Ministerio de Educación

Gobierno de Chile

100 TOP
Electronics
WORDS TP BOOKLET
3° MEDIO

DEG
División Educación General

English Opens Doors Program

Division de Educación General - Mineduc

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100 TOP

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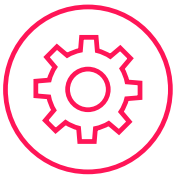
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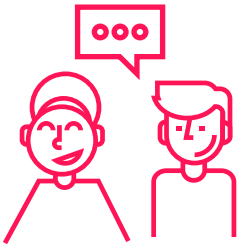
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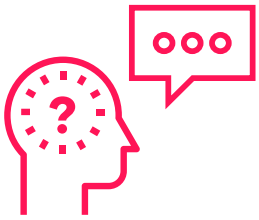
Think & discuss

ACTIONS


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¡Bienvenido!

Welcome!

ES

A continuación, te presentamos un recurso elaborado para avanzar en uno de nuestros principales objetivos: mejorar la calidad y fortalecer la enseñanza Técnico-Profesional en el país.

La creación de este Booklet responde a la importancia de aprender el idioma inglés en el contexto de cada especialidad técnica, de manera que en el futuro puedas acceder a mayores oportunidades de especialización y en el mundo laboral.

Es por esta razón que creamos este recurso didáctico, donde proponemos tanto a docentes como estudiantes, las 100 palabras más utilizadas en cada especialidad aplicadas en contextos específicos, fundamentales para el dominio del idioma.

Dado que en el mundo de hoy es importante entregar todas las opciones para favorecer el aprendizaje del inglés, el trabajo continuo de las actividades que ofrece cada unidad te permitirá desarrollar habilidades lingüísticas como la lectura, audición, expresión escrita y oral, además de trabajar colaborativamente en los proyectos al término de cada unidad.

Esperamos que este 100 Top Words Booklet sea una contribución para el aprendizaje del idioma en la especialidad que has elegido.

EN

We are pleased to present you with this resource, which was created to advance one of our primary objectives- improving and strengthening the quality of technical professional education in Chile.

The creation of this booklet responds to the importance of learning the English language in the specific context of each technical specialty and aims to provide you with access to greater opportunities in your area of concentration, and in the labor market in general.

With that in mind we have created this educational resource, through which we propose to teachers and students alike – the 100 most commonly used words for specific contexts, fundamental to language mastery in each area of technical specialization.

Given the current importance of providing all possible opportunities to foment English language acquisition, the successive completion of the activities offered in each unit will facilitate the development of your linguistic abilities, including reading comprehension, written and oral expression, as well in collaborative learning projects provided at the end of each unit.

We hope that the "100 Top Words" Booklet will contribute to your English language learning, in the technical professional concentration that you have chosen.

Tus comentarios nos importan: escríbenos a TPenglish@mineduc.cl

Electronics Booklet Glossary

(A)

1. Adjustable wrench (n) — An open-end wrench with a movable jaw, allowing it to be used with different sizes of fastener head (nut, bolt, etc.)

2. Affordable (adj) — That you have the financial means for.

3. Air conditioning (n) — A system for controlling the humidity, ventilation, and temperature in a building or vehicle, typically to maintain a cool atmosphere in warm conditions.

4. Analog circuit (n) — A circuit with a continuous, variable signal (that is, an analog signal), as opposed to a digital circuit where a signal must be one of two discrete levels.

5. Anti-static wrist strap (n) — A key piece of safety gear that helps to prevent the buildup of static electricity near sensitive electronics or other projects where static charge could damage electronics or cause safety issues.

6. Anti-theft alarm (n) — A device or method which is used to prevent the unauthorized access of items one considers valuable.

7. Artificial intelligence (n) — The ability of a computer program or a machine to think and learn. It is also a field of study which tries to make computers "smart".

8. Assemble (v) — Fit together the separate component parts of (of a machine or other object).

9. Assembly (n) — The action of fitting together the component parts of a machine or other object.

10. Audio amplifier (n) — An electronic device that amplifies low-power electronic audio signals such as the signal from a radio receiver or an electric guitar.

11. Automatic night light (n) — A device that turns on a light when the surrounding environment is dark. It is a portable version of an automatic streetlight.

12. Automation (n) — The act of implementing the control of equipment with advanced technology; usually involving electronic hardware.

(B)

13. Bandwidth (n) — The numerical difference between upper and lower frequencies of a band of electromagnetic radiation. Abbreviation = BW

14. Board (n) — A flat piece of material designed for a special purpose.

(C)

15. Capacitator (n) — An electronic component having capacitive reactance.

16. Case (n) — Also known as a computer chassis, tower, system unit, CPU (when referring to the case as a whole rather than the processor).

17. Circuit (n) — An interconnection of components that provides an electrical path between two or more of them.

18. Current (n) — Measured in amps, it is the flow of electrons through a conductor. Also known as electron flow, it measured in amps.

19. Copper (n) — A ductile malleable reddish-brown corrosion-resistant diamagnetic metallic element.

20. CPU (n) — Abbreviation for Central Processing Unit. It is the part of a computer (a microprocessor chip) that does most of the data processing.

21. Current (n) — A flow of electricity through a conductor.

22. Customer (n) — Someone who pays for goods or services.

D **23. DC** — Abbreviation for Direct Current.

24. Debugging (n) — The routine process of locating and removing computer program bugs, errors or abnormalities.

25. Device (n) — An instrument invented for a particular purpose.

26. Diagonal cutter (n) — Pliers intended for wire cutting.

27. Digital circuit (n) — A circuit where the signal must be one of two discrete levels.

28. Diode (n) — A device through which current can pass freely in only one direction.

E **29. Ear protection** (n) — Device used to protect the ear, either externally from elements such as cold, intrusion by water and other environmental conditions, debris, or specifically from noise.

30. Electrical tape (n) — Insulating tape; a type of pressure-sensitive tape used to insulate electrical wires and other materials that conduct electricity.

31. Electronic circuit (n) — The complete path of electronic current.

32. Electronic siren (n) — An electronic device producing a sound as a signal or warning.

33. Electron (n) — A subatomic particle of an atom, with a negative charge, that orbits the positively-charged nucleus.

34. Explode (v) — Burst outward, usually with noise.

F **35. Face shield** (n) — A device used to protect the wearer's entire face (or part of it) from hazards such as flying objects and debris, chemical splashes (in industry).

36. Fix (v) — Make ready or suitable or equip in advance for a particular purpose or for some use, event, etc. Repair.

G **37. Gadget** (n) — A device or control that is very useful for a particular job.

38. Goggles (n) — Tight-fitting spectacles worn to protect the eyes.

39. Gloves (n) — A covering for the hand worn for protection against cold or dirt and typically having separate parts for each finger and the thumb.

40. Graphics card (n) — Printed circuit board that controls the output to a display screen.

H **41. Hard drive** (n) — Non-volatile computer storage device containing magnetic disks or platters rotating at high speeds. Abbreviation: HDD.

42. Heat sink (n) — A device or substance for absorbing excessive or unwanted heat.

43. Heater (n) Device that heats water or supplies warmth to a room.

44. Hex wrench (n) A screwdriver whose handle and hexagonal head are at right angles.

I **45. Inductor** (n) An electrical device (typically a conducting coil) that introduces inductance into a circuit.

46. Integrated circuit (n) A circuit of transistors, resistors, and capacitors constructed on a single semiconductor wafer or chip, in which the components are interconnected to perform a given function.

J **47. Junction** (n) Contact or connection between two or more wires or cables. The area where the p-type material and n-type material meet in a semiconductor.

K **48. Knob** (n) A round handle; a circular rounded projection or protuberance.

L **49. Leak** (n) An accidental hole that allows something (fluid or light etc.) to enter or escape.

50. LED circuit (n) LED circuit or LED driver is an electrical circuit used to power a light-emitting diode (LED).

51. LED flasher (n) Semiconductor integrated circuits used to turn on and off groups of light-emitting diodes either sequentially or according to a programmed pattern.

M **52. Magnifying glass** (n) A lens that produces an enlarged image, typically set in a frame with a handle and used to examine small or finely detailed things such as fingerprints and fine print.

53.Measuring tape (n) A length of tape or thin flexible metal, marked at graded intervals for measuring.

54. Monitor (n) Electronic equipment that is used to check the quality or content of electronic transmissions.

55. Motherboard (n) A printed circuit board containing the principal components of a computer or other device, with connectors for other circuit boards to be slotted into.

56. Multimeter (n) An instrument designed to measure electric current, voltage, and usually resistance, typically over several ranges of value.

N **57. Needle nose plier** (n) Cutting and holding pliers used by artisans, jewelry designers, electricians, network engineers and other tradespeople to bend, re-position and snip wire.

O **58. Ohm** (n) Unit of resistance symbolized by the Greek capital letter omega (Ω).

59. Overheat (v) To (cause to) become hotter than necessary or wanted.

P **60. Plier** (n) Variously shaped hand tool having a pair of pivoted jaws, used for holding, bending, or cutting.

61. Personal Protective Equipment (n) PPE-Specialized clothing or equipment worn by employees for protection against health and safety hazards.

62. Phillips screwdriver (n) A screwdriver having a cross-shaped tip rather than the rectangular tip of a standard (flat-blade) screwdriver.

63. Plug (n) An electrical device with two or three pins that is inserted into a socket to make an electrical connection.

64. Port (n) Computer circuit consisting of the hardware and associated circuitry that links one device with another (especially a computer and a hard disk drive or other peripherals)

65. Power supply (n) An electronic circuit that delivers a constant voltage supply to a simple application or automation.

66. Printed circuit board (n) An electronic circuit consisting of thin strips of a conducting material such as copper, which have been etched from a layer fixed to a flat insulating sheet.

67. Probe (v) Question or examine thoroughly and closely; examine physically with or as if with a probe.

68. Process (n) A particular course of action intended to achieve a result.

Q **69. Quartz crystal** (n) Natural or synthetically manufactured mineral often used to make crystal oscillators, to create an electrical signal with a precise frequency (i.e. used as a resonator in electronic circuits).

R **70. RAM** (n) Abbreviation for Random Access Memory, an acronym for Random Access Memory, a type of computer memory that can be accessed randomly.

71. Relay (n) Electromechanical device that opens or closes contacts when a current is passed through a coil.

72. Repair (v) Restore by replacing a part or putting together what is torn or broken.

73. Report (v) To give a description of something or information about it to someone.

74. Report (n) A short account of the news; the act of informing by verbal report.

75. Resistor (n) Component made of material that opposes flow of current and therefore has some value of resistance.

76. Resolder (v) To unite (something) with solder again.

77. Ribbon cable (n) A cable for transmitting electronic signals consisting of several insulated wires connected together to form a flat ribbon.

S **78. Signal** (n) An electric quantity (voltage or current or field strength) whose modulation represents coded information about the source from which it comes.

79. Screwdriver (n) A tool with a flattened or cross-shaped tip that fits into the head of a screw to turn it.

80. Slotted screwdriver (n) Also known as a flat head or flat blade screwdriver.

81. Solder (n) Metallic alloy used to join two metal surfaces.

82. Soldering gun (n) An approximately pistol-shaped, electrically powered tool for soldering metals using tin-based solder to achieve a strong mechanical bond with good electrical contact.

83. Surveillance camera (n) Video cameras used for the purpose of observing an area.

T **84. Tablet** (n) Mobile computing device that has a flat, rectangular form like that of a magazine or pad of paper, that is usually controlled by means of a touch screen.

85. Temperature monitor (n) A portable measurement instrument that is capable of autonomously recording temperature over a defined period of time.

86. Tester screwdriver (n) A simple electrical device that you can use to see whether a circuit is carrying current.

87. Tool (n) An implement used in the practice of a vocation.

88. Toolkit (n) A set of tools, especially one kept in a bag or box and used for a particular purpose.

89. Torque wrench (n) A tool for setting and adjusting the tightness of nuts and bolts to a desired value.

90. Touch sensor (n) A type of equipment that captures and records physical touch or embrace on a device and/or object.

91. Trace (n) A line that interconnects components on a circuit board.

92. Transistor (n) Term derived from "transfer resistor." Semiconductor device that can be used as an amplifier or as an electronic switch.

93. Transmit (v) Broadcast over the airwaves, as in radio or television; transmit or serve as the medium for transmission.

94. Troubleshoot (v) Trace and correct faults in a mechanical or electronic system.

95. Turn on (v) To make a piece of equipment start working by pressing a button or moving a switch.

V **96. Voltage** (v) Term used to designate electrical pressure or force that causes current to flow.

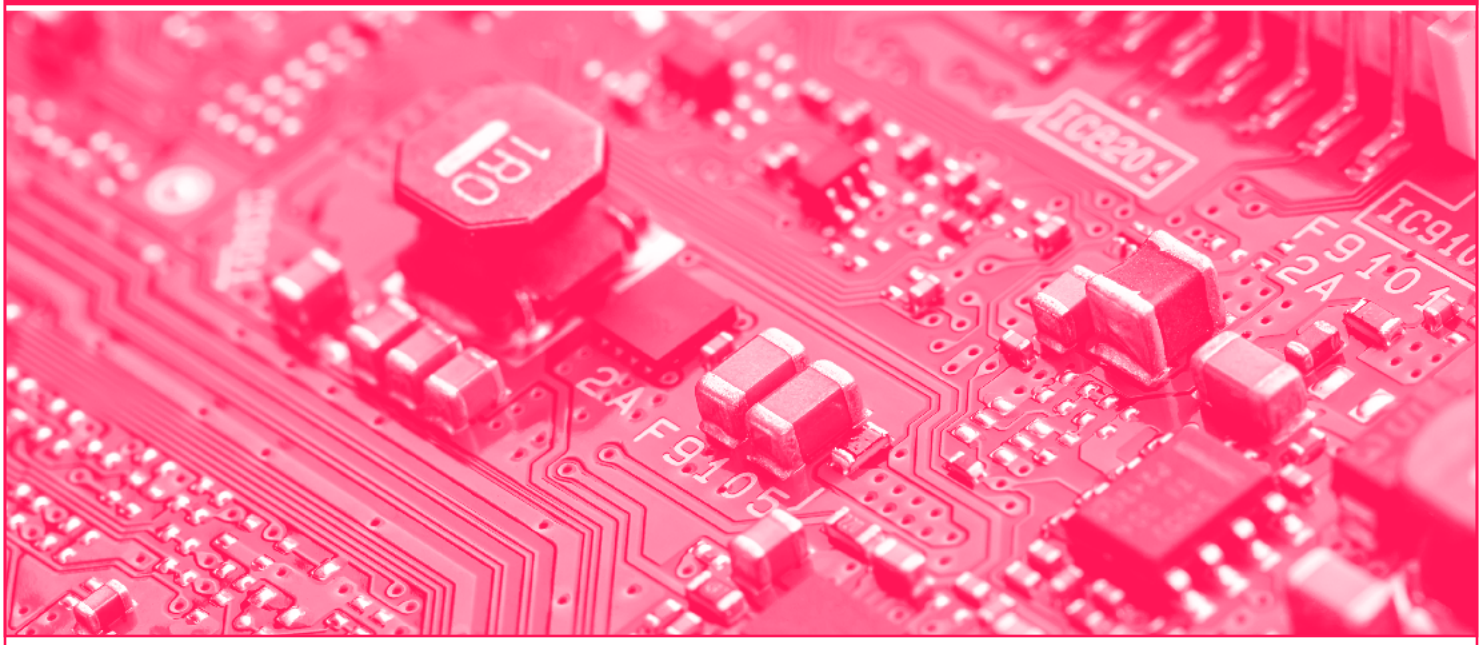
W **97. Wavelength** (n) Distance between two corresponding points of the same phase on a wave. Equal to waveform velocity divided by frequency.

98. Wire (n) Single solid or stranded group of conductors having a low resistance to current flow. Used to make connections between circuits or points in a circuit.

99. Wire stripper (n) A hand-held device used to strip the electrical insulation from electric wires.

100. Wrench (n) A hand tool that is used to hold or twist a nut or bolt.

Unit I: Electronics Projects



Goals: Comprehend general information in oral and written texts in contexts related to students' interests and concerns.

Skills: Listening, reading, speaking, writing

Project: "Our electronics project proposal"

☆ 18 KEY WORDS

Board (n.)	Relay (n.)
Capacitator (n.)	Transistors (n.)
Circuit board (n.)	Wire (n.)
Copper (n.)	Toolkit (n.)
Device (n.)	Tool (n.)
Diode (n.)	SATA connection (n.)
Electronic circuit (n.)	Resolder (v.)
Gadget (n.)	Power supply (n.)
Overheat (v.)	Resistors (n.)

Lesson I: Listening Comprehension

BEFORE YOU LISTEN

A. Complete the chart below by making predictions about what you are about to hear. Use the title of the audio as a guide.

Title	"Basic repair troubleshooting tips"
Purpose	
Speaker(s)	
Specific words/concepts	

WHILE YOU LISTEN

Click here to listen

B. Now you will listen to the audio to confirm your predictions. Complete the chart below with the information from the audio. Then, compare with a classmate. **You will listen twice**

Title	"Basic repair troubleshooting tips"
Purpose	
Speaker(s)	
Specific words/concepts	

C. Now listen again to the troubleshooting tips provided by a technician to repair an electronic device and put them in order as you hear them. (from 1 to 4)

What to look for first

_____ Power supplies

_____ Bad solder connections

1 **Capacitors**

_____ Discolored or burnt circuit board areas

AFTER YOU LISTEN

D. Discuss in groups (3-4):

Besides following the tips provided by the technician, what else would you do to repair an electronic device? (e.g.: **I would look** for information provided in the device's manual because....)

_____

_____

_____

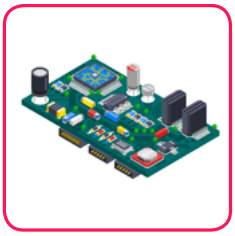
Lesson II: Reading Comprehension

BEFORE YOU READ

A. Match the following concepts with the corresponding picture.

Wire - Capacitor - Quartz crystal - Inductor - Gadget
Electronic circuit - Diode - Trace - Relay - Integrated circuit

1. _____



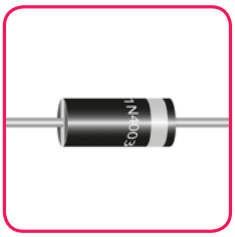
2. _____

3. _____

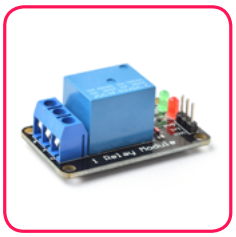
4. _____

5. _____

6. _____

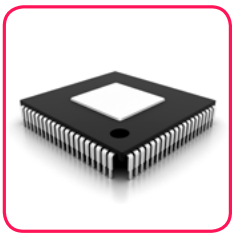


7. _____



8. _____

9. _____



10. _____

WHILE YOU READ

B. Read the text quickly and highlight the concepts related to the field of electronics. Then, compare with a classmate.

Example: Electronic gadgets have become an integral part of our lives since they have a wide range of applications in the modern world.

C. Read the text and match column A with column B to form complete sentences. Compare with a classmate.

A		B	
1.	Electronic gadgets	_____	are essential components of an electronic circuit.
2.	An electronic circuit	_____	has several components and conductive wires to connect them, forming a loop.
3.	A printed circuit board	_____	can fit inside a small silicon chip.
4.	Resistors, capacitators and diodes	_____	can't make current flow.
5.	ICs	_____	have electronic circuits, which are the lifelines of them.
		_____	is a type of electronic circuit along with open, closed, short, and integrated circuits.

ELECTRONIC CIRCUITS

Electronic gadgets have become an integral part of our lives since they have a wide range of applications in the modern world.

These gadgets have electronic circuits that can control machines and process information, so they can be defined as the lifelines of various electrical appliances.

An electronic circuit is a structure that directs and controls electric current to perform various functions including signal amplification, computation, and data transfer.

An electronic circuit comprises several different components such as resistors, transistors, capacitors, inductors, diodes, relays, quartz crystals, and light-emitting diodes, among others. Conductive wires or traces are used to connect the components to each other and the circuit is complete only if it starts and ends at the same point, forming a loop.

Among different types of electronic circuits, we can find open circuits, closed circuits, short circuits, Printed Circuit Boards (PCBs), and integrated circuits (ICs).

Open circuits are the ones where current can't flow because one or more components are disconnected either intentionally, by using a switch, or accidentally due to broken parts.

Closed circuits are the ones that form a loop without any interruptions. Even if a circuit is connected to a dead battery not performing any work, it is still considered a closed circuit.

In the case of short circuits, a low-resistance connection forms between two points in an electric circuit. As a result, the current tends to flow through this newly formed connection rather than along the intended path. Unfortunately, they have usually led to serious accidents as the current can flow at a dangerously high level, damaging electronic equipment, causing batteries to explode, and even starting a fire in commercial and residential buildings.

Printed Circuit Boards comprise a plastic board with connecting copper tracks on one side and lots of holes to affix the components. The layout of the circuit board is printed chemically onto the plastic board.

Although PCBs can offer a lot of advantages, most modern instruments such as computers and mobiles require complex circuits, having thousands and even millions of components. That's where integrated circuits come in. ICs are the tiny electronic circuits that can fit inside a small silicon chip, increasing the efficiency of electronic devices and reducing their size as well as manufacturing cost.

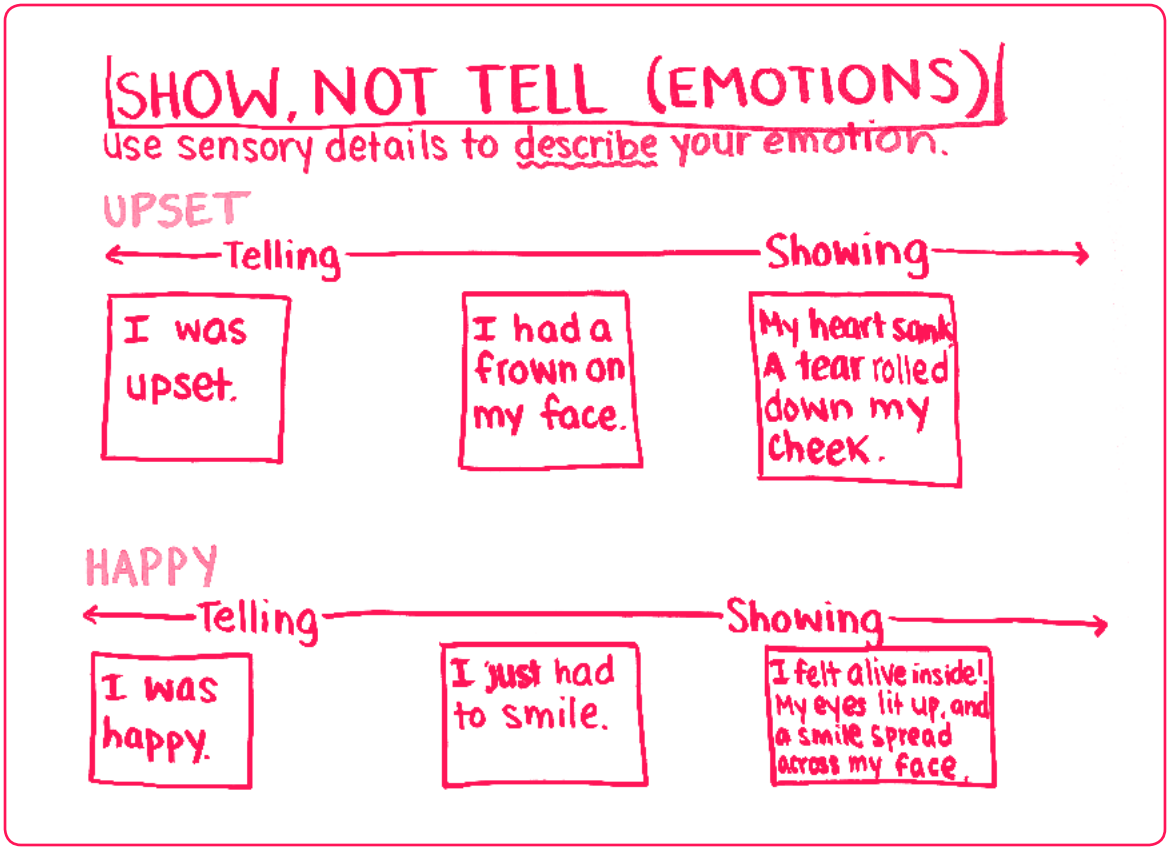
AFTER YOU READ

D. In groups (3-4): *Create an anchor chart[1] to summarize the main concepts from the text. Once finished, stick it on a wall inside the classroom. Then, you can provide positive comments on other groups' anchor charts at the end such as:

Amazing job!
I loved your creativity!
Keep up the good work!

You did great! I love it!
Outstanding! Brilliant!

Example of an anchor chart



***Supplies needed in advance:** white or light-colored cardboard, crayons and post-it notes to post comments on other groups' anchor charts.

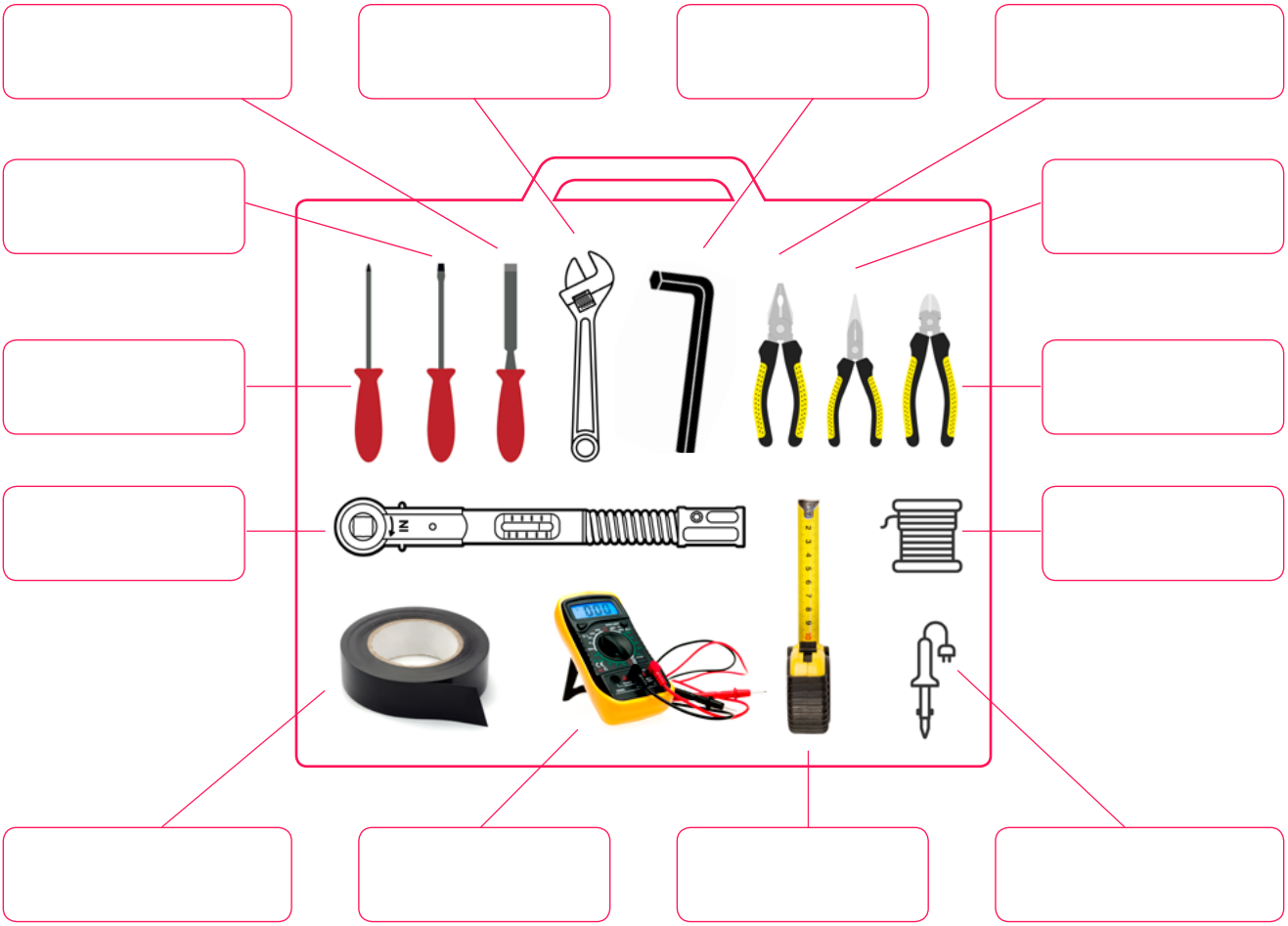
[1] More info & examples: https://www.weareteachers.com/anchor-charts-101-why-and-how-to-use-them-plus-100s-of-ideas/

Lesson III: Speaking

WARM UP

A. Look inside an essential tool kit for an electronics technician and complete the labels of the tools you know using the concepts from the box. Compare with a classmate.

Slotted Screwdriver - Hex Wrench - Needle Nose Plier
Phillips Screwdriver - Wire Stripper - Multimeter - Torque Wrench
Tester Screwdriver - Solder Wick - Measuring Tape - Adjustable Wrench
Soldering Iron - Diagonal Cutter - Electrical Tape



B. Now look again at the essential tool kit with the tools' names and classify them in the following categories:

Screwdrivers	Wrenches	Pliers	Soldering	Others

INPUT

C. Look at the following dialogue between a customer and an electronics technician.

Context of the dialogue: A customer goes to an electronics technical service to repair an electronic device. T: Technician / C: Customer

T: Good morning, my name is **Christopher**, welcome to **ET service**. How can I help you?

C: Good morning Christopher, I'm **Isabel**. I need to fix this **game controller**. It's not working properly.

T: OK. I'll need to use this **Phillips screwdriver** to **unscrew the screws and open the controller.**

C: That's fine. What's that tool over there? And what do you use it for?

T: Oh, that's a **soldering iron**, and I use it to solder **components in an electronic circuit.**

C: Cool!

CONTROLLED PRACTICE

D. Pairwork. Each student will choose a character to roleplay the dialogue (i.e.: student A is technician, and student B is customer).

E. Now switch roles and repeat the dialogue again.

FREER PRACTICE

F. Pairwork. With your partner, create a similar dialogue changing the following information:

- Names of characters
- Name of technical service
- Electronic device to be fixed
- Name of tools and uses accordingly.

You can select tools from the tool kit in the warm up activity, for example: soldering iron. **Present it to the rest of the class.**

WRAP-UP

G. Write a sentence naming a tool from the toolkit that didn't appear in the dialogue presented or created, and explain what it is used for.

Lesson IV: Writing

PRE WRITING

A. What information does an electronics project proposal have? Write the concepts on the following cloud.

Electronics Project Proposal

B. Now look at the following example and confirm your predictions.

NAME OF THE PROJECT:	**RAIN ALARM**

FUNCTIONING

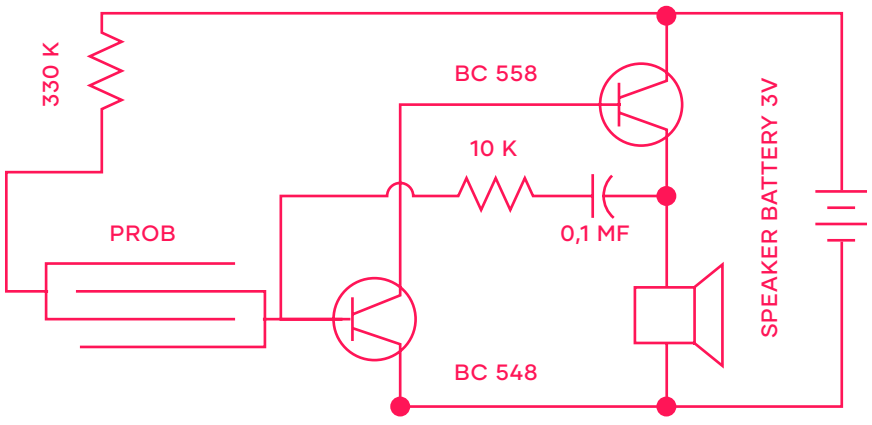
This rain circuit is used to give an alert when it's going to rain. This circuit is used in homes to alert people who mostly work inside that it has started to rain so that the people can bring in washed clothes and other things that are vulnerable to rain.

Whenever the rainwater comes in contact with the probe in the above circuit, then the current flows through the circuit to enable the Q1 (NPN) transistor and also Q1 transistor activates Q2 transistor (PNP) to become active. Thus, the Q2 transistor conducts and then the flow of current through the speaker generates a buzzer sound. While the probe is in touch with the water, this procedure replicates again and again. The oscillation circuit built in the above circuit changes the frequency of the tone, and thus tone can be changed.

REQUIRED MATERIALS & EQUIPMENT

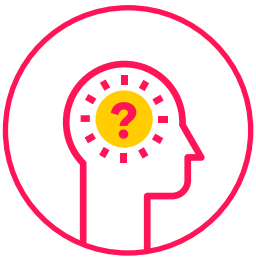
QUANTITY	DESCRIPTION
01	10K resistor
01	330K resistor
01	BC548 transistor
01	BC 558 transistor
01	3V battery
01	01mf capacitor
01	speaker

CIRCUIT SCHEME



DRAFTING

C. In your notebook, write a draft of an electronics project proposal including the following information:



- Name of the project
- Its purpose
- Where and/or when?
- Detailed description of how it will work
- Materials/equipment required.

Here are some ideas of electronics projects which you may choose: **temperature monitor, touch sensor, LED flasher, anti-theft alarm, sound activated switch, electronic siren, automatic night light, audio amplifier, LED circuit.**

REVISING

D. (In pairs) Use the following checklist to assess your classmate's draft. Once finished, return the draft and comments.

ELECTRONICS PROJECT PROPOSAL	✓ TICK IF COMPLETED	COMMENTS & SUGGESTIONS (*)
Name of the project		
Purpose, where and/or when will be used, how it will work, material & equipment		
Correct use of grammar, sentence structure, word choice, punctuation, capitalization & spelling		

* Comments & suggestions may provide reference to specific missing information, grammar, sentence structure, word choice, punctuation, capitalization & spelling errors.

EDITING

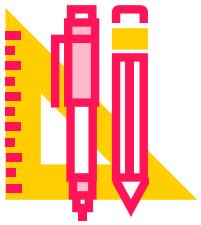
E. Using the following layout, re-write your proposal taking into account your classmate's feedback (re-check criteria established on the checklist)

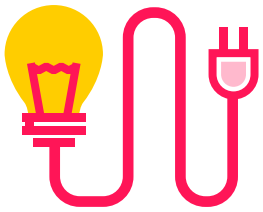
Subject: English as a Foreign Language	Grade: 3rd _____	Date: _____
Name		
Name of the project		
FUNCTIONING		
REQUIRED MATERIALS & EQUIPMENT		

PUBLISHING

F. Now deliver the final version to your teacher.

Project: "Our electronics project proposal"



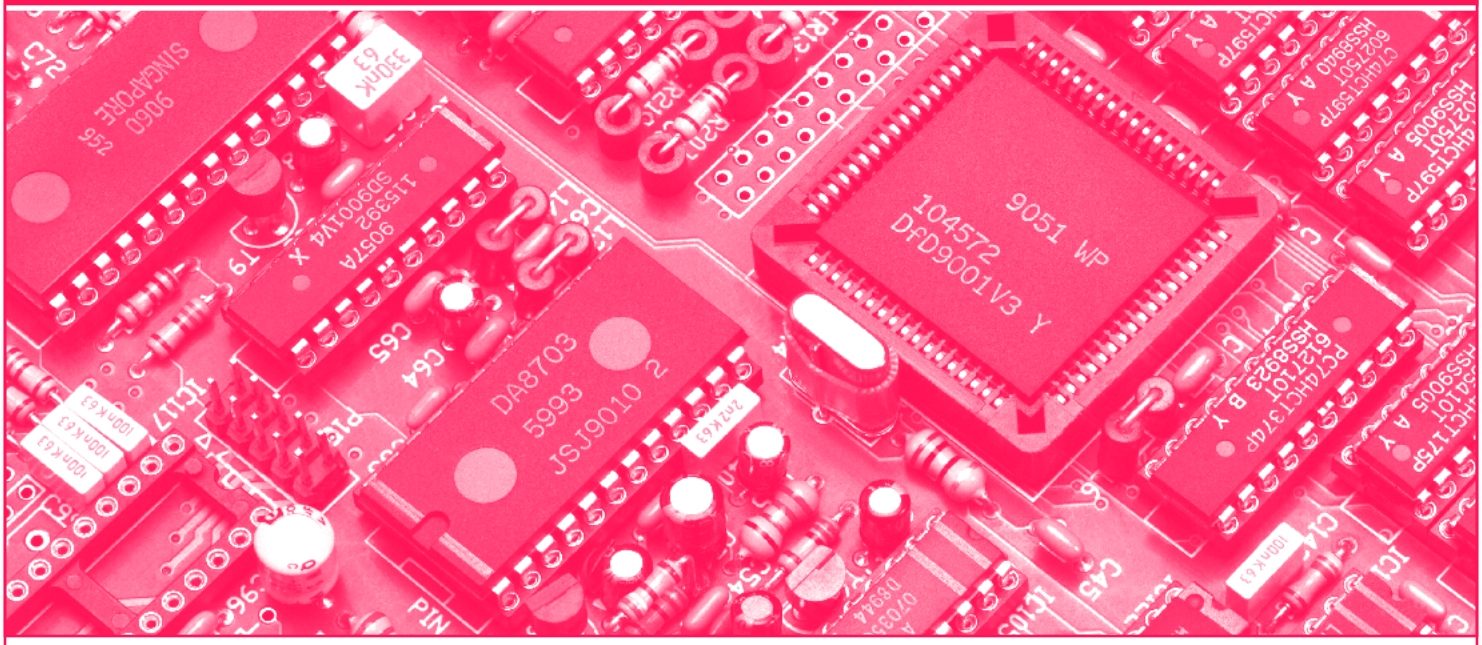


Name of the project	"Our electronics project proposal"
Level	Elementary to intermediate
Time	90-135 min
General aims	Students will present an infographic and a circuit scheme of an electronic project proposal orally. (From Lesson IV: Writing)
Language aims	Students will practice all four language skills, with a main focus on the productive skills (speaking & writing)
Resources/ Materials	Cardboards, Colored Pencils/Pens/Markers, Pictures, Glue, Scissors.
Teacher's role	Collect information about what is an infographic and how to create one (essential information that must be included). You can use links provided on references or prepare a handout beforehand in case there are no technological resources available.
Student preparation:	Collect material needed to create the infographic. Use information from lesson IV regarding the electronics project selected and circuit scheme.

PROCEDURE
1. Explain and provide examples of what an infographic is and how to create one. 2. Divide the class into groups of 3-4 and allow time for discussion and negotiation of electronics project selected as a group and materials needed to create infographic. 3. After selecting the project, each group works on the infographic with materials selected. 4. Once the infographic is finished, each group practice their oral presentation according to rubric criteria. 5. Each group presents in front of the class.

Follow up	Teacher or other groups can provide feedback about one or two aspects of a group's performance such as posture and pronunciation, or the project itself, emphasizing the positive instead of the negative.
Variation	Depending on the level of proficiency, other groups can take notes during oral presentations and ask questions after presentation is finished in order to gather more specific information. After presenting, groups could develop the electronics project proposal with subject teachers.
Rubric	• Rubric to assess infographic (self or peer assessment) • Rubric to assess oral presentation (peer assessment)

Unit II: Assembly and repair of electronic circuits



Goals: Produce short and clear oral and written texts in contexts related to students' interests and concerns, in order to express a critical personal posture with respect to others' positions

Skills: Listening, reading, speaking, writing

Project: "Assembly of electronic circuit"

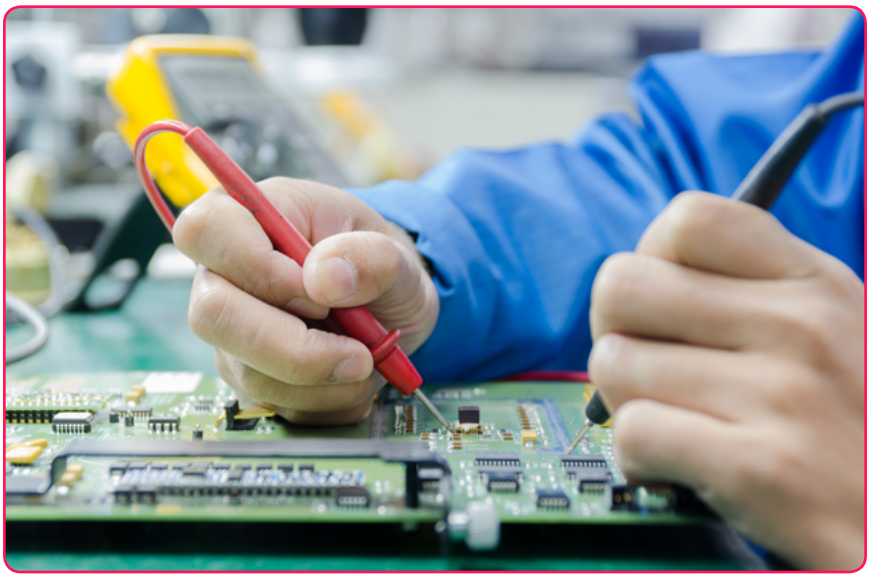
☆ 12 KEY WORDS

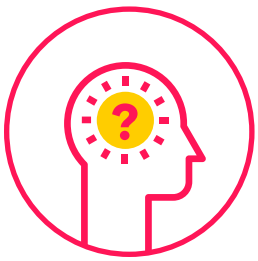
Analog circuit (n.)
Digital circuit (n.)
Signals (n.)
Transmit (v.)
Process (n.)
Printed circuit board (n.)
Repair (v.)
Solder joints (n.)
Fix (v.)
Report (v. n.)
Customer (n.)

Lesson I: Listening Comprehension

BEFORE YOU LISTEN

A. Look at the picture and predict what the audio is going to be about.





I think the audio is going to be about

B. Now compare your answer with a classmate

WHILE YOU LISTEN

Click here to listen

C. Now listen to the audio and confirm your predictions. Take notes about the N° of speaker(s) and the main purpose of the audio.

Prediction	
Purpose	
Number of Speaker(s)	

D. Listen again to complete the following chart. **You will listen twice**

How to make a PCB	Materials & equipment needed	Actions involved
First option		
Second option		

AFTER YOU LISTEN

E. Write a brief summary of what the audio was about. (For example: The man in the audio talked about how to make a ...../ I think the audio was about .....)

Lesson II: Reading Comprehension

BEFORE YOU READ

A. Read the text quickly to choose the best title:

A. What analog circuits are
B. Similarities between analog and digital circuits
C. Analog versus digital circuits

WHILE YOU READ

B. Read the text quickly and circle the unknown words. Write them in your notebook and look them up in your dictionary to find out their meaning. Then, compare with a classmate.

ANALOG VS. DIGITAL CIRCUITS

Analog and digital circuits are used to transmit and process information like sound and light from an environment to generate continuous variable signals. Analog circuits can route the signals directly, whereas digital circuits change the analog signals by evaluating them at regular intervals and giving out the resulting values. To get the outputs, analog circuits can directly give the signals while a digital circuit has to change the information back to an analog signal. The working of an analog circuit can be done with a normal waveform for converting, storing and amplifying the signals, while a digital circuit alters the wave forms into pulse signals.

Analog Circuit

The analog electronic circuit includes an analog signal with any continuously changeable signal. While working on an analog signal, an analog circuit alters the signal in some manner. Analog circuits can be used to convert the original signal into some other format such as a digital signal. Analog circuits may also modify signals in inadvertent ways like adding noise or distortion. Analog circuits are classified into two types, namely active analog circuits and passive analog circuits. An analog circuit uses an electrical power source while a passive circuit uses no external electrical power.

Digital Circuit

A digital circuit is a circuit where the signal should be one of two discrete levels. Each level is interpreted as one of two different states (for instance, 0 or 1). These circuits built with transistors to make logic gates in order to execute Boolean logic operation. This logic is the base of digital electronics and computer processing. Digital circuits are less vulnerable to degradation in excellence than analog circuits. It is also simpler to execute error detection and rectification with digital signals. To make the routine process of designing these circuits, designers use EDA (electronic design automation) tools, a kind of software that develops the logic in a digital circuit.

The **main differences** between analog and digital circuits are:

- Analog circuits operate on analog signals commonly known as continuous valued signals whereas digital circuits function on signals that exist simply at 2 levels, i.e. zeros and ones.
- The designing of an analog circuit is difficult since every component has to be positioned by hand for designing the circuits whereas digital circuits are very simple to design since the technique of an automation can be used at a variety of levels of circuit design.
- In analog circuits, no change of i/p signals is necessary before processing, the circuit directly executes different logical operations and generates an analog o/p whereas in digital circuits, the i/p signals change from analog to digital (A/D) form before it is processed. That is to say, the digital circuit is accomplished by processing digital signals only, and generates o/p which is again changed back from digital to analog signals (D/A) so that the o/p gives relevant results that can be understood by individuals.
- Analog circuits are typically routine made and they don't have flexibility whereas digital circuits have a high degree of elasticity.

AFTER YOU READ

C. Read the text to complete the following chart.

	ANALOG CIRCUITS	DIGITAL CIRCUITS
Definition	Are used to transmit and process information like sound and light from an environment to generate continuous variable signals.	
Main features		Signals should be one of two discrete levels. Less vulnerable to degradation. Simpler to execute error detection and rectification.
Differences	Operate on analog signals commonly known as continuous valued signals.	Operate on signals that exist at 2 levels.

AFTER YOU READ

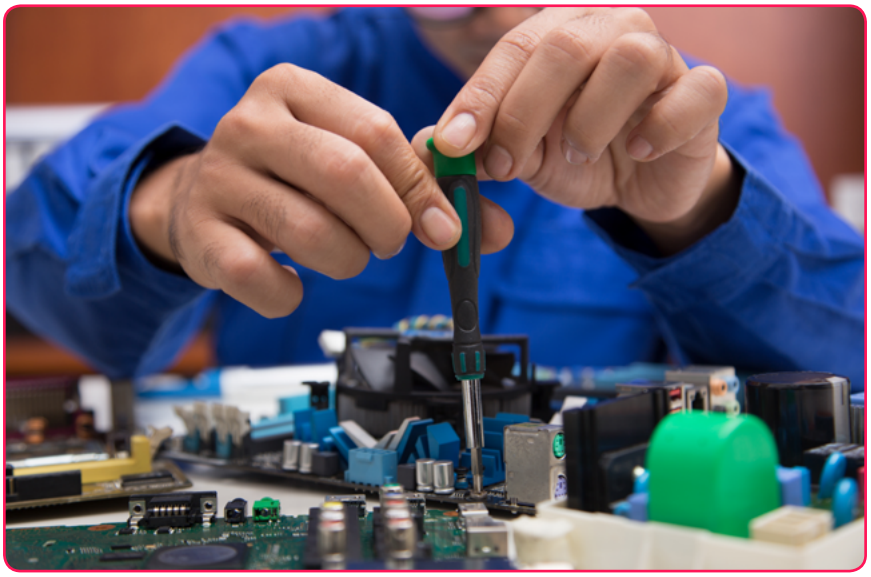
D. Create a word cloud with concepts taken from the text. Minimum words/concepts: 20*

*Use the following link to create a word cloud online: https://www.wordclouds.com/

Lesson III: Speaking

WARM UP

A. Look at the picture and describe the scene. (What is the person doing? Which equipment/components do you recognize in the picture?)



B. Now compare your description with a classmate.

INPUT

C. Read the following text about diagnostic and repair of Printed Circuit Boards (PCBs)

Diagnosing problems and repairing PCBs involve several actions. To diagnose old PCBs, you need to: inspect solder joints, identify the problem, inspect integrated circuits, consult the manual, inspect with a microscope, test functionality. To diagnose and repair new ones you should: identify the problem with the use of a V/I instrument (also known as analog signature analysis), identify the location of the problem through examinations at the microscopic level, remove the faulty part from the PCB & place the new one.

CONTROLLED PRACTICE

D. According to the text, put the steps into the appropriate category.

Identify the problem - Remove the faulty part - Consult the manual
Identify the location of the problem - Inspect integrated circuits - Test functionality
Use a V/I instrument to identify the problem - Inspect with a microscope
Consult the manual - Place the new part on the PCB - Inspect solder joints

Old PCBs	New PCBs

FREER PRACTICE

E. Group discussion. In groups, discuss which materials you would need to diagnose and fix a PCB. Provide arguments.

- Each group makes a brief presentation about their discussion

WRAP-UP

F. Write a list with the materials needed to diagnose and repair a PCB.

Lesson IV: Writing

PRE WRITING

A. What information must a technical report include? (Example: A technical report must include diagnostic information about the electronic device or appliance).

B. Now look at the following example and confirm your predictions.

TECHNICAL REPORT	
COMPANY NAME	**LOGO**
Johny Electronics Ltd.	
CUSTOMER INFORMATION	
Name: Tom Mercury	Phone N°: 555-55-55
ID N°: 11.111.111°2	Email: tommercury@gmail.com
Responsible Technician: Christopher Longton	
SYMPTOMS PRESENTED (ACCORDING TO THE CUSTOMER)	
Keypad problem. According to the customer, some keys from the keypad are not working.	
DIAGNOSIS	
Disassembling hardware parts of the phone. Inspecting components such as PCB, and keypad. Identifying the problem: keys from the keypad are broken. Probable cause of problem: device suffered several falls.	
SOLUTION	
Removal and replacement of keypad	
REPAIR COSTS	
$40.000	

DRAFTING

C. Hypothetical situation: You are a technician working for an electronic devices/appliances maintenance and repair company.

Write a draft of a technical report including the following information:

- Name & logo of the company
- Customer's information
- Symptoms
- Diagnosis
- Solution and repair costs.

INPUT

D. In pairs, use the following checklist to assess your classmate's draft. Once finished, return the draft and comments.

TECHNICAL REPORT	✔ TICK IF COMPLETED	COMMENTS & SUGGESTIONS (*)
Name and logo of the company		
Customer's information, symptoms, diagnosis, solution & repairing costs		
Correct use of grammar, sentence structure, word choice, punctuation, capitalization & spelling		

* Comments & suggestions may provide reference to specific missing information, grammar, sentence structure, word choice, punctuation, capitalization & spelling errors.

EDITING

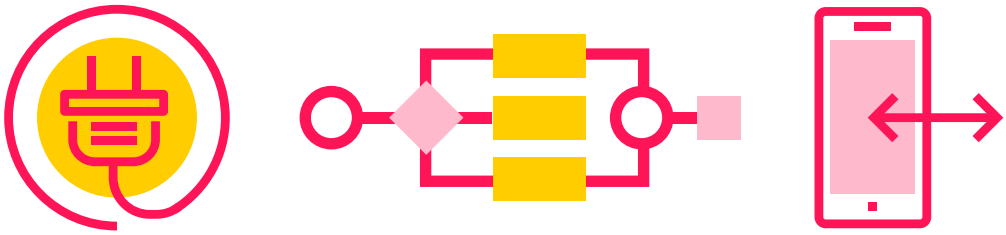
E. Using the following layout, re-write your technical report taking into account your classmate's feedback (re-check criteria established in the checklist).

TECHNICAL REPORT	
COMPANY NAME	**LOGO**
CUSTOMER INFORMATION	
Name:	Phone N°:
ID N°:	Email:
Device/Appliance:	
Responsible Technician:	
SYMPTOMS PRESENTED (ACCORDING TO THE CUSTOMER)	
DIAGNOSTIC	
SOLUTION	
REPAIRING COSTS:	

PUBLISHING

F. Now deliver the final version to your teacher.

Project: "Assembly of Electronic circuit"

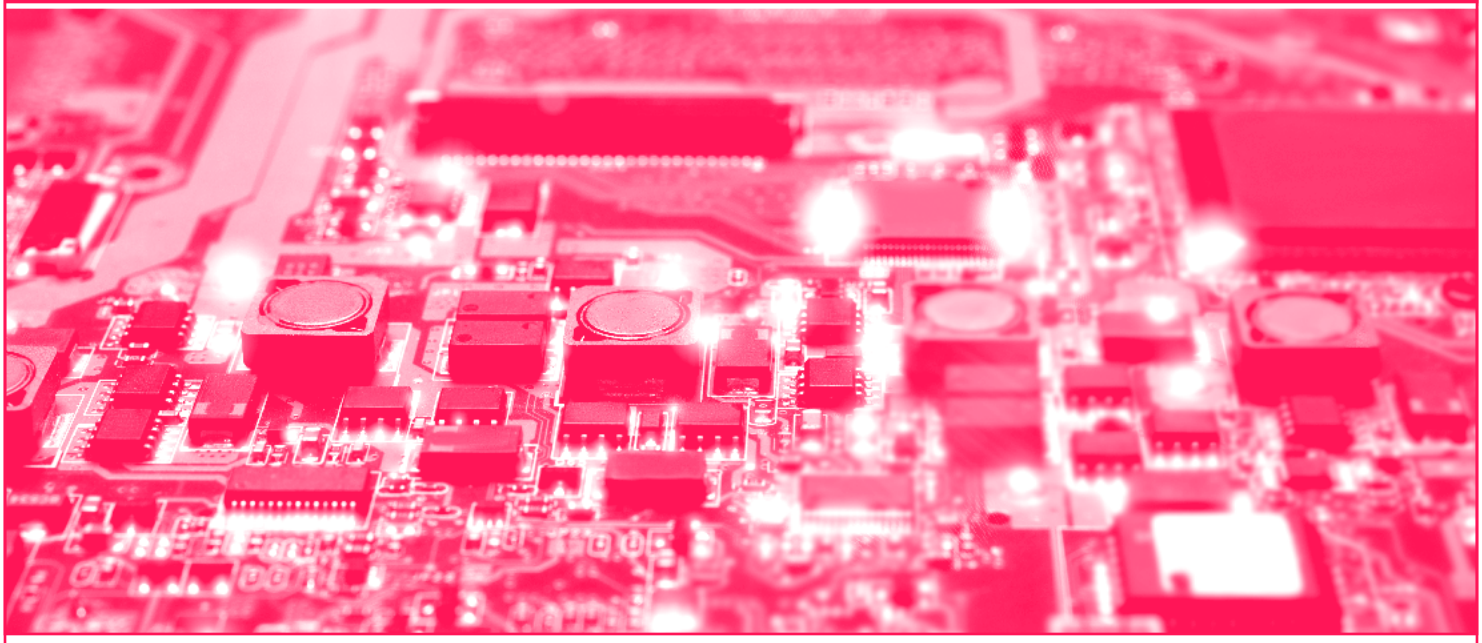


Name of the project	"Assembly of electronic circuit"
Level	Elementary to intermediate
Time	90-135 min
General aims	Students will record a video assembling an electronic circuit and presenting the process step by step. (Considering electronics project proposal of unit 1)
Language aims	Students will practice all four language skills, with a main focus on the productive skills (speaking & writing)
Resources/ Materials	Cellphones or video cameras, electronic components necessary to assemble the electronic circuit of the project, notebooks, electronics project proposal (from unit 1).
Teacher's role	Make sure students are able to collect electronic components needed, or provide them if possible. Create a handout with guidelines for video recording.
Student preparation	Collect material needed to assemble the electronic circuit. Use information from electronics project proposal.

PROCEDURE
1. Explain and provide examples of the process involved in assembling an electronic circuit. 2. Divide the class into groups of 3-4 and allow time for discussion of materials needed and roles each member will have in the recording and presentation of video. 3. Each group works on the assembling process, steps involved in the procedure, and recording of the video. 4. Once the video is finished, each group presents it to the rest of the class.

Follow up	Teacher or other groups can provide feedback about one or two aspects of video presentation such as assembly process explanation, proper functioning, etc.
Variation	Depending on the level of proficiency, other groups can take notes during video presentations and ask questions in order to gather more specific information.
Rubric	• Rubric to assess video presentation (peer assessment)

Unit III: Assembly and maintenance of digital systems and equipment



Goals: Use knowledge of English in the comprehension and production of oral texts and brief, written texts, in order to build a personal view.

Skills: Listening, Reading, Speaking, Writing

Project: "Replacing a hardware component"

☆ 19 KEY WORDS

Anti-static wrist strap (n.)
Current wave (n.)
Debugging (n.)
Ear protection (n.)
Electrons (n.)
Face shield (n.)
Gloves (n.)
Goggles (n.)
Knob (n.)
Multimeter (n.)
Omega symbol (n.)
Personal Protective Equipment (n.)
Plug (n.)
Port (n.)
Probe (v.)
Resistance (n.)
Tool (n.)
Troubleshoot (v.)
Voltage (n.)

Lesson I: Listening Comprehension

BEFORE YOU LISTEN

A. What type of Personal Protective Equipment (PPE) can you recognize in the picture? Make a list of words in your notebook. Example: Gloves.

B. Now compare your answer with a classmate.

C. According to the picture and previous activity, write one or two sentences about what you think the audio is going to be about. **Example: I think the audio is going to be about PPE.**

WHILE YOU LISTEN

Click here to listen

D. Listen and match each PPE with its function.

1	Face shield	_____	can prevent static build-up.
2	Gloves	_____	can save you from cuts & scrapes.
3	Ear protection	_____	can prevent you from getting your eyes hurt.
4	Anti-static wrist strap	_____	can prevent damage to your hearing from loud noise.
5	Goggles	_____	can prevent you from damaging your whole face.

AFTER YOU LISTEN

E. Choose two PPE from the previous section, draw them, and write at least two sentences comparing them.

Example:

1. Face shields **are safer than** goggles.
2. Goggles **are cheaper than** face shields.

Lesson II: Reading Comprehension

BEFORE YOU READ

A. Read the title of the text and complete the first two columns of the following chart. Write at least one sentence in each column.

What I **Know**	What I **Want** to know	What I **Learned**
e.g.: I know a multimeter is an essential equipment for electronic technicians.	**e.g.:** I want to know what a multimetermeasures	
I know....	I want know....	

WHILE YOU READ

B. Read the text quickly and underline words related to:

Components of a multimeter (Blue) e.g.: display

Types of measurements (Red) e.g.: current

C. Read the text quickly and select the correct option to complete each sentence.

1. The red probe is usually plugged into_____.

A. COM
B. mAVΩ

2. The selection knob is used to _____.

A. set the type of measurement
B. turn on the light of the display

3. _____is the most important function for troubleshooting and debugging circuits.

A. Continuity
B. Resistance

4. _____measures electrical potential.

A. Voltage
B. Current

HOW TO USE A MULTIMETER

A multimeter is an indispensable tool that is used to diagnose and troubleshoot circuits. As its name states, it is a meter capable of measuring multiple things related to electricity, namely: voltage, current, and resistance. A multimeter has a display, selection knob, and ports. The display usually has four digits and the ability to display a negative sign. A few multimeters have illuminated displays for better viewing in low light situations. The selection knob allows the user to set the multimeter to read different things such as milliamps (mA) of current, voltage (V) and resistance (Ω). Two probes are plugged into two of the ports on the front of the unit. COM stands for common and is almost always connected to Ground or '-' of a circuit. The COM probe is conventionally black but there is no difference between the red probe and black probe other than color. 10A is the special port used when measuring large currents (greater than 200mA). The mAVΩ is the port that the red probe is usually plugged in to. This port allows the measurement of current (up to 200mA), voltage (V), and resistance (Ω). The probes have a banana type connector on the end that plugs into the multimeter. Any probe with a banana plug will work with this meter. This allows for different types of probes to be used. To start, connect the red probe into the mAVΩ port and the black probe into the COM port.

Continuity is quite possibly the single most important function for troubleshooting and debugging circuits. This feature allows us to test for conductivity of materials and to trace where electrical connections have been made or not made. Set the multimeter to 'Continuity' mode. It may vary among DMMs, but look for a diode symbol with propagation waves around it (like sound coming from a speaker).

Similar to testing for continuity is measuring resistance. The continuity setting simply rings a tone when the resistance is low (on the order of a few ohms). But, if you want to know an actual value for the resistance, this is the setting you want. Turn the knob to one of the resistance settings. These are marked by the Omega symbol (Ω). This represents the unit ohms which is used to measure resistance.

Voltage is a measurement of electrical potential between two points. It is sometimes also called the potential difference. Similar to the settings when measuring resistance, the various settings for measuring voltage specify the maximum range. You will notice that there are two different ranges when measuring voltage. The one on the top has two straight lines and the one below has a squiggly line. The two straight lines indicate direct current (DC) measurements. This is what is most common in electronics. The other one is alternating current (AC), and this is the type of electricity that is found in the walls of your house. Be sure that you have the knob turned to the right setting. The 20V setting is probably the most typical for our applications.

Current is the rate of moving charges in a circuit. We now know that this is the movement of electrons, but by convention, we still look at current as the movement of charges from positive (+) to negative (-). In order to capture the rate of moving charges, you need to break the circuit and put the meter in-line where you want to measure current. Move the knob to the appropriate current range that you expect to measure. If you are measuring anything above 200 mA, you need to also move the red probe to the 10A port.

AFTER YOU READ

D. Now complete the last column of the chart stating what you learned from the text. Write at least two sentences.

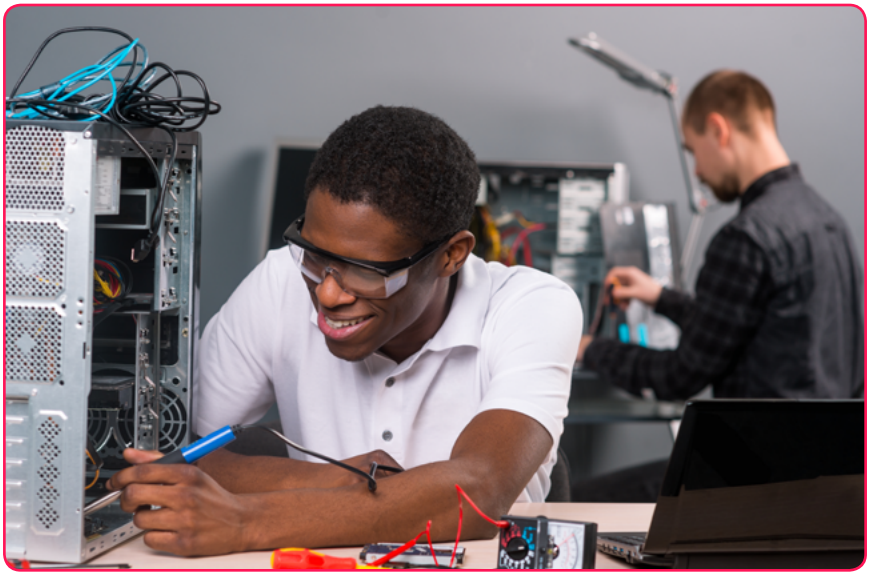
What I **Know**	What I **Want** to know	What I **Learned**
		e.g.: I learned a multimeter can be used to measure voltage.
		I learned....

E. Now compare your answer with a classmate.

Lesson III: Speaking

WARM UP

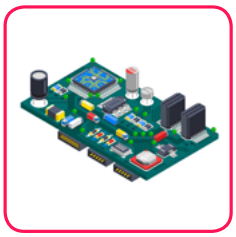
A. Look at the picture and describe the scene. (What is the person doing? Which computer hardware components do you recognize in the picture?)



B. Now compare your answer with a classmate.

INPUT

C. Look at the following pictures and then read the conversation below.



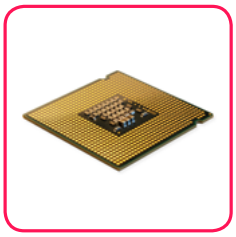
1

2

3

4

5



6

7

8

9

10

1.Motherboard
2. Heat sink

3. Case
4. Power supply

5. Monitor
6. CPU

7. RAM
8. Graphics card

9. Ribbon cable
10. Hard drive

Fernando: Look! Here are the essential hardware components to build a computer. Do you know what a motherboard is?

Julieta: Yes, a motherboard is the main circuit board that connects all main components of a computer. What is a heat sink?

Fernando: mmmm... I think a heat sink is a device used to absorb excessive or unwanted heat in a computer.

Julieta: Oh, I see.

INPUT

D. Pairwork. With a partner, fill in the gaps the following conversation choosing other essential hardware components from the picture. Look for their definitions in a dictionary or on the web.

STUDENT A Look! Here are the essential hardware components to build a computer. Do you know what a _____is?

STUDENT B Yes, a _____ is _____

_____

STUDENT A What is a _____?

Mmm... I think a _____ is _____

_____

STUDENT B Oh, I see.

INPUT

E. Pairwork. With your partner, create a similar dialogue choosing four more essential hardware components from the picture (2 components each). **Present it to the rest of the class.**

WRAP-UP

F. Write one to three lines about something that was meaningful to you during this lesson.

Example: "I really enjoyed creating the dialogue with my partner" "I learned how to pronounce the components, that was meaningful for me"

_____

_____

_____

_____

_____

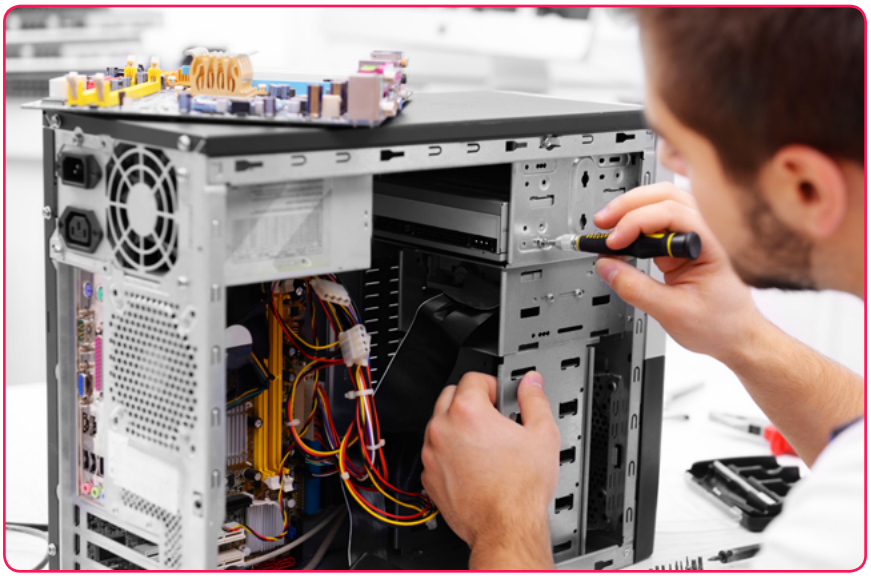
_____

Lesson IV: Writing

PRE WRITING

A. What information can you find in a procedure manual? (**Example**: A procedure manual can include information about the steps involved to replace a device)

B. Now look at the following example and confirm your predictions.



PRE WRITING

C. Hypothetical situation: you are asked to write a procedure manual to replace a hardware component from a computer in order to be used by new electronic technicians that have just started to work at the company.

D. Choose a hardware component of a computer and write a draft of a procedure manual including the name of the hardware component, any note and/or warning, required tools, and step by step procedure.

REVISING

C. In pairs, use the following checklist to assess your classmate's draft. Once finished, return the draft + comments.

PROCEDURE MANUAL	✔ TICK IF COMPLETED	COMMENTS & SUGGESTIONS (*)
Name of hardware component		
Note and/or warning		
Required tools		
Step by step procedure		
Correct use of grammar, sentence structure, word choice, punctuation, capitalization & spelling		

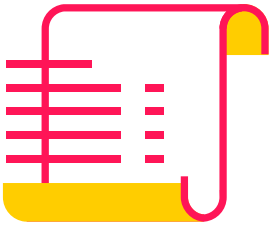
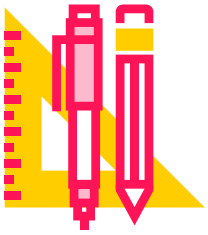
* Comments & suggestions may provide reference to specific missing information, grammar, sentence structure, word choice, punctuation, capitalization & spelling errors.

EDITING AND PUBLISHING

F. Using the following layout, re-write your procedure manual taking into account your classmate's feedback (re-check criteria established on the checklist). Then deliver the final version to your teacher.

PROCEDURE MANUAL
NAME OF HARDWARE COMPONENT
REQUIRED TOOLS
NOTE/WARNING
PROCEDURE
STEP_____

Project: “Replacing a hardware component poster”

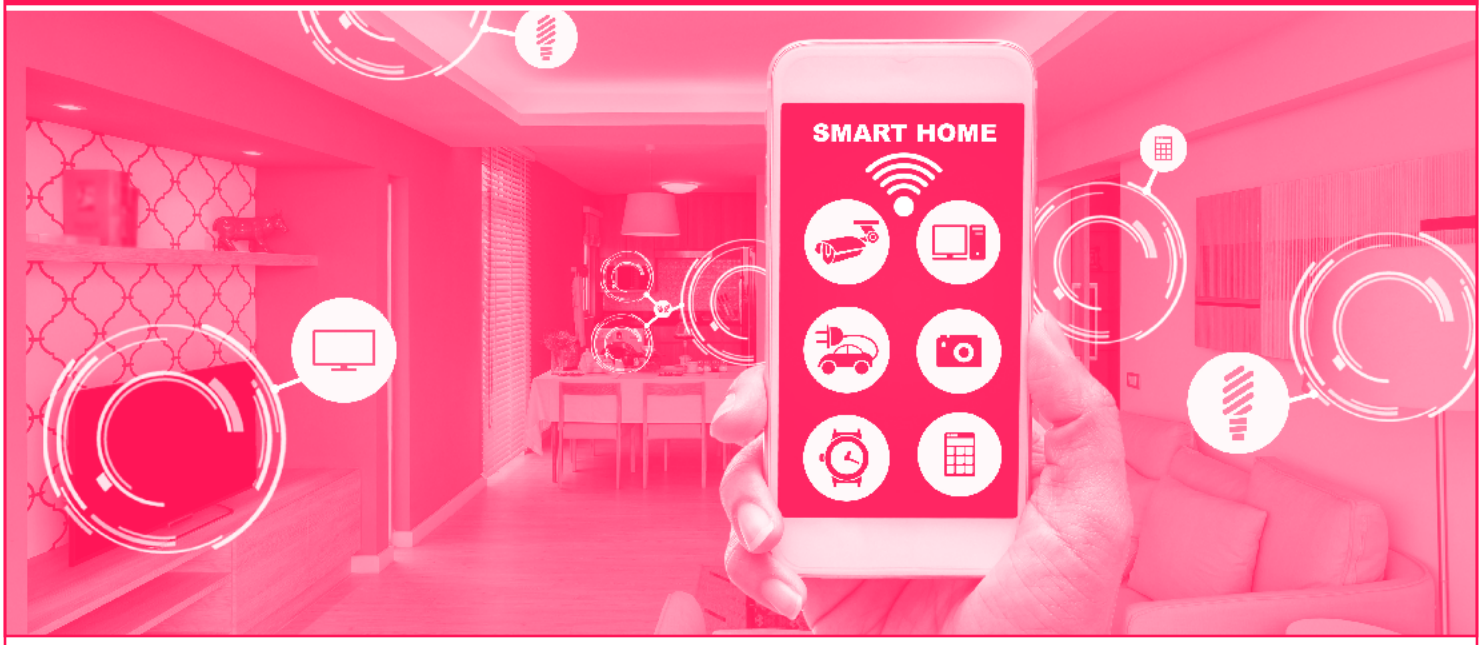




Name of the project	“Replacing a hardware component poster”
Level	Elementary to intermediate.
Time	90-135 min.
General aim(s)	Students will present a poster with step by step procedure to replace a hardware component of a computer.
Language aim(s)	Students will practice all four language skills, with a main focus on the productive skills (speaking & writing)
Resources/ Materials	Cardboards, colored pencils/pens/markers, pictures or drawings, glue, scissors.
Teacher’s role	Make sure students are able to collect materials and information needed. Create a handout with guidelines for poster making & presentation.
Student preparation	Collect material needed to create a poster. Use information from Lesson IV.

PROCEDURE
1. Explain and provide a handout with guidelines for poster making & presentation. 2 Divide the class into groups of 3-4 and allow time for discussion of materials needed, hardware component selected, and roles each member will have during the project. 3. Each group works on their poster for presentation. 4. Once the poster is finished, each group practices their oral presentation according to rubric criteria. 5. Each group presents in front of the class.

Follow-up	Teacher or other groups can provide feedback about one or two aspects of a group's performance such as posture and pronunciation, or the steps mentioned, emphasizing the positive instead of the negative.
Variation	Depending on the level of proficiency, other groups can take notes during oral presentations and ask questions after presentation is finished in order to gather more specific information. If they have access to technology, they could design a poster online (using power point, canva.com or other electronic resource).
Rubric	• Rubric to assess poster (peer assessment) • Rubric to assess oral presentation

Unit IV: Home automation control systems



Goals: Fluently produce and understand short and clear oral and written texts in communicative situations that involve differing points of view, in order to interact and become aware of one's own identity.

Skills: Listening, Reading, Speaking, Writing

Project: "Home automation idea"

☆ 12 KEY WORDS

Affordable (adj.)
Air conditioner (n.)
Artificial Intelligence (n.)
Automation (n.)
Camera (n.)
Heater (n.)
Smartphone (n.)
Soldering gun (n.)
Surveillance (n.)
Tablet (n.)
Turn on (v.)
Wrench (n.)

Lesson I: Listening Comprehension

BEFORE YOU LISTEN

A. Circle the concept(s) in the box that you recognize in the picture

resistor - relay - multimeter - wrench
PLC - PCB - soldering gun

B. Now compare your answer with a classmate.

C. According to the pictures, predict what the audio is going to be about. (e.g.: I think the audio is going to be about automation projects)

WHILE YOU LISTEN

Click here to listen

D. Listen to the audio and select the most suitable title. Circle one of the alternatives below.

A. The future of automation
B. Relays vs. PLCs
B. How to solder a PCB

E. Now listen again and complete the chart below with the information from the audio. Then, compare with a classmate. **You will listen twice**

	RELAY	**PLC**
Definition	Is an electro-mechanical operator switch	Is ...
Roles		Monitoring and controlling role.
Main Differences	We cannot write a program on a relay.	We can write a program on a PLC.

AFTER YOU LISTEN

F. Imagine you are going to design a home automation project. Would you use PLCs or Relays? Why? (e.g.: I would use a PLC because it has more capabilities of I/O)

Lesson II: Reading Comprehension

BEFORE YOU READ

A. Look at the picture that relates to the text, and think of words and concepts you think you will find in the text.

WHILE YOU READ

B. Read the text quickly and circle unknown words. Write them in your notebook and look up their meaning in the dictionary. (e.g.: affordable)

C. Read the text and answer true or false to the following statements. Write a T for true or F for false. Correct the false statements.

1. _____ Home automation is a system that facilitates processes.
2. _____ Turning on your car with your smartphone is an example of home automation.
3. _____ Nowadays, people refuse home automation systems.
4. _____ Home automation can improve the lives of people with reduced mobility.
5. _____ Anyone can understand the potential of home automation without experiencing it.

HOW WILL HOME AUTOMATION AFFECT OUR FUTURE?

Once restricted to luxury or super-tech buildings, home automation is proving to be an increasingly fundamental and affordable addition to architectural projects, whether to new buildings or renovations. While understanding how they operate can be extremely complex, the primary purpose of technology is to make life simpler, safer, and easier. By definition, home automation seeks to be globally intelligent, functioning as a system that facilitates processes without unnecessarily complicating the user's life. The idea is to connect devices, which in turn connect and talk through a centralized control unit, accessible by computers, tablets, and mobile phones. These include lights, appliances, electrical outlets, and heating and cooling systems, but also alarms, doors, windows, smoke detectors, surveillance cameras, and many other sensors and devices.

For example, home automation users can turn the lights on or off at specific times each day, adjust the heater or air conditioner to turn on a few minutes before they arrive home, or turn on all the lights in their home when the security system alarm is triggered. In addition to these immediate effects, monitoring applications can also provide accurate home information by generating detailed reports on equipment that could be working better or spending less. As systems such as Google Home, Alexa, and Amazon Echo become more and more common and artificial intelligence becomes more and more sophisticated, the

integration of diverse applications in residential spaces should increasingly enter our daily lives through the Internet of Things (commonly referred to as IoT). That is, in addition to smartphones and personal computers, appliances and sensors are able to identify patterns, process information, and perform tasks both through commands and automatically. From a clock or a refrigerator to cars, machines, and urban infrastructure, many of the mechanical products we interact with can communicate and automate processes. Although it sounds like a science fiction script, these are technologies that are not so far from us. Nowadays, more people are able to access, and prefer home automation systems because among the benefits they can find are increased security, improvement in the lives of with reduced mobility, resource saving, and smarter buildings and everyday life.

It is important to mention that these systems must be highly protected, as a single attempt to break into this centralized system can lead to the invasion of privacy and the loss of valuable confidential information. Still, most people who have experienced life in an automated space will likely be uncomfortable returning to traditional systems. It is critical to experience the benefits of home automation in order to understand its potential and to know which elements will best improve your daily life.

AFTER YOU READ

D. Now add a word or concept that appears in or relates to the text to complete this acronym. The first one is done as an example.

Alarms

U _____

T _____

O _____

M _____

A _____

T _____

I _____

O _____

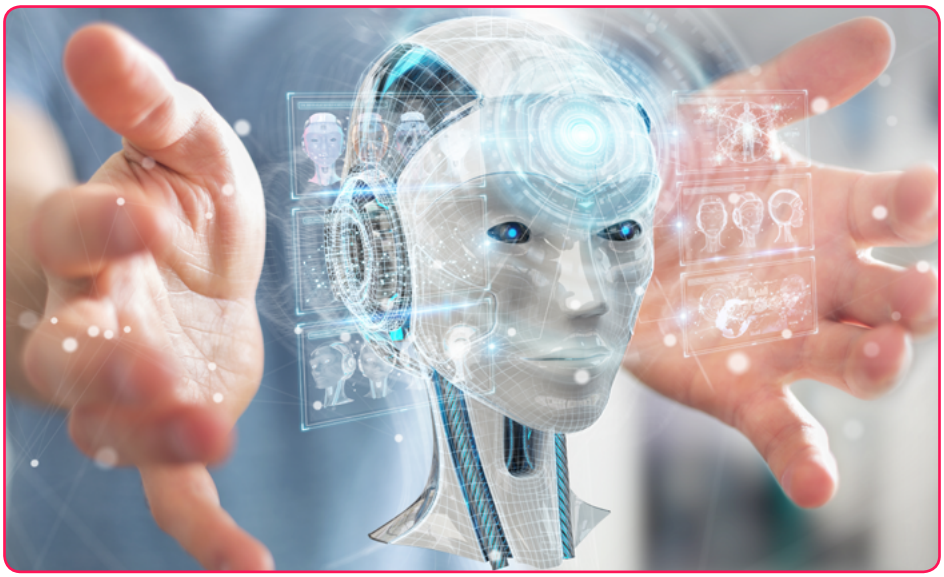
N _____

Lesson III: Speaking

WARM UP

A. What do you know about Artificial Intelligence (AI)?

B. What is your opinion about Artificial Intelligence (AI)? Write at least 2 sentences. (e.g., in my opinion AI is going to perform jobs humans used to do)



C. Now compare your description with a classmate.

WARM UP

D. Read the following text

AUTOMATION AND AI WILL HELP SOCIETY

Automation is when we take something that is otherwise done by humans, such as driving, and make it automated. AI refers to technology that is becoming as smart, or smarter, than humans. These together can alter society in many ways, either for better or for worse.

People that are in favor of automation and AI claim that they will help society and technology progress such as in the area of medical procedures and medicine. They have also helped eliminate menial jobs, giving more free time to spend with family, loved ones, and doing what we love.

As for people that are against they, say that automation and AI take jobs away, make humans lazy since people can refuse to cook or drive their cars, and ultimately will make traditional human development and reproduction obsolete, since humans can now grow in a test tube.

WARM UP

E. Pairwork. Find a partner and discuss the topic. Provide arguments whether you are in favor of or against automation and AI. You can use expressions such as:

Introduce your point: To begin with.... First of all....
Connecting your point: Also....furthermore....in addition....
Showing importance: More importantly.... What's worse....above all....
Giving examples: For instance....for example.....
Giving opinions/preferences: In my opinion, the way I see it.... I feel that.... I honestly believe....
Disagreeing: I'm afraid I don't agree..... the problem with your point of view is that....
Partially agreeing: I agree with you to a point however.... I see what you are saying but....

EXAMPLE

STUDENT A **Well, to begin with I feel that** automation and AI will help and are already helping society because they are making a lot of things easier, like watching what's happening at home through your cellphone while you are at work.

STUDENT B Yes, **I see what you are saying but, in my opinion,** automation and AI are not helping society because many people have lost their jobs at factories due to automation.

FEER PRACTICE

F. Pairwork. With your partner, write a summary of your discussion and present it to the rest of the class, orally.

WARM UP

G. Imagine yourself in thirty years. How do you think automation and AI will be present in our everyday lives? Write at least two sentences.

Lesson IV: Writing

PRE WRITING

A. What information can you find in a brief essay? (**Example:** a brief essay has an introduction, like a regular essay)

B. Now look at the following example and confirm what is needed in a brief essay.

LANDSCAPE LIGHTING

Introduction

In the following essay I will provide a brief explanation of a home automation idea I came up with.

Body

Since I live in the suburbs, my house is very dark when daylight is over so it is very difficult for me to put the key in the door without lighting from my cellphone. That is why my home automation idea is related to creating an automation system so landscape lighting in my house can turn on automatically at sunset and off again at sunrise.

Conclusion

With automated landscape lighting at home, I will not have problems again to access my house easily during nighttime.

DRAFTING

C. Think of a home automation idea that could help you and your family at home. (i.e. lights, access, alarms, camera surveillance, garden watering, HVAC, kitchen appliances, etc.)

D. Write a draft of a brief essay to present your idea including a title, 2-3 sentence introduction, a paragraph body (10 sentences max.), and 2-3 sentence conclusion as in th example provided.

REVISING

E. In pairs, use the following checklist to assess your classmate's draft. Once finished, return the draft and comments

ESSAY	✓ TICK IF COMPLETED	COMMENTS & SUGGESTIONS (*)
Title		
Introduction		
Body		
Conclusion		
Correct use of grammar, sentence structure, word choice, punctuation, capitalization & spelling		

* Comments & suggestions may provide reference to specific missing information, grammar, sentence structure, word choice, punctuation, capitalization & spelling errors.

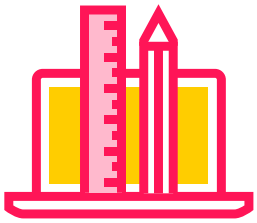
EDITING

F. Re-write your brief essay taking into account your classmate's feedback (re-check criteria established in the checklist)

PUBLISHING

G. Now deliver the final version to your teacher

Project: "Home Automation Idea"



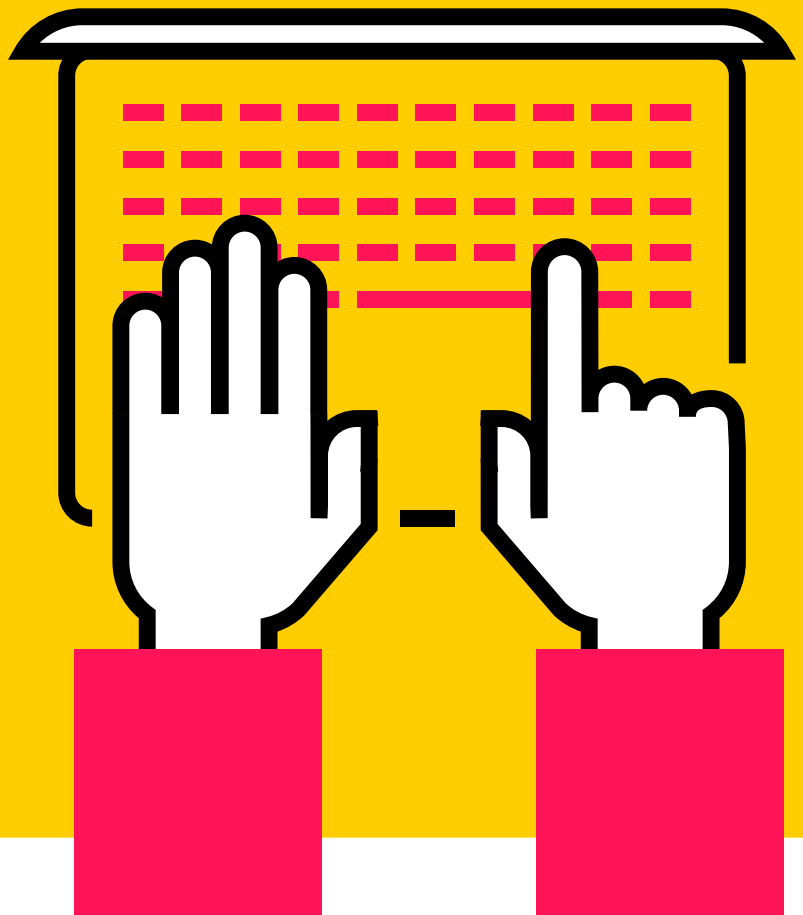
Name of the project	"Home Automation Idea"
Level	Elementary to intermediate.
Time	90-135 min.
General aim(s)	Students will present a home automation idea using audiovisual resources*.
Language aim(s)	Students will practice all four language skills, with a main focus on the productive skills (speaking and writing).
Resources/ Materials	Computer access, pictures and/or videos.
Teacher's role	Make sure students are able to collect materials and information needed. Create a handout with guidelines for oral presentation using audiovisual resources.
Student preparation	Collect material needed to create a poster. Use information from Lesson IV.

* i.e.: Power Point, pretzi, video, etc.

PROCEDURE
1. Explain and provide a handout with guidelines for oral presentation using audiovisual resources. 2. Divide the class into groups of 3-4 and allow time for discussion of materials needed, home automation idea selected, and roles each member will have during the project. 3. Each group works on the design of the audiovisual resource that they will use during presentation. 4. Once the audiovisual resource is finished, each group practices their oral presentation according to rubric criteria. 5. Each group presents in front of the class.

Follow-up	Teacher or other groups can provide feedback about one or two aspects of a group's performance such as posture and pronunciation, or home automation idea, emphasizing the positive instead of the negative.
Variation	Depending on the level of proficiency, other groups can take notes during oral presentations and ask questions after presentation is finished in order to gather more specific information. Home automation idea can be later developed with their subject teacher in charge of the home automation control systems module.
Rubric	• Rubric to assess oral presentation using audiovisual resource.

Appendix



ANSWER KEY

· UNIT I

LESSON I, BEFORE YOU LISTEN (A)

Title	'Basic repair troubleshooting tips'	
Purpose	Troubleshooting tips to repair electronic devices	
Speaker(s)	An electronic technician with expertise in repairing electronic devices	
Specific words/concepts	Troubleshooting Device Capacitor Power supplies Circuit board Solder connections Bloat Leak Explode	Discolored Burnt Resistors Transistors Overheating SATA connections Magnifying glass Resolder

LESSON II, BEFORE YOU READ

1. Gadget
2. Electronic circuit
3. Wire
4. Trace
5. Capacitor
6. Inductor
7. Diode
8. Relay
9. Quartz crystal
10. Integrated circuit

LESSON II, WHILE YOU READ (B)

Gadget: A small technical apparatus or electronic device.

Electronic circuit: The complete path of an electric current.

Wire: A length of such metal used to conduct current in electrical systems.

Trace: A tracing, drawing or sketch or something.

Capacitor: A device for accumulating and holding a charge of electricity.

Inductor: A coil used to introduce inductance into an electric circuit.

Diode: A device through which current can pass freely in only one direction.

Relay: An electrical device that responds to a change of current or voltage in one circuit by making or breaking a connection in another.

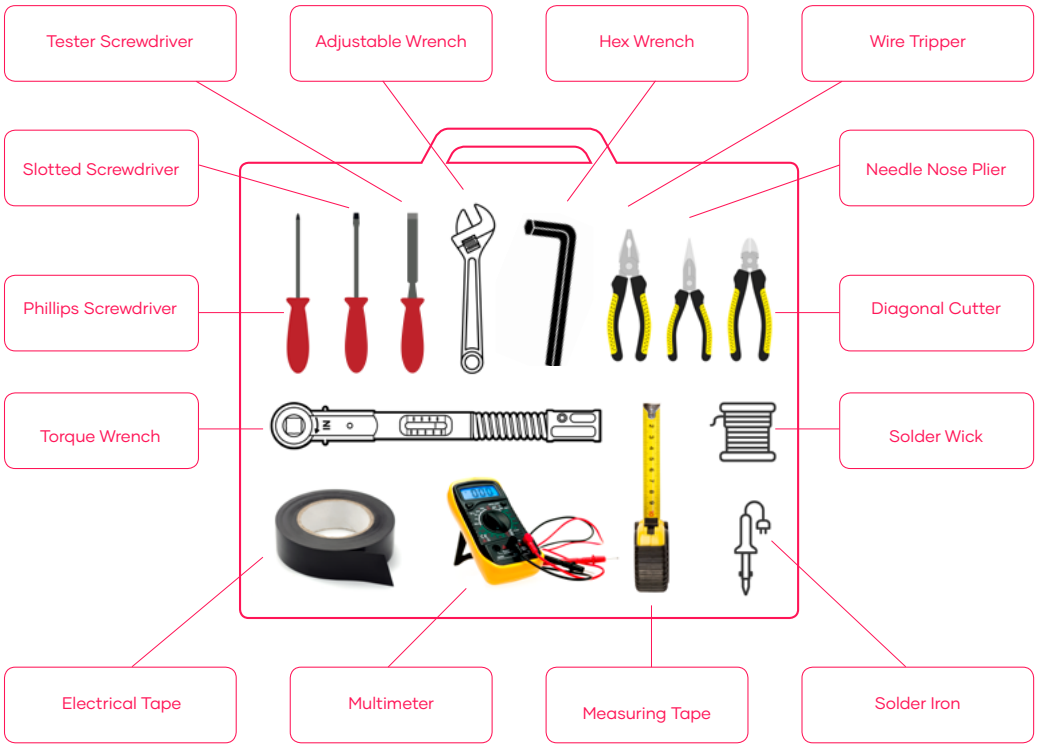
Quartz crystal: Natural or synthetically mineral often used to make crystal oscillators to create an electrical signal with a precise frequency (i.e.: used as resonator in electronic circuits).

Integrated circuit: A circuit of transistors, resistors, and capacitors constructed on a single semiconductor wafer or chip, in which the components are interconnected to perform a given function.

LESSON II, WHILE YOU READ (C)

4, 2, 5, /, 1, 3

LESSON III, WARM UP (A)



UNIT 2

LESSON II, BEFORE YOU READ (A)

C. Analog versus digital circuits

LESSON III, CONTROLLED PRACTICE (D)

Old PCBs
- Identify the problem
- Consult the manual
- Inspect integrated circuits
- Test functionality
- Inspect with a microscope
- Consult the manual
- Inspect solder joints

New PCBs
- Remove the faulty part
- Identify the location of the problem
- Use a v/i instrument to identify the problem
- Place the new part on the pcb

UNIT 3

LESSON I, WHILE YOU LISTEN (D)

Answer key: 4-2-5-3-1

LESSON II, WHILE YOU READ (C)

1. B mAVΩ
2. A set the type of measurement
3. A Continuity
4. A Voltage

UNIT 4

LESSON I, BEFORE YOU LISTEN (A)

Relay - PLC

LESSON I, WHILE YOU LISTEN

B. Relays vs. PLCs

LESSON II, WHILE YOU READ

1T, 2F, 3F, 4T, 5F

INFOGRAPHIC RUBRIC

RUBRIC UNIT 1

Criteria	Excellent (7)	Good (5)	Poor (3)	Needs Improvement (1)	Score
Format/ Appearance	Infographic includes visual support related to the content presented. (i.e.: functioning, required materials & equipment, circuit scheme.)	Infographic includes visual support related to part of the content presented (i.e.: functioning or circuit scheme)	Infographic includes visual support but it doesn't relate to the content presented.	Infographic does not include visual support.	
Organization	Infographic includes title, and subtitles regarding content presented. (i.e.: name of project, functioning, required materials & equipment, circuit scheme)	Infographic includes title or subtitles regarding content presented (i.e.: name of project, functioning, required materials & equipment, or circuit scheme)	Infographic includes title or subtitles regarding content presented but they are not easy to read.	Infographic does not include title or subtitles regarding content presented.	
Content	All information needed about electronics project proposal is presented (i.e.: name of project, functioning, required materials & equipment, circuit scheme)	Most information needed about electronics project proposal is presented.	Some information needed about electronics project proposal is presented.	Incorrect use of grammar, punctuation and spelling. A lot of mistakes made that interfere with meaning.	
TOTAL					

VIDEO PRESENTATION RUBRIC UNIT 2

Criteria	Excellent (7)	Good (5)	Poor (3)	Needs Improvement (1)	Score
Video Quality	Viewers can see appropriate images of electronic circuit assembly while procedure is provided. Sound is clear and loud.	Viewers can see most images of electronic circuit assembly while procedure is provided. Sound is somewhat clear and loud.	Viewers are able to see properly but sound is not clear and loud enough.	Viewers are not able to see and hear properly.	
Oral skills	Students use a clear voice, rhythm and tone and pronounce clearly and correctly during presentation.	Students use a clear voice, rhythm and tone and pronounce clearly and correctly most of the time during the presentation.	Students' voice, rhythm and tone are not clear enough and pronunciation mistakes are made during the presentation.	Students' voice, rhythm and tone are not clear and mistakes are made in pronunciation which break down communication during presentation.	
Assembly Procedure	Every step of the procedure is properly organized and presented in the video.	Most steps of the procedure are properly organized and presented in the video.	Some steps of the procedure are properly organized and presented in the video.	Few or some steps of the procedure are presented but are not properly organized.	
TOTAL					

POSTER RUBRIC UNIT 3

Criteria	Excellent (7)	Good (5)	Poor (3)	Needs Improvement (1)	Score
Organization	Poster includes title, and subtitles regarding content presented. (i.e.: name of hardware component, procedure)	Poster includes title or subtitles regarding content presented (i.e.: name of hardware component or procedure)	Poster includes title or subtitles regarding content presented but they are not easy to read.	Poster does not include title or subtitles regarding content presented.	
Organization	Poster includes title, and subtitles regarding content presented. (i.e.: name of hardware component, procedure)	Poster includes title or subtitles regarding content presented (i.e.: name of hardware component or procedure)	Poster includes title or subtitles regarding content presented but they are not easy to read.	Poster does not include title or subtitles regarding content presented.	
Content	All information needed about procedure to replace a hardware component is presented (i.e.: hardware component, all steps involved in the procedure)	Most information needed about procedure to replace a hardware component is presented.	Some information needed about procedure to replace a hardware component is presented.	Little or no information needed about procedure to replace a hardware component is presented.	
Grammar & Mechanics	Correct use of grammar, punctuation and spelling. Minor or no mistakes.	Mostly correct use of grammar, punctuation and spelling. Some mistakes are made but they don't interfere with meaning.	Somewhat correct use of grammar, punctuation and spelling. Mistakes made that interfere with meaning.	Incorrect use of grammar, punctuation and spelling. A lot of mistakes made that interfere with meaning.	
TOTAL					

ORAL PRESENTATION RUBRIC UNIT 4

Criteria	Excellent (7)	Good (5)	Poor (3)	Needs Improvement (1)	Score
Non-verbal skills	Student makes eye contact while presenting and stands up straight and still during presentation.	Student often makes eye contact while presenting and stands up straight and still most of the time during the presentation.	Student rarely makes eye contact while presenting and sways or fidgets during presentation.	Student doesn't make eye contact while presenting and slumps or leans during presentation.	
Oral skills	Student uses a clear voice, pace and tone and pronounces clearly and correctly during presentation.	Student uses a clear voice, pace and tone and pronounces clearly and correctly most of the time during the presentation.	Poster includes title or subtitles regarding content presented but they are not easy to read.	Poster does not include title or subtitles regarding content presented.	
Visual support	Poster is visually attractive and contains images that relate to the presentation.	Poster is somewhat visually attractive and contains images that relate to the presentation.	Poster is somewhat visually attractive and contains some images that relate to the presentation.	Poster is not visually attractive.	
TOTAL					

SCRIPTS

UNIT 1: ELECTRONICS PROJECTS

LESSON 1: LISTENING COMPREHENSION

Audio Script

(Context: an electronic technician with expertise in repairing electronic devices provides troubleshooting tips to repair electronic devices)

Hi, there! I'm going to give you some advice to repair electronic devices. Whether you are a beginner, intermediate or advanced electronic repair technician, the first thing you want to look for are capacitors. They are the N°1 thing that fails on electronic devices. They'll bloat, they'll explode, they'll leak, so look for those signs, OK? Sometimes they won't be obvious so they're gonna be the tricky ones and it's gonna take a little bit of skill to find, so you'll actually have to troubleshoot the circuit and find out where.....erhhh....What the problem is.

The second thing to look for is power supplies and components, power parts OK? Anything where heat is generated. So, look for capacitors in the power supply because sometimes power components will generate a lot of heat next to capacitors.
The third one is burnt or discolored circuit board areas. You're going to flip the board over, you're gonna see where all the SATA connections are and look for discoloration. Then flip the board back over where the parts are and look at the circuit board and see if there's any discoloration on it OK? Uhhmmm...Let's see what else...

You definitely wanna look for anything that is smoked like resistors, if they have a discoloration on them, or the color band is almost unreadable, that means the resistor is overheating or something in the circuit is causing the resistor to heat past its value.

The fourth one is bad solder connections. Cheap circuit boards are notorious for bad SATA connections so you'll need a magnifying glass or microscope or a good eye loupe set and you'll need to flip the board to look for cracked solder joints, especially around the heat components, alright? So, if you have transistors or anything where heat is generated you are gonna find, possibly, cracked solder joints or it could happen anywhere on the board where heat is not an issue because of a bad manufacturing of the solder wave machine. A cracked solder joint is when the solder joint actually separates from the joint. It will actually kind of look like a ring around with a pin coming out if it's a through-hole component, so if you are in doubt, resolder. Sometimes just the heat alone from the soldering will bring things back to life because you have a bad capacitor, so if it works again but it fails some time later, you'll have to look for the bad capacitor and replace it.
I hope this helps with general first-time troubleshooting tips for you guys, so that's it.

UNIT 2: ASSEMBLY AND REPAIR OF ELECTRONIC CIRCUITS

LESSON 1: LISTENING COMPREHENSION

Audio Script

(Context: a man is providing guidelines on how to make a PCB using two different methods)

Electronics is not my background but I've been having a lot of fun making circuit boards with my CNC machine so, today I wanna tell you how to make a printed circuit board, or PCB.
You can make a circuit board using a CNC machine to drill around the traces, a drill bit to drill the holes, and engraver to cut out the board and then you can solder on components and it should work.

Another method is to use a permanent marker to draw the traces, a drill bit to drill the holes an engraver to cut out the board and then you can use chemicals to move the copper, rubbing alcohol and sunscreen to remove the permanent marker.
I will explain how to create a PCB using the second method. The first thing to do is to wash up the copper clad laminate with soap and water and rubbing alcohol. Thus, the ink will stick better to the copper.

Then cut some scrap wood of the same dimension to place underneath the copper when drilling. I use express PCB to actually design the layout of the circuit and print the layout to transfer it to the board.

To ensure an accurate transfer, tape the print out over the top of the copper clad laminate and use a pushpin to stab through the paper where each component will penetrate the board. Remove the printed sheet and make sure all components are marked on the copper. Use the bit drill to drill out the holes that were marked on the board and use the permanent marker to draw traces between all the components, referencing the printed PCB layout.

Use the engraver to cut the perimeter. The two chemicals I use to remove the copper are hydrogen peroxide and hydrochloric acid. This is very strong acid, so make sure to use proper protection and use it outside in a well-ventilated area. Place the board and wait a few minutes until you see the copper fade away. Then remove the permanent marker with rubbing alcohol and a bit of sunscreen to remove what's left. After rinsing the board, it should be ready for soldering the components. And that's how a PCB is done.

UNIT 3: ASSEMBLY AND MAINTENANCE OF DIGITAL SYSTEMS AND EQUIPMENT

LESSON 1: LISTENING COMPREHENSION

Audio Script

(Context: a risk preventionist is providing a talk to new technicians working for a company) [R: Risk Preventionist T: Technician]

R: Good morning everyone and welcome to our company. My name is Cristina Araneda and I will lead today's induction. My job is to help you avoid suffering any type of injury or hazards when performing any type of electrical work. That's why the first thing I'll do is to provide you with your own PPE.

T: I'm sorry Ms. Araneda but what's PPE?

R: Oh, right. Sorry. PPE stands for personal protective equipment. PPE is used to keep safe from all the hazards you may encounter while doing your work. I have a bag with a label for each of you, but before I give it to you, I'll show you what's inside of it.

Number one and the most important thing is gloves. As I know you have already worked before, you know how messed up your hands can get, so gloves are going to save you from all kinds of cuts and scrapes.

Safety glasses or goggles are another essential PPE. They'll prevent you from getting your eyes hurt so make sure to use them when assembling circuits, cutting wires or soldering.

This one here is a face shield, and you can use it to prevent damaging your whole face while working.

If you have to use a high-speed drill or work in loud places, which is going to be the case here, don't forget to wear ear protection like this one to avoid harm in your hearing from loud noise.

This is an anti-static wrist strap, which will help you to reduce static electricity when working on electronic gear. This wrist strap grounds you at all times and prevents static build-up.

The bag also has safety shoes, coveralls and a hard hat.

T: Great! Do we have to sign something?

R: That's correct! Please come here as I call you.

UNIT 4: HOME AUTOMATION CONTROL SYSTEMS

LESSON 1: LISTENING COMPREHENSION

Audio Script

(Context: A teacher is giving a lesson about relays and PLCs) [T: Teacher, S: Student]

T: OK, so today we will talk about relays and PLCs, or Programmable Logic Controllers. Both of them can be used in home and industrial automation projects, but are they similar, or different?

A relay is an electro-mechanical operator switch. It's a hardware switching device that controls the electrical circuit by using switching logic, whereas a PLC is a mini computerized industrial controller that controls the circuit by performing software logic using I/O, CPU, and memory.

For the controlling electro-mechanical system, the basic functions of both relays and PLCs are the same in the industries but if we compare both of them, PLC systems perform better in terms of work and accuracy, and require less time and less wiring. The main reasons why industries are shifting to use PLCs over relays are:

First, PLCs play a monitoring as well as a controlling role in designing circuits whereas relays only play a controlling role.

We can write a program on a PLC but not on a relay, and it's easier to modify the designing circuit on a PLC than a relay.

In addition, PLCs are more flexible and provide more capabilities of inputs and outputs.

So, has any of you ever seen a PLC circuit?

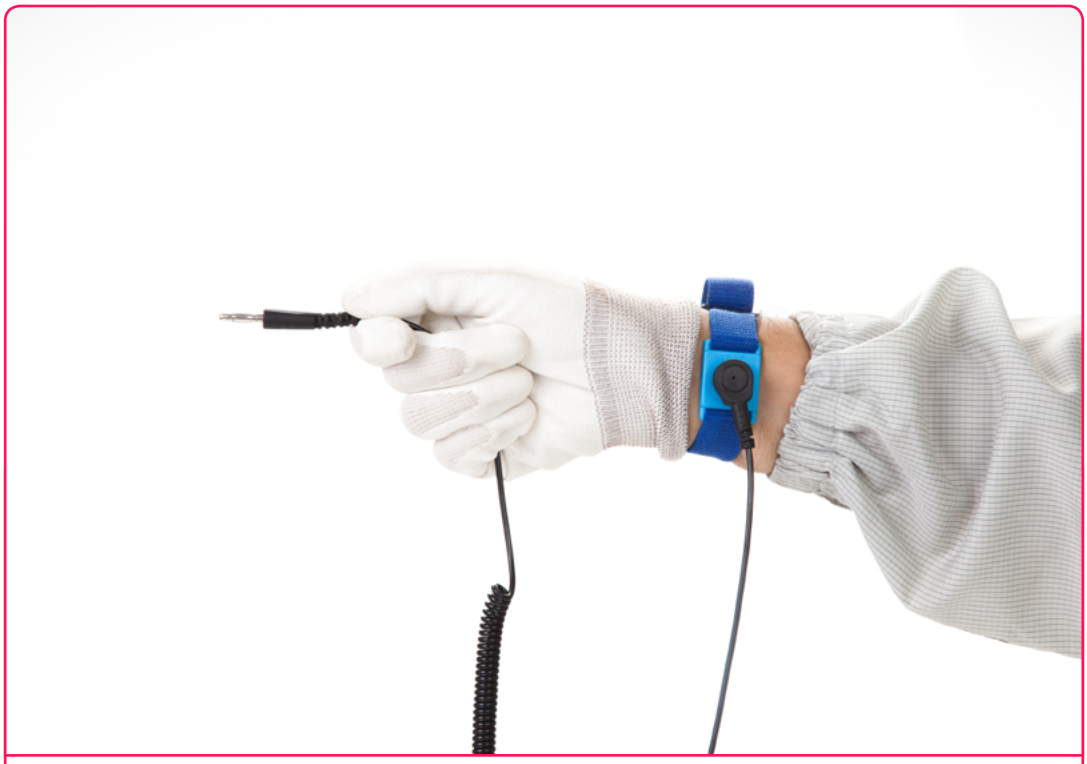
S: I have. My father works for a home automation company and he showed me how a PLC functions.

T: Cool! What was the project about?

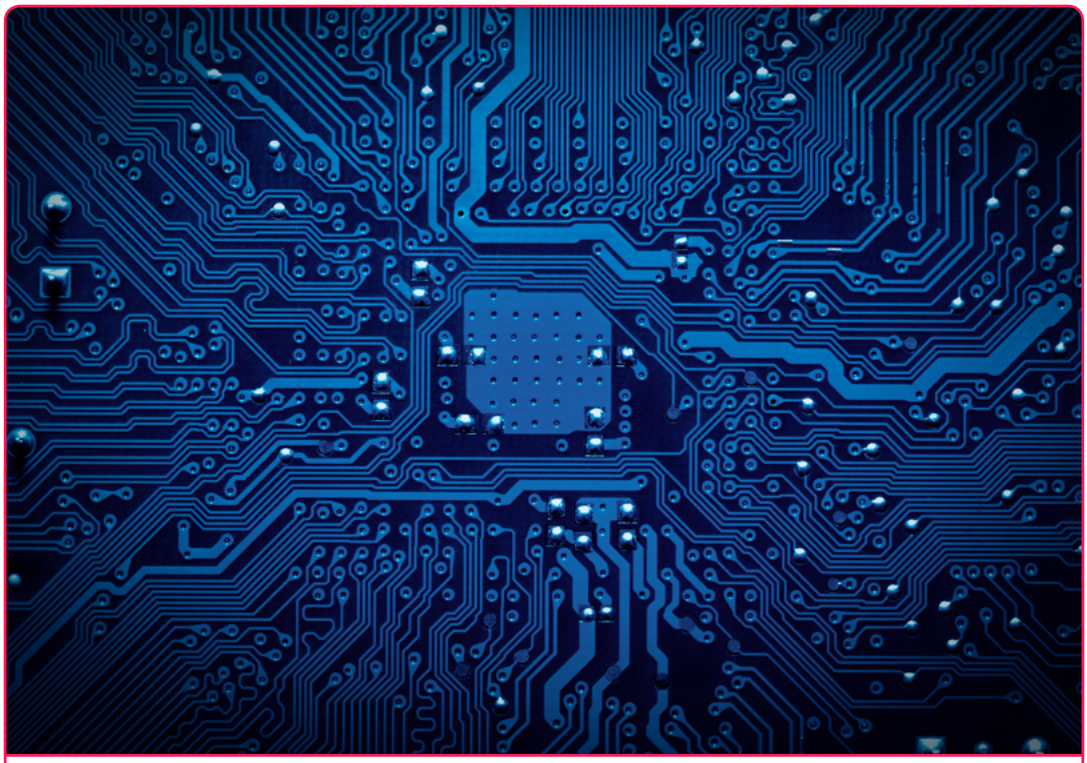
S: Oh, it was a home system to control lights and garden watering. They used a PLC with 14 I/O ports, 8 inputs and 6 outputs.

T: Great! Now I will show you different models of PLCs and how they have been used in various automation projects.

Flashcards



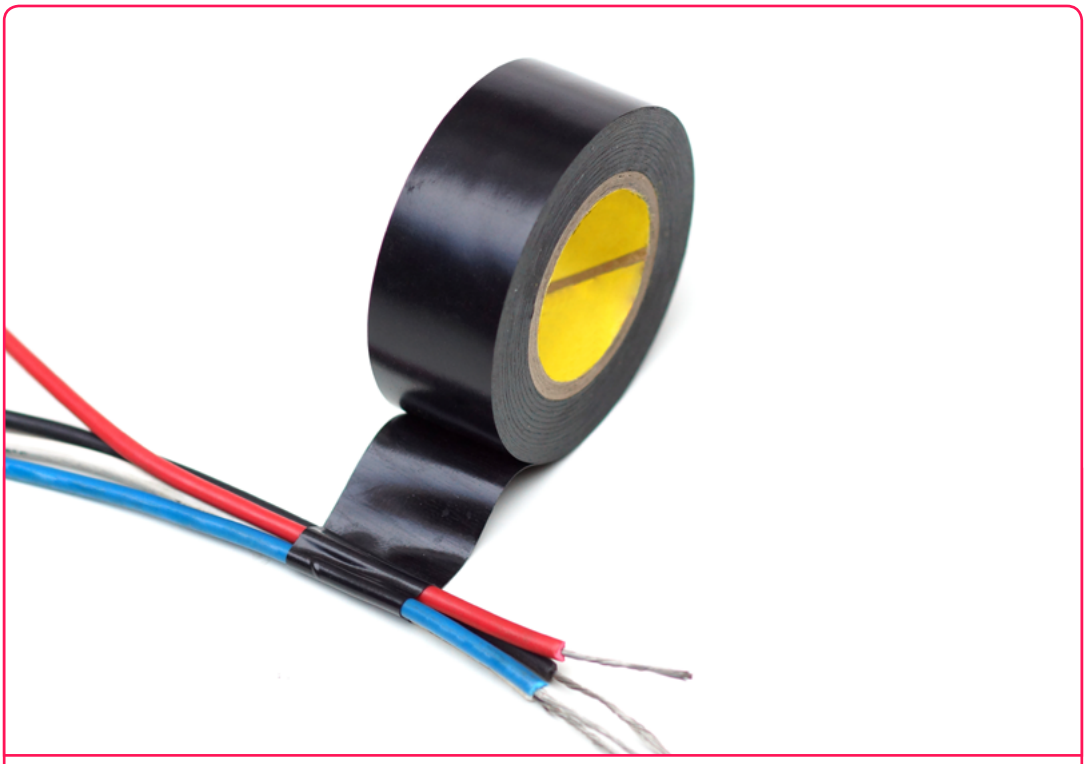
ANTI- STATIC WRIST STRAP



ELECTRONIC BOARD

CPU

EAR PROTECTION



ELECTRIC TAPE

GADGET

GOGGLES

GLOVES

MEASURING TAPE

Ω

OMEGA SYMBOL

QUARTZ CRISTAL

RIBBON CABLE

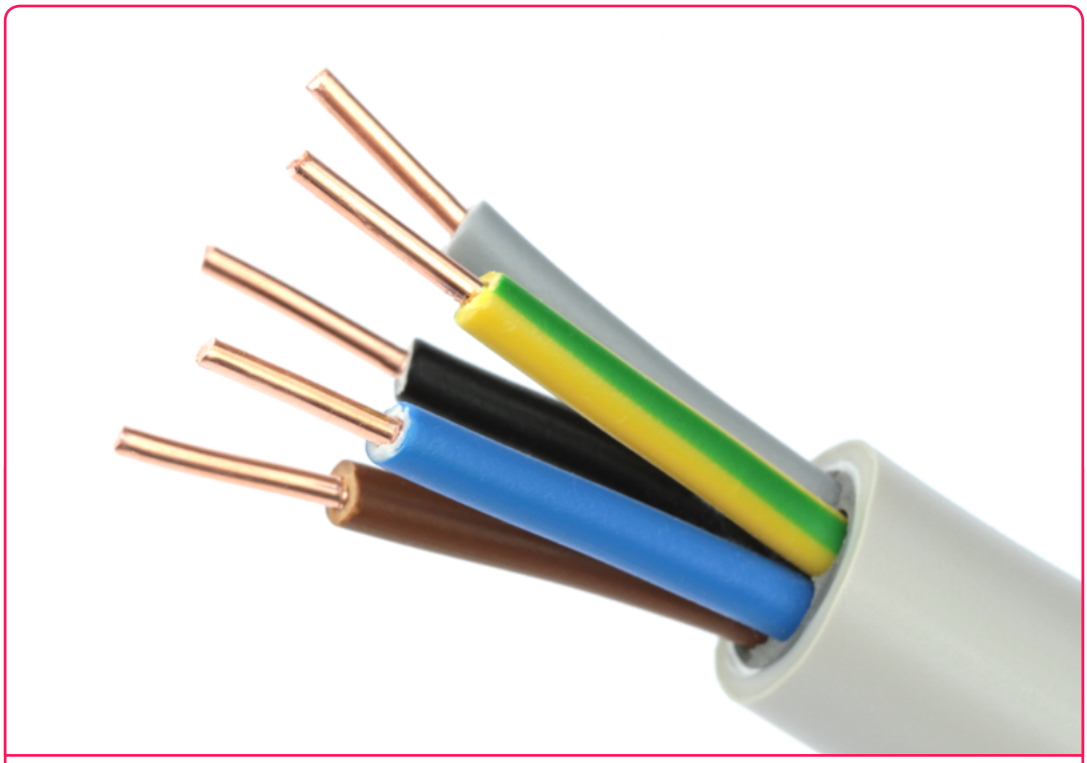
SLOTTED SCREWDRIVER

SOLDERING GUN

SURVEILLANCE CAMERA

TESTER SCREWDRIVE

TOOLKIT



WIRE

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UNIT 1

• Audio adapted from:

The Active Region (n.d.) Some basic electronic repair troubleshooting tips [Video File]. Retrieved from https://www.youtube.com/watch?v=kqFGk84PEiw

• Text adapted from:

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COMPLEMENTARY RESOURCES FOR STUDENTS:

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COMPLEMENTARY RESOURCES:

• Final Project

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