





Virginia Evans Jenny Dooley Carl Taylor



Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Consumer Electronics	Advertisement	camcorder, cell phone, computer, consumer electronics, digital camera, DVD player, e-book reader, MP3 player, speaker, stereo, tablet, television	Offering assistance
2	Electricity Basics	Course description	ampere, charge, circuit, conduct, current, electricity, electron, ohm, resistance, volt, watt,	Asking for clarification
3	Electricity Basics 2	Textbook excerpt	alternating current, capacitance, direct current, hertz, impedance, inductance, negative, polarity, positive, reactance, rectification, transformer	Checking for understanding
4	Tools	Advice column	diagonal cutters, electrical tape, flathead screwdriver, hammer, hemostat, hex wrench, magnifier, needlenose pliers, Phillips screwdriver, torque wrench, wire stripper	Expressing preferences
5	Tools 2	Webpage		
6	Soldering Tools			Giving reassurance
7	Testers and Brochure analog meter, capacitance meter, frequency counter, inductance meter, isolation transformer, logic analyzer, multimeter, oscilloscope, signal generator, spectrum analyzer, transistor tester		Talking about price	
8	Workspace	Magazine carpet, electrical service, lighting, location, power strip, article spot lighting, sturdy, surface, swing arm, workbench suggestic		Making suggestions
9	Actions	Job advertisement	adjust, align, analyze, assemble, calibrate, clean, disassemble, explain, inspect, lift, modify, recommend, remove, repair	Asking for information
10	Actions 2	Occupational manual	bend, carry, climb, crouch, drive, kneel, pull, push, reach, sit, stand, twist, walk	
11	Work Settings	Classified ads	construction site, elevated, factory, field, home, office, pole, shop, studio, tower, underground	Disagreeing
12	Electrical Safety	Safety poster	bare, circuit ground, contact, discharge, energized, exposed, jewelry, live connection point, non-conductive, retain, shock, terminal, turn off	
13	Math	Course description	add, decimal, divide, formula, fraction, multiply, power, proportion, ratio, root, subtract Asking abo	
14	Measurements	Article	angular frequency, centimeter, decibel, inch, micron, milibar, millimeter, phase angle, time constant, watt-hour	
15	Prefixes	Chart	giga (G), kilo (k), mega (M), micro (μ), milli (m), nano (n), pico (p), prefix, symbol, terra (T), value	Giving advice

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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Causes of Product Failure	Article	break down, corrosion, electrical stress, failure, heat stress, mechanical wear, mortality, physical stress, power surge, resistance, reversed polarity, wear out	Giving bad news
2	Initial Evaluation	Guide	abuse, age, conditions, evaluation, exhibit, gradual, idle, in common, in operation, manufacturer, sudden	Giving an opinion
3	External Evaluation	Checklist	activity, apart, dead, display, eliminate, external, hiss, hum, malfunctioning, remote control, scramble, tap, warm up	Getting someone to stop
4	Circuits	Course description	active element, circuit, closed, component, leg, open, origin, parallel, rectify, reservoir, series, short circuit, shorted, stage, wire	Troubleshooting
5	Signals	Textbook excerpt	amplitude, analog, analog-to-digital converter, cycle, digital, duty cycle, fall time, frequency, harmonic energy, phase relationship, rise time, sawtooth wave, signal, sine wave, square wave, waveform	Making comparisons
6	Capacitors	Catalog page	capacitor, ceramic capacitor, electrolytic capacitor, farad, insulator, mark, plastic capacitor, plate, range, rating, tantalum capacitor, trimmer capacitor	Expressing uncertainty
7	Crystals and Resonators	Web tutorial	ceramic, crystal, encased, filter, generate, lead, piezoelectric effect, quartz, resonator, slab, slice, vibrate	Giving reassurance
8	Diodes	Textbook excerpt	anode, band, biasing element, bridge rectifier, cathode, diode, double rectifier, light-emitting diode (LED), maximum, peak inverse voltage (PIV), pulse, rectifier, valve	Speculating
9	Fuses	Instructions	ructions blow, coil, cylinder, exceed, fuse, holder, hot side, protect, rectangular, slow-blow fuse, spring, surface-mount requests	
10	Chips (Integrated Circuits)	Press release	chip, custom, defective, fan, graphics card, large scale integrated chip (LSI), microscopic, silicon, small scale integrated chip (SSI), transistors	
11	Resistors			Asking for an explanation
12	Potentiometers	Webpage	audio taper pot, gang, isolate, linear taper pot, log taper pot, potentiometer (pot), resistance curve, rheostat, rotary, shaft, substrate, terminal, trimpot, wiper	Asking for a recommendation
13	Relays and Switches	Trade magazine article	contact, control, normally closed, normally open, passage, pole, relay, shut down, switch, throw, unconnected, variety	Talking about duration
14	Transistors	Article	amplify, base, bias, bipolar transistor, collector, depletion mode, drain, emitter, enhancement mode, gate, junction field effect transistor (JFET), metal-oxide semiconductor field-effect transistor (MOSFET), source	Making apologies
15	Voltage Regulators	Manual	alter, charge up, compensate, detect, incoming, linear regulator, output, pulse-width modulation (PWM), regulate, series pass transistor, switching regulator, voltage regulator, zener diode	Agreeing

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Glossary 3/





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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Diagrams	Magazine article	block diagram, chassis, conceptual, diagram, drawing, lay out, navigate, overall, pictorial diagram, placement, schematic diagram, section, service manual, specify	Asking for assistance
2	Call Numbers	Instructions	call number, designation, far away, identifier, label, look up, method, multi-section, standardize, unique, unrelated	Expressing frustration
3	Disassembling Devices	Trade magazine article	adhesive, case, come off, disassemble, disconnect, force, hidden, indentation, panel, patience, sealed, smack, snap, stuck	Giving a reminder
4	Replacing Components	Article on replacing components	chop off, clear, clip, coating, deform, delaminate, double-check, flow, heatsinking, molten, multi-layer, suck, thermal absorption	Disagreeing
5	Choosing Components	Column on choosing components	application , build up, consider, mail-order, oxidation, reuse, similar, standardized, stockpile, substitute	Interrupting someone
6	Power Supply	Textbook excerpt	congregate, filter, hard switch, inductor, linear power supply, microprocessor, power supply, regulation system, round, square, switching supply, toroid, voltage inverter	
7	Input/Output	Online article	nline article amplification, antenna, audio, cable, collect, composite, display, feed, input, input jack, output, resonate, transducer, varactor Expressing a lack of understand	
8	Signal Processing	Work order	Vork order combine, convert, parameters, play back, process, record, retrieve, send, small-scale, synthesize, take in, tuning	
9	Heat Sinks	Magazine article	active heat sink, airflow, aluminum, attachment, case fan, cool down, copper, draw away, heat sink, overheat, passive heat sink, speed, thermal conductor	Asking for advice
10	Separating the Snaps	ting Manual excerpt figure out, gap, give, half, melt, necessary, pop, pry, Expre		Expressing gratitude
11	Removing Ribbon Cables	Instructions	·	
12	Layers	yers Textbook excerpt battery compartment, circuit board, counterclockwise, drawing paper, fixed, industry standard, layer, lose track, metal shield, nut, precisely, stack		
13	Interior Reassembly	Online article	blob, corrosion, crimping, fractures, glyptal, inner, lead dress, multiple, overtighten, reassembly, reverse, secure, slice, tack down, wipe	Expressing surprise
14	Exterior Reassembly	Trade magazine article	bulge, grip, line up, mend, noticeable, pressure, snug, strip, sturdy, style, test out, weak, wobbly Asking for an opinion	
15	Disposal of Electronics	Newspaper article		

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Unit 9 – Heat Sinks
Unit 10 – Separating the Snaps
Unit 11 – Removing Ribbon Cables
Unit 12 – Layers
Unit 13 – Interior Reassembly
Unit 14 – Exterior Reassembly
Unit 15 – Disposal of Electronics
Glossary

Mr. Tech'S



flathead screwdriver

Phillips screwdriver

wire stripper

WEEKLY

ADVICE COLUMN

Question: I want to start repairing electronics. What sort of tools do I need to get started?

Dear Reader.

Start by buying a Phillips screwdriver and needlenose pliers. These are two of the most basic tools. Phillips screws are most common in electronics. However, sometimes you'll see slotted ones. In this case, you'll need a flathead screwdriver. Another useful tool is a hammer. For electrical work, diagonal cutters are important. You will also need a wire stripper and electrical tape. A medical hemostat is also helpful to hold your wires.

After these basics, look into different types of wrenches. I suggest a **hex wrench** and a **torque wrench**. Also, a **magnifier** is helpful for detailed work.

torque wrench

Get ready!

- 1 Before you read the passage, talk about these questions.
 - 1 What are some tools used when working on electronics?
 - 2 What tools can be used for cutting wires?

Reading

- Read the advice column. Then, choose the correct answers.
 - **1** What is the purpose of the response?
 - A to explain how to use a magnifier
 - **B** to describe different types of wrenches
 - C to list tools needed to repair electronics
 - D to explain the importance of hammers
 - 2 According to the passage, which item is used in a different profession?
 - A diagonal cutter
- C hex wrench
- **B** wire stripper
- **D** hemostat
- 3 What tool is used with slotted screws?
 - A torque wrench
 - **B** flathead screwdriver
 - C hammer
 - **D** Phillips screwdriver

Vocabulary

- Match the words or phrases (1-8) with the definitions (A-H).
 - 1 __ hemostat
- 5 __ electrical tape
- 2 __ hammer
- 6 __ hex wrench
- **3** __ wire stripper
- 7 __ Phillips screwdriver
- 4 __ torque wrench
- 8 __ needlenose pliers
- A a tool with a heavy metal head used for pounding or striking
- **B** an L-shaped tool used for loosening or tightening screws and bolts with a head shaped like a hexagon
- **C** a clamping tool used to clamp and hold wires
- **D** small pliers with thin long jaws used for cutting and gripping in detailed work
- **E** a tool that uses a gauge to tighten nuts and bolts
- F a tool used to cut and remove insulation from a wire
- **G** tape made of plastic or vinyl used to insulate electrical wires
- H a tool used to drive Phillips screws

- 4 Read the sentences and choose the correct words or phrases.
 - 1 Jenna used her Phillips screwdriver / flathead screwdriver for slotted screws.
 - 2 Henry used his hex wrench / diagonal cutters to cut the wires at an angle.
 - 3 The magnifier / hemostat is very helpful for looking at details.

Listening

needlenose pliers

- 6 Listen to a conversation between an apprentice and a professional electrician.

 Mark the following statements as true (T) or false (F).
 - 1 __ The man already has a Phillips screwdriver.
 - **2** __ The woman prefers plastic handles on screwdrivers.
 - 3 __ The woman likes Klein needlenose pliers for professional work.
- Conversation.
 Visite is a simple to the conversation.

Professional:	Hi, nice to meet you. Do you	
	1	
	?	
Apprentice:	Yes, I already have a 2	
	·	
Professional:	That's good, but you'll need a	
	3 , too.	
Apprentice:	Okay, I'll get one. 4	
	a certain type?	
Professional:	Yes, I prefer the ones with 5	
	for a better grip.	
Apprentice:	Okay, thanks. And I also have Klein	
	needlenose pliers.	
Professional:	Great. 6	
	Klein needlenose pliers for	
	professional work.	

diagonal cutters

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

You also need ...

I prefer ...

I really like ...

Student A: You are a professional electrician. Talk to Student B about:

- what tools he or she still needs to get
- what type of tool you prefer and why
- what brand of tool you prefer

Student B: You are an apprentice. Talk to Student A about which tools you need.

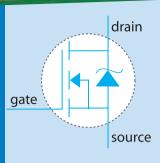
Writing

Use the advice column and the conversation from Task 8 to make a list of advice from the professional electrician.

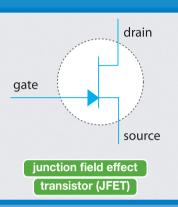
Advice from the professional electrician

WHAT DOES IT DO?

All About Transistors

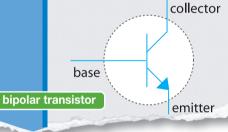


MOSFET transistor



A transistor is a device that determines the flow and quantity of current.

Transistors have the ability to switch and **amplify** electronic signals.



There are several different types of transistor: the **bipolar transistor**, the **junction field effect transistor (JFET)** and the **metal-oxide semiconductor field-effect transistor (MOSFET)**. Both FET and bipolar transistors need a **bias** voltage in order to turn on.

A bipolar transistor has three terminals. An electrical current flows into the first terminal, known as the **base**. The base changes the current flow between the **emitter** and **collector**.

Field effect transistors also have three terminals. However, the terminals have different names: the **gate**, **source**, and **drain**. The other difference is that voltage applied to the gate changes the current flow between the source and drain. MOSFETs have two main operating modes: **enhancement mode** and **depletion mode**. Depletion mode transistors are "normally on" whereas enhancement mode transistors are "normally off."

Get ready!

- 1 Before you read the passage, talk about these questions.
 - 1 What are two types of transistor?
 - 2 What are the three terminals in a FET transistor?

Reading

Read the article. Then, complete the table.

Transistor	Information
Bipolar	
JFET	
MOSFET	

Vocabulary

3 Match the words or phrases (1-7) with the definitions (A-G).

1	amplify	5	gate
2	bias	6	JFET
3	drain	7	source
4	enhancement mode		

- A an operating mode where the channel is free of charge carriers when the gate source voltage is zero
- **B** the part of a transistor where charge-carrying holes originate
- **C** a type of transistor that has a gate, source, and drain
- **D** a fixed voltage, applied to a device, in order to control its operation
- **E** the controlling terminal that alters the current flow between the source and drain
- **F** to increase the power of a signal
- **G** the part of a FET that does the same job as the collector

	ne sentence pairs. Choose which word or phrase s each blank.	Speaking 8 With a partner, act out the
1 base / depletion mode		roles below based on Task 7.
	transistors are devices	Then, switch roles.
th	nat are "normally on."	USE LANGUAGE SUCH AS:
	hechanges the flow	I'm already having
0	f current between two terminals.	
2 MOS	SFET / emitter	I apologize for How about?
	is a kind of transistor that requires ne least amount of signal current in order to turn on.	now about?
	he is the section of a transistor	
W	here charge-carrying holes originate.	Student A: You are a customer in an electronics store. Talk to
3 bipo	lar transistor / collector	Student B about:
A O	nce charge carriers have left the base, they flow into the	a problem with a purchasethe cause of the problem
	is a piece of	possible compensation
е	quipment used to amplify and switch electronic signals.	
do?	en and read the article again. What do transistors	Student B: You are a tech in an electronics store. Talk to Student A about the computer.
Listenir 🙃 😡 List	ten to a conversation between a customer and a	Writing
	lark the following statements as true (T) or	9 Use the article and the conversation from Task 8 to
1 T	he computer model is usually a good one.	fill out the notice
	he computer's transistor does not work correctly.	from the stereo
	he man offers to give her a new computer.	manufacturer.
	no man enero to give nor a new eempaten	
7 ₩ List	en again and complete the conversation.	
Customer:	I bought this computer here last week, and I'm already having problems with it.	NOTICE FORM DODOIS No select
Tech:	I apologize for the 1 Can I take a look at it?	Repair Needed
Customer:	Sure, but I don't know that I still want it. What kind of computer breaks 2?	Item affected:
Tech:	I'm so sorry it's given you difficulties. We don't usually have problems with 3	Repair needed:
Customer:	Really?	
	Okay, I think I know what the issue is. According to your computer's 4, it's part of a	Suggested customer compensation:
	batch that got faulty transistors.	
Customer:	Well that 5	
Tech:	I can 6 fairly easily.	

Glossary

add [V-T-U13] To add numbers is to combine them to form another total number.

adjust [V-T-U9] To adjust is to alter or move something slightly, in order to improve it.

alcohol [N-UNCOUNT-U5] Alcohol is a chemical solution and is used as a cleaning agent.

align [V-T-U9] To **align** is to arrange things so that they make a straight line or are in the right position, in relation to other objects.

alternating current [N-UNCOUNT-U3] **Alternating current** is a flow of electrical current that continually changes direction at a quick rate.

ampere [N-COUNT-U2] An ampere is the base unit of electric current. It is equal to one coulomb per second.

analog meter [N-COUNT-U7] An **analog meter** is an old-fashioned device that shows measurements by means of a moving needle. It is useful for showing slow fluctuating voltages and small dips and spikes of voltage.

analyze [V-T-U9] To analyze is to study something carefully, in order to explain or understand it.

angular frequency [N-UNCOUNT-U14] The **angular frequency** is a unit that represents the relationship between different wave forms.

assemble [V-T-U9] To assemble is to put the different parts of something together.

bare [ADJ-U12] If a wire is bare, it is uncovered.

bench vise [N-COUNT-U5] A bench vise is a clamp that holds wood or metal in place to be worked on with tools.

bend [V-I-U10] To bend is to move forward and downward, so that you are not upright.

bond [V–T–U6] To **bond** things together is to stick them together.

calibrate [V-T-U9] To calibrate is to change or check an instrument or tool, in order to make it more accurate.

camcorder [N-COUNT-U1] A camcorder is a device that combines a video camera, recorder, and player.

capacitance [N-UNCOUNT-U3] Capacitance is the ability to store an amount of electricity in an electric field.

capacitance meter [N-COUNT-U7] A capacitance meter is a device used to smooth power output. It is known for being unreliable.

carpet [N-UNCOUNT-U8] Carpet is a thick, heavy floor covering made of fabric.

carry [V-T-U10] To carry is to hold something with your hands or arms, and then take it somewhere.

cell phone [N-COUNT-U1] A cell phone is a portable, wireless telephone.

centimeter [N-COUNT-U14] A **centimeter** is a measurement unit used to determine an object's length or width and is one hundredth of a meter.

charge [N-COUNT-U2] A **charge** is the physical property of an object that makes it undergo a negative or positive force when it is near another electrically charged object.

circuit [N-COUNT-U2] A circuit is a system of electrical conductors that electricity flows through.

circuit ground [N-COUNT-U12] The ground or **circuit ground** is the place in the circuit where the current goes after it has been used. It is also called the earth.

clean [V-T-U9] To clean something is to get the dirt off something.

climb [V-I-U10] To climb is to use your feet and hands in order to travel up, down, over or across something.

clip lead [N-COUNT-U5] A clip lead is a short wire that is used to create an electrical current connection.

component [N-COUNT-U6] A **component** is one part of a piece of equipment. Many components are used to build larger machines.

computer [N-COUNT-U1] A **computer** is an electronic device that accepts, processes, and displays data.

conduct [V-T-U2] For electricity to conduct, it passes through an object.

connection point [N-COUNT-U12] A connection point is a place where two parts of a circuit meet.



Electronics

Career Paths: Electronics is a new educational resource for electronics professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. Career Paths: Electronics addresses topics including setting up a workspace, electrical safety, transistors, circuits, and reading diagrams.

The series is organized into three levels of difficulty and offers a minimum of 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

Included Features:

- A variety of realistic reading passages
- Career-specific dialogues
- · 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- · Complete glossary of terms and phrases

The Teacher's Guide contains detailed lesson plans, a full answer key and audio scripts.

The audio CDs contain all recorded material.



