORT

.....is	electrical non electrical	because it	needs doesn't need	mains batteries	to work

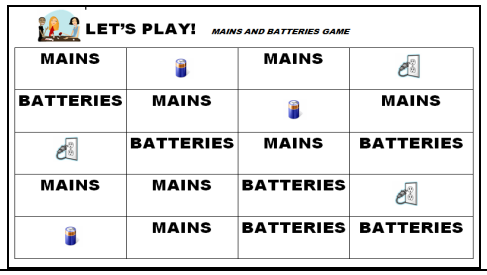
ACTIVITY 4.	**MAINS AND BATTERIES GAME**
GROUPING	Fours: two and two
MATERIALS	☐ Dice (download template at http://www.senteacher.org/Worksheet/13/Fractions.xhtml). ☐ Supplementary material 2 –board game-. ☐ Counters.
EXPLANATION	- Ask students if they know what sources of electricity make electrical appliances work. Revisit the words *mains* and *batteries*. - Give each group a blank dice template, they draw on each side of the dice three objects that work with batteries and three with mains (some can work with both). Each pair makes counters for the game. - Give out a *Mains and Batteries* board for each group and start playing.

BASIC RULES

- Throw dice
- If you get an object that works with mains, cover a *mains* square.
- If you get an object that works with batteries, cover a *batteries* square.
- If you get an object that works with both, cover any of them.

OBJECTIVE

- Make three in a row.

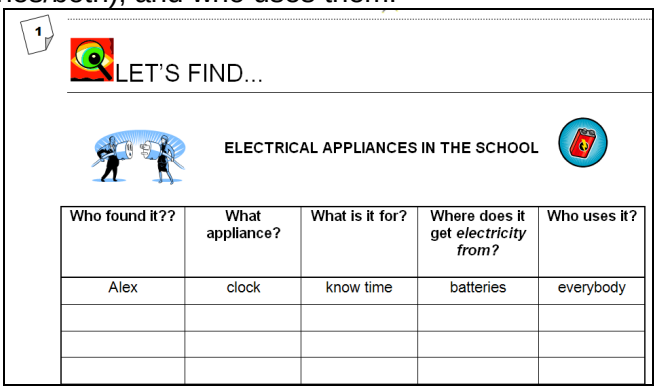


LANGUAGE SUPPORT

- Vocabulary of the objects they draw on the dice.

- Who starts?
- Throw the dice.
- It's my turn // It's your turn.
- Three in a row

ACTIVITY 5.	**LET'S FIND... Electrical appliances in the school.**
GROUPING	Pairs / whole group
MATERIALS	☐ Worksheet 1. ☐ Worksheet 2 –optional-.
EXPLANATION	- Students walk around the class/school in small groups to find electrical appliances and complete what they are for, where they get electricity from (mains/batteries/both), and who uses them.



- Then, the whole group share their findings.
- In the last column of the grid, they also have to write who uses the electrical appliance. Encourage them to notice that most of the people in the school need most of the appliances they have found. They can reflect on the importance of electricity.
- As a follow-up they can do worksheet 2, which has the same structure as worksheet 1 but it has to be done at home.

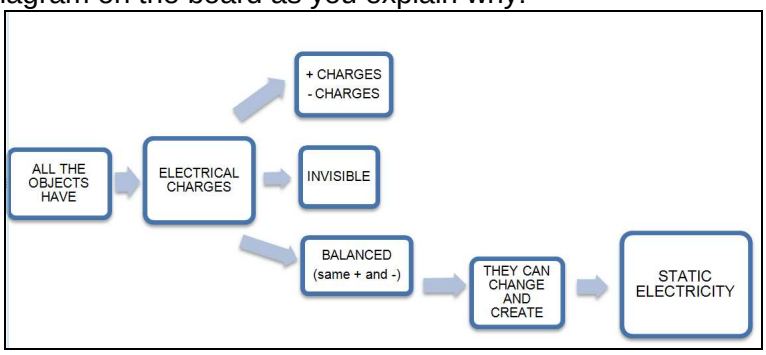
LANGUAGE SUPPORT

- Vocabulary of the objects they find.

I /We/Alex	found a	It is used for.....	and it uses electricity from	mains batteries both

ACTIVITY 6. *OPTIONAL*	**WHICH HOUSEHOLD APPLIANCE CONSUMES THE MOST ELECTRICAL POWER?**
GROUPING	Pairs / whole group
MATERIALS	☐ Supplementary material 3 –Power Point-
EXPLANATION	- Students watch the Power Point and guess which ten electrical appliances consume the most electrical power. Then they have to discuss which one consumes the most. It is the fridge because it has to be on all day long. - They also talk about what appliances are necessary and the ones that they use the most.
LANGUAGE SUPPORT	- Vocabulary of household appliances. I think that ... consumes the most electrical power

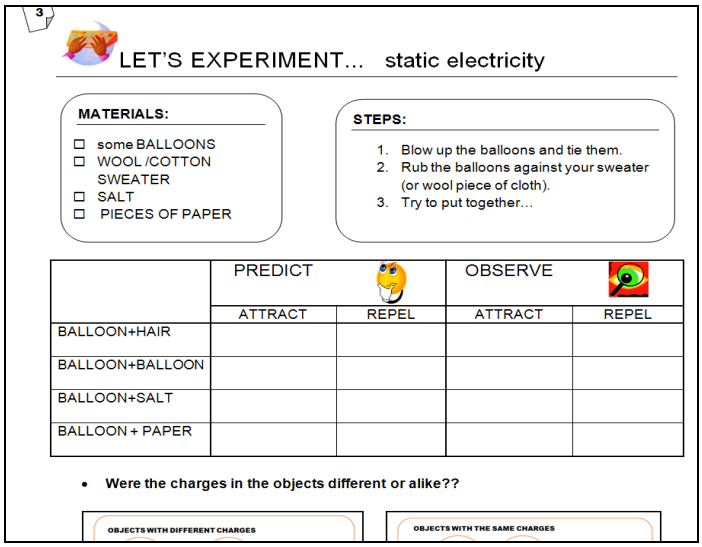
SESSION 2. ELECTRICAL CHARGES & STATIC ELECTRICITY

ACTIVITY 1.	**WHAT'S GOING ON??**
GROUPING	Pairs / whole group
MATERIALS	☐ Paper strips with sentences (support teaching resources 2)
EXPLANATION	- Review some vocabulary such as: corridor, wool sweater, hair stands on end... before doing the activity - Make pairs. - Give each pair a strip of paper with one of these sentences. 1. You are walking along a corridor … 2. ...you are going to open the door and… ZzZZp electric shock. 3. You arrive home on a very cold day … 4. ...you take off your wool sweater and WHOOSH all your hair stands on end. 5. What's going on?? - Each pair has to think how to mime the sentence on the paper. - Ask them to mime them while the rest observe. - Read the sentences aloud and students mime them. - Ask again: ***What's going on??* - Listen to students answers and ask them about personal experiences with static electricity. - Then ask: *** Do you know why this happens?* - Draw a diagram on the board as you explain why: 

	***This happens because all the objects around us are electrically charged (give examples of objects and ask students, too). They have electrical charges.* - Ask and try to elicit information from students: ***Can you see the electrical charges on the … (name things around you, e.g. bottle, bin, board, hair…)? Why?* ***Because the charges are very tiny particles. They are invisible.* - Explain: ***The electrical charges can be positive (draw a positive sign on the board) and ……, ask students: negative.* - Ask students to make a positive/negative sign with their fingers. - Explain/ask: *** Can you feel the electrical charges or feel little electric shocks when you touch all these objects?? No. This happens because most of the objects around us have balanced charges: what do you think this means?* - Try to elicit information from students. If they don't give the correct answer, take a balloon, a bottle or a similar object. Draw three positive signs on it and say: ***Imagine this is the positive charge of the balloon. If the charge is usually balanced, how many negative charges do I have to draw to make it balanced?* ***Three, so there are three positive and three negative. Balanced charge means that there are the same positive and negative charges.* - Ask: ***Do you think electrical charges are always the same or can they change?* - Explain: *** Charges can change with some objects; they can change if you rub them. It happens especially with some plastic objects, when you rub them against wool cloth. Say, 'Let's try'.*

ACTIVITY 2.	**LET'S EXPERIMENT WITH STATIC ELECTRICITY!**
GROUPING	Pairs/ whole group
MATERIALS	☐ Balloons. ☐ Wool/cotton cloth. ☐ Salt. ☐ Tiny pieces of paper. ☐ Worksheet 3.
EXPLANATION	- Show the materials: salt, tiny pieces of paper and balloons. - Ask: ***What will happen when I put the balloon next to the salt or the paper?* - Ask some students to try it and explain: *** They check but nothing happens. This is because the charges are balanced.* - Ask/Explain: ***What will happen when I put them next to each other after rubbing the balloon against the wool cloth?* ***They can attract or repel each other. This is called …… (STATIC ELECTRICITY).*

- Ask them to represent attract and repel using their hands with the person beside them.
- Give out worksheet 3 and tell them they are going to experiment with static electricity.



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LET'S EXPERIMENT… static electricity

MATERIALS:

- ☐ some BALLOONS
- ☐ WOOL /COTTON SWEATER
- ☐ SALT
- ☐ PIECES OF PAPER

STEPS:

1. Blow up the balloons and tie them.
2. Rub the balloons against your sweater (or wool piece of cloth).
3. Try to put together…

	PREDICT		OBSERVE	
	ATTRACT	REPEL	ATTRACT	REPEL
BALLOON+HAIR				
BALLOON+BALLOON				
BALLOON+SALT				
BALLOON + PAPER				

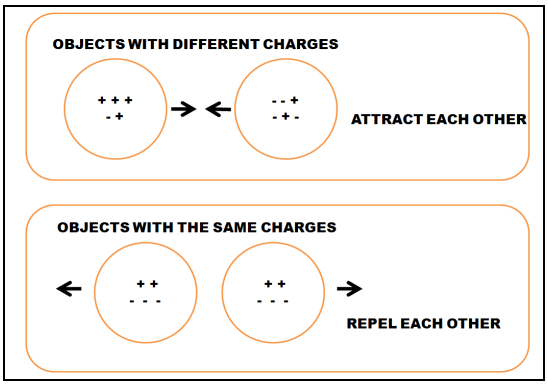
- **Were the charges in the objects different or alike??**

OBJECTS WITH DIFFERENT CHARGES

OBJECTS WITH THE SAME CHARGES

- Students follow the instructions on the worksheet. First, they predict in pairs what will happen after they rub a balloon with a wool cloth and share it with the rest of the group. Then they rub the balloon and try to bring it closer to some materials. Then, they check their predictions.
- Share the results (whole group).
- To reflect on the charges (different or alike), explain/draw on the board:

*** When electrical charges are different objects attract. When electrical charges are alike, objects repel.*



- Ask them to complete the activity about how the charges are on the worksheet. Share results.

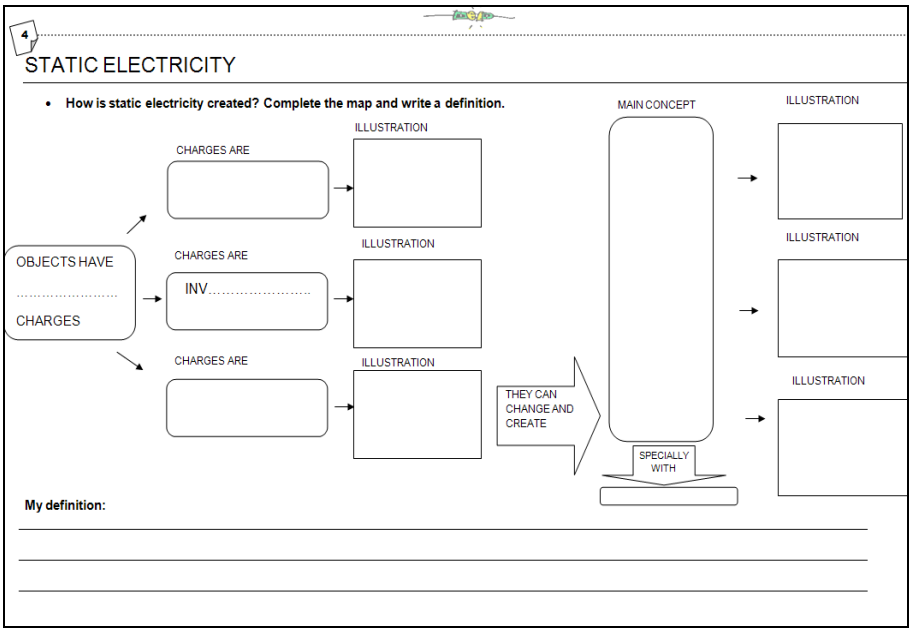
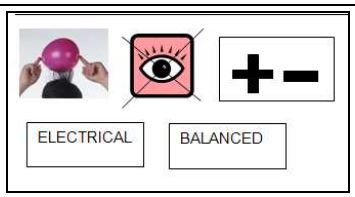
- If there is enough time, students can also try to rub other objects against wool to see what happens (ruler, plastic pen, pencil...).
- Students complete and share the activity 'What a surprise!'.

LANGUAGE SUPPORT

I/we think the balloon	will	attract repel	the other balloon the hair the salt the papers

I/we checked the balloon	attracts repels	the other balloon the hair the salt the papers

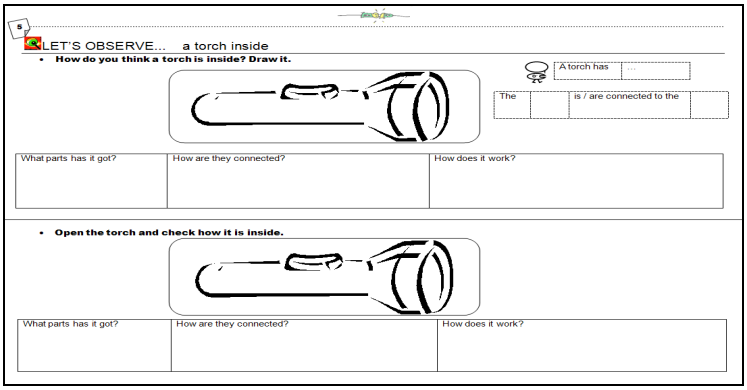
ACTIVITY 3.	**LIGHTENING**
GROUPING	Whole group
MATERIALS	☐ Picture of lightening (support teaching resources 3)
EXPLANATION	- Show picture of lightening. Explain it is related to electrical charges and with the experiment they have done rubbing objects. - Ask students to reflect on how it happens. ***Do you know how it happens?? What happens when two or more clouds are together?* - Explain: ***Lightening is created because charges move from cloud to cloud. They change their charges and they create electricity. You can see these in flashes of lightening.* - Ask them if they have experienced any situation with lightening.

ACTIVITY 4. ***OPTIONAL***	**STATIC ELECTRICITY: Concept definition map**
GROUPING	Whole group
MATERIALS	☐ Worksheet 4 ☐ Paper with pictures and words –worksheet 4-
EXPLANATION	- Revisit what students learnt in the previous lesson about static electricity. - Give out worksheet 4 and the paper with pictures and words.   - Students cut out the pictures and words for the concept map. - They fill in the concept definition map in pairs with the pictures and words they have been given and they write and draw other words or illustrations that are missing. - Then, they make their own definition.

SESSION 3. LET'S MAKE A HUMAN CIRCUIT!

ACTIVITY 1.	**LOOP CARDS**
GROUPING	Pairs / whole group
MATERIALS	☐ Loop cards (support teaching resources 4)
EXPLANATION	- Hand out one card per pair. - Explain how to play. - Review some words such as: *plug into a socket, store...* before doing the activity. BASIC RULES - Someone starts by reading the definition at the bottom of the card. - When you hear the definition of the word at the top of your card, say the word aloud. - Then read the definition at the bottom of the card.
LANGUAGE SUPPORT	- Vocabulary and definitions from the loop cards.

ACTIVITY 2. ***OPTIONAL***	**LIGHTENING**
GROUPING	Whole group
MATERIALS	☐ Picture of lightening (support teaching resources 3). ☐ Light bulb –optional-.
EXPLANATION	- Show the lightening image again as a stimulus for revisiting what they learned in the previous session. - Explain (you can show the following example using a light bulb): ***Charges similar to the ones we were experimenting with in the last lesson are the ones that flow through our wires and create electricity.* *For instance, when a light bulb lights up, it is because negative charges (electrons) are moving inside it. The electrons come inside the bulb through a wire and go back through another one.*

ACTIVITY 3.	**ELECTRICAL CIRCUITS. How does a torch work?**
GROUPING	Individual/whole group
MATERIALS	☐ Worksheet 5. ☐ A real torch. ☐ Optional: support teaching resources 7 (how a torch works).
EXPLANATION	- Ask students if they have ever used a torch. Ask them why, when... - Give out worksheet 5 and ask them to draw the inside of a torch. Then ask them to write down its parts, how they are connected and how the torch works.  LET'S OBSERVE... a torch inside • How do you think a torch is inside? Draw it. A torch has ... The ... is / are connected to the ... What parts has it got? / How are they connected? / How does it work? • Open the torch and check how it is inside. What parts has it got? / How are they connected? / How does it work?

- When they finish, ask:

*** What parts have you drawn in your torch?*

- Take a real torch and show its main parts: batteries, bulb, metal wire/spring, lamp contact and switch.

- Explain:

***Electricity always flows through circuits. Inside the torch there is an electrical circuit to make it work.*

- Show them how the parts are linked and how it works:

***All electricity circuits must have:*

1. *A source of energy. What is the source of energy in the torch? The batteries*
2. *Something that transforms electric energy into another form of energy. In the torch, electric energy is transformed into..... (light) using a ..... (light bulb).*
3. *Metal spring/wire to connect all the parts (the batteries, the bulb and the switch) and to let electricity flow through the circuit.*
4. *A switch. When you press on the switch, all the circuit connects and the torch works. What happens when you press off?*

- Explain how it works and show it with the torch.

***The circuit works thanks to energy in the battery. When we press on, the switch connects all the circuit: batteries, metal spring/wire, lamp contact and light bulb. Then, the batteries give energy to the light bulb though the metal spring/wire and the lamp contact (see* support teaching resources 7*).*

- Ask students to complete the second part of the worksheet and draw exactly how a torch works. When they finish ask them how it works.
- Ask them which parts they have changed and which ones were right.
- Ask:

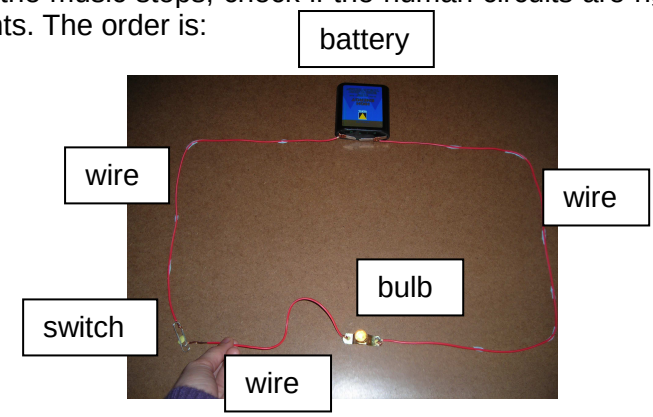
***Why do you think batteries run out?*
***Because all its energy has gone.*

LANGUAGE SUPPORT

A torch has	batteries switch metal spring/wire light bulb

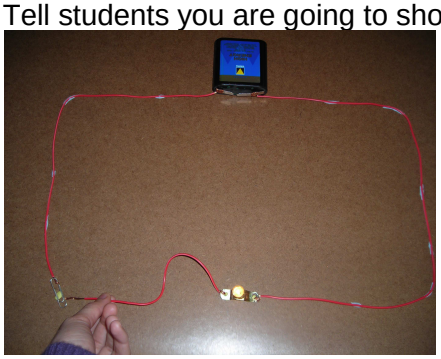
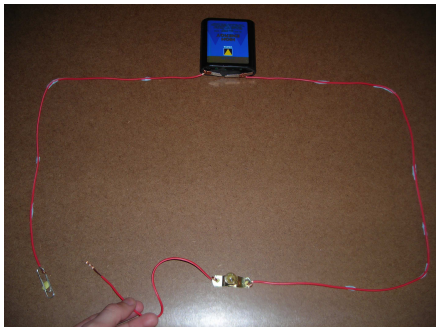
The	batteries switch metal spring/wire light bulb	are connected to the	batteries switch metal spring/wire light bulb

When you press 'on' all the circuit is connected and the	batteries switch metal spring/wire light bulb	give energy to the	batteries switch metal spring/wire light bulb	through the	batteries switch metal spring/wire light bulb

ACTIVITY 3.	**LET'S MAKE A HUMAN CIRCUIT!**
GROUPING	Individual / whole group
MATERIALS	☐ A5 pieces of paper. ☐ String.
EXPLANATION	- Ask students them if they remember the parts of the circuit (batteries, wires, a light bulb and a switch). - Explain they are going to play a game to make a human circuit. The circuit will have the same parts as the one they saw in the torch in the previous activity. - Give out A5 pieces of paper and give each student a number from one to six. - Explain that depending on the number they are, they have to draw something on their piece of paper. 1: battery 4: wire 2: wire 5: bulb 3: wire 6: switch - Each student punches the picture, passes some string through the holes and makes a pendant with it. - They put their pendants on round their necks. - Explain they are going to play a game. BASIC RULES - Walk around the class as you are listening to music. - When the music stops, get in a group of six and try to represent an electrical circuit holding your hands. - Remind students each circuit needs a battery, three wires, a bulb and a switch. - When the music stops, check if the human circuits are right by asking students. The order is:  - If a group is right, ask them to hold hands and mumble 'mmMMmm' to represent the sound of electricity.
LANGUAGE SUPPORT	We were right to connect the: bulb / wire / switch / battery — to the: bulb / wire / switch / battery We need to change the: bulb / wire / switch / battery — to the: bulb / wire / switch / battery

SESSION 4. ARE THEY CONDUCTORS AND INSULATORS?

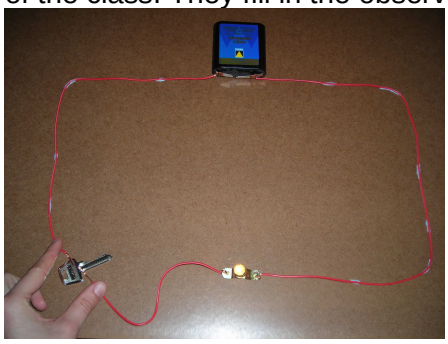
ACTIVITY 1.	**LET'S GUESS!**
GROUPING	Individual/pairs
MATERIALS	☐ Small metal, plastic, wood, glass, rubber and cork objects (e.g. a pin, a rubber, a glass bottle, a pencil, a pencil with two points, a cork, a key, a coin, a golden/silver earring or similar). ☐ Two boxes (with labels on them saying conductor and insulator) –if possible a metallic –conductor- and a cardboard box –insulator-.
EXPLANATION	- Show the boxes and stick a label with the word 'conductor' on the metal box and a label with the word 'insulator' on the cardboard one. - Ask: ***What do the words conductor and insulator suggest to you? What can they do with electricity?* - Give students some post-it notes to write what they think on them and stick them on the boxes. It does not matter if they don't write anything. - Share the results. - Put the boxes apart.
LANGUAGE SUPPORT	I/we think a conductor insulator is... can... has...

ACTIVITY 2.	**LET'S EXPERIMENT ... IS IT A CONDUCTOR OR AN INSULATOR?**
GROUPING	Threes/ whole group
MATERIALS	☐ Simple electrical circuit as shown in the picture (with a battery, wires, a bulb, and a paper clip). ☐ A pin, a rubber, a glass bottle, a pencil, a pencil with two points, a cork, a key, a coin, a golden/silver earring or similar ☐ Worksheet 6.
EXPLANATION	- Tell students you are going to show them an electrical circuit.   - Ask them before you show the circuit if they remember its parts and how it works. - Show them the different parts of it (a battery, wires, a bulb, and a paper clip) and how they are connected. - Show how the light lights up and doesn't by moving the paperclip (it replaces the switch in the torch circuit). - Ask for a volunteer to try the same, substituting the paperclip for a rubber. ***What happens?* ***The bulb doesn't light up because the rubber is an insulator.* *The bulb lights up with the paperclip because it is a conductor.* - *Show* a pin, a rubber, a glass bottle, a pencil, and pencil with two points, a cork and a golden/silver earring. - Ask them to predict what will happen when putting the materials in the circuit.

6 LET'S EXPERIMENT... with conductors and insulators

MATERIAL	PREDICT				OBSERVE			
	WILL LIGHT UP			WON'T LIGHT UP	LIGHTS UP			DOESN'T LIGHT UP
	BRIGHTLY	QUITE BRIGHTLY	VERY BRIGHTLY		BRIGHTLY	QUITE BRIGHTLY	VERY BRIGHTLY	

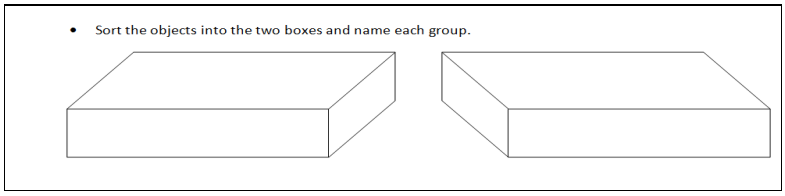
- They fill in the prediction column on the worksheet and choose a new object/material from the class to be tested.
- Share the predictions.
- Each group of three checks one material and shows if the light lights up to the rest of the class. They fill in the observe column.



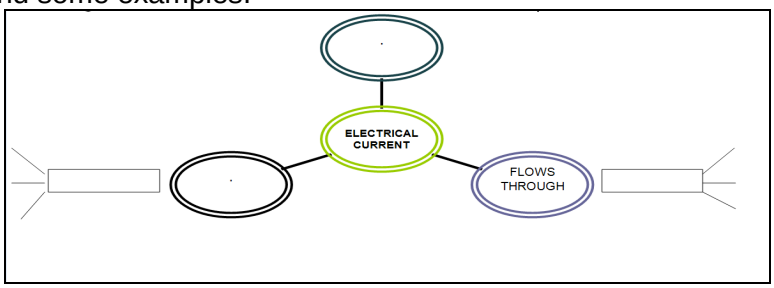
LANGUAGE SUPPORT

I/we think the bulb	will light up won't light up	brightly very brightly quite brightly	with the	pin pencil pencil with two points gold key coin

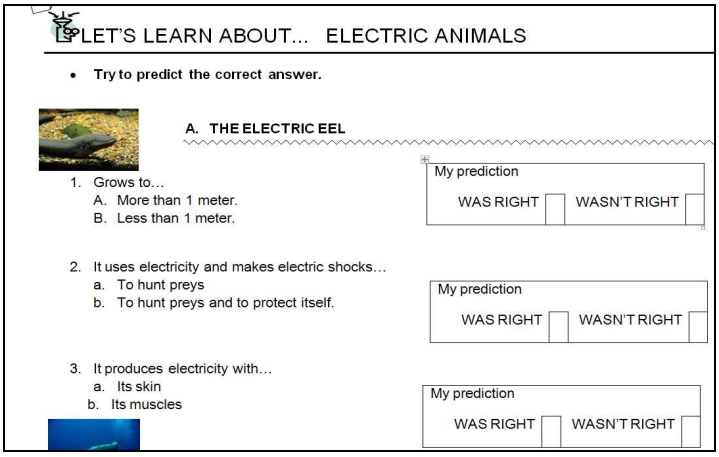
I/we checked the	pin pencil pencil with two points gold	and it lights up the bulb	brightly very brightly quite brightly
		and it doesn't light up the bulb.	

ACTIVITY 3.	**BACK TO THE BOXES**
GROUPING	Threes
MATERIALS	☐ Two boxes (with labels on them saying conductor and insulator) –from actv.1-. ☐ A pin, a rubber, a glass bottle, a pencil, a pencil with two points, a cork, a key, a coin, a golden/silver earring or similar ☐ Worksheet 6.
EXPLANATION	- Students complete the second activity on the worksheet. They classify the materials and give a name to each box (conductors/insulators).  - The whole group shares the results and puts the objects in the correct box as they classify them. - They complete the questions at the end of the worksheet. KEY: • **Identify the metals in the boxes. Are they good or bad conductors?** Gold, key, coin and pin. They are good conductors. • **Which one is the best conductor? Why?** Gold is the best conductor because it made the light bulb light up very brightly. • **What surprised you the most?** Probably, the thing that surprises most of the students is the difference between the pencil that is an insulator and the pencil with two points that conducts electricity because graphite is a conductor although it is not a metal.
LANGUAGE SUPPORT	The pin The pencil The pencil with two points Gold Coin Key is an electrical conductor insulator because it allows it doesn't allow electricity to flow through it.

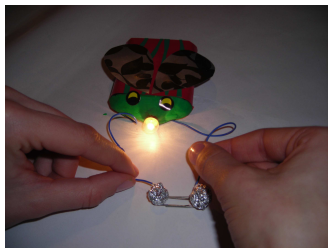
SESSION 5. ELECTRICAL CURRENT / CONDUCTORS AND INSULATORS QUIZZ

ACTIVITY 1.	**LET'S KNOW MORE ABOUT... electrical current**
GROUPING	Individual /pairs/whole group
MATERIALS	☐ Worksheet 7.
EXPLANATION	- Students read and complete the concept map with information from the text. They have to write three characteristics of electric current and some examples.  - They share the results with a pair and then with the whole group.

ACTIVITY 2.	CONDUCTORS AND INSULATORS QUIZZ
GROUPING	Small groups
MATERIALS	☐ Online quiz at http://www.bbc.co.uk/schools/ks2bitesize/science/tests/conductors.shtml ☐ Or printable quiz at http://www.bbc.co.uk/apps/ifl/schools/ks2bitesize/science/quizengine?quiz=s05_circuitsandconductors_quiz&templateStyle=science_m
EXPLANATION	- Split the class in two/three groups. - Read the question in the quiz aloud and each group writes down the answer (A-B-C). - Check the answer. - Each correct answer scores a point.

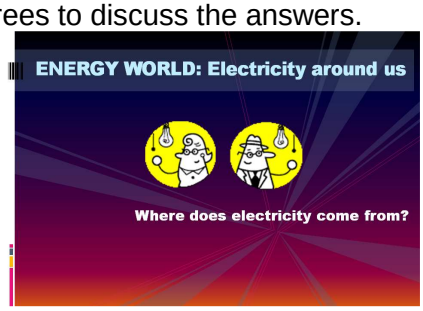
ACTIVITY 3.	ELECTRIC ANIMALS
GROUPING	Individual/pairs
MATERIALS	☐ Worksheet 7. ☐ Support teaching resources 6.
EXPLANATION	- Make pairs. - Ask students: ***Do you think animals have electricity in them?* ***Do you know any electric animal?* - Tell students they are going to work on electric animals. - Give out worksheet 7 and ask one student of the pair to complete part A and the other to complete part B. They have to guess some information about the animals.  LET'S LEARN ABOUT... ELECTRIC ANIMALS • Try to predict the correct answer. A. THE ELECTRIC EEL 1. Grows to… A. More than 1 meter. B. Less than 1 meter. My prediction WAS RIGHT WASN'T RIGHT 2. It uses electricity and makes electric shocks… a. To hunt preys b. To hunt preys and to protect itself. My prediction WAS RIGHT WASN'T RIGHT 3. It produces electricity with… a. Its skin b. Its muscles My prediction WAS RIGHT WASN'T RIGHT - When they finish they exchange papers. - Each student corrects the activity of his/her pair by reading the information from the support teaching resources 6.

SESSION 6. ELECTRICAL BUGS –making a circuit-

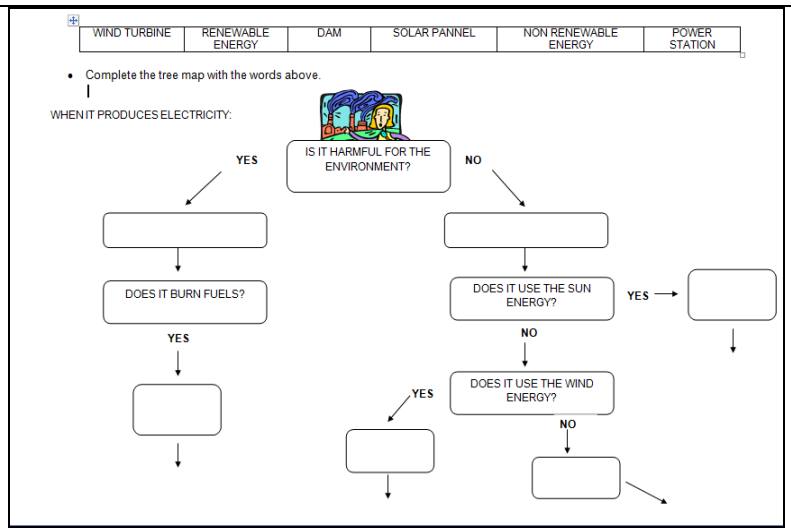
ACTIVITY 1.	LET'S MAKE AN ELECTRICAL BUG!
GROUPING	Individual / Whole group
MATERIALS	☐ One 3R12 battery (4,5v) ☐ One small torch bulb (3,5v) ☐ Electrical wire ☐ Some kitchen foil ☐ Coloured papers ☐ Plasticine ☐ Stickers ☐ Scissors ☐ Supplementary material 4 –Power Point instructions-
EXPLANATION	- Tell students they are going to make an electric circuit that will look like a bug.  - Explain they will be able to check which materials are conductors and insulators with their electrical bug. - Follow instructions on the Power Point to make it or print the Power Point slides and show them step by step so that students can follow them. - When students finish the electrical bug they can find objects that light up or don't light up the bulb. - Ask students: *** What happens when the bulb lights up?* *If the objects are conductors, the circuit is connected and the bug's nose lights up.* *** What happens when the bulb doesn't light up?* *If the balls don't touch a conductor, there's no circuit. Electricity can't flow, so the bulb doesn't light up.* - Students can walk around the class and find conductors and insulators.

UNIT 2. WHERE DOES ELECTRICITY COME FROM?

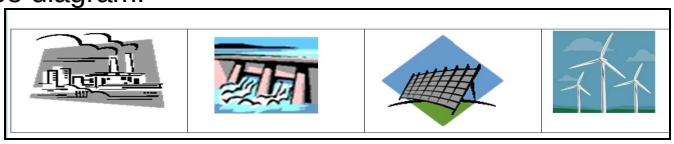
SESSION 7. WHERE DOES ELECTRICITY COME FROM?

ACTIVITY 1	**WHERE DOES ELECTRICITY COME FROM?**
GROUPING	Whole group /pairs
MATERIALS	☐ Supplementary material 5 –Power Point-.
EXPLANATION	- Ask students if they know where electricity comes from. - Explain they are going to watch a Power Point to find out. - Show the Power Point and try to elicit information from students before it appears on the slide. - On some slides there are questions for the students, they can be grouped in pairs /threes to discuss the answers.  - At the end of the Power Point it says 'to be continued'. Tell students they will know some other information in another session.
LANGUAGE SUPPORT	For slide 3: The chimneys are: at the top / at the bottom / on the right / on the left / in the middle / in the corner — of the picture

ACTIVITY 2.	**ENERGIES TREE DIAGRAM**
GROUPING	Individual /pairs /whole group
MATERIALS	☐ Worksheet 8. ☐ Pictures -worksheet 8-
EXPLANATION	- Give out the worksheet. - Ask students to read the questions in the grids and fill in the tree diagram with the words in the boxes above. - Then, they discuss it in pairs.

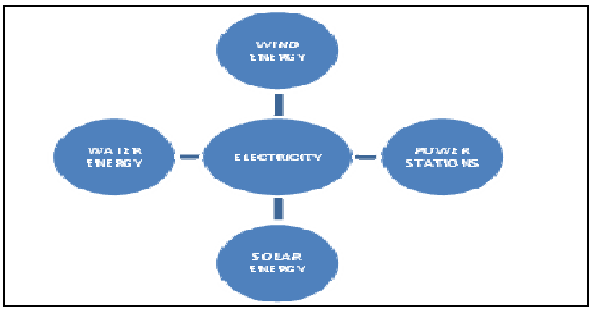


- Give out the pictures and ask students to cut them out and put them on the tree diagram.



- They compare it in pairs.
- The whole group corrects the activity.

SESSION 8. HOW DOES ELECTRICITY GET TO OUR HOMES?

ACTIVITY 1.	**MAKE YOUR ELECTRICITY GRID**
GROUPING	Threes-Fours /Whole group
MATERIALS	☐ Worksheet 9 ☐ Support teaching resources 7 (pictures of wind turbines, solar panels, power stations, dams, pylons, substations and houses). ☐ Wire (or thread). ☐ Cardboard. ☐ Scissors, glue, sellotape.
EXPLANATION	- Activate prior knowledge, ask: ***Where does electricity come from?* - Make a diagram on the board, e.g.  - Make groups of three or four. - Tell students that each group is going to make a different electricity grid (one group with power station, another with solar power...). Each group decides how their grid is (parts, connections...). - Show them the different parts of the grid (wind turbines, solar panels, power stations, dams, pylons, substations and houses) and display them on a table.

- Write the four types of electricity grid on different pieces of paper. Each group takes a paper. Then they make the grid that is written on it.

STEPS to make the grid:

- Decide what parts the grid has and take them from the table.
- Discuss how they are connected.
- Stick them on cardboard (they have to stand still).
- Connect the different parts with the wire (they can stick the wire to the part with sellotape).

- They complete the worksheet (materials and how it works) as they are making the grid.
- Then, they show the other groups what pieces they used to make their grid and how they made the connections.

LANGUAGE SUPPORT

Electricity comes from	wind turbines solar panels power stations dams

We need a	wind turbine solar panel power station dam pylon substation house

First Then Finally	we connected the	wind turbine solar panel power station dams pylon substation	to the	pylon substation house

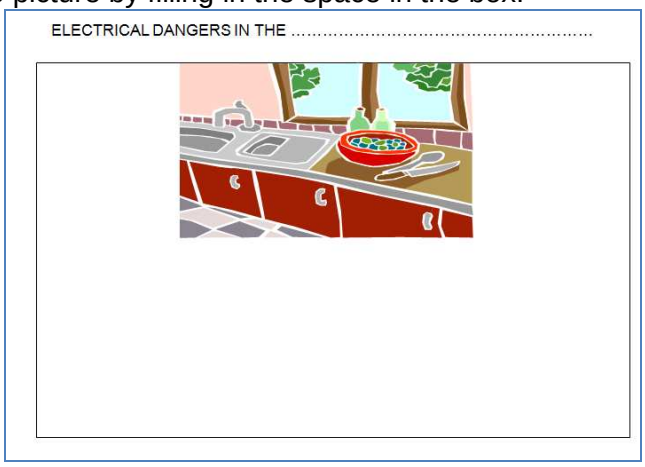
ACTIVITY 2.	**ONLINE CHECK**
GROUPING	Threes/Fours /Whole group
MATERIALS	☐ www.switchedonkids.org
EXPLANATION	- Connect to the web www.switchedonkids.org, go to '*what is electricity?*' and watch it. There is basic information about electricity sources and how does it gets to houses.

<table>
<tr><td></td><td>- Then each group checks what was right on their grid and what was not. They make any changes on the worksheet.
- The whole group share the right connections and the changes they made.</td></tr>
<tr><td>LANGUAGE SUPPORT</td><td>
<table>
<tr><td>We were right to connect the</td><td>wind turbine
solar panel
…</td><td>to the</td><td>pylon
substation
house</td></tr>
</table>
<table>
<tr><td>We need to change the</td><td>wind turbine
solar panel
…</td><td>to the</td><td>pylon
substation
house
...</td></tr>
</table>
</td></tr>
</table>

UNIT 3. ELECTRICAL DANGERS AND ELECTRICAL SAFETY

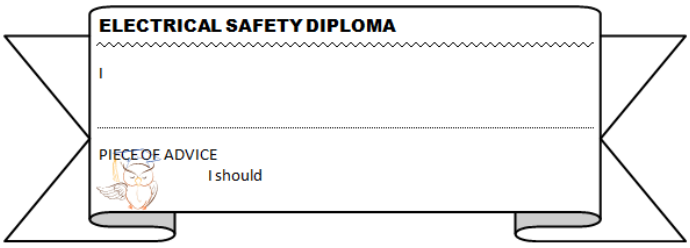
SESSION 9. ELECTRICAL DANGERS.

ACTIVITY 1.	**ELECTRICAL DANGERS AT HOME**
GROUPING	Whole group/pairs
MATERIALS	☐ Website http://www.switchedonkids.org.uk/house.html
EXPLANATION	- Explain you are going to work on electrical dangers. - Ask if they know any electrical danger. - Go to the website http://www.switchedonkids.org.uk/house.html and show it with the beamer. If it is not possible with beamer it can be done with the OHP or photocopies. - Students say a part of the house and they find electrical appliances there. E.g. - Then they identify electrical dangers in pairs. - They share them with the rest. - The whole group checks the answers. E.g.
LANGUAGE SUPPORT	I think ..... can be dangerous If you ..... you could get an electric shock

ACTIVITY 2.	**WARNINGS POSTER**
GROUPING	Individual/pairs
MATERIALS	☐ Worksheet 10. ☐ Supplementary material 6 –posters-.
EXPLANATION	- Give each student one of the posters (kitchen, bathroom or bedroom) from the supplementary material 6. Give out worksheet 10 and read the instructions of the activity aloud: - Complete the picture by filling in the space in the box.  - Draw two things to make it electrically dangerous. - Look at your picture and write one warning in a speech bubble (on the worksheet) to make it electrically safe. Cut it out and stick it. - Exchange your picture with one of your classmates. Write a warning in a speech bubble for his/her picture danger. Cut it out and stick it.
LANGUAGE SUPPORT	Don't… Always keep… Put… You must…

SESSION 10. ELECTRICAL SAFETY

ACTIVITY 1.	**PRESENTING AND DISPLAYING POSTERS**
GROUPING	Whole group
MATERIALS	☐ Supplementary material 6 –posters-
EXPLANATION	- Each student presents its poster to the rest. - Display the posters on the walls. Make and hang a big heading 'ELECTRICAL DANGERS'.
LANGUAGE SUPPORT	My / kitchen, bathroom, bedroom / is not electrically safe because / there is/are the / .....
	My warnings are / don't…, always keep…, put…, you must…

ACTIVITY 2.	**ELECTRICAL SAFETY QUESTIONNAIRE**					
GROUPING	Individual /whole group					
MATERIALS	☐ Worksheet 11. ☐ Score –worksheet 11-					
EXPLANATION	- Give a worksheet to each student. - Read the questionnaire aloud and check understanding. - Each student completes his/her test. - Give them a paper with the score. - They count how many points they have. - They read how they know about electrical dangers according to their score. FROM 0 TO 6: DANGER!!! ELECTRICITY IS VERY DANGEROUS. You must learn a LOT more about it. Have a look at the posters we did to know how to be safe! FROM 8 TO 12: You know some things about ELECTRICAL SAFETY. The posters help you to learn a bit more. FROM 12 TO 16: You know quite a lot about ELECTRICAL SAFETY. FROM 18 TO 20: CONGRATULATIONS!!! You are an EXPERT on ELECTRICAL SAFETY!! You should help mates that are not aware of electrical dangers. - Then they fill in the ELECTRICAL SAFETY diploma on the worksheet.  - Share the results.						
LANGUAGE SUPPORT		I scored	..... points, and	I am an EXPERT on I know quite a lot about I know some things about I must learn a LOT more about	electrical safety.	

UNIT 4. ELECTRICITY IMPORTANCE AND ENVIRONMENTAL IMPACT

SESSION 11. WHY IS ELECTRICITY IMPORTANT?

ACTIVITY 1.	**LIVING WITH AND WITHOUT ELECTRICITY.**
GROUPING	Pairs/whole group
MATERIALS	☐ Support teaching resources 8.
EXPLANATION	- Stick the pictures on the board. - Ask students what the pictures suggest to them. - Encourage them to ask you questions about the pictures to develop their curiosity. - Ask students to sort the pictures into two groups. Give them some clues to guess they belong to two different villages. - Ask them ***Where do you think these villages are?* - Explain they belong to two different Peruvian villages. - Ask them if they know where Peru is. - Ask: *** What are the differences between the two villages?* ***Where would you prefer living? Why?* - The whole group share their opinions about the pictures. - The pictures belong to two different villages. In one village they cook and make light using fire because they don't have electricity. In the other, the pictures show they have a power station and they can have light at night.
LANGUAGE SUPPORT	I think *in the first village* *in the second village* they are they aren't they can they can't they have got they haven't got

ACTIVITY 2.	**WATCHING THE VIDEO**
GROUPING	Whole group
MATERIALS	☐ Video at http://www.bbc.co.uk/apps/ifl/learningzone/clips/showrecord?ContentType=text/html%3b%20charset=utf-8;Id=2410;returnUrl=%3FSuppressCaching%3D1%3Battrib_1%3DSCHOOL_LEVEL_NAME%3Battrib_2%3DSUBJECT_NAME%3Battrib_3%3DTOPIC%3Battrib_4%3DSearchText%3Bbool_1%3DAND%3Bbool_2%3DAND%3Bbool_3%3DAND%3Bconfig%3Dresults_within%3Bformat%3D%3Boper_1%3Deq%3Boper_2%3Deq%3Boper_3%3Deq%3Boper_4%3Deq%3Bval_1_1%3DPrimary%3Bval_2_1%3D%3Bval_3_1%3DElectricity%20Conductors%2520%2526%2520Circuits%3Bval_4_1%3D%3Bpage%3D2%3Bpagesize%3D12;SuppressCaching=1;pagesize=12; *Or* www.bbc.co.uk/schools, *then go to* class clips--primary--science--electricity conductors & circuits--two Peruvian villages with and without electricity
EXPLANATION	- Tell students they are going to watch a clip about the two Peruvian villages silently. They have to guess what is happening. - Ask ***What do you think is happening in these villages?* ***What can they do in the first village and in the second?* ***Who looks happier?* - Review some vocabulary before watching the video. Write it down on the board and ask students to mime the words. Help them when they don't know how to do it. Suggested vocabulary: *wood fire, candle, go to bed, gloomy classroom, do homework, watch television.* - Play the video with sound. Video transcript : *VILLAGE WITHOUT ELECTRICITY* *This village in Peru doesn't have electricity. Wood fires for cooking and seeing just by the light from candles does not make for an easy life.* *No dishwasher, fridges or other electrical things when you only have candle power.* *Everybody goes to bed really early because it's dark and at schools reading and writing can be difficult in gloomy classrooms.* *VILLAGE WITH ELECTRICITY* *But nearby there's a village that has a power station.* *This produces electricity which is delivered to the village.* *'The most positive things which it has brought to La Peca is electric light, with electricity we can have activities at night. Sometimes all the locals get together in the park when there's a birthday, or a national day.'* *Her daughter Jessica is pleased to have electricity, too.* *'It's important because at night you can do your homework. Some people use it to watch television so that they can use it to watch films at night. It means you can go out, too. You can go to the park at any time because there is electricity. When there's no light, you can't go out!.'* - Ask students what is really happening. Ask them if their prediction was right. - Ask the questions that were asked before watching the video with sound: *** What are the differences between the two villages?* ***Where would you prefer living? Why?*
LANGUAGE SUPPORT	In the village without electricity: they are / they aren't / they can / they can't / they have got / they haven't got / ... and in the village with electricity: they are / they aren't / they can / they can't / they have got / they haven't got / ...

ACTIVITY 3.	**WHO DO YOU AGREE WITH?**
GROUPING	Individual/ pairs/ whole group
MATERIALS	☐ Worksheet 12.

EXPLANATION	- Give the worksheets out.
	- Explain that the children in the pictures are from the two Peruvian villages.
	- Read the texts aloud.
	- Give them time to think who they agree with.
	- Share opinions in pairs and correct the activity with the whole group.
	- Then students think and complete the questions from the worksheet.
	  - *In which village do you think people are happier? Why?*
	  - *If you had to live without electricity, which electrical gadget would you miss the most?*
	  - *Which electrical gadget could you live without?*
	- Share opinions.

LANGUAGE SUPPORT	

I think people are happier	in the village without electricity in the village with electricity	because	they can they have	...

I would miss	heating light computer fridge ..... (electrical appliance)	the most

I could live without	games console heating ..... (electrical appliance)

ACTIVITY 4.	**LET'S DO A SURVEY!**
GROUPING	Fours/fives
MATERIALS	☐ Worksheet 13.
EXPLANATION	- The survey will consist of finding out: *If there was no electricity* *-What would you miss the most?* *- What could you live without?* - Divide the class into 6 groups (so that there are 4 or 5 students per group). - Each group will be responsible to collect some data. Each class in year 6 collects different data and they will share it at the end of the survey. E.g. 6A collects:

		WHAT WOULD YOU MISS THE MOST?
Group 1	6A STUDENTS	
Group2	6A PARENTS	
Group3	Y6 TEACHERS	

		WHAT COULD YOU LIVE WITHOUT?
Group 4	6A STUDENTS	
Group5	6A PARENTS	
Group6	Y6 TEACHERS	

6B collects:

		WHAT WOULD YOU MISS THE MOST?
Group 1	6B STUDENTS	
Group2	6B PARENTS	
Group3	Not Y6 TEACHERS	

		WHAT COULD YOU LIVE WITHOUT?
Group 4	6B STUDENTS	
Group5	6B PARENTS	
Group6	Not Y6 TEACHERS	

- **STEP 1** –worksheet 13-

- Tell students they will collect at least 15 opinions.
- Show them the collecting data worksheet and read it aloud so that students know how it works.

LET'S DO A SURVEY!

We are .....

Our question is…	

We ask …	

1st STEP

Collecting DATA

- Ask your question to the group of people you have to do the survey on.
- Write each person's name and their answer in the grid.

NAME	If there was not electricity, ...?
1.	
2	

- Ask them to have it completed for the following lesson.

SESSION 12. WITH AND WITHOUT ELECTRICITY SURVEY

ACTIVITY 1.	**LET'S DO A SURVEY!**
GROUPING	Fours/fives.
MATERIALS	☐ Worksheets 14,15,16,17.
EXPLANATION	- Students have already done the survey and they have completed the grid. • **STEP 2** –worksheet 14- - Give out worksheet 14. They have to count the results of the people they asked.

- When they finish they report their results.

Processing SURVEY'S RESULTS

2nd STEP

- Count the results.
- Use the grid to report the results

TOTAL OF PEOPLE ASKED	WE ASKED .... (number) (group of people)

What would ..... miss?	Number of .....

- **STEP 3** –worksheet 15-

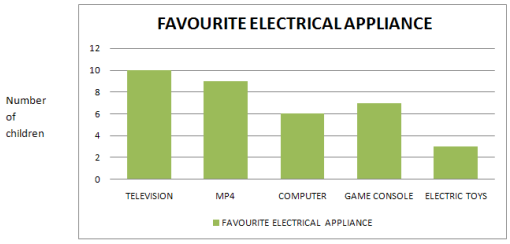
- Give out worksheet 15. Students can see a real chart and have to answer some questions about it.

Studying a bar chart

3rd STEP

- Look at the chart and answer the questions below.

- The following chart shows the result from a survey in which 35 children from 10 to 12 years old were interviewed.



- **STEP 4** –worksheet 16-

- Students make their own bar chart following the instructions on worksheet 16.

Making a bar chart

4th STEP

- Read the instructions and make your bar chart.

YOU NEED: A3 SQUARED/GRAPH PAPER, RULER, PENCIL, RUBBER CRAYONS

1. Draw two perpendicular lines
2. Label the vertical line as number of people. Label the horizontal line as electrical appliances.
3. Mark the centimeters on the vertical line. Each centimeter will be one person, so draw as centimeters as people you asked in the survey.

2
1

- **STEP 5** –worksheet 17-

- They present their bar chart to the rest of the class.

LANGUAGE SUPPORT

For worksheet 14:

Two Seven …….. (number)	students teachers parents …… (group of people)	out of	fifteen twenty twenty-five ……. (total people asked)	would miss	light heating computer ……. (electrical appliance)	the most

For the presentation:

Our survey is about	what people would miss the most what people could live without	if there wasn't electricity

We asked	fifteen twenty twenty-five ……. (total people asked)	students teachers parents …… (group of people)

Our bar chart shows that	students teachers parents …… (group of people)	would miss	light heating computer ……..	the most
		could live without	light fridge ……	

Our bar chart shows that	light heating computer …… (electrical appliance)	Is the second third forth	electrical appliance	students teachers parents …… (group of people)	would miss the most could live without

ACTIVITY 2 ***OPTIONAL***	**POWER CUT POEM**
GROUPING	Small groups
MATERIALS	☐ Worksheet 18. ☐ Support teaching resources 9.
EXPLANATION	- Show the picture of the power cut. - Ask students what the picture suggests to them. - Ask them about personal experiences with power cuts. - Show the pictures of the evil creature and the magic fairy. - Make pairs. Give each pair a letter A or B. - Tell students they have to imagine there is a power cut. Tell all the A pairs have to imagine the role of an EVIL CREATURE during a power cut: happy, sad, angry, scared, guilty, saviour…

	- Tell the B pairs they have to imagine the role of a MAGIC FAIRY during the power cut: happy, sad, angry, scared, guilty, saviour… - Turn off the lights and light up two candles. Play some lively music (e.g. theme tune from 'The Flintstones') and ask the A pairs to represent the evil creature. Make them stop. - Ask B pairs to represent the magic fairy. Make them stop. - Tell all of them to perform as their creature while walking around the class. - Give out the worksheet with the poem. Ask A pairs to try to make an evil creature voice and read aloud the first verse together. Ask B pairs to try to make a magic fairy voice and read the second verse together. - All the students walk around the class while reading the poem and performing their parts. - Ask students: *** How would you feel if there was a global power cut?* ***If could ask for one wish, what would you choose?* ***What character do you prefer the evil creature or the magic fairy. Why?* - Perform the poem again. It can be done changing the roles.
LANGUAGE SUPPORT	I would feel: happy / sad / excited / scared My wish would be to make: light / MP4 / computer / toys: work I prefer the: evil creature / magic fairy: because it: is scary / can give wishes

SESSION 13. LET'S BECOME ELECTRISAVERS!

ACTIVITY 1.	**WHAT CAN YOU DO TO PROTECT THE ENVIRONMENT?**
GROUPING	Whole group / small groups
MATERIALS	☐ Supplementary material 7 –Power Point-
EXPLANATION	- Ask students if they remember the Power Point about energy sources they watched in previous lessons. Ask: ***What did it say at the end? To be continued.* - Explain they are going to watch the second part of it. - Show the Power Point. Most of the information on slides 4, 5 and 6 is a revision of content so elicit information from students before it appears on the slide. - On some slides there are questions for the students, they can be grouped in pairs /threes to discuss the answers. - On slide 7 students start thinking of ways for saving electricity and using it responsibly.
LANGUAGE SUPPORT	For slide 1. I need electricity: in my bedroom, ... (place) / to listen to music, to use the computer,... (action) / in the morning, ... (time)

ACTIVITY 2.	**SAVE ELECTRICITY = SAVE THE ENVIRONMENT**
GROUPING	Small groups
MATERIALS	☐ Worksheet 19.
EXPLANATION	- Hand out the worksheets and ask students to read the text boxes. - They cut the text boxes and put them in the correct arrow. - They discuss their solution in pairs. - All the group talks about the order of the text boxes. - Students stick the boxes in the arrows.
LANGUAGE SUPPORT	I think this text should: go first / go second / go the last / go here I agree / I don't agree

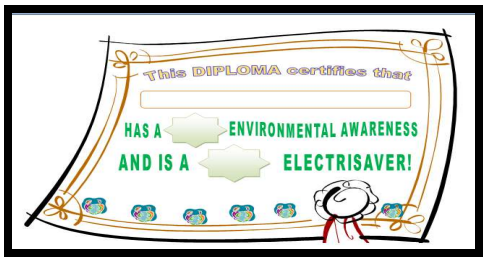
ACTIVITY 3	**THE ELECTRISAVERS GAME**
GROUPING	Small groups
MATERIALS	☐ Two dice per group ☐ Counters ☐ Supplementary material 8 -board, instructions and cards-
EXPLANATION	- Tell students they are going to play a game where they have to give solutions about electricity use. - Make groups of 5. Make two pairs within each group and one member of the group will be the teacher. - Give them the instructions worksheet and read them aloud. BASIC RULES - To play the game you need: two teams and a teacher in your group. - Throw two dice. Subtract the high number from the low one. E.g. 5 – 1 = 4 - Take a card and read the question. - Discuss it and find an answer with your pair. - The group teacher checks if the answer is correct or not. If the answer is wrong the teacher doesn't say the correct answer. - If the answer is good move forward 4 squares. If not go back 4 squares. - The objective is to get to the sign - Review the meaning of some words before starting to play.
LANGUAGE SUPPORT	You should: open the blinds / close the blinds / go away / switch on /off the light

ACTIVITY 4.	**ELECTRICITY ECO-AUDIT AT SCHOOL**
GROUPING	Pairs/small groups
MATERIALS	☐ Worksheet 20.
EXPLANATION	- Give students some time to go around the school to try to find three places where electricity is being used properly and three where it isn't. They complete the worksheet with their findings. - In the cases in which electricity is not being used properly they the

	effects it could have and they give a solution. - They share their findings. - Students can also do this activity at home.
LANGUAGE SUPPORT	They/We should: open the blinds / close the blinds / switch on /off the light / use

SESSION 14. ELECTRISAVERS ADVERTISING

ACTIVITY 1.	**TOP 3 TIPS FOR SAVING ELECTRICITY**
GROUPING	Individual / small groups / whole group
MATERIALS	☐ Worksheet 21.
EXPLANATION	- Tell students after discussing about how to save electricity, they have to think about their TOP 3 TIPS for saving electricity individually. - Make groups of 3/4 students and ask them to agree on their TOP 3 TIPS for saving electricity as a group. - All the class agrees on their TOP 3 TIPS for saving electricity.
LANGUAGE SUPPORT	Open the blinds / Close the windows / Switch on /off the light / Use..... — when you ...

ACTIVITY 2.	**ARE YOU AN ELECTRISAVER?**
GROUPING	Individual
MATERIALS	☐ Worksheet 22. ☐ Score –worksheet 22-. ☐ Supplementary material 9 -diploma template-.
EXPLANATION	- Students complete the questionnaire. - Give out the scores so that they can check their result. - Collect the questionnaires so that you can prepare the diplomas for the following lesson. - Print the diplomas templates and fill them in with students' names and their grade of electricity awareness and electrisaver.  From 7 to 11 LOW ENVIRONMENTAL AWARENESS / NOT VERY GOOD ELECTRISAVER. From 12 to 16 MEDIUM ENVIRONMENTAL AWARENESS / GOOD ELECTRISAVER From 17 to 21 points HIGH ENVIRONMENTAL AWARENESS /VERY GOOD ELECTRISAVER.
LANGUAGE SUPPORT	Open the blinds / Close the windows / Switch on /off the light / Use..... — when you ...

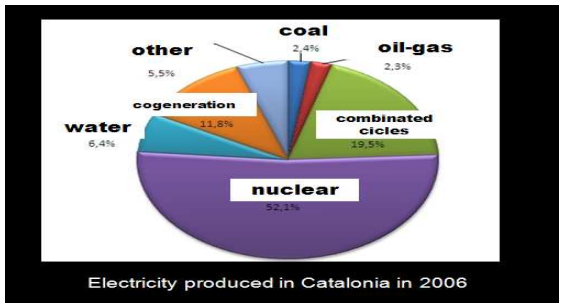
ACTIVITY 3.	**ELECTRISAVER LEAFLET**
GROUPING	Individual
MATERIALS	☐ Worksheet 23.
EXPLANATION	- Tell students they are going to make a leaflet to make people aware of the importance of electricity and how to use it responsibly. - Show the worksheet where they can see the different parts of the leaflet. COVER: Slogan (short and visual) 1st PAGE: Why is saving electricity important? (short sentences) 2nd PAGE: Saving electricity tips (with visual support) - Read the tips for making a nice leaflet at the top of the page. Ask them to tick the boxes of the tips when they use any of them. - In order to persuade and inform people about the importance of saving energy in their leaflets, they can get ideas from the electricity eco-audit, the questionnaire and the top 3 saving tips that they have done in previous lessons.

SESSION 15. ELECTRISAVERS LEAFLETS

ACTIVITY 1.	**WHAT I THINK ABOUT MY LEAFLET**
GROUPING	Individual
MATERIALS	☐ Worksheet 24.
EXPLANATION	- Give each student a self-assessment worksheet. Ask them to tick the boxes and to complete the questions to reflect and assess their own work. - In case they want to change anything after doing the self-assessment tell them they can do it later.

ACTIVITY 2.	**LEAFLETS PRESENTATION**
GROUPING	Whole group / Individual (response partner)
MATERIALS	☐ Worksheet 24. ☐ Worksheet 25 (peer-feedback).
EXPLANATION	- Give out the peer feedback worksheet. - Tell students they have to complete the worksheet after one of their classmate's presentations. Tell each student who he/she is giving feedback to. - Each student presents his/her leaflet. - When they finish the rest say what they liked, what the best tip was ... Then each student gets the feedback worksheet. - When presentations are finished you can display the leaflets. - You can also choose two or three leaflets to copy and then give them to other children and people in the school. - After the presentation give each student an electrisaver diploma (supplementary material 9).
LANGUAGE SUPPORT	For the oral presentation: My slogan is _____ Here it says saving electricity is important because... _____ My tips for saving electricity are _____

	For oral feedback for the LEAFLET: I like — the cover / the slogan / the tips / ... — because it's/they're — colourful / interesting / attractive / well presented For the oral feedback for the presentation: The presentation was — clear / interesting / nice / funny

ACTIVITY 3.	**WHO KNOWS THE MOST ABOUT... ENERGIES IN CATALONIA?**
GROUPING	Four/ Five groups
MATERIALS	☐ Supplementary material 10 –Power Point-. ☐ A, B, C, D flashcards
EXPLANATION	- Make groups of four/five students. - Each group thinks of a name for their group. - Give each group a set of flashcards (A, B, C and D). - Start showing the Power Point. - One student reads a question and all the groups think about the answer. - Say: ** *Three, two, one show your answers* - Each group shows its answer. They get a point if it is correct. - After some slides there is some extra visual information about the answers (maps, diagrams...), ask questions and talk about it with students. 
LANGUAGE SUPPORT	Our answer is — A / B / C / D — (answer)