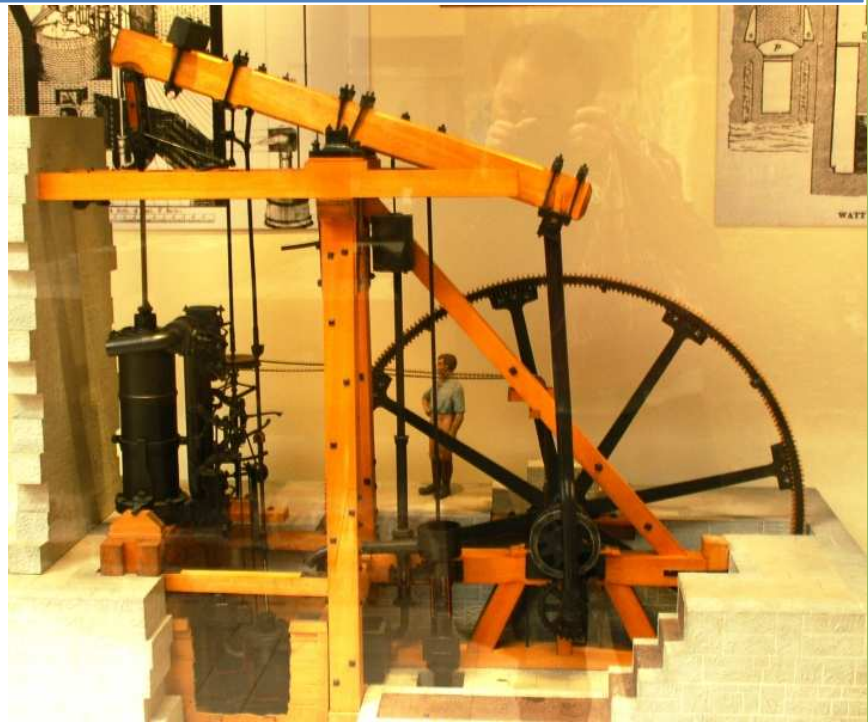


COMBUSTION ENGINES, TRANSPORT AND SOCIETY



Luís Manuel Linde Linde

INS BISBE BERENGUER

ABERDEEN OCTOBER-DECEMBER 2010

TEACHING NOTES

**COMBUSTION ENGINES, TRANSPORT
AND SOCIETY**
Teaching notes

Luis Manuel Linde Linde

ABERDEEN OCTOBER-DECEMBER 2010

INTRODUCTION

'**Combustion engines, transport and society**' is a unit that should be taught in the level third of ESO in the subject of technology.

This unit is divided into the following three parts: 'Combustion engines', 'Environmental Problems due to Fossil Fuel Combustion', and 'Transport and society'. Each part has its respective teaching notes, worksheets, and lesson plans.

In these materials, the teacher will find many activities, with different level of difficulties (from HOT activities to LOT activities). The teacher should choose the set of activities according to his/her student's level, and must plan the activities according to the social environment. Timing should be adapted according to the type of students. Most of the information that appears in these teaching notes also appears in the student's worksheet. Since taking notes from class in L2 is very difficult for our pupils, they will be provided with all the information.

Most of the activities should be done in groups (cooperative work).

It is recommended to start each part with an introduction about concepts and/or vocabulary that are going to be used in the exercise. All these contents are treated in the activities.

The use of colours and pictures in the worksheet and in the Power Point presentation may facilitate students' comprehension of contents and grammar.

Each part has a power point presentation that can help the teacher explain the contents and the activities. Some internet materials such as simulations are recommended as well. Each power point presentation contains the same information that the students have in his/her worksheet to facilitate the learning process. I have suggested the use of different Webpages (with simulations, etc.) in some activities, but of course, not all of them should be used (in case any of them disappear, the teacher should look for another one). Teachers should select the best option according to their students' level.

'**HELP GENERAL GRAMMAR**' tables should be given to each student. These tables will be used in every unit. (Material that appears in the students' worksheet)

Self-assessment is included after each lesson, serving as a useful exercise in which students reflect and express the knowledge achieved during the learning process. In addition, it can be used by the teacher as a self-evaluation of his/her materials. Peer assessments are included as well, with grids that should be written by the partners. (Material that appears in the students' worksheet)

The final assessment process should be completed in the provided matrix at the end of the teaching notes.

SOME OF THE IMAGES, WEB PAGES AND INFORMATION USED IN THESE MATERIALS ARE TAKEN FROM THE INTERNET ONLY FOR EDUCATIONAL PURPOSES.

TOPIC: COMBUSTION ENGINES, TRANSPORT AND SOCIETY	Timing: 13 hours
UNIT: Combustion engines	

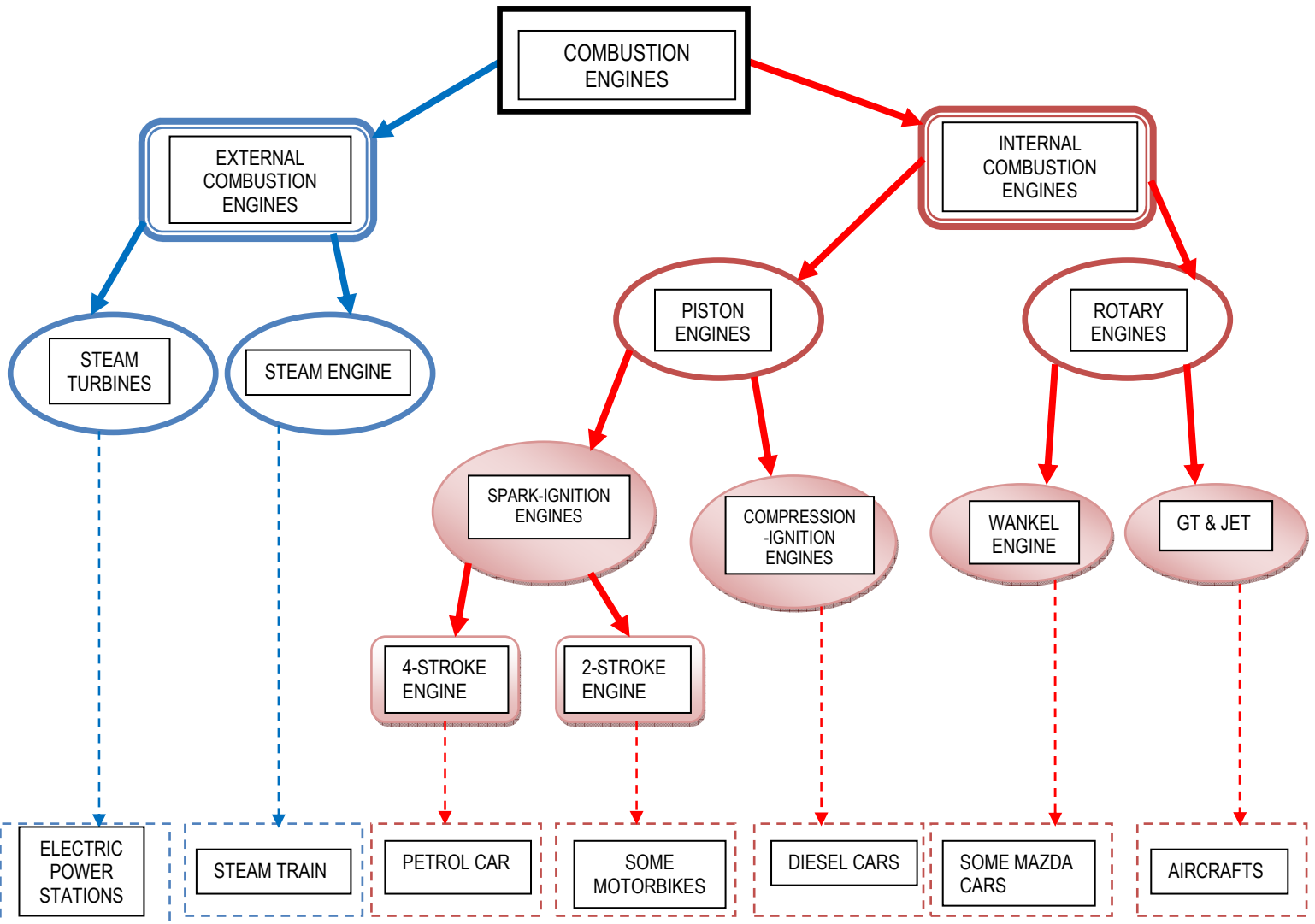
WHAT TO DO IN CLASS

Activities organization	LESSON 1
<i>In general all the activities are in a Power Point presentation that may help the teacher. Review it before starting the activities.</i>	Timing
<ul style="list-style-type: none"> - To start this unit it is necessary to explain briefly the main information about the definition of a combustion engine, its characteristics and how a combustion engine works. The description should be clear, concise, and explain the key words of the unit. The Power Point presentation is useful since it covers the mentioned topics. Some information appears in activity 6. 	20 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 1 proposed in the worksheet. ANSWERS: T , F (external combustion engine), T , F (internal combustion engine) Activity 1 and activity 2 can be corrected together by peer assessment. Recommended to show the Aeolipile from Webpages, for instance: http://modelengines.info/aeolipile/ , or the video: http://www.youtube.com/watch?v=Y8eb3ak1f9g - In peer assessment, each student evaluates the work done by his/her partner, and corrects according to the following guidelines: 6 points if students did entire the exercise correctly (with corrections), 4 points if the exercise is correct but without corrections or with bad corrections (false answers not well corrected); or 1 point for each correct answer and/or a correct correction (false answers well corrected). Teacher may give the answer if asked. Teacher must write the score in his/her activities assessment table that appear at the end of this part of the teacher notes. 	10 Minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 2 suggested in the worksheet. Teacher can show the video (How an Aeolipile works): http://www.youtube.com/watch?v=pedClpGfy10&NR=1 - More information in: http://www.daviddarling.info/encyclopedia/A/aeolipile.html - Peer assessment according to the following guidelines: 2 points for each description if it is right. If the description is fair 1 point. Maximum 4 points. Teacher must write the score in his/her activities assessment table that appear at the end of this part of the teacher notes. 	15 minutes
<ul style="list-style-type: none"> - Before starting the activity 3, explain how to write hypothetical sentences. (Individual activity) Do activity 3 proposed in the worksheet. Power Point can serve as a useful teaching aid in the learning process. 	15 minutes

Activities organization	LESSON 2
<ul style="list-style-type: none"> - Before starting next activity, revise hypothetical sentences and correct exercise 3. Some students may read out aloud the sentence they have written. Afterwards, when teacher has collected the portfolio, he/she will correct the students' work. Maximum 4 points. 	15 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 4 proposed in the worksheet. Students may consult the help given in the activity or the 'HELP GENERAL GRAMMAR' given at the beginning of the unit. - Teacher must collect all the compositions and correct them. Maximum 20 points. 	25 minutes
<ul style="list-style-type: none"> - (Individual activity) Do activity 5 proposed in the worksheet. . - Teacher must collect all the drawings and correct them. Maximum 10 points. 	20 minutes

Activities organization	LESSON 3
<ul style="list-style-type: none"> - (Work in pairs). In activity 6 students must read the text and underline the key words with different colours. Teacher should help the students by explaining the words students don't understand and by helping them to find key words. This activity can be assessed by the teacher after correcting the students' portfolio. Maximum 5 points. 	20 minutes
<ul style="list-style-type: none"> - (Work in pairs) Do the activity 7 proposed in the worksheet. Students can use the HELP given or the 'HELP GENERAL GRAMMAR' given at the beginning of the unit. - The peers assessment uses the following marks' system: Question 1: 2 Points Question 2: 1 Point Question 3: 1 Point Question 4: 1 Point Question 5: 1 Point Question 6: 2 Points Question 7: 1 Point Question 8: 3 Points Question 9: 2 Points Question 10: 2 Points Teacher must write the score in his/her activities assessment table that appears at the end of this part of the teaching notes. 	20 minutes
<ul style="list-style-type: none"> - (Work in pairs) Do activity 8 proposed in the worksheet. Students have to fill in the gaps of the min map, writing the suitable word that appears in the box. - Peers assessment. Teacher can show the picture with the answers that appear in the Power Point presentation. Each correct answer 1 point. ANSWERS given in the mind map below: 	20 minutes

ANSWERS ACTIVITY 8



Activities organization	LESSON 4
<ul style="list-style-type: none"> - (Work in pairs). Do the activity 9. Running dictation. It is recommended that the teacher forms groups, since varying levels of difficulty (in texts). Group C is the shorter and easier, group D is the longer, and group A and B are the intermediate. Suggestion: The teacher should form groups where each group has students of equal levels. After making the groups, the teacher should read the roles of the running dictation. These instructions and texts appear under this table. Next, the teacher put sheets with a text and a letter around the class. Students must look for this letter and dictate the text according to the instructions given. Students have to pay special attention to the bold words in order to do activity 10. - It is not necessary to assess the activity. In order to encourage students, the teacher can assign a point system where the first group that finishes the activity can have 10 points, the second 9, the third 8, etc. 	20 minutes
<ul style="list-style-type: none"> - (Work in pairs) Do the activity 10 in the worksheet. The same group that did the activity 9 has to fill in the gaps, etc. These letters appeared in bold in activity 9 texts. Pictures appear after this table. - Peers assessment (between peers that have the same letter. Teacher should say the answers). Despite groups have different number of gaps, the maximum mark is 8. Each right answer 1 point. Students that have more than 8 answers can fail in some gaps. Pictures will be handed out to the students after finishing activity 9. Pictures appear after 9 activity texts. The answers appear in texts (bold), and should be well written. 	20 minutes
<ul style="list-style-type: none"> - (Work in pairs) Activity 11 is a speaking activity. Same groups than in activities 9 and 10. Students have to be experts in the steam engine worked in activities 9 and 10. They will have to talk about the main parts of their steam engine and how it works. Power Point presentation serves as a helpful teaching guide. Teacher should walk around the class and monitor the students, helping and correcting them if necessary. Students can take notes; describe how his/her steam engine works, the main parts, etc. They can draw a picture as well. - To assess this activity, teacher may use the peer assessment table that appears under this table. In such case, students will need a minimum of 5 minutes to evaluate the work in the group made by partners. This peers assessment should be given to the teacher who will decide how to evaluate it according to the language proficiency level of his/her pupils. 	20 minutes

RUNNING DICTATION ACTIVITY 9

INSTRUCTIONS

- ✓ Work in pairs.
- ✓ Assigned a letter A, B, C or D to each group.
- ✓ Each group must have a runner/reader and a writer.
- ✓ A different steam engine will be assigned to each group.
- ✓ First, the runner has to go around the room to find his or her steam engine.
- ✓ Second, the runner has to read the sentences committing them to memory.
- ✓ Students are not allowed to touch the paper, take the paper back to the group or shout out the sentence across the room.
- ✓ Once the runner thinks he/she can remember the sentence he/she must return to the group and say to them the memorized sentence.
- ✓ The writer of the group writes down the sentence as it is dictated, if the runner forgets part of the sentence he/she is allowed to go back to the paper and re-read and rememorized it.
- ✓ The team that finishes first wins.

TEXTS ACTIVITY 9

STUDENTS A

Denis Papin (1647-1712) steam engine:

A is the **boiler** for the generation of the steam, provided with a safety valve (an invention of Papin). On opening the **stopcock, E**, the steam passes through B into the **cylinder, D**, and by its expansion drives the **plunger, F**, against the water contained in the cylinder, **D**, which is thus forced into the **chamber, N**, compressing strongly the air, which in turn expels the water through the **pipe, x**, to the height desired. **G** is a **funnel** for the fresh water supply, and at **S** and **T** are **valves** opening upwards and downwards. After the condensation of the steam in **D**, a renewed supply of water, through G, forces the plunger, **F**, to the top of the cylinder, ready for the next action of steam.

Adapted from: <http://chestofbooks.com/crafts/scientific-american/XXXVI-8/Papin-s-Steam-Engine.html>

STUDENTS B

Thomas Savery (1650-1715) steam engine; '*The miner's friend*':

Savery knew that the Earth's atmosphere could exert a force when a vacuum is formed and try to use this principle to solve the problem of water inside mines. He thought about the construction of an engine which would draw water into a container, by condensing steam within the container. In his words provided an "engine to raise water by fire". Then, using steam pressure, push the water up a pipe to the required height. His engine was quite dangerous because of explosions. Savery was the first person who used the unit 'horsepower' (1 HP = 736 w), comparing his engine to the power of about 10 horses. **Parts: A: Delivery pipe; B: Steam valve closed; C: Steam; D: Vacuum; E: Boiler; F: Atmospheric pressure; G: Water; H: Suction pipe.**

Adapted from: <http://inventors.about.com/library/inventors/blsteamengine.htm#savery> and <http://www.mgsteam.btinternet.co.uk/engdev.htm>

STUDENTS C

Thomas Newcomen (1663-1729) steam engine:

The Newcomen steam engine used the force of atmospheric pressure to do the work. Thomas Newcomen's engine pumped steam into a cylinder. The steam was then condensed by cold water which created a vacuum on the inside of the cylinder. The resulting atmospheric pressure operated a piston, creating downward strokes. **Parts: A: Heat; B: Water; C: Steam; D: Boiler; E: Cylinder; F: Piston; G: Chain-beam lever; H: Pump plunger.**

Adapted from: <http://www.mgsteam.btinternet.co.uk/engdev.htm>

STUDENTS D

James Watt (1736-1819) steam engine:

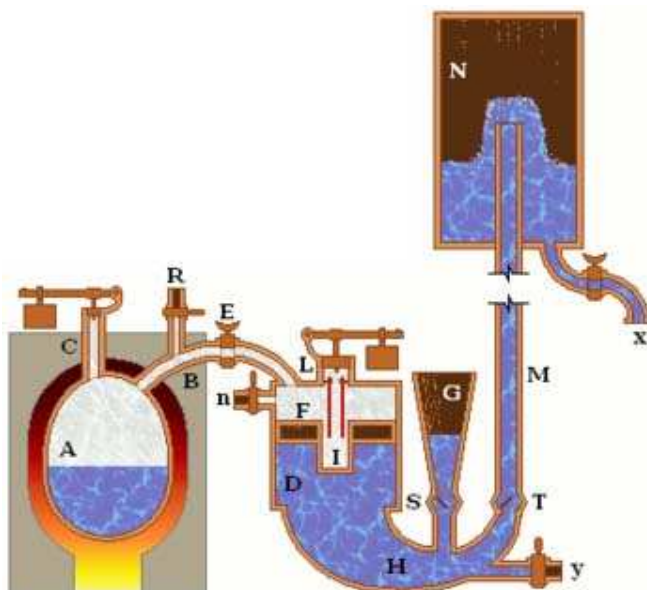
By the 19 century it was necessary to transform heat into motion for transport and industry. James Watt designed the most known steam engine. Coal was burned in a furnace to heat water in the boiler. A pipe carried the **high pressure steam (12)** from the boiler to the **cylinder (13)**. The steam pushed a **piston (1)** up inside the cylinder and the **piston-rod (2)**. The condenser made the steam turning back into water moving the piston down. A mechanism **crosshead bearing (3) - Connecting rod (4)**, transformed the lineal movement into rotary movement. This mechanism was joined to a **crank (5)** and an **eccentric valve motion (6)**, producing a rotary movement in a **flywheel (7)**. This flywheel rotated to power industrial machinery connected by a **belt (10)**. The steam entrance into the cylinder was regulated by a **sliding valve (8)** and a **centrifugal governor (9)** regulated the steam pressure and so that the speed of the steam engine. The **exhaust steam (11)** was expelled through a tube.

Adapted from: http://en.wikipedia.org/wiki/Watt_steam_engine

PICTURES ACTIVITY 10

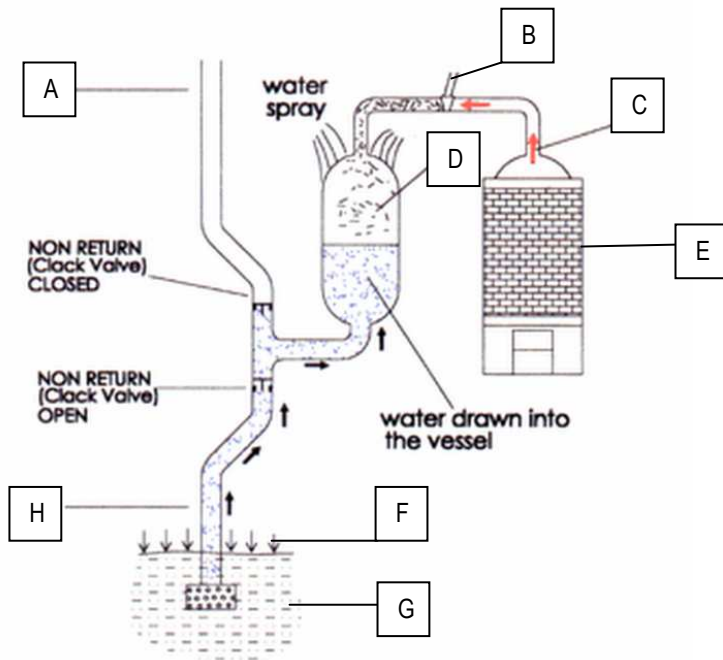
STUDENTS A

You have to label the diagram of the Papin steam engine (A, E, D, F, N, x, G, S, T). (Letters and words that appear in the text)



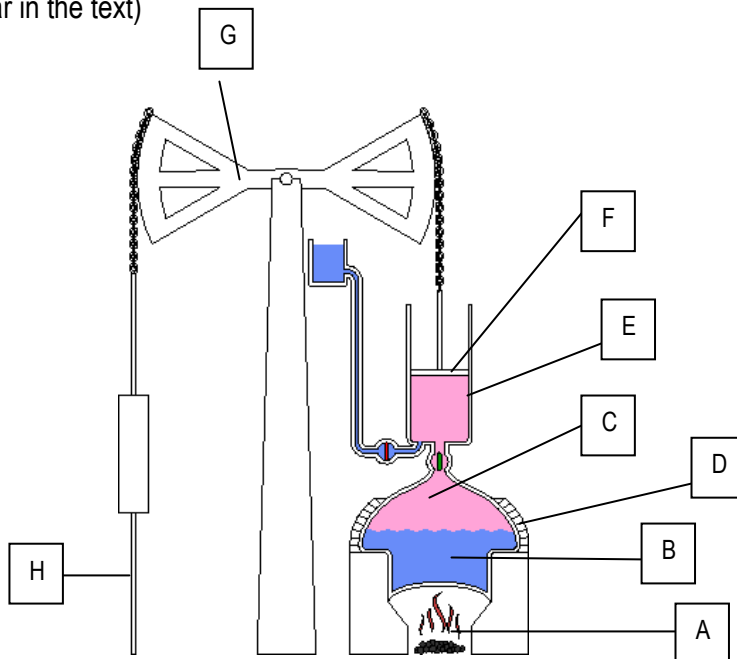
STUDENTS B

You have to label the diagram of the Savery steam engine A, B, C, D, E, F, G, H. (Letters and words that appear in the text)



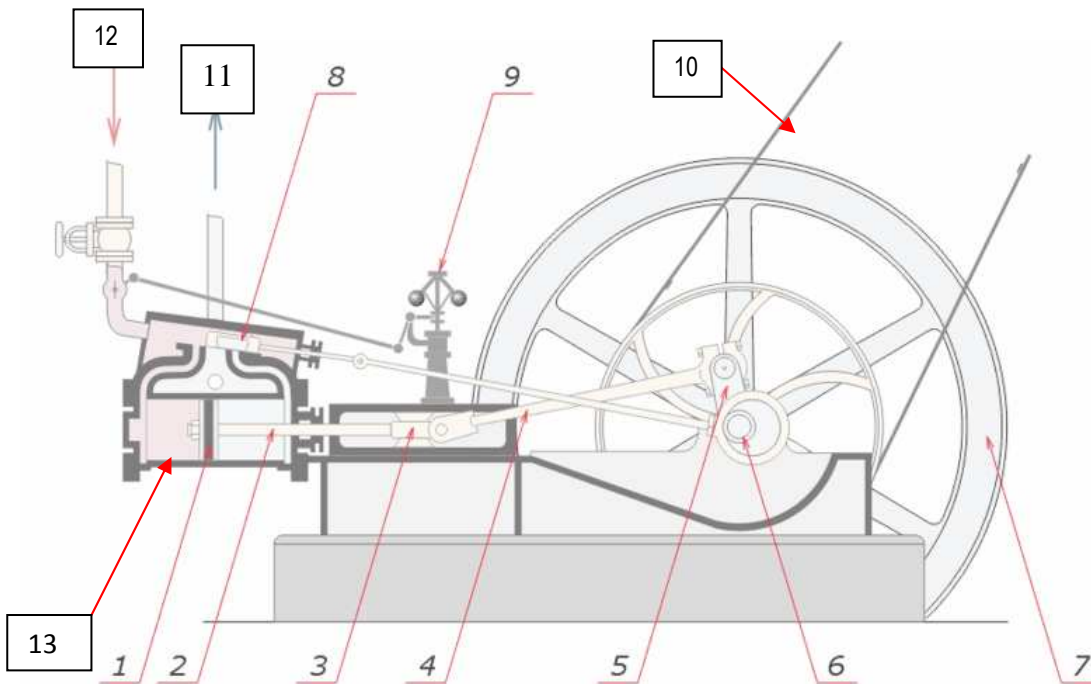
STUDENTS C

You have to label the diagram of the Newcomen steam engine A, B, C, D, E, F, G, H. (Letters and A, B, C, D, E, F, G, H. (Letters and words that appear in the text))







STUDENTS D

You have to label the diagram of the Watt steam engine 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13. (Numbers and words that appear in the text)



PEER EVALUATION ACTIVITY 11. Your name _____

YOUR PARTNER'S NAME:	What to evaluate:				
		COULD BE BETTER	SATISFACTORY	GOOD	VERY GOOD
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				

Activities organization	LESSON 5
<ul style="list-style-type: none"> - (Work in pairs). Previous activity. Same groups as in activities 9, 10 and 11, students should talk in order to remember their steam engines, because they will be experts in their engine to do activity 12. 	20 minutes
<ul style="list-style-type: none"> - (Groups of four). Activity 12: Expert Jigsaw activity. Following with activities 9, 10 and 11; do activity 12. Make groups of four. In every group each student has a different letter A, B, C and D (groups from activities 9, 10 and 11). With the information of each student, they have to answer the questions asked. - Correct this activity in peers. Each right answer is 1 point. Marks: Question 1: 4 Points (if correct order). Order: Denis Papin, Thomas Savery, Thomas Newcomen and James Watt steam engines. Question 2: 2 Points.(Thomas Savery steam engine, because of explosions) Question 3: 1 Point. (James Watt steam engine) Question 4: 1 Point. (Thomas Savery) Question 5: 1 Point. (James Watt steam engine, Centrifugal governor) Question 6: 1 Point. (To regulate the steam pressure and so that the speed of the steam engine) 	20 minutes
<ul style="list-style-type: none"> - (Groups of four) Same groups than activity 12. Use of simulations. Students in their worksheet have different WebPages where there are some simulations about steam engines. Teacher should explain what students have to do and what the WebPages are related to. In worksheet, students have all the information: How did a steam engine used in a textile industry work? http://www.ub.es/histodidactica/img/hero.swf How does a steam engine ship work? http://www.ub.es/histodidactica/img/steamer.swf How does a steam engine train work? http://www.bbc.co.uk/history/british/victorians/launch_ani_rocket.shtml How do different steam engines work? (For instance, you can see the Newcomen steam engine working. It was made by <i>Matt Keveney</i>; 'Animated Engines'): http://www.animatedengines.com/index.shtml Students should take some notes (components, how the engine works, draw of the steam engines, etc) to do the activity 14 and 16. Teacher should walk around the class helping students. 	20 minutes

Activities organization	LESSON 6
<p>- (Groups of four). Activity 14 is an interactivity activity. Same group as in the activity 13. In this activity student will become familiar with different aspects about the Watt steam engine. Students have to follow the roles and complete the tasks. Student should take some notes on how a Watt steam engine works and about its main components; they may draw a picture as well. Information can be used to do activity 16. Teacher should explain what students have to do and what the WebPages are related to.</p> <p>In the worksheet, students have all the information.</p> <p>Go to the Webpage: http://www.schoolsliaison.org.uk/kids/soho/soho.htm</p>	20 minutes
<p>- (Groups of four) Do the activity 15 proposed in the worksheet. The same group that did the previous activity. Students have to go to the suggested webpage (Simulation and questions), following the instructions, where they will find some differences between the Newcomen steam engine and the Watt steam engine. Students should take notes because the information can be used in activity 16.</p> <p>In the worksheet, students have all the information.</p> <p>Go to the Webpage: http://www.24hourmuseum.org.uk/trails/watt/</p>	20 minutes
<p>- (Groups of four) Working in the same groups as in activity 15, here are the instructions for activity 16. Students have to write a composition (150 words) comparing the four steam engines studied. Students have to discuss the main parts and how each steam engine works. Before doing the composition, teacher must give to the students a text (model) in which two or more things (not related with engines) are compared. Students will have 10 minutes to examine the structure and the grammar. If they want they may take some notes (model under this table). A grammar HELP is included in the worksheet. If it is necessary, students can use the 'HELP GENERAL GRAMMAR' as well. Power Point presentation can serve as a useful teaching aid. <i>Optionally, before do the activity 16, teacher could show some exercises or a text with comparative sentences.</i></p> <ul style="list-style-type: none"> - Composition will be given to the teacher. - Optional peer evaluation (5 more minutes). 	20 minutes





COMPARATIVE TEXT MODEL: (Activity 16)

Buy a car: Toyota Corolla versus a BMW

When it comes to buying a car, an automobile, one has to decide which type of car to buy. The Toyota Corolla is a less luxurious than a BMW since its design is simple and does not have leather cushioning. With a price tag of 30.000 euros, the BMW is more expensive than a Toyota Corolla. With a gas mileage of 15 kilometres per litre vs. 8 kilometres per litre, the Toyota Corolla is more efficient than the BMW. In other words, you spend less money than on a BMW. However, the BMW is a sport car is which it can reach a speed of up to 200 kilometres, whereas the Toyota Corolla’s maximum is 130. Thus, the BMW is an automobile with a greater velocity capacity than the Toyota Corolla. On the other hand, regarding car repairs, the cost repairing a Toyota Corolla are less expensive than a BWM. When it comes down to making a decision, factors such as, price (budget), features and consumer needs, it what will determine which car to buy.

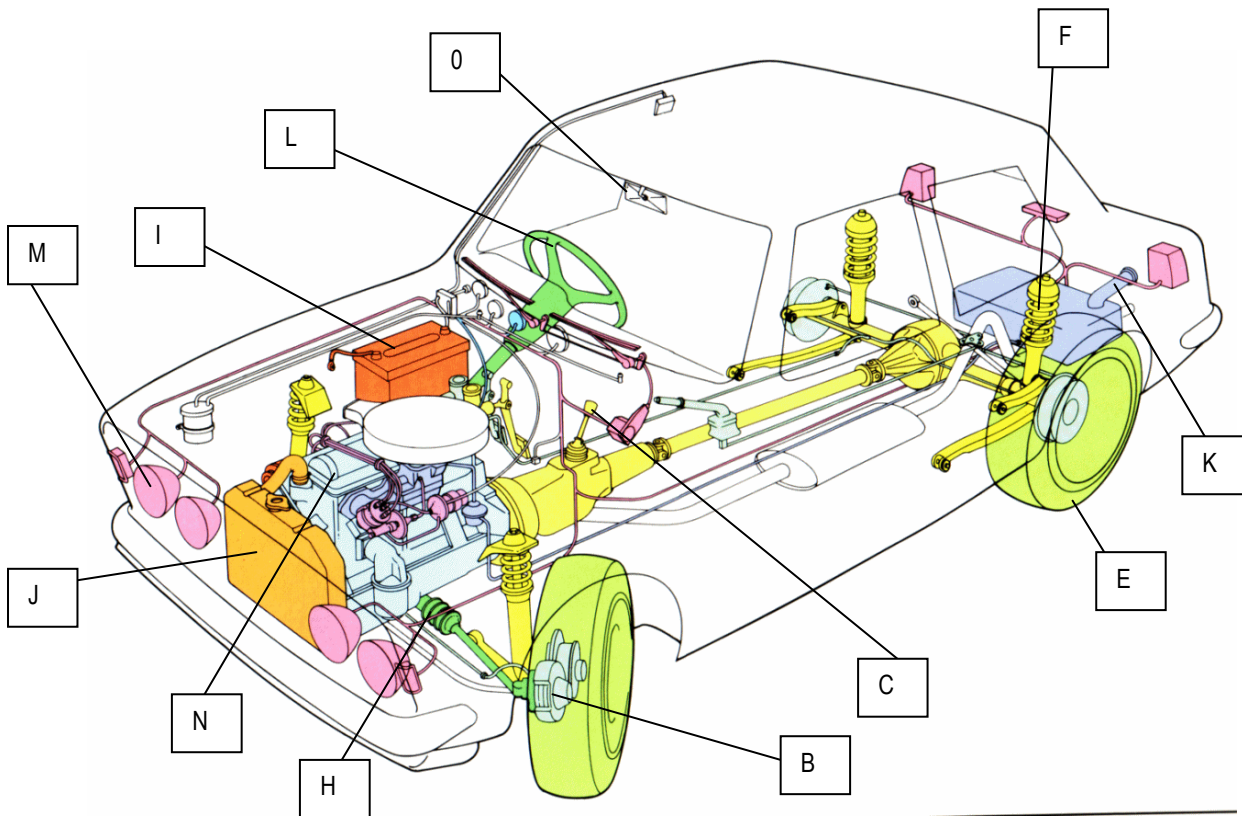
By Assad Sikundr Malik

PEERS EVALUATION ACTIVITY 16. Your name _____

YOUR PARTNER'S NAME:	What to evaluate:				
		COULD BE BETTER	SATISFACTORY	GOOD	VERY GOOD
	Follow the roles				
	Participation in discussion				
	Clear explanations				
	Help in composition (writing)				
	Give ideas				
	Accuracy of vocabulary				
	Follow the roles				
	Participation in discussion				
	Clear explanations				
	Help in composition (writing)				
	Give ideas				
	Accuracy of vocabulary				
	Follow the roles				
	Participation in discussion				
	Clear explanations				
	Help in composition (writing)				
	Give ideas				
	Accuracy of vocabulary				

Activities organization	LESSON 7
<ul style="list-style-type: none"> - (Work in pairs). The activity 17 is a Speaking and writing activity. Students have to work in the same group as activity 9 (running dictation). They have to compare the answers given by their respective experts Jigsaw group in activity 12, and they have to explain and write their answers and their differences. They have some help in their worksheet. Answers are given in activity 12. 	15 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 18 students have to write a composition (150 words). They have two choices and they have to choose one of them. They are two WebPages that can be used, or the teacher can recommend other WebPages. Students can use the activities 16 and 17 grammar or/and the HELP GENERAL GRAMMAR. WebPages (Teacher can provide different WebPages, according to his/her students or encourage students to find other WebPages): http://www.yale.edu/ynhti/curriculum/units/1981/2/81.02.06.x.html http://www.nettleworth.durham.sch.uk/time/victorian/vindust.html - Composition will be given to the teacher. 	35 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 19 students have to read a small text and fill in the gaps in a diagram. Each correct answer scores one point. - More information (Turbine types, etc) could be achieved, for instance, from the Webpage: http://library.thinkquest.org/C006011/english/sites/dampfturbine.php3?v=2 - ANSWERS: A: Internal casing (stator); B: External casing (stator); C: Rotor; D: Rotating blades. 	10 minutes

Activities organization	LESSON 8
<ul style="list-style-type: none"> - To start this lesson do a Brainstorming activity, in which students have to say (in Spanish or/and Catalan if they didn't know the word in English), the parts of a car they know. Teacher should write these words and next to each one, the word in English. If there are some difficulties to know the word in English, it is possible to use a dictionary or the internet. Afterwards students have to write in his/her portfolio, the words (vocabulary) in Spanish/Catalan and in English. 	15 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 20 students have to read the main parts of a car definitions (supported by pictures), and then they have to fill in the gaps in the car picture (each definition letter in a gap in the picture). There are three definitions that don't appear in the car draw. Students have to write the letter of these three definitions. - Peer assessment (One group assess other group answers). Each correct answer 1 point. Correction after finish activity 22. ANSWERS appear under this table. 	20 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 21 students have to match each definition with the correct word that appears in the box under the car picture. - Each correct answers scores one point. Peer assessment (One group assess other group answers). Correction after finish activity 22. - ANSWERS: A: CLUTCH B: BRAKES C: GEAR STICK D: CRANKCASE E: WHEEL F: SUSPENSION G: TRANSMISSION H: DIFFERENTIAL I: BATTERY J: RADIATOR FAN K: EXHAUST PIPE L: STEERING WHEEL M: HEADLIGHTS N: ENGINE O: CAR MIRROR 	10 minutes
<p>(Work in pairs). In activity 22 students have to read a text and after that they have to do the true/false activity, correcting false sentences.</p> <p>ANSWERS: T , F (less), F(more) , F (diesel and some petrol no)</p> <ul style="list-style-type: none"> - Activities 20, 21 and 22 can be corrected together by peer assessment. (One group assess other group answers) - In activity 22, in the peer assessment, each student corrects the work done by his/her partner, and put the mark according to the following marking scheme: 7 points if students did all the exercise correctly (with corrections to the false sentences), 4 points if the exercise is correct but without corrections or with bad corrections; or 1 point for each correct answer and/or each correct correction. Teacher can give the answer after asking students for answers. Teacher has to write the score in his/her activities assessment table that appear at the end of this part of the teacher notes. 	15 minutes



The three definitions that don't appear in the drawing of the car are the letters: A, D, G

Activities organization	LESSON 9
<ul style="list-style-type: none"> - (Work in pairs). Activity 23 is an interactive activity. In this activity students have to go to the Webpage that appears in their worksheet: http://www.cars.com/go/advice/intercar/ic_index.jsp, where different components of a car are shown. There are simulations of each component. It is an interesting webpage to understand how different components in a car work. It is recommended that the teacher has a look at the Webpage before hand, in order to give instructions about what to do, and in which order. For instance, the teacher can show on his/her computer a mechanism and explain how it works; afterwards, the teacher should leave students to play/experiment with the simulations. In case the Webpage disappear, teacher should look for another one. 	30 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 24 students have to read the text that appears in their worksheets about engines, and after that they have to answer the questions. To write, they can use the HELP GENERAL GRAMMAR. - Peer assessment. Score of each question: Question 1: 6 Points Question 2: 2 Points Question 3: 2 Points Question 4: 2 Points Question 5: 2 Points 	20 minutes
<ul style="list-style-type: none"> - Teacher should explain how to calculate the engine cylinder volume. Power Point can help the teacher. Students have all the information in activity 25, and an example. Remember to use cm 	10 minutes

Activities organization	LESSON 10
<ul style="list-style-type: none"> - Teacher should revise how to calculate the engine cylinder volume, explained in the previous lesson. (Should be repeated because some students have some problems with maths). Power Point can serve as a teaching aid. 	<p>10 minutes</p>
<ul style="list-style-type: none"> - (Work in pairs). In activity 25 students have to calculate the engine cylinder volume of two cars. And students have to write how these cars will be sold, meaning that a 1485 cm³ car will be sold as a 1.5 - Peer assessment. Score and answer of each question: CAR A: $V_u = 466.19 \text{ cm}^3$ (4 Points); $V_T = 2797.18 \text{ cm}^3$ (2 Points); sold as a 2.8 (2 Points). CAR B: $V_u = 508.94 \text{ cm}^3$ (4 Points); $V_T = 2035.75 \text{ cm}^3$ (2 Points); sold as a 2.0 (2 Points). 	<p>15 minutes</p>
<ul style="list-style-type: none"> - (Groups of three). Activity 26 is a Jigsaw activity. Before doing the activity the teacher has to explain what a Jigsaw is. <ol style="list-style-type: none"> 1. Put the students in groups of three (home group). 2. Label each student A, B or C. 3. Each group decide who is the leader, who will write the answer for activity 27. 4. Now all the A's students sit together, all the B's and all the C's. It is possible to make more than one group of A's B's or C's depending on the number of students. 5. Give all the A students the same sheet (Student A), all the B students the same sheet (Student B) and all the C students the same sheet (Student C). 6. The students in each group discuss the information on their sheet. They have to understand, and memorize the main information that appears in their sheet. 7. They can consult the webpage that appears in their sheet in order to understand better the contents. 8. Students should take notes. 9. After 20 minutes each student goes back to their original group (home group). 10. They then do Activity 27. <p>Some WebPages: http://www.myrctoys.com/faqs/engine-diagrams-and-animations or http://www.animatedengines.com/otto.shtml or http://www.youtube.com/watch?v=-8cXXjsRg70 (video) or http://www.prelovac.com/vladimir/wankel-engine or http://en.wikipedia.org/wiki/Engine or http://www.howstuffworks.com/engine.htm (go to internal combustion) or http://www.youtube.com/watch?v=FfTX88Sv4l8 (video) or http://www.compgoparts.com/TechnicalResources/FourStrokeEngineBasics.asp or http://www.forgefex.com/casestudies/prenticehall/ph/engine/engine.htm or http://www.grc.nasa.gov/WWW/K-12/airplane/engopt.html or http://science.howstuffworks.com/transport/engines-equipment/two-stroke2.htm or http://www.myrctoys.com/faqs/engine-diagrams-and-animations</p>	<p>20 minutes</p>

<p>http://en.wikipedia.org/wiki/Internal_combustion_engine</p> <p>http://auto.howstuffworks.com/diesel1.htm</p> <p>http://www.myrc toys.com/fags/engine-diagrams-and-animations</p> <p>or</p> <ul style="list-style-type: none"> - To assess this activity (26) do a peer assessment that appears under this table, in which at the end of activity 27, each student evaluates the work of their partners in activity 26 (example of evaluation for a group of five students). 	
<ul style="list-style-type: none"> - (Groups of three). The same home group as activity 26. Do activity 27. The leader of the group (decided in activity 26) should write the answers. - To asses, each correct answer is one point. - A peer assessment is highly recommended. Groups of students should exchange worksheets. - The answers are under the peer evaluation of activity 26. 	<p>15 minutes</p>

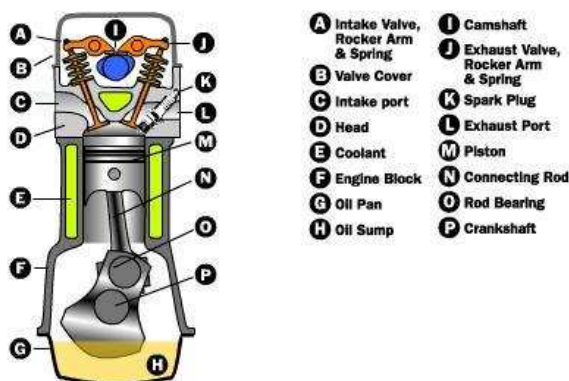
TEXTS ACTIVITY 26

STUDENT A

You have to understand how a petrol four-stroke works in order to explain it to the members of your original team. Discuss it with the members of your Student A team. You have to memorize the parts of the petrol four-stroke engine, the name of each stroke, and what happen in each stroke. You can take some notes about the aspects proposed before, underlined the key words, or/and drawing some pictures.

Petrol four-stroke engine

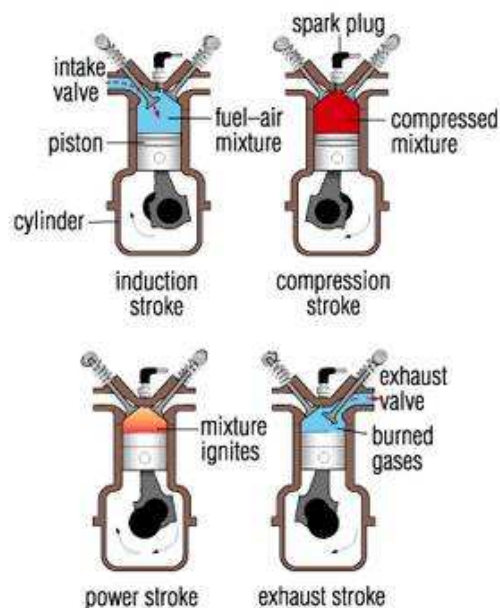
Four-stroke engines were designed by the German engineer Nikolaus Otto (1876). Follow the thermodynamic cycle with his name. A four-stroke engine completes the thermodynamic cycle in four movements of the piston which occurs between the moment in which petrol enters the cylinder and when the process is repeated. Petrol is used as a combustibile and to initiate the combustion process an air-fuel mixture is needed. With a crankshaft and connecting rod system, the lineal movement is transformed in rotary motion. These engines are lighter than Diesel engines.



Picture 1

Four-strokes: (You have the help of a draw)

1. **INTAKE STROKE:** Piston goes down, reducing the pressure inside the cylinder and sucking a mixture of air and fuel into cylinder through the intake port. The intake valve then closes.
2. **COMPRESSION STROKE:** With both intake and exhaust valves closed, piston goes up, compressing fuel and air mixture. This heats mixture.
3. **POWER STROKE (COMBUSTION):** The spark from spark plug ignites mixture. Gases expand and force piston down.
4. **EXHAUST STROKES:** Piston rises again while the exhaust valve is open, pushing out the remains of burned gases as exhaust fumes.



Picture 2

Go to this webpage to watch simulations and explanations: <http://www.myrctoys.com/faqs/engine-diagrams-and-animations> or <http://www.animatedengines.com/otto.shtml> or <http://www.youtube.com/watch?v=-8cXXjsRg70> (video) or <http://www.physics.hku.hk/~phys0607/lectures/chap04.html> (simulations and explanations) or <http://auto.howstuffworks.com/engine.htm>

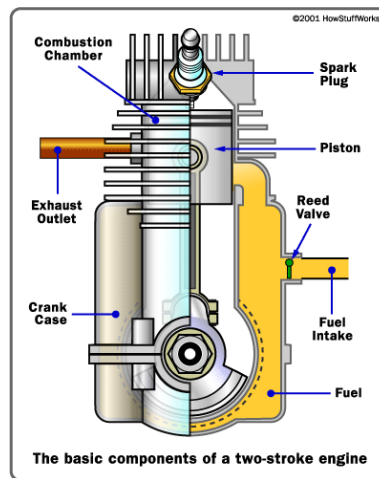
STUDENT B

You have to understand how a two-stroke works in order to explain it to the members of your original team. Discuss it with the members of your Student B team. You have to memorize the parts of the two-stroke engine, the name of each stroke, and what happens in each stroke. You can take some notes about the aspects proposed before, underlined the key words, or/and drawing some pictures.

Two-stroke engine

The invention of the two-stroke cycle is attributed to the Scottish engineer Dugald Clerk who invented it in 1878 and in 1881 patented his design. The two-stroke engines follow the Otto thermodynamic cycle as well, but this engine completes the cycle in two movements of the piston; for this reason is called two-stroke engine.

This is accomplished by using the beginning of the compression stroke and the end of the combustion stroke to perform simultaneously the intake and exhaust functions. The two-stroke engine requires a specific oil to gas ratio. It is used in some motorbikes.



Picture 3

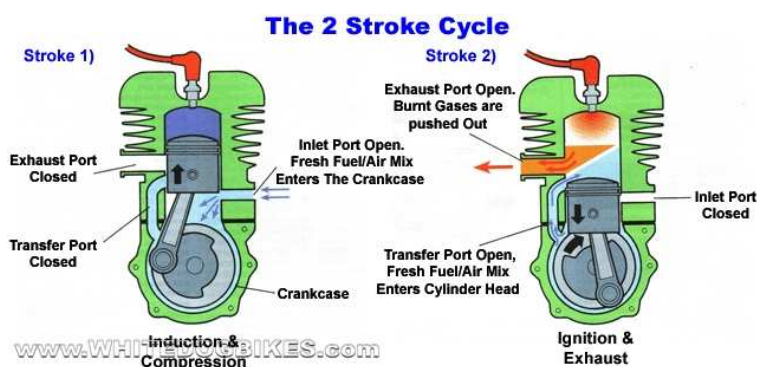
Two-strokes: (You have the help of a drawing)

1. INTAKE AND COMPRESSION:

The piston begins its movement from the bottom of the cylinder starting to go-up. The intake port is uncovered and the mixture of combustible and air is pushed to the crankcase where it is pressurized by the piston movement. In its up movement, the piston covered the exhaust port. When fuel and air in the cylinder have been compressed the spark plug fires and the mixture ignites.

2. COMBUSTION AND EXHAUST:

The resulting explosion drives the piston downward. As the piston approaches the bottom of its stroke, the exhaust port is uncovered. The pressure in the cylinder drives most of the exhaust gases out of cylinder. Note that as the piston moves downward, it compresses the air/fuel mixture in the crankcase.



Picture 4

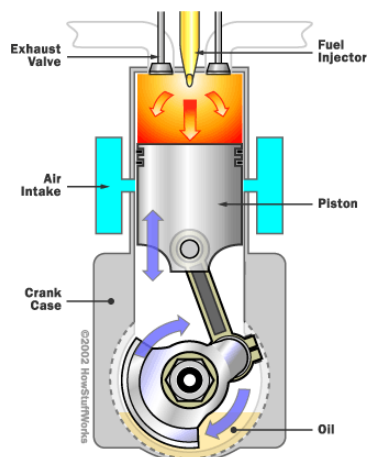
Go to this webpage to watch a simulation: <http://science.howstuffworks.com/transport/engines-equipment/two-stroke2.htm> or <http://www.myrctoys.com/faqs/engine-diagrams-and-animations> (in this last page you have to go to A 2 -Cycle engine and click on a picture), or <http://www.animatedengines.com/twostroke.shtml>

STUDENT C

You have to understand how a diesel four-stroke works in order to explain it to the members of your original team. Discuss it with the members of your Student C team. You have to memorize the parts of the diesel four-stroke engine, the name of each stroke, and what happens in each stroke. You can take some notes about the aspects proposed before, underline the key words, or/and drawing some pictures.

Diesel four-stroke engine

The diesel engine was designed by the German engineer Rudolf Diesel in 1897. Follow the thermodynamic cycle with his name (Diesel). The diesel engine is used mainly by larger vehicles and some trains, and in recent years has become more popular in cars in Europe. Diesel engines work in a similar way to petrol engines, but at stroke one, only air is taken into the cylinder. Air is compressed and heated to a very high temperature at stroke two. Diesel fuel is forced into the cylinder at stroke three, where it is so hot that the fuel burns without a spark. So this kind of engines doesn't need spark plug. Diesel engines can be used for much more time than the petrol engines. Diesel engines have the highest thermal efficiency of any regular internal or external engine; the fuel is Gasoil. Diesel engines are noisier than petrol engines.

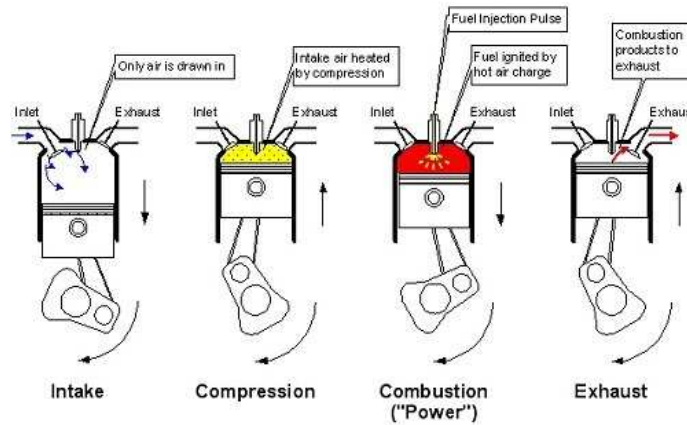


Picture 5

Four-strokes: (You have the help of a draw)

1. **INTAKE (INDUCTION) STROKE:** Piston goes down, sucking air into cylinder through the intake port. The intake valve then closes.
2. **COMPRESSION STROKE:** With both intake and exhaust valves closed, the piston goes up, compressing and heating the air.
3. **POWER STROKE:** As the piston reaches the top, fuel is injected at just the right moment and ignites with the hot air. Afterwards, gases expand and force piston down.
4. **EXHAUST STROKES:** Piston rises again while the exhaust valve is open, pushing out remains of burned gases as exhaust fumes.

4-stroke Compression-ignition (Diesel) Engine Cycle







Picture 6

Go to any of these webpage to watch a simulation: <http://auto.howstuffworks.com/diesel1.htm> or <http://www.myrctoy.com/fags/engine-diagrams-and-animations> (in this last page you have to go to Diesel engine and click on a picture) or <http://www.animatedengines.com/diesel.shtml>

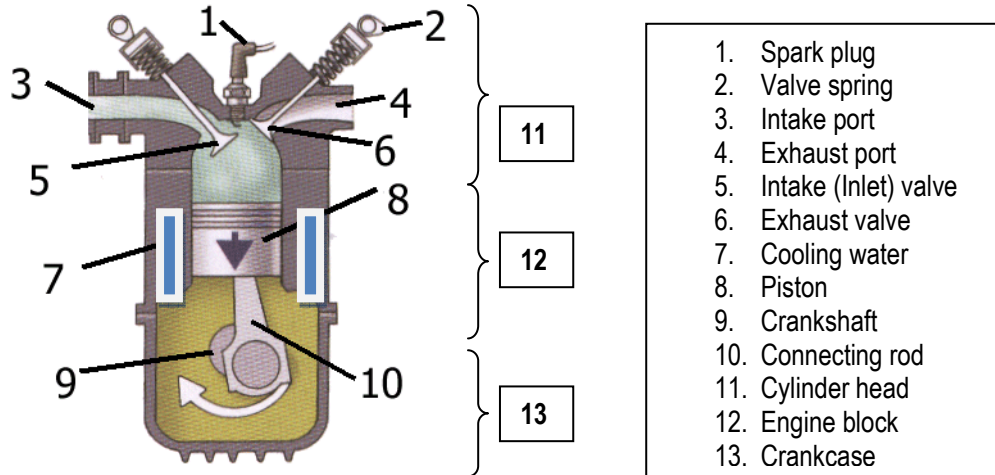
PEER EVALUATION ACTIVITY 26. Your name _____

(For 5 students in the experts group)

YOUR PARTNER'S NAME:	What to evaluate:				
		COULD BE BETTER	SATISFACTORY	GOOD	VERY GOOD
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				

ANSWERS ACTIVITY 27

1. (14 Points) What is the name of this piston engine? **Petrol four-stroke engine**. Match a number with the words in the box below:



2. (8 points, two for each stroke, one for the name and other for the description) Write the name of the four-strokes of a Diesel engine, and describe each one with your own words.

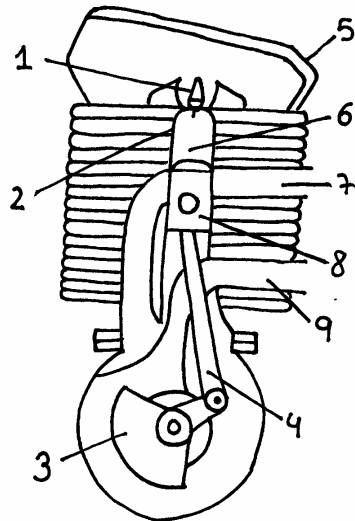
First stroke:

Second stroke:

Third stroke:

Fourth stroke:

3. (10 Points) What is the name of this piston engine? **Two-stroke engine**. Match a number with the words in the box below:



1. Spark plug
2. Cylinder
3. Crankshaft
4. Connecting rod
5. Cylinder head
6. Combustion chamber
7. Exhaust port
8. Piston
9. Intake port

4. (8 Points, two points for each answer) Which is the use of next components?
- a) Spark plug:
 - b) Connecting rod:
 - c) Crankshaft:
 - d) Valves:

Activities organization	LESSON 11
<ul style="list-style-type: none"> - (Groups of three). Same groups as in activity 27. In activity 28 students will write a composition (150 words) comparing the three piston engines studied. Before doing the composition, teacher must give to the students a text (model) in which two or more things (not related with engines) are compared. Students will have 10 minutes to examine the structure and the grammar. If they want they may take some notes (model activityb16). After that, the teacher collects the texts; then student should watch the WebPages given (worksheet) than can help them in the writing task. They have a grammar HELP as well. - After finishing the activity, the composition will be given to the teacher to correct it. 	40 minutes
<ul style="list-style-type: none"> - (Work in pairs or in groups of four). Activity 29 is a Taboo or Pictionary activity. According to student's abilities, they have to explain in English some words or draw a picture. Students have to select a game: Taboo (for those who are better in explaining) or Pictionary (best abilities in drawing). Teacher will make groups of two or four students. It is highly recommended that each group consists of one student who is good explaining, and another who is good drawing. In every group, each student sits opposite their partner. Students have to define the words (in bold) that appear in cards (Explaining the word (Taboo) or drawing a picture (Pictionary)). <p>In any case students can say the words that appear in their card. HELP for the students that want to play Taboo: They can use some of the expressions given in GRAMMAR HELP in activity 28 or the HELP GENERAL GRAMMAR.</p> <p>Under the word students have to define are different words that they can't use (forbidden) in their explanations, but according to the language skills of students, these words can be written (more difficult) or not. I prefer not to write any forbidden word, because of the English skills of most of my students.</p> <p>The group that manages more right words is the winner.</p> <p>To assess this activity, the teacher should ask the number of cards that students managed to explain. The group of maximum cards will have 10 points; the group/groups with one less right answer 9 points, etc.</p> <p>Under this table, teacher can find the cards.</p> <p><i>According to the English students' ability, another optional activity is proposed (instructions after Taboo cards).</i></p>	20 minutes

TABOO-PICTIONARY CARDS ACTIVITY 29

ENGINE

STEAM

WATT STEAM ENGINE

NEWCOMEN STEAM ENGINE

AEOLIPILE

TURBINE

SAVERY STEAM ENGINE

BOILER

FURNACE

EXHAUST PIPE

CENTRIFUGAL GOVERNOR

ROCKET ENGINE

COAL

BURN

CYLINDER

PISTON

FLYWHEEL

EXHAUST VALVE

BELT

PRESSURE

ROTOR

STATOR

SUSPENSION

GEAR STICK

TRANSMISSION

CLUTCH

CRANKCASE

BATTERY

CAR MIRROR

STEERING WHEEL

HEADLIGHT

BRAKES

RADIATOR FAN

WHEEL

CARBURETTOR

**ELECTRONIC
INJECTION**

TURBO COMPRESSOR

SPARK PLUG

CYLINDER HEAD

ENGINE BLOCK

CYLINDERS IN V

BORE

STROKE

ENGINE CYLINDER VOLUME

FOUR-STROKE ENGINE

TWO-STROKE ENGINE

COMBUSTION GASES

FUEL

EXHAUST STROKE

POWER STROKE

COMPRESSION STROKE

INTAKE STROKE

GASOIL

INTAKE PORT

CRANKSHAFT

CONNECTING ROD

WANKEL ENGINE

JET ENGINE

DIESEL ENGINE

PETROL ENGINE

OPTIONAL ACTIVITY 29

Instructions:

1. You will form groups of 2 to 4 people.
2. Each group will have two sets of cards. One set of cards is the image while the other set is the name or definition.
3. The number of each set will be about 25 cards. (50 cards)
4. Face down the cards into two columns. One column the pictures and the other column the descriptions or definitions (**Taboo cards**).
5. Pick one card from each column and turn it over (face up). If the image matches with the description you keep the cards and continue picking cards. If the image does not match the description, place the card in the original position face down. Continue with this activity until you have correctly match all the cards (images with descriptions)

CARDS

AEOLIPILE _____	SAVERY STEAM ENGINE _____	NEWCOMEN STEAM ENGINE _____
WATT STEAM ENGINE _____	CENTRIFUGAL GOVERNOR _____	CLUTCH _____

BRAKES

GEAR STICK

CRANKCASE (OIL SUMP)

WHEEL

SUSPENSION

TRANSMISSION

BATTERY

RADIATOR FAN

EXHAUST PIPE

STEERING WHEEL

HEADLIGHT

ENGINE

CAR MIRROR

CARBURETTOR

PETROL 4 STROKE ENGINE

CYLINDERS IN V

SPARK PLUG

TWO-STROKE ENGINE

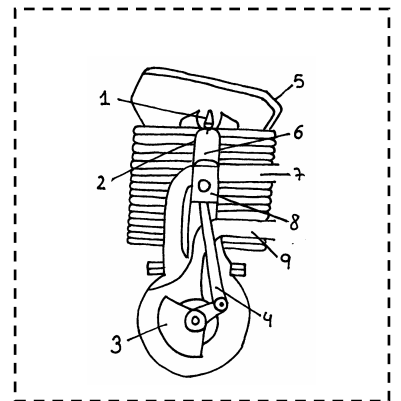
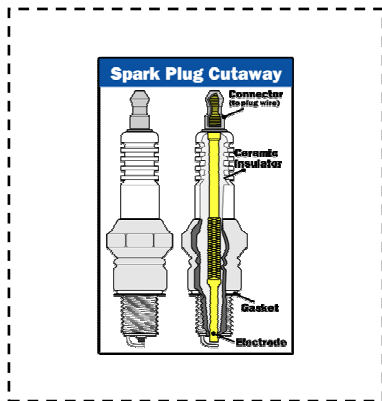
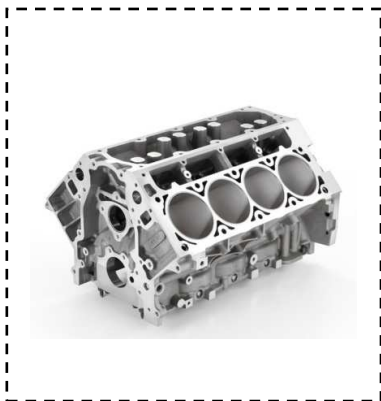
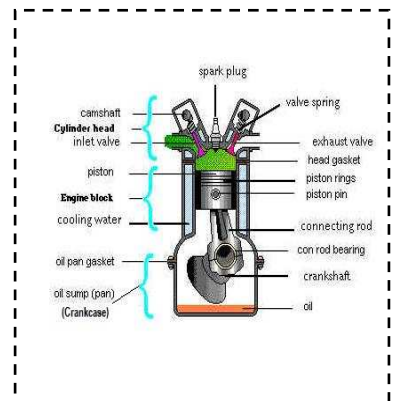
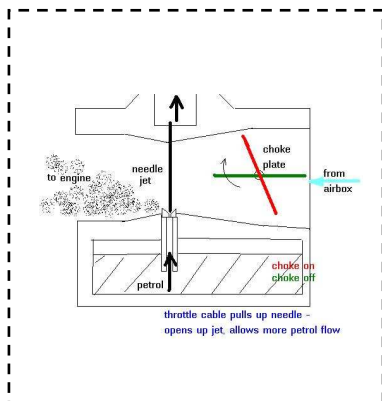
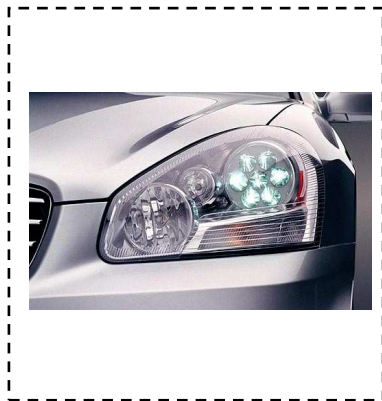
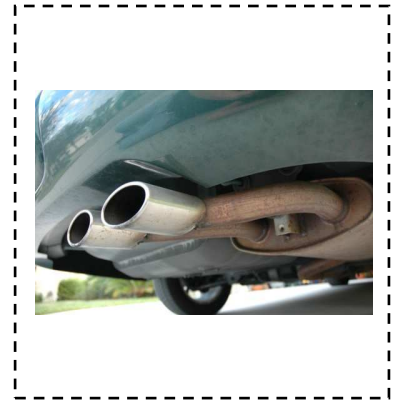
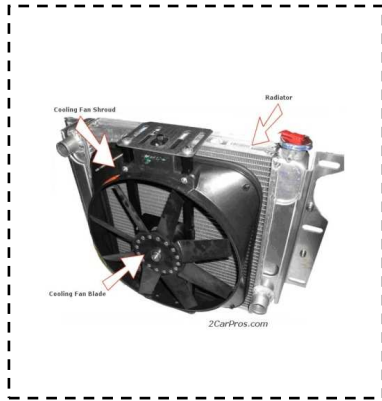
DIESEL ENGINE

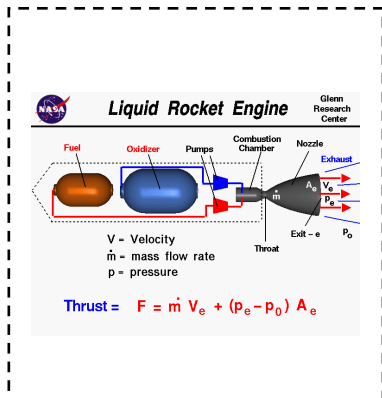
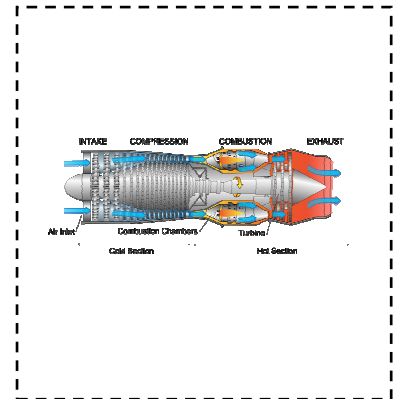
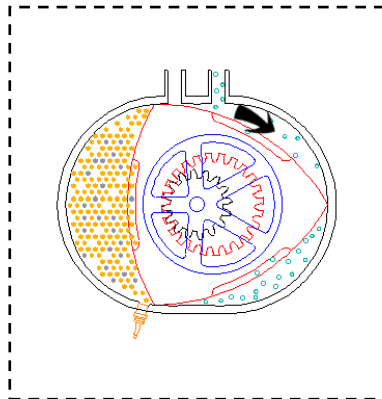
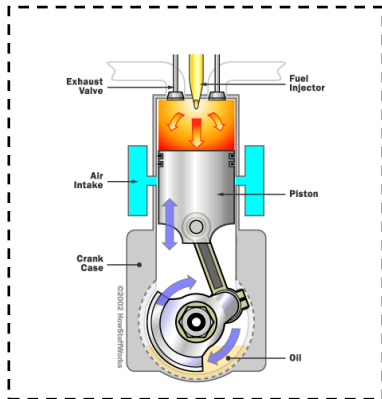
WANKEL ENGINE

JET ENGINE

ROCKET ENGINE

TURBINE





Activities organization	LESSON 12
<ul style="list-style-type: none"> - (Work in pairs). In activity 30 students have to complete the crossword. - Peer assessment is recommended (changing worksheets). Teacher can say the answers and students correct them. Each correct answer one point. Maximum 24 points). Under this table teacher will have the answers. 	<p>30 minutes</p>
<ul style="list-style-type: none"> - Teacher should explain how a rotary engine works. Power Point and WebPages added (activity 31 and 32) can help the teacher. 	<p>15 minutes</p>
<ul style="list-style-type: none"> - (Work in pairs). Do the activity 31. Students have to write the text about the Wankel engine in order. <p>Answer: Text in order:</p> <p><i>'The Wankel engine is a type of internal combustion engine which uses a rotary design to convert pressure into rotating motion instead of using reciprocating pistons. It is a four-stroke engine where the motion takes place in an oval space. The rotor is like a triangle. Due to its compact design, Wankel rotary engine have been installed in a variety of vehicles and devices such as automobiles (some cars made by the Japanese Mazda), aircrafts, go-karts, personal water craft, chain saws and auxiliary power units'.</i></p> <p>Adapted from: http://en.wikipedia.org/wiki/Wankel_engine</p> <div data-bbox="526 1115 837 1444" data-label="Diagram"> </div> <p style="text-align: center;">Wankel engine</p> <p>ANSWERS:</p> <ol style="list-style-type: none"> 1. C 2. A 3. E 4. B 5. D 	<p>15 minutes</p>

ANSWERS CROSSWORD ACTIVITY 30

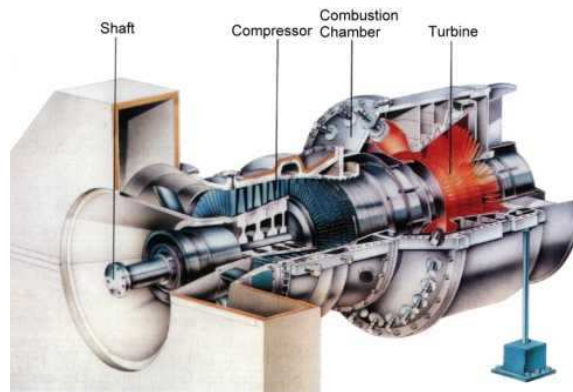
The crossword puzzle grid contains the following words:

- Across:**
 - 2: FURNACE
 - 4: HEADLIGHT
 - 5: NOISES
 - 6: STROKE
 - 7: RELIOB
 - 9: EXHAUST
 - 10: WHEEL
 - 11: PISTON
 - 12: ENIBRUT
 - 13: COAL
- Down:**
 - A: DIE
 - B: BURN
 - C: GEAR
 - D: BOB
 - E: CRANKCASE
 - F: MAT
 - G: HORN
 - H: REWIND
 - I: ISLAND
 - J: BURN
 - K: BURN

Activities organization	LESSON 13
<ul style="list-style-type: none"> - (Work in pairs). Activity 32 is an interactive activity. In this activity students have to go to one of the Webpages that appears in their worksheet: http://library.thinkquest.org/C006011/english/sites/wankel.php3?v=2 http://www.prelovac.com/vladimir/wankel-engine http://www.animatedengines.com/wankel.shtml http://www.rotaryengineillustrated.com/ <p>There are simulations that explain how a Wankel engine works. It is recommended that the teacher has a look before the students, in order to give instructions and choose with simulations suit the students' level. After that students have to match the picture of a stroke in a Wankel engine with the correct stroke. Peer assessment (Changing worksheets) (4 Points, one for each right answer). ANSWERS: Intake: B ; Exhaust: C; Compression: D ; Power: A</p>	15 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 33 students have to write a composition about how a Wankel engine works (100 words). Students may use the help given and the HELP GENERAL GRAMMAR. After finishing the activity, the composition should be given to the teacher to correct it. 	20 minutes
<ul style="list-style-type: none"> - (Work in pairs). In activity 34 students have to read a text about gas turbines and Jet engines, and fill in the gaps with the suitable word from the box. There are more words than gaps. - Peer assessment. (Changing worksheets). Each correct answer one point. Maximum 12 points. - ANSWERS: in text under this table. 	15 minutes
<ul style="list-style-type: none"> - Student self assessment. Students have to assess themselves. Teacher should take the self assessment. 	10 minutes

ANSWERS ACTIVITY 34:**Gas turbines**

A gas turbine is a (**rotary**) machine similar in principle to a steam turbine and it consists of three main components: a (**compressor**), a combustion chamber, and a turbine. The (**air**) after being compressed in the compressor is heated by burning (**fuel**) in it.

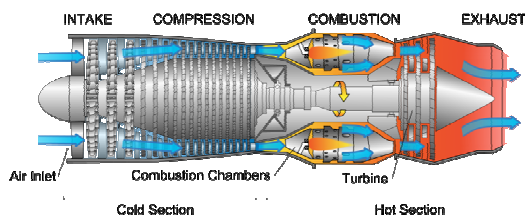


Gas turbine

Jet engines

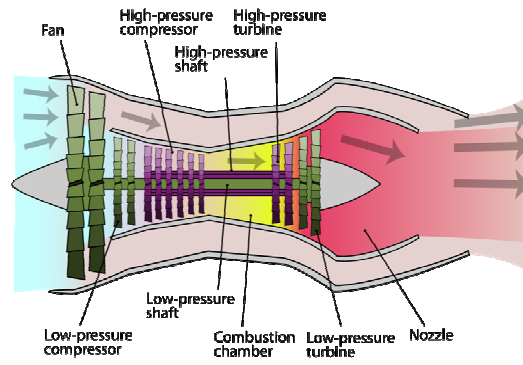
A jet engine is any engine that creates force by releasing a high speed jet of a liquid or a gas. Most jet engines are internal (**combustion**) engines used by aircraft. The hot (**gases**) produced in the combustion reaction are forced to turn the turbine blades (for this reason jet engines are also called gas (**turbine**) engines), and to go out of the back of the engine at high speed pushing the (**plane**) through the air.

The turbojet engine is very fast, but noisy and less (**efficient**) with fuel than a turbofan engine. They are only used for high-speed jet planes.



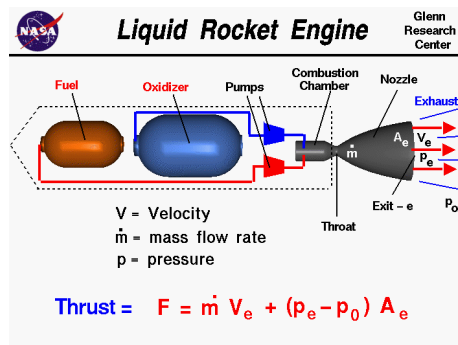
Turbo jet

Turbojet and turbofan engines are similar, but turbofan has a big fan in the front of the turbine that promotes its turn. The exhaust gases speed is lower in turbofan engines than in turbojet engines. This makes them not to be as (**fast**) as turbojets, but turbofans are more efficient, quieter and use less fuel than turbojet. They used to serve as a (**passenger**) jet.



Turbofan

A rocket engine produces force by pushing gases at high speed. Instead of using air for the combustion reaction, rocket engines burn with liquid (**oxygen**). For this reason, rocket engines can travel in space where there is no air.



Rocket engine

fast	turbine	oxygen	rotary	gases	passenger	fuel
efficient	plane	compressor	air	combustion	water	pollution

TEACHING NOTES

TOPIC: COMBUSTION ENGINES, TRANSPORT AND SOCIETY	Timing: 4 hours
UNIT: Environmental Problems due to Fossil Fuel Combustion	

WHAT TO DO IN CLASS

Activities organization	LESSON 1
<i>In general all the activities are in a Power Point presentation that can help the teacher. See it before starting the activities.</i>	Timing
<ul style="list-style-type: none"> - To start this unit it is necessary to explain the following information: the combustion reaction, the products that appear in this reaction, and the effects on the environment (Global warming, acid rain and chemical fog). This description should be clear, concise and explain the key words of the unit. It is useful the Power Point presentation can serve as a useful teaching aid. All this information is treated in the activities. - Example of combustion reaction: (Video) http://www.youtube.com/watch?v=oeQTFpuC5Jc http://www.youtube.com/watch?v=q3tf9OxBdYc http://www.youtube.com/watch?v=UygUcMkRy_c http://www.youtube.com/watch?v=LzagxjtZrJY http://vimeo.com/8352696 - 	20 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 1 in the worksheet (answer questions). Power point presentation can serve as a useful teaching aid. - To assess, each correct answer two points, regular answer one point. Maximum 8 points. 	14 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 2 in the worksheet (true-false activity). - ANSWERS: F (Oxygen), T, F (Always carbon and hydrogen), F (carbon dioxide) <p>To assess, each correct answer one points, each correct correction (false sentence) one point Maximum 7 points.</p>	6 minutes
<ul style="list-style-type: none"> - (Work in pairs) Do the activity 3 in the worksheet (fill in the gaps). Power Point can serve as a useful teaching aid. - ANSWERS: Air, hydrocarbon, carbon, water, sulphur, acid, impossible, combustion, atmospheric, nitrogen. <p>To assess each correct answer one point. Peer assessment is recommended (changing the worksheets). Maximum 10 points.</p>	20 minutes

Activities organization	LESSON 2
<p>- (Groups of four) Activity 4 is an expert Jigsaw activity. Power Point can serve as a helpful teaching aid. Before doing the activity the teacher has to explain what a Jigsaw is. (It is recommended to explain the different environmental problems due to fossil fuel combustion before doing the Jigsaw activity).</p> <ol style="list-style-type: none"> 1. Make groups of four students. (Home group). 2. Label each student A, B, C or D. 3. Each group decide who is the leader, who will write the answer in the mind map that the teacher will give to the students at the end of the activity. 4. Now all the A's students sit together, all the B's, all the C's and all the D's. It is possible to make more than one group of A's B's, C's or D's depending on the number of students. 5. Give all the A students the same sheet (Student A), all the B students the same sheet (Student B), all the C students the same sheet (Student C) and all the D students the same sheet (Student D) 6. The students in each group discuss the information on their sheet. They have to understand, and memorize the main information that appears in their sheet. 7. Students should take notes. 8. After 20 minutes each student goes back to their original group (home group). 9. The teacher gives the mind map to each home group. 10. Students must complete the mind map without looking at their papers. <p>To assess this activity:</p> <ul style="list-style-type: none"> - Do a peer evaluation for the cooperative work (that appears in the students' worksheet, with a maximum of 20 points). - Do a peer assessment for the mind map (changing the mind maps between different groups) Each correct answer one point, with a maximum of 21 points. <p>Maximum score: 20+21 points. Sheets that teacher must give to the students, the mind map and the answers are under this table.</p>	40 minutes
<p>- (Work in pairs) Do activity 5 in the worksheet. Power Point can help the teacher in order to see better the pictures. There is more than one possibility.</p> <p>ANSWERS: Global warming or carbon dioxide or greenhouse effect; acid rain or sulphur or nitrogen oxides or harms trees and destroys buildings; chemical fog or PM & VOC or respiratory problems; global warming or carbon dioxide or greenhouse effect; acid rain or sulphur or nitrogen oxides or harms trees and destroys buildings; chemical fog or PM & VOC or respiratory problems; acid rain or sulphur or nitrogen oxides or harms trees and destroys buildings; global warming or carbon dioxide or greenhouse effect; global warming or carbon dioxide or greenhouse effect; acid rain or sulphur or nitrogen oxides or destroys buildings.</p> <p>- Each correct answer one point. Maximum score 10 points.</p>	10 minutes
<p>- (Work in pairs) Do the activity 6 in the worksheet. Firstly, the teacher must explain the use of this words box to build sentences. Power Point can serve as a helpful teaching aid. Maximum score: 10 points. Optionally, students can play a domino game described below the next table. Maximum score: 10 points as well.</p>	10 minutes

TEXTS ACTIVITY 4 (Adapted from the chapter 2, book “Energy”, by John Stringer. Evans, published in association with WWF)

Student A. INSTRUCTIONS: You have to understand the acid rain formation process in order to explain it to the members of your original team. Discuss with the members of your Student A team some aspects of the topic such as: What does acid rain mean? What are the effects of acid rain? How is acid rain produced? Take notes, underline the key words, and/or draw some pictures.

ACID RAIN

Fossil fuel combustions release sulphur and nitrogen dioxides to the air. These gases react with water in the air to form a weak acid. The mix of gases travels through the air due to atmospheric conditions, and can turn back to the Earth surface as a fog (dry deposition) or as rain (wet deposition). Wet deposition, also called acid rain, is a rain that has a lower pH than a normal rain. Acid rain harms trees and damages buildings by eroding the stone from which they are made. The acid drains through the soil, killing plants, and go into rivers and lakes, dying fishes and other aquatic organism due to the acidic level of water in them.

- **Sulphur oxides** (SO_x) – Usually sulphur dioxide. Sulphur dioxide is a chemical compound with the formula SO₂ (SO₃ is possible as well). SO₂ is produced by volcanoes and in various industrial processes. Since coal and petroleum often contain sulphur compounds, their combustion generates sulphur dioxide and with atmospheric steam water produce H₂SO₄, causing the **acid rain**. This is one of the causes for concern over the environmental impact of the use of these fuels as power sources.
- **Nitrogen oxides** (NO_x) - Usually nitrogen dioxide. Nitrogen dioxide is produced by the combustion with air, due to the high temperature combustion. Nitrogen dioxide is the chemical compound with the formula NO₂. It is one of the several nitrogen oxides. NO₂ is one of the most prominent air pollutants and with atmospheric steam water produce nitric acid, causing the **acid rain**.



Student B. INSTRUCTIONS: You have to understand the global warming process in order to explain it to the members of your original team. Discuss with the members of your Student B team some aspects of the topic such as: What does global warming mean? What are the effects of global warming? How global warming is produced? What does the greenhouse effect mean? What are the main greenhouse gases? Take notes, underline the key words, and/or draw some pictures.

GLOBAL WARMING (Greenhouse effect)

Global warming consists of a slow rise in the Earth surface temperature.

Burning fossil fuels and wood releases carbon dioxide to the atmosphere. Carbon dioxide, water vapour and methane are greenhouse gases, meaning that these gases trap heat, which is vital for life on Earth, in the atmosphere (similar to a natural blanket). Without this heat, Earth would become a frozen, lifeless planet. However, as more greenhouse gases are released into the atmosphere, due to the huge quantity of Fossil Fuel Combustions, more heat is trapped. The effect of this phenomenon is a rise in the average global temperature of the Earth surface.

The effects of global warming are uncertain. However, it is likely that the rise of temperatures will disrupt climates around the world, causing some areas to have more rain than before, other to have less. There could also be more extreme weather events, such as hurricanes, flooding, and droughts. The increased temperatures make the ice sheets melt in the Arctic and Antarctica and this, combined with the expansion of water in the oceans, causes the sea levels to rise.

- **Carbon dioxide** (CO₂) - A greenhouse gas emitted from combustion but is also a gas vital to living organisms. It is a natural gas in the atmosphere.
- **Volatile organic compounds** (VOC) - VOCs, for instance **methane** (CH₄). Effect varies depending on local air quality. Methane is an extremely efficient greenhouse gas which contributes to enhance global warming. Other hydrocarbon VOCs are also significant greenhouse gases via their role in creating ozone and in prolonging the life of methane in the atmosphere.

Student C. INSTRUCTIONS: You have to understand the chemical fog process and some information about carbon monoxide in order to explain it to the members of your original team. Discuss with the members of your Student C team some aspects about the topic such as: What does chemical fog mean? What are the effects of chemical fog? How chemical fog is produced? What is carbon monoxide? How carbon monoxide is produced? What are the effects of carbon monoxide? Take notes, underline the key words, and/or draw some pictures.

CHEMICAL FOG

Chemical fog is a quite dangerous fog produced by the badly combustion of fossil fuels, and happens in some places with special environmental conditions (not wind, etc.). This fog can produce some health problems, for instance, respiratory problems.

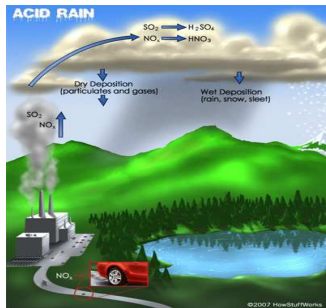
- **Particulate matter** (PM) - Particulates alternatively referred to as particulate matter (PM) or fine particles, are tiny particles of solid or liquid suspended in a gas.
- **Volatile organic compounds** (VOC) - Some of them as for instance the aromatic compounds benzene, toluene and xylene are suspected carcinogens.

PM and/or VOC + NOT VENTILATION → CHEMICAL FOG

CARBON MONOXIDE (CO) – Carbon monoxide is a colourless, odourless, non-irritating but very poisonous gas (can be a lethal gas). It is a product by incomplete combustion of fuel such as natural gas, coal or wood. Vehicular exhaust is a major source of carbon monoxide.

Student D. INSTRUCTIONS: Look at these pictures and try to describe what happen in each picture and try to match the pictures that are related in order to explain it to your original group. Take notes and/or draw some pictures.

CAUSES (ACID RAIN)



Picture 7

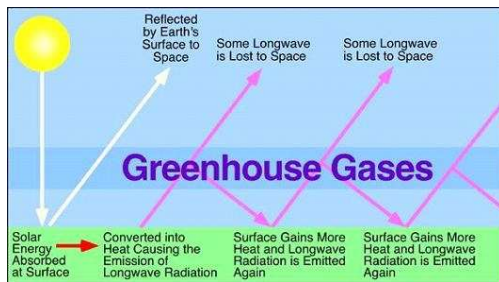
EFFECTS



Picture 8

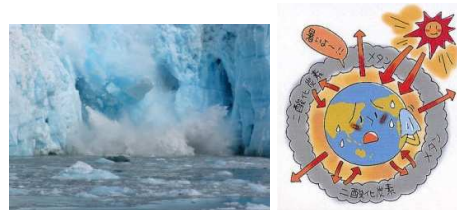
- Harms trees and lakes.
- Damage buildings.

CAUSES (GLOBAL WARMING)



Picture 9

EFFECTS



Picture 10

Picture 11

- Climate changes.
- Increase of Earth's surface temperature.

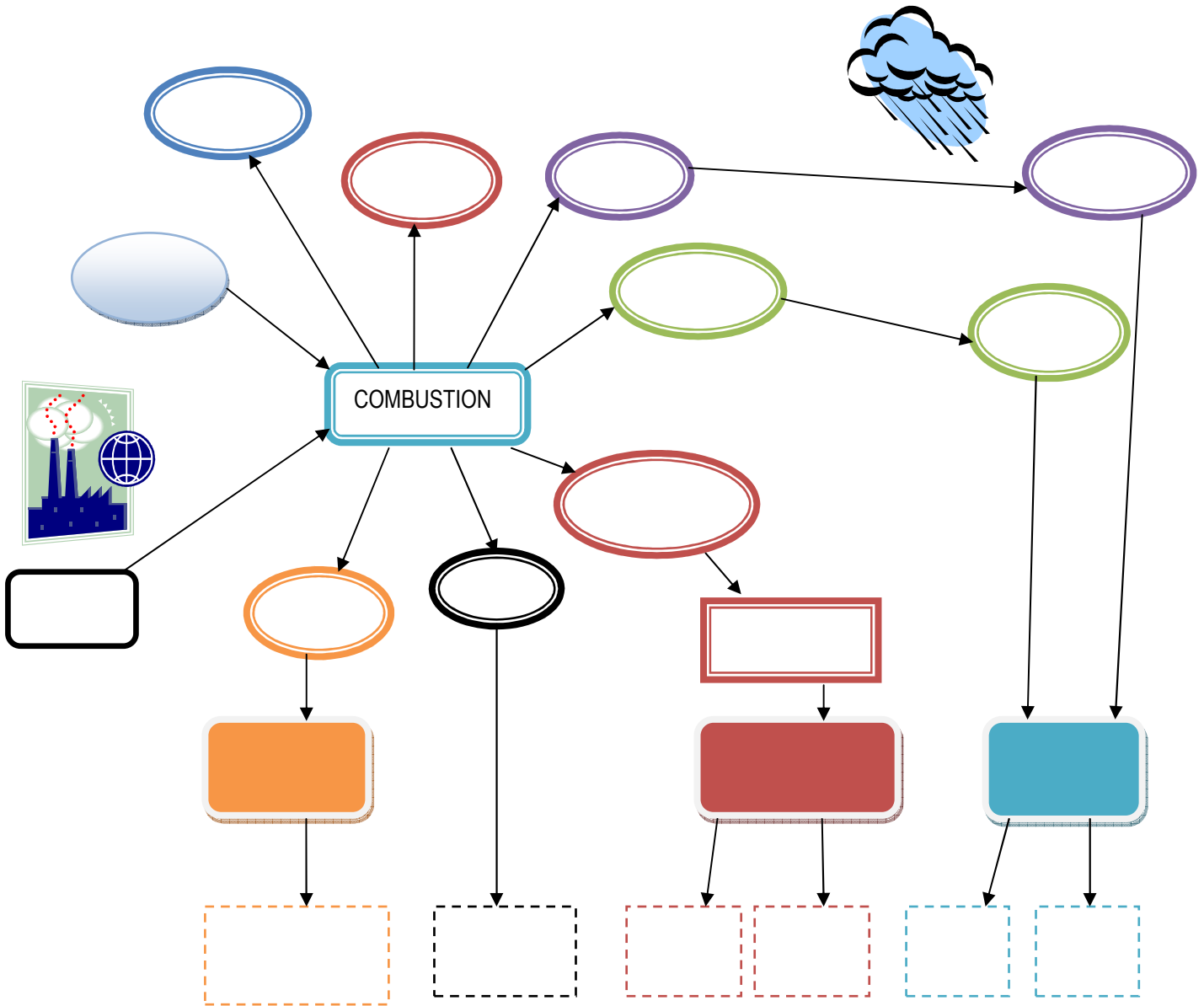
CAUSES (CHEMICAL FOG)

EFFECTS: Respiratory problems.



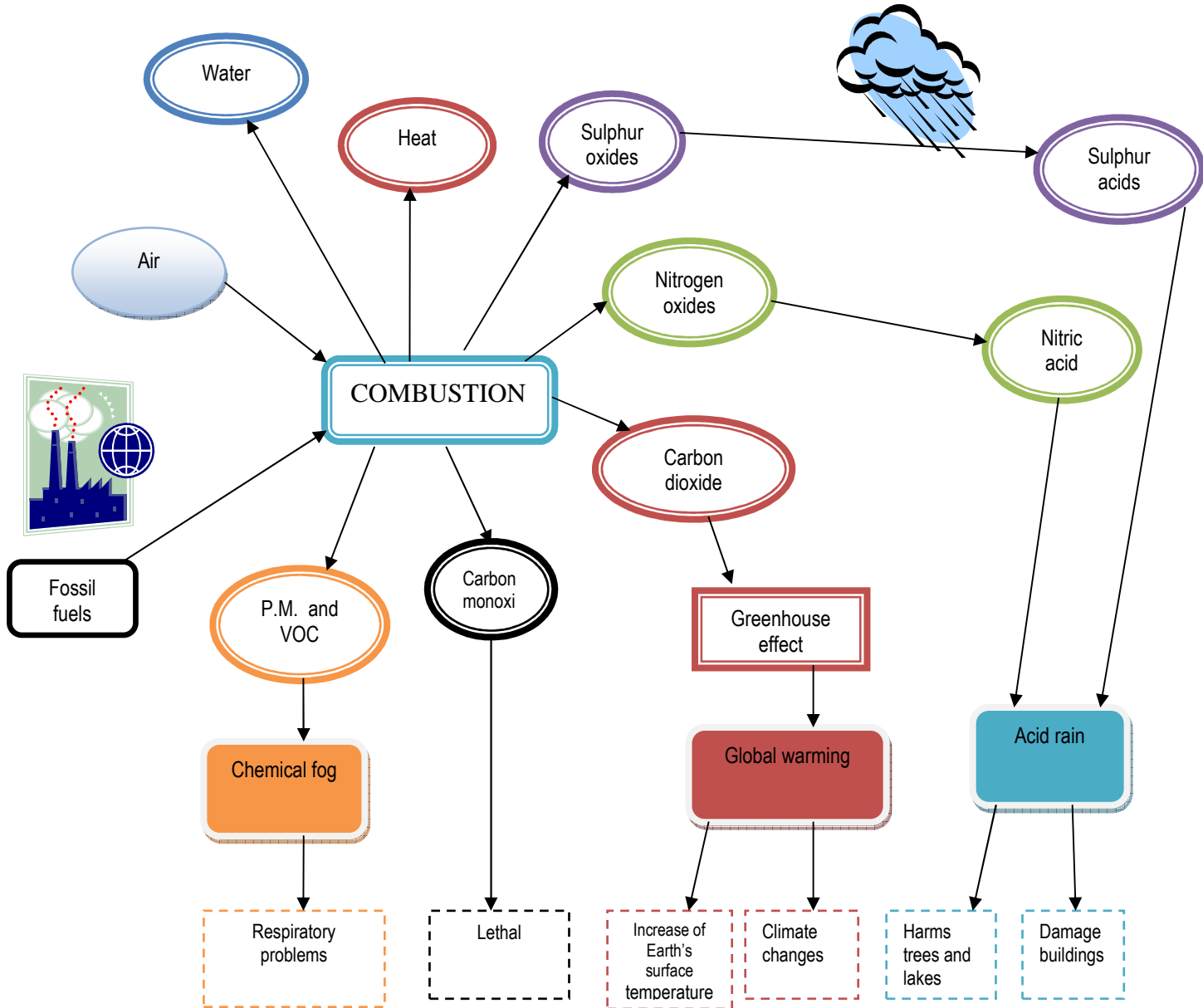
Picture 12

With the information that each person of the group knows, complete the mindmap. Answers are in the box below.



Nitrogen oxides	Particulate matter and volatile organic compounds (PM and VOC)	Air	Water
Sulphur oxides	Fossil fuels	Carbon dioxide	Harms trees and lakes
Heat	Combustion	Lethal	Climate changes
Increase of Earth's surface temperature	Sulphur acids	Chemical fog	Greenhouse effect
Damage buildings	Carbon monoxide	Nitric acid	Respiratory problems
Global warming			Acid rain

ANSWERS ACTIVITY 4



Activity 6 (OPTIONAL) DOMINO GAME (Adapted from “Active Teaching and Learning Approaches in Science”, Centre for Science Education, Sheffield City Polytechnic.)

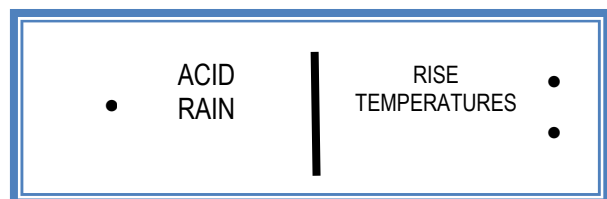
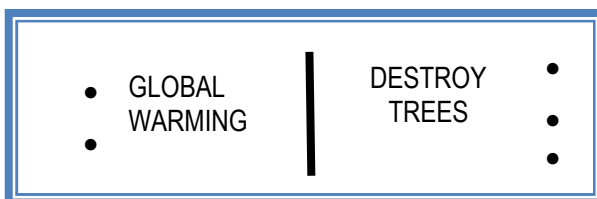
ROLES:

1. The game is for two or four players.
2. The 20 pieces of domino are given to the students. Each student must have the same quantity of pieces.
3. One student starts by laying any domino down, face up.
4. The player to the left plays the next domino so that the Environmental Problems due to the Combustion of Fossil Fuels on the new domino matches with the cause that produces it on the previous domino.
5. The game continues with players matching the dominoes in their hand with the dominoes that have already been laid.
6. If a player cannot match a domino they must say “Pass” and allow the player on their left to continue the game.
7. The game continues in this way until one player has played all their dominoes.
8. Any player may challenge another player if they think the pieces don’t match.
9. The game can also finish when there are no more possibilities to match pieces.
10. The match should be checked by the teacher, and if the match is wrong the player who laid the wrong domino loses three points. If the match is correct then the player who made the challenge loses three points.
11. The player who has more points will have a 10 in teacher score of activity 6, the second 9, etc.

SCORING:

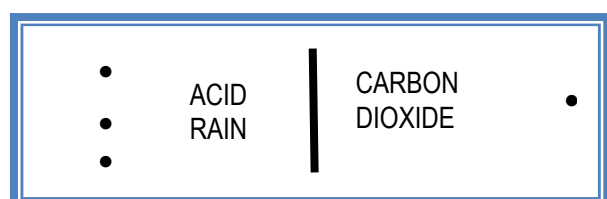
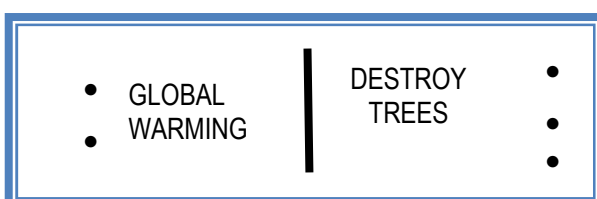
- A. Every time two pieces of domino match, the player adds up the total of dots shown on the pieces that match.

Example: Destroy trees (3 dots) matches with Acid rain (1 dot); Score: $3+1 = 4$ points.



- B. If a player matches two pieces with the same number of dots, the total score will be the double of the number of dots:

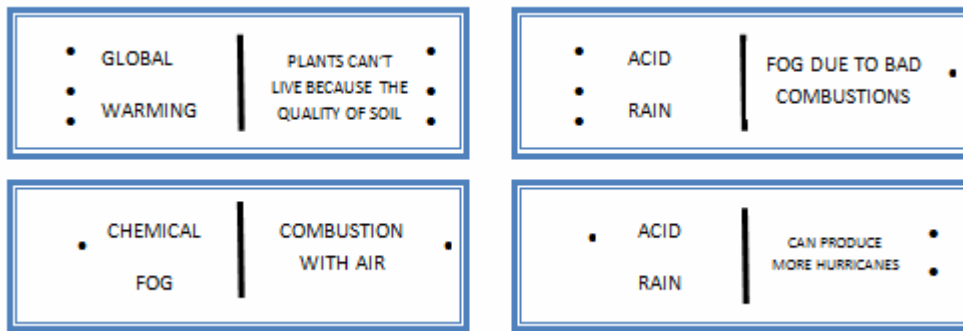
Example: Destroy trees (3 dots) matches with Acid rain (3 dots); Total score $2 \cdot (3+3) = 12$



C. The player who lay down all their pieces first will receive 10 extra points.

DOMINO

<ul style="list-style-type: none"> • GLOBAL • WARMING 		<ul style="list-style-type: none"> DESTROY TREES
<ul style="list-style-type: none"> • GLOBAL WARMING 		<ul style="list-style-type: none"> RESPIRATORY PROBLEMS
<ul style="list-style-type: none"> • GLOBAL • WARMING 		<ul style="list-style-type: none"> DAMAGE BUILDINGS
<ul style="list-style-type: none"> • CARBON • MONOXIDE 		<ul style="list-style-type: none"> SULPHUR OXIDES
<ul style="list-style-type: none"> • GLOBAL • WARMING 		<ul style="list-style-type: none"> FISHES DIE
<ul style="list-style-type: none"> • ACID • RAIN 		<ul style="list-style-type: none"> LESS ICE IN NORTH POLE
<ul style="list-style-type: none"> • CHEMICAL • FOG 		<ul style="list-style-type: none"> REPLACE THE BLOOD OXYGEN
<ul style="list-style-type: none"> • CHEMICAL • FOG 		<ul style="list-style-type: none"> CAN DESTROY FORESTS IN COUNTRIES WHICH DON'T PRODUCE IT
<ul style="list-style-type: none"> • ACID • RAIN 		<ul style="list-style-type: none"> CARBON DIOXIDE
<ul style="list-style-type: none"> • CHEMICAL • FOG 		<ul style="list-style-type: none"> GREENHOUSE EFFECT
<ul style="list-style-type: none"> • ACID • RAIN 		<ul style="list-style-type: none"> LETHAL GAS
<ul style="list-style-type: none"> • ACID RAIN 		<ul style="list-style-type: none"> RISE TEMPERATURES
<ul style="list-style-type: none"> • ACID • RAIN 		<ul style="list-style-type: none"> NITROGEN OXIDES
<ul style="list-style-type: none"> • GLOBAL • WARMING 		<ul style="list-style-type: none"> FOG WITH COMPONENTS SUSPECTED TO BE CARCINOGENS
<ul style="list-style-type: none"> • CARBON MONOXIDE 		<ul style="list-style-type: none"> PARTICULATE MATTER
<ul style="list-style-type: none"> • ACID RAIN 		<ul style="list-style-type: none"> MORE OR LESS RAIN IN SOME PARTS OF THE WORLD



Activities organization	LESSON 3
- (Work in pairs) Do the activity 7 in the worksheet. Each correct answer one point. Maximum score 5 points.	10 minutes
- (Work in pairs) Do the activity 8 in the worksheet. Power Point may serve as an effective teaching aid. Each correct answer two points. Regular answers one point.	15 minutes
- (Work in pairs) Do the activity 9 in the worksheet. Power Point can serve as a helpful teaching aid. Maximum score ten points, according to the teacher observation.	15 minutes
- (Work in pairs) In activity 10 students must build a word search. Teacher should explain how to build the word search. The format should be the same as the example. The words should be obtained from questions written under the word search, in a box. Words can be written in any direction. Diagonal is allowed. Do activity 10 proposed in the worksheet. Power Point can serve as a helpful teaching aid. Maximum score 20 points.	20 minutes

Activities organization	LESSON 4
<ul style="list-style-type: none"> - (Work in pairs) In activity 11 each group of students should solve the word search made by the group next to them. It should be presented as a competition. The first group that finish the word search will have a score of ten points, the second group nine, etc. 	15 minutes
<ul style="list-style-type: none"> - (Work in groups of six. It is possible groups with fewer students). The activity 12 is a role plays discussion. Teacher should explain how this play runs. Each student represents a role (woman or man). Teacher must give to the student one paper with a character who participates in the United Nations meeting. Each person has some reasons to discuss about the greenhouse effect according the information the pupil has on his/her paper. Students must read his/her paper and must start the discussion. One of the students should be designated as the chairperson (students can elect him/her). The chairperson has to introduce the people that are taking part in the meeting. Students must give their opinion and justify it. Students may find help (scaffolding) in the worksheet. Teacher will walk around monitoring conversations and helps pupils with problems. - Characters appear under this table. 	30 minutes
<ul style="list-style-type: none"> - Peer evaluation and self assessment. Students have to fill in the peer evaluation that is in their worksheet, according to the work done in activity 12. After that, each student has to fill in the self assessment document. In the pigeometre, they put a mark (number between 1 and 10) for themselves and answer the questions about the things they have learned in this part of the unit. If student don't have enough time they can finish it at home. 	10 minutes
<ul style="list-style-type: none"> - (Individual activity) In the activity 13, students have to look for some information on the internet about 'The Kyoto Protocol' and write an essay about it. The teacher has to explain how to do this work and where to find information. Students have scaffolding (activity 12) to do the activity. This work should be done at home and give to the teacher. (About 5 minutes to explain it to the students) 	5 minutes

Characters activity 12

<p>Mr A. Lopez/Ms G. Lorenzo Atmosphere science expert You have worries about the amount of carbon dioxide released into the atmosphere. You believe that as more fossil fuels are burned, more carbon dioxide is produced, increasing the greenhouse effect on Earth. It produces the global warming and climate changes. In your opinion it is absolutely crucial to burn less fossil fuel.</p>	<p>Mr J. Mendoza/Ms V. Saramango Economic consulter of the government of Venezuela You are interested in improving the lifestyle conditions of the people who live in your country. As a result, you propose to extract more oil and to cut down more trees (to build better roads) in order to develop your country. In fact, these are your country's natural resources, and it is the only way to live for some people.</p>
<p>Ms G. Martinez/Mr. L. Sanz President of the World Association of Car Manufacturers You want to protect your industry, and don't want to reduce the number of cars made by the car industry, or to be forced to increase prices. Car companies spend lots of money to reduce pollutants and fuel consumption in their cars, and from his/her opinion, the problem of pollution is being solved.</p>	<p>Ms I. Fernández/Mr. O. Pérez Expert geologist that works in a prestigious American university. In your opinion there is just a small quantity of fossil fuel remaining inside the Earth, and it is necessary to stop extracting the oil in the actual amount of barrels. The fossil fuel can't be regenerated easily, so it is necessary to conserve actual oil reserves. Increasingly, there have been many environmental disasters due to the extraction or the transport of fuel.</p>
<p>Ms C. Mohamed/Mr O. Khalifa Specialist in Environmental problems Your studies show that the level of oxygen (an essential gas in animal life) is decreasing each year, mainly because of the use of oxygen to burn fossil fuels. This oxygen is not easily regenerated. Furthermore, some countries are cutting down trees (producing deforestation). Trees and vegetation increase atmospheric oxygen through photosynthesis. Other environmental worries are environmental disasters due to the extraction and transport of fuel.</p>	<p>M. P. Gómez/Ms E. Rodríguez Expert chemist You don't think carbon dioxide released into the atmosphere is a problem because this gas can be dissolved in sea water. But from your experience as a chemist you know that combustion (mainly by petrol engines) produces other gases that have an influence on the greenhouse effect and on the acid rain. These cannot be absorbed easily by the sea. In your opinion, all the cars need to have catalytic converters to avoid the production of these gases. And it supposes an increment of more than 500 € on the cost of a car.</p>

Adapted from: Sheffield City Polytechnic/Collins Educational 1992. Active Teaching and Learning Approaches in Science

TOPIC: COMBUSTION ENGINES, TRANSPORT AND SOCIETY	Timing: 4 hours
UNIT: Transport and society	

WHAT TO DO IN CLASS

Activities organization	LESSON 1
<i>In general all the activities are in a Power Point presentation that can serve as a helpful teaching aid. See it before starting the activities.</i>	Timing
<ul style="list-style-type: none"> - To start this unit it is necessary to explain some aspects that have had an influence on the kind of transport used in a society. The power point presentation included in this work is useful. The aspects treated in this unit are: cultural, economic, environment and location, distances and oil reserves. 	15 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 1 in the worksheet. Power point may help to distinguish better the images. In fact, after saying to the students what they have to do, it is useful to view pictures that appear in the Power Point presentation, one by one. ANSWERS: Are use nowadays: Pictures: 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18 Are not used nowadays: Pictures: 1, 9, 15 Peer assessment activities 1, 2 and 3 (changing worksheets). Each correct answer one point. 	5 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 2 in the worksheet. Power Point can serve as a helpful teaching aid. There are different possibilities. Peer assessment activities 1, 2 and 3 (changing worksheets) 	5 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 3 in the worksheet. Power Point can serve as a helpful teaching aid. ANSWERS: Picture 1: China Picture 2: Amazon Picture 3: Saudi Arabia Picture 4: Lapland Picture 5: Polynesia Picture 6: India Picture 7: Indonesia Picture 8: Ethiopia Picture 9: United States Distances: 1: Bicycles; 2: Magnetic levitation train; 3: Plane; 4: Rocket Differences (different possibilities): Picture 14 and picture 15: Cultural aspect. Picture 16 and picture 17: Oil reserves, economic or cultural aspect. Picture 18 and picture 19: Economic aspect. Peer assessment activities 1, 2 and 3 (changing worksheets). Each correct answer one point. 	10 minutes
<ul style="list-style-type: none"> - (Individual activity) Do the activity 4 in the worksheet. Power Point can serve as a helpful teaching aid. Maximum score 5 points. 	10 minutes
<ul style="list-style-type: none"> - (Work in pairs) Do the activity 5 in the worksheet. Power Point can serve as a helpful teaching aid. Maximum score 10 points. Teacher observation. 	15 minutes

Activities organization	LESSON 2
- (Work in pairs) Before starting to do the activity, explain how to draw a diagram. Power Point can help the teacher. Do the activity 6 in the worksheet. Maybe it is easier for students the bars diagram. They can choose. The diagram must give to the teacher. Maximum score 20 points.	30 minutes
- (Work in pairs) Do the activity 7 proposed in the worksheet. Power Point can serve as a helpful teaching aid. Each correct sentence one point.	15 minutes
- (Work in pairs) Do the activity 8 proposed in the worksheet. Power Point can serve as a helpful teaching aid. Maximum 4 points. Teacher observation.	15 minutes

Activities organization	LESSON 3
- (Work in pairs) Explain how to construct hypothetical sentences. Power Point can help the teacher. In the worksheet students have scaffolding about how to write this kind of sentences. Do the activity 9. Each correct sentence two points.	15 minutes
- (Work in pairs) Explain how to do the activity 10 and how to prepare activity 11. The Power Point can serve as a helpful teaching aid. In the worksheet students may use scaffolding about how to write an essay about hypothesising and predictions, and about how to prepare an oral presentation. This activity could be finished at home. The composition must be give to the teacher. Maximum 30 points.	45 minutes

Activities organization	LESSON 4
- (Work in pairs) Activity 11. Oral presentation. Each group has to share their essay made in activity 10. Each group has a maximum of 5 minutes. The rest of the partners have to assess the oral presentation. They have to fill in the box that is in the worksheet (or that can be given by the teacher), a group evaluation about the group oral presentation, and an individual evaluation about the individual oral presentation.	50 minutes
- (Individual work) Students have to do a self assessment. (Appear in the worksheet or can be given by the teacher). In this self assessment, students have to evaluate their oral exposition and the knowledge learnt during the unit. In the pigeometre, they have put a mark (number between 1 and 10) for themselves and answer the questions about the things they have learned in this part of the unit. If they don't have time, they can finish it at home.	10 minutes

ASSESSMENT

To asses, it is possible to use different techniques, according the thing we are assessing. The portfolio of each student is a good tool to assess. Between others:





1. PEER ASSESMENT

To **asses activities**, I propose a peer correction in some activities, meaning that, the teacher give the answers in class and each student correct the activity made by the nearest partner/group, writing the mark in each activity. After that, these scores are given to the teacher. The teacher corrects the rest of the activities.

1.1. To do a peer assessment about a speaking activity in groups, I propose:

PEER EVALUATION. Your name _____

(For a group of six students)

YOUR PARTNER'S NAME:	What to evaluate:				
		COULD BE BETTER	SATISFACTORY	GOOD	VERY GOOD
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				
	Follow the roles				
	Participation in discussion				
	Clear reason explanations				
	Oral structures and spelling				

1.2. To do a peer assessment about the oral exposition of a group, I propose:

(For a group of two students' exposition)

Fill this peer evaluation questioner.

Your name: Group: Date:

Your role: listen **very** carefully, respectful with your partners and be constructive.

Name of the persons of the group: 1.
2.

GROUP PRESENTATION	YES	NO	COMMENTS
Does each member of the team present a part of the project?			
Is the presentation clear and complete?			
METHODOLOGY			
Do you think is an interesting presentation?			
GROUP ASSESSMENT	Mark:		
LANGUAGE USED			

(For an oral presentation of two students)

INDIVIDUAL EVALUATION		--	-	+ / -	+	++
Correct pronunciation	Name student 1:					
	Name student 2:					
Clear articulation	Name student 1:					
	Name student 2:					
Expressive voice	Name student 1:					
	Name student 2:					
Appropriate intonation	Name student 1:					
	Name student 2:					
Appropriate speed	Name student 1:					
	Name student 2:					
Appropriate pauses	Name student 1:					
	Name student 2:					
Strong voice projection	Name student 1:					
	Name student 2:					
Appropriate volume	Name student 1:					
	Name student 2:					
Correct memorization	Name student 1:					
	Name student 2:					
Fluidity in reciting	Name student 1:					
	Name student 2:					
Strong points of each one:		Weak points of each one:				
Comments:						
Individual assessment. Name student 1:			Mark:			
Name student 2:			Mark:			

2. Self assessment

2.1. To do a self assessment about the oral presentation in a group., I propose:

About the oral presentation:

a) Use the assessment sheet to assess the different criteria for both you (individual) and your group:

++	+	+/-	-	--
----	---	-----	---	----

My assessment:

My group assessment:

b) Which do you think were your strong points? Which do you think were your weak points?

My strong points:	My weak points:
My group's strong points:	My group's weak points:

c) What did you learn about transport and society from your presentation?

d) What did you learn about transport and society from other presentations?

e) What did you learn about preparing and doing a presentation in English?

2.2. To do a self assessment, about the knowledge achieved in each part of the unit, I propose:

About the unit:

1. Fill, according to your opinion, your mark in the PIGEOMETRE: (Write a number between 1 and 10):

1----- 10

2. What have you learned from this unit?

3. What was easy for you?

4. What did you find difficult?

5. What do you do out of school to help you with your English work?

6. What would you find most helpful?

7. What do you most like doing?

8. What do least like doing?

9. Any suggestions?

3. TEACHER ASSESSMENT:

3.1. To assess the activities I propose I propose a peer correction in some activities, meaning that, the teacher give the answers in class and each student correct the activity made by the nearest partner, writing the mark in each activity. After that, these scores are given to the teacher. The teacher corrects the rest of the activities.

Marks for each activity:

PART: COMBUSTION ENGINES

Activities (worksheet)	Points
Activity 1	/6
Activity 2	/4
Activity 3	/4
Activity 4	/20
Activity 5	/10
Activity 6 According to the words underlined by the student.	/5
Activity 7	/16
Activity 8	/19
Activity 9	/10
Activity 10	/8
Activity 11 According to the teacher observation or the peer evaluation.	/10
Activity 12	/10
Activity 13 According to the teacher observation	/5
Activity 14 According to the teacher observation	/5
Activity 15 According to the teacher observation	/5
Activity 16	/20
Activity 17 According to the teacher observation and/or peer evaluation.	/10
Activity 18	/20
Activity 19	/4
Activity 20	/12+3
Activity 21	/15
Activity 22	/7
Activity 23 According to the teacher observation	/5
Activity 24	/14
Activity 25	/16
Activity 26 According to the teacher observation and/or peer evaluation	/10
Activity 27	/40
Activity 28	/20
Activity 29	/10
Activity 30	/24
Activity 31	/5
Activity 32	/4
Activity 33	/20
Activity 34	/12
TOTAL:	/408

PART: ENVIRONMENTAL PROBLEMS DUE TO THE FOSSIL FUELS COMBUSTION

Activities (worksheet)	Points
Activity 1 (2 point for each correct answer. 1 point for regular answers)	/8
Activity 2 (1 point for each correct answer and 1 point for each correct correction(false sentences))	/7
Activity 3 (1 point less for each mistake)	/10
Activity 4 (The first part (oral activity), according to the teacher observation and could be use the peer group assessment; first part 20 points; and writing activity (fill in the gaps) 21 points that can be assessed by the nearest partner group, telling the teacher the answers in class. Each mistake 1 less point)	/20+21
Activity 5 (1 point less for each mistake)	/10
Activity 6 (To correct by the teacher)	/10
Activity 7 (To correct by the teacher)	/5
Activity 8 (To correct by the teacher)	/10
Activity 9 (According to the teacher observation)	/10
Activity 10 (To correct by teacher and his/her observation. Students have to follow the roles purposed)	/20
Activity 11 (To correct by the teacher)	/10
Activity 12 (According to the teacher observation and could be use the peer group assessment)	/20
Activity 13 (To correct by the teacher)	/20
TOTAL:	/181

PART: TRANSPORT AND SOCIETY:

Activities (worksheet)	Points
Activity 1 (1 point less for each mistake)	/18
Activity 2 (1 point less for each mistake)	/5
Activity 3 (1 point less for each mistake)	/19
Activity 4 (To correct by the teacher)	/5
Activity 5 (According to the teacher observation)	/10
Activity 6 (To correct by the teacher)	/20
Activity 7 (To correct by the teacher)	/10
Activity 8 (According to teacher observation)	/4
Activity 9 (To correct by the teacher)	/8
Activity 10 (To correct by the teacher counting the peer assessment)	/30
Activity 11 (Peer and self evaluation and teacher assessment)	/30
TOTAL	/159

3.2. To assess the speaking activity I propose:

Name: Group: Date:

CRITERIA:	POINTS:
1. Individual	
- Participation in group work.	/10
- Delivery: pronunciation, articulation, voice projection and interaction during the activity.	/15
- Clear explanation ideas.	/20
- Introduce 'giving opinions' and 'discussions' expressions.	/15
- Follow the roles. He/she is respectful with partner ideas.	/10
CRITERIA	
2. Group	
SUBJECT	
- Quality of the content.	/10
- Organization/structure and coordination during the activity.	/10
- Appropriateness of the vocabulary.	/10
- Global quality of group delivery during the activity.	/10
TOTAL:	/110

3.3. To assess writing presentations such as essays and descriptive writing, I propose:

Name:

Name:

Essay (Advantages/disadvantages)	
CRITERIA	POINTS
Form: complete sentences, paragraphs, punctuation ...	/10
Writing process clear	/10
Content follows instructions	/10
Personal development of advantages and disadvantages	/10
Communicative ability: message clear and logical, vocabulary and linking words appropriate	/10
Accuracy: structures and spelling	/10
TOTAL	/60

Descriptive	
CRITERIA	POINTS
Form: complete sentences, paragraphs, punctuation ...	/10
Writing process clear	/10
Content follows instructions	/10
Creative/ descriptive and personal	/10
Communicative ability: message clear and logical, vocabulary and linking words appropriate	/10
Accuracy: structures and spelling	/10
TOTAL	/60

3.4. To make the summative assessment I recommend the assessment matrix proposed by Deborah J. Short with small modifications made by me. Of course not all the squares should be assessed.

MATRIX TO ASSESS

		HOW										
		Check list, inventory	Anecdotal record, teacher observation	Student self evaluation	Peer evaluation	Group assessment	Portfolios	Performance, manipulative	Written essays, reports	Oral reports	Student interviews	Feedbacks on oral and writing productions
WHAT	Projects											
	Problem solving											
	Content area skills											
	Concept comprehension											
	Language used											
	Communication skills											
	Individual behaviour											
	Group behaviour											
	Attitudes											