

Science

Topic 3: Tools and Simple Machines

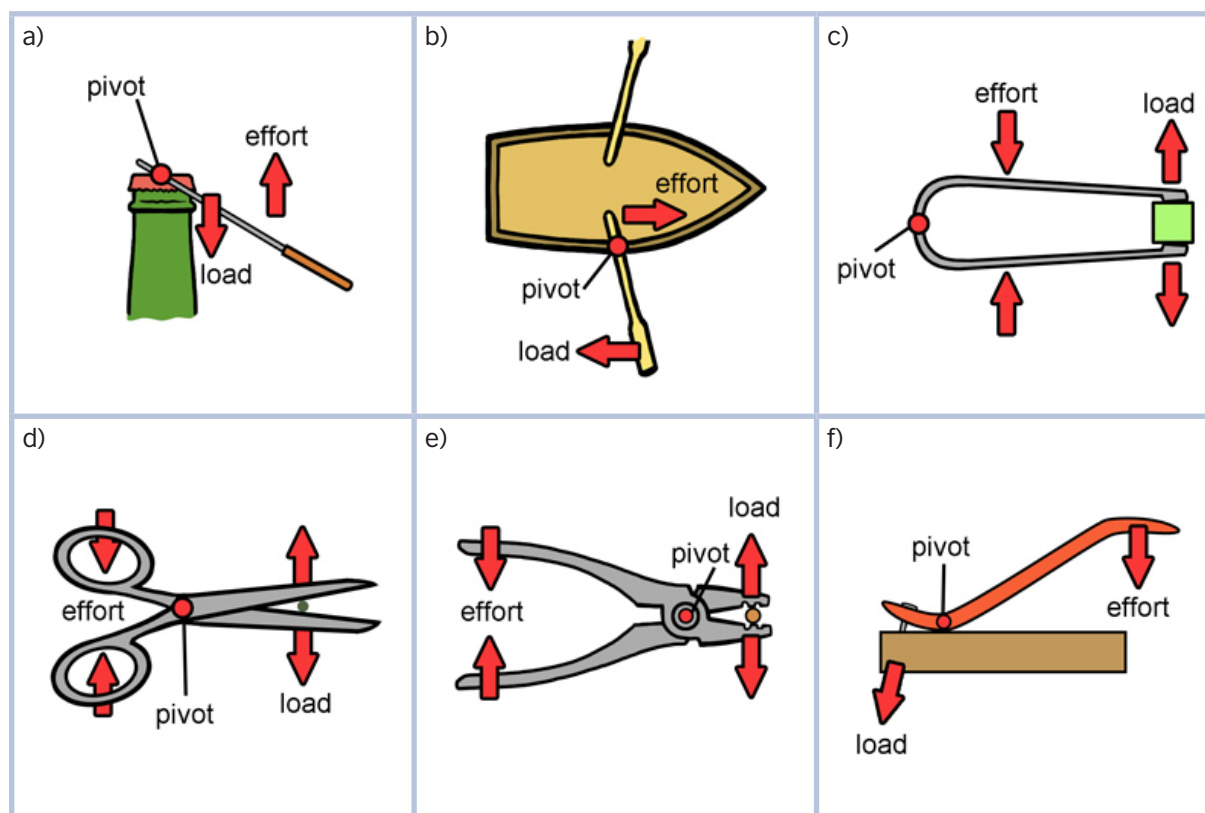
Topic 3: Tools and Simple Machines

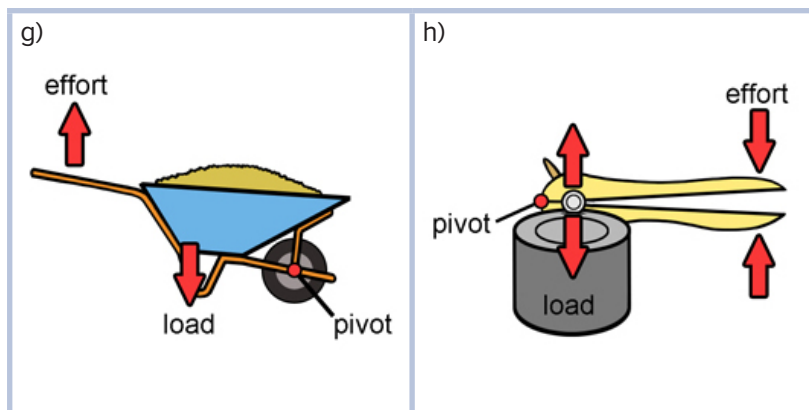
1. Choose the correct words from the list to fill the gaps in the text about **simple machines and levers**.

force	lever	machine
pivot	push	seesaw

A ^{a)} _____ is an invention that makes work easier. A simple machine increases the strength of a ^{b)} _____ or a pull, or the distance of a movement, to do a task. A nutcracker increases the ^{c)} _____ from your hand to crack a hard nut. A long fishing rod increases the distance moved by your arm to cast a line. A ^{d)} _____ is a simple machine made with a rod or a bar. A ^{e)} _____ is a lever. It has a ^{f)} _____ in the middle where it tips and balances. If you push down on one end, the other end goes up.

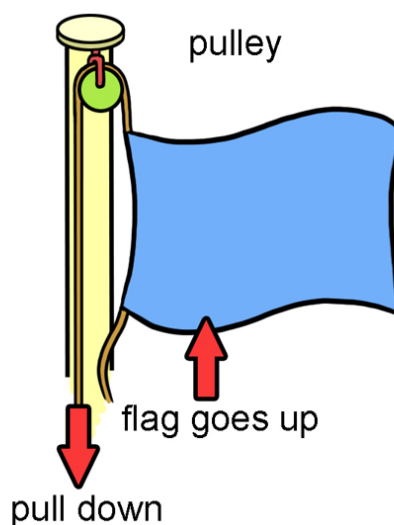
2. These pictures show different kinds of **levers**. Match the sentences with the pictures.





		Answer
1	An oar uses the side of the boat as a pivot.	
2	The pivot in a pair of scissors is the point where the two parts are connected.	
3	Effort is applied in a can opener by squeezing the arms together.	
4	The load pulls against the crowbar where the nail is levered out of a piece of wood.	
5	Pliers carry a load between their pincers.	
6	Effort is exerted by pushing together the two arms of the tongs.	
7	A bottle opener uses the top of the bottle as a pivot.	
8	Effort is applied upwards on the handles of a wheelbarrow.	

3. Make sentences about **how a pulley works** by matching the beginnings and endings.
Write your answers in the grid below.

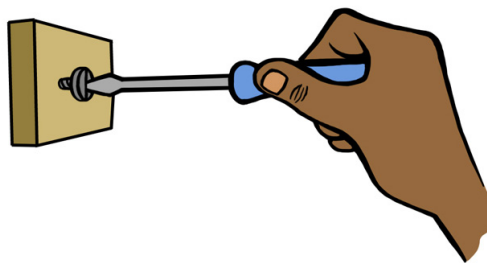


a)	A pulley is	1	raise a flag up a pole with a simple pulley.
b)	It has	2	changes the direction of the force from down to up.
c)	You can	3	a groove on the outside for a string or rope.
d)	When you	4	a special kind of wheel.
e)	The pulley	5	pull down on the rope, the pulley turns and the flag goes up.

Write your answers here:

a)	b)	c)	d)	e)

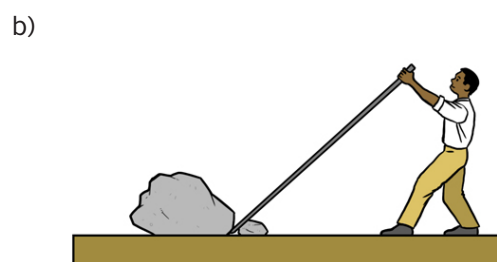
4. Choose the correct words from the list to fill the gaps in the sentences about **screws**.

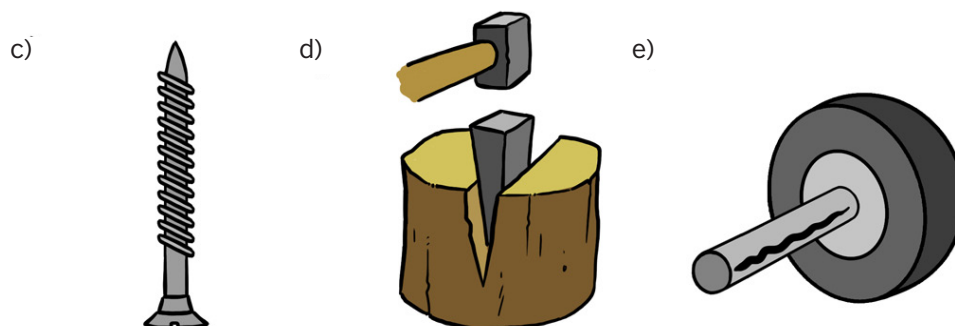


push	screw	turn	thread	wind	multiplies	groove
------	-------	------	--------	------	------------	--------

- A _____ has a groove that winds round in a spiral shape.
- The spiral _____ is called a thread.
- When you _____ a screw, the thread cuts into the wood.
- The screw is pulled into the wood by one thickness of the _____.
- You can't _____ a screw into wood with your bare hands.
- The screw thread _____ your strength.
- You _____ the screw in a little at a time.

5. These pictures show **simple machines**. Match the names with the pictures.





wheel and axle	lever	inclined plane	screw	wedge
----------------	-------	----------------	-------	-------

Answers:

a)		b)		c)	
d)		e)			

6. Fill in the table about **metals and their uses** with the correct words from the list.

Al	Au	copper	dull
magnetic	mercury	pipes	resistant

Metal	Symbol	Properties	Some uses
iron	Fe	common, strong, shiny, a) _____ grey metal that rusts in air	making steel for tools, bridges, buildings, large ships and cars
b) _____	Cu	reddish metal that is easy to draw into wires and pipes; conducts heat and electricity well; not magnetic	electric wires, water c) _____ , coins
aluminium	d) _____	light, silvery-white metal; resists corrosion	aircraft, cooking pots, bicycles, drinks cans, cooking foil
tin	Sn	silvery-white metal that can be polished to a bright shine; resists corrosion	coating steel to make food cans that are e) _____ to corrosion
f) _____	Hg	very heavy silver liquid; the only metal that is liquid at normal temperatures	in thermometers
lead	Pb	heavy, soft, g) _____ grey metal	diving weights
gold	h) _____	heavy, shiny, yellow metal; very resistant to corrosion	jewellery and decoration, high value coins

7. Choose the correct words from the list to fill the gaps in the text about **properties of metals**.

conduct	dense	ductile	lustrous	malleable	solid
---------	-------	---------	----------	-----------	-------

Most metals:

- a) are _____ (can be polished until they shine)
- b) are _____ (heavy for their size)
- c) _____ heat and electricity well
- d) are _____ (can be pulled out into fine wires)
- e) are _____ (can be hammered into thin sheets without breaking)
- f) are _____ at normal temperatures (except mercury)

8. Fill in the table on properties and uses of **metal alloys** with the correct words from the list.

brass	bronze	steel	iron	solder
coins	aircraft	bicycles	joining metals	chromium

Alloy name	Made from	Uses
a) _____	copper, zinc	musical instruments, decorative items
b) _____	copper, tin	statues, bearings
Cupronickel	copper, nickel	c) _____
Duralumin	aluminium, copper	d) _____
e) _____	iron, carbon	construction, tools, vehicles
Stainless steel	f) _____ _____ carbon	kitchen fittings, cutlery, surgical equipment
g) _____	lead, tin	h) _____

9. Find the words about **metals and their properties** in the word search.

<p>V S U R T I F E H E L I C M N D</p> <p>P I S P F L C N I Z E F R W Y M</p> <p>O L U G O S Q V Q G E X V O N P</p> <p>W V W H S I S L U J T V H X N O</p> <p>N E A T Z W O R O H S J V C T R</p> <p>H R S V M Q X P G M L C A M I T</p> <p>W N I V I L T T B R O N Z E N C</p> <p>T J X G S D I N O G C C F T S G</p> <p>K E J H B U A G C S N O H A O T</p> <p>V F W E U Y F I H D H P E L N T</p> <p>M B N L N V M X D T Y A A L O C</p> <p>P D V E X M U H H X L O V I R C</p> <p>Y T W K O P T G E O Q T Y C O S</p> <p>C G F C G M L U L B R A S S U E</p> <p>P F S I T S K W V S Q I J F S Z</p> <p>M C S N K W B V Y F F Z T X U A</p>	<p>bendy</p> <p>brass</p> <p>bronze</p> <p>heavy</p> <p>iron</p> <p>light</p> <p>metallic</p> <p>nickel</p> <p>silver</p> <p>soft</p> <p>sonorous</p> <p>steel</p> <p>tin</p> <p>zinc</p>
---	---

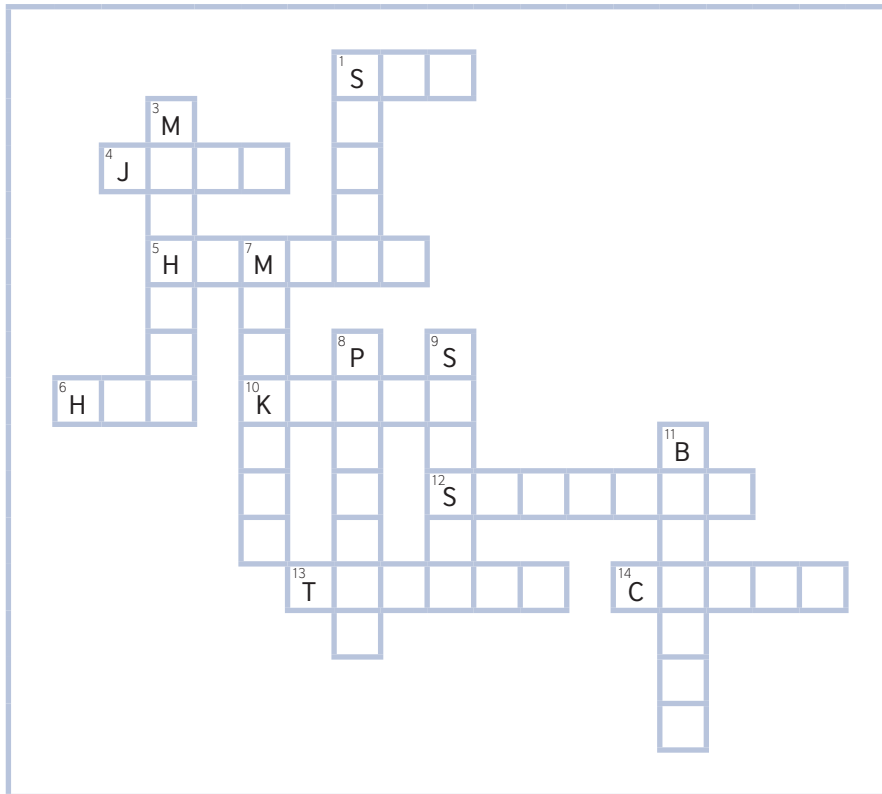
10. Complete the crossword by answering the following questions. All the correct answers are about **metal objects**.

Across:

- 1) A tool for cutting wood consisting of a long wooden handle and a jagged metal blade.
- 4) A piece of equipment for lifting and supporting a heavy object (for example, a car).
- 5) A tool for hitting nails into wood consisting of a handle and a heavy metal top.
- 6) A tool with a long handle that is used for removing weeds from the soil.
- 10) An object with a blade used for cutting things.
- 12) A tool that is used for turning small pieces of metal called nuts.
- 13) A small tool with a curved blade that is used to dig in the garden.
- 14) A tool used for holding two things together firmly.

Down:

- 1) A tool with a handle and a flat part that you push into the earth to dig.
- 3) A large knife that can be used as a tool.
- 7) 'can': A container in which milk is stored.
- 8) A tool that looks like scissors but has ends for holding things rather than cutting them.
- 9) A long board for children to play on. It is balanced on a support in the middle.
- 11) A tool used for blowing air into a fire. It consists of a leather bag between two wooden boards that you pull apart and push together.



11. Unscramble the letters to make words that answer the questions on **care and maintenance of tools**.

benchwork	geaser	gronts	leaningc	loot
penshar	race	tenanimance	tonicfun	valangize

a)	What verb means the activity of looking after someone or something?	
b)	What verb describes the activity or job of removing the dirt from something?	
c)	What verb means to work or operate in a particular way?	
d)	What verb means to put fat or oil on something to protect it?	
e)	What noun means work that is done to keep something in good condition?	
f)	What verb means to make something such as a knife, tool or pencil sharp?	
g)	What adjective describes material like metal that is powerful and robust?	
h)	What noun is a piece of equipment that you use to do a particular type of work?	
i)	What noun is a large strong table where you work with tools?	
j)	What verb means to protect the surface of steel or iron against rust by coating it in zinc?	

Glossary

agriculture	/ˈæɡrɪˌkʌltʃə(r)/ noun [U] the work, business, or study of farming.
aircraft	/ˈeə(r)ˌkrɑːft/ (plural aircraft) noun [C] a plane, helicopter, or other vehicle that flies.
aluminium	/ˌæləˈmɪniəm/ noun [U] a light silver-coloured metal element that does not corrode easily. Symbol: <i>Al</i> .
anvil	/ˈænvɪl/ noun [C] a metal block on which a blacksmith shapes metal objects with a hammer.
axe	/æks/ noun [C] a tool for cutting wood, consisting of a long wooden handle and a heavy metal blade.
axle	/ˈæks(ə)/ noun [C] a metal bar that connects a pair of wheels on a car or other vehicle.
balance	/ˈbæləns/ noun [C] a piece of equipment used for weighing things.
bellows	/ˈbeləʊz/ noun [C] a tool used for blowing air into a fire. It consists of a leather bag between two wooden boards that you pull apart and push together.
bendy	/ˈbendi/ adj easy to bend.
bottle opener	/ˈbɒt(ə)l ˈəʊp(ə)nə(r)/ noun [C] a small tool that is used for removing the lid from a bottle.
brass	/brɑːs/ noun [U] a shiny yellow metal that is a mixture of copper and zinc.
bridge	/brɪdʒ/ noun [C] a structure that supports a road, railway, or path going over a river, or another road.
bronze	/brɒnz/ noun [U] a hard brown metal made from copper and tin.
can	/kæn/ noun [C] a metal container with round sides for holding food or drink: <i>a can of beans</i> .
car jack	/dʒæk/ noun [C] a piece of equipment for lifting and supporting a heavy object, for example a car.
care	/keə(r)/ noun [C] the activity of looking after something: It is important to take proper care of the machinery.
can opener	/kæn ˈəʊp(ə)nə(r)/ noun [C] a small tool that is used for opening tin cans.
carpentry	/ˈkɑː(r)pɪntri/ noun [U] the activity of making and repairing wooden things.
chromium	/ˈkrəʊmiəm/ noun [U] a white metal used for putting a hard shiny covering on other metals. Symbol: <i>Cr</i> .
clamp	/klæmp/ noun [C] a tool used for holding two things together firmly.
cleaning	/ˈkliːnɪŋ/ noun [U] the activity or job of keeping things clean, or removing the dirt from something.
concentrate	/ˈkɒns(ə)nˌtreɪt/ verb [I/T] to give all your attention or effort to one thing or activity: <i>concentrated effort</i> .
conduct	/kənˈdʌkt/ [T] if something conducts heat or electricity, heat or electricity can move through it.

conductor	/kənˈdʌktə(r)/ noun [C] a substance that heat or electricity can pass through: <i>Metals are good conductors of electricity and heat.</i>
copper	/ˈkɒpə(r)/ noun [U] a red-brown metal element that is a good conductor of electricity and heat. It is used to make electric wires, water and gas pipes, and alloys. Symbol: <i>Cu</i> .
corrosion	/kəˈrʊʒ(ə)n/ noun [U] damage that is caused to metal or stone when it is corroded.
crowbar	/ˈkrəʊ.bɑː(r)/ noun [C] a metal bar with a curved end, used for forcing things open
dense	/dens/ adj a dense substance is very heavy in relation to its size.
ductile	/ˈdʌktail/ adj ductile metals such as copper and aluminium can be pressed into different shapes.
dull	/dʌl/ adj not bright or shiny.
effort	/ˈefə(r)t/ noun [U] the force used on a machine of any type in order to make it able to move an object
force	/fɔː(r)s/ noun [C] a power that makes an object move or changes the way it moves: <i>the force of gravity.</i>
fulcrum	/ˈfʊlkrəm/ noun [C] the point on which a lever balances or turns.
function	/ˈfʌŋkʃən/ verb [I] to work or operate in a particular way: <i>Get this machine functioning efficiently!</i>
galvanize	/ˈgælvənaɪz/ verb [T] to protect the surface of steel or iron against rust by coating it in zinc.
girder	/ˈgɜː(r)də(r)/ noun [C] a large metal bar that is used for making the frame of a building or a bridge.
gold	/gəʊld/ noun [U] a valuable yellow metal element used for making jewellery and in alloys. Symbol: <i>Au</i> .
grease	/griːs/ verb [T] to put grease, fat, or oil on something.
groove	/gruːv/ noun [C] a line that has been cut into a surface — grooved adj.
hammer	/ˈhæmə(r)/ noun [C] a tool for hitting nails into wood. It consists of a handle and a heavy metal top.
heat	/hiːt/ noun [U] the energy that is produced when the temperature of something changes.
heavy	/ˈhevi/ (heavier, heaviest) adj involving a lot of physical effort or force.
hoe	/həʊ/ noun [C] a tool with a long handle that is used for removing weeds from the soil.
inclined plane	/ɪnˈklaɪnd pleɪn/ noun [C] a flat surface that forms a slope, making an angle of less than 90 degrees with a horizontal surface.
invention	/ɪnˈvenʃ(ə)n/ noun [C/U] something that someone has made, designed, or thought of for the first time.
iron	/ˈaɪə(r)n/ noun [U] a chemical element that is a hard heavy metal used in making steel. Symbol: <i>Fe</i> .
jewellery	/ˈdʒuːəlri/ noun [U] objects made of precious metals and stones such as rings worn as decoration.

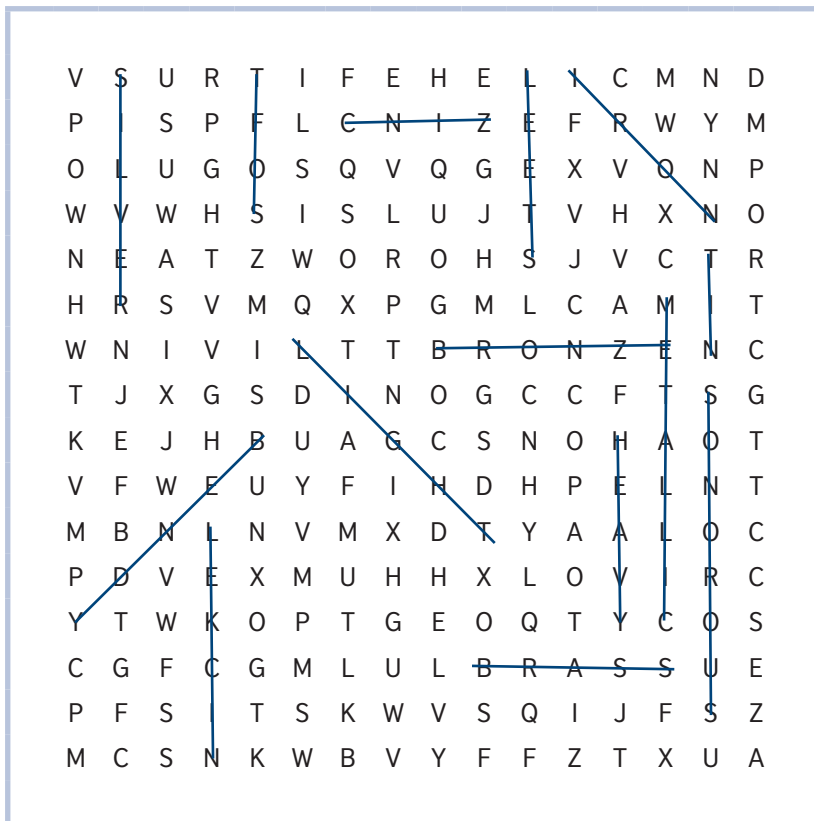
knife	/naɪf/ (plural knives /nalvz/) noun [C] an object with a blade, used for cutting things: <i>knives and forks.</i>
lever	/ˈli:və(r)/ noun [C] a solid bar, often made of metal, that you put under a heavy object to move it.
light	/laɪt/ adj not weighing much, or weighing less than you expect.
load	/ləʊd/ noun [C] the weight moved by a machine of any type.
lustrous	/ˈlʌstrəs/ adj bright and shiny.
machete	/məˈʃeti/ noun [C] a large knife that can be used as a tool.
machine	/məˈʃi:n/ noun [C] a simple tool or piece of equipment that changes the size or direction of a force, for example a lever or a screw: <i>a simple machine.</i>
magnetic	/mægˈnetɪk/ adj able to attract iron or steel objects.
maintenance	/ˈmeɪntənəns/ noun [U] work that is done to keep something in good condition: <i>aircraft maintenance.</i>
malleable	/ˈmæliəb(ə)l/ adj a malleable metal is easy to press into different shapes.
masonry	/ˈmeɪsənri/ noun [U] the bricks or stones that make a building, wall, or other structure.
mercury	/ˈmɜ:(r)kjəri/ noun [U] a very heavy silver metal element, used in thermometers. Symbol: <i>Hg.</i>
metallic	/mɪˈtæliɪk/ adj consisting of metal, or similar to metal.
milking can	/ˈmɪlɪŋ kæn/ noun [C] a container in which milk is stored.
multiply	/ˈmʌltɪplaɪ/ verb [I/T] to add a number to itself a particular number of times: <i>If you multiply 3 by 3, you get 9.</i>
nickel	/ˈnɪk(ə)l/ noun [U] a hard silverwhite metal element, used in batteries and to make alloys. Symbol: <i>Ni.</i>
oar	/ɔ:(r)/ noun [C] a long stick with a wide flat blade at one end, used for rowing a boat.
oil	/ˈɔɪl/ verb [T] to put oil on something.
pincers	/ˈpɪnsə(r)z/ (plural) a tool like scissors but with ends used for holding things rather than cutting them.
pipe	/paɪp/ noun [C] a tube (sometimes made of metal) that carries liquid or gas from one place to another.
pivot	/ˈpɪvət/ noun [C] a fixed point or pin that something turns on or balances on.
plane	/pleɪn/ noun [C] a flat surface.
pliers	/ˈplaɪə(r)z/ noun [plural] a metal tool that looks like a strong pair of scissors, used for holding small objects or for bending or cutting wire.
property	/ˈprɒpə(r)ti/ noun [C] a quality or feature of something.

pulley	/ˈpʊli/ (plural pulleys) noun [C] a simple machine used for lifting heavy things, consisting of a wheel with a rope around it. The rope is pulled in order to raise a load.
push	/pʊʃ/ [I/T] to move someone or something away from you using your hands.
resistant	/rɪˈzɪst(ə)nt/ adj not harmed or affected by something: <i>a rust-resistant metal</i> .
roller	/ˈrɒlə(r)/ noun [C] something that is shaped like a tube that goes over a surface in order to carry or transport something.
rust	/rʌst/ noun [U] the red-brown substance called iron oxide, that forms on the surface of iron or steel through a chemical reaction with water and air.
saucepan	/ˈsɔːspən/ noun [C] a round deep metal container with a long handle used for cooking food on a cooker.
saw	/sɔː/ noun [C] a tool that is used for cutting wood or metal.
scissors	/ˈsɪzə(r)z/ noun [plural] a tool for cutting paper, with two blades that open and shut.
screw	/skruː/ noun [C] a thin pointed piece of metal that you push and turn with a screwdriver to fasten one thing to another. It has a raised line that curves around it called a thread.
seesaw	/ˈsiːsɔː/ noun [C] a long board for children to play on. It is balanced on a support in the middle.
sharpen	/ˈʃɑː(r)pən/ verb [T] to make something such as a knife, tool, or pencil sharp.
shine	/ʃaɪn/ noun [singular] the bright appearance that something such as wood, metal, or leather has when it is in good condition: <i>shiny</i> .
silver	/ˈsɪlvə(r)/ noun [U] a light grey metal element that is the most effective conductor of electricity and heat of any substance.
soft	/sɒft/ adj a soft substance is easy to press or shape and is not hard or firm.
solder	/ˈsɒldə(r)/ noun [U] a soft metal that becomes liquid when it is heated, and is used for joining two metal surfaces together.
solid	/ˈsɒlɪd/ noun [C] a substance that is not a liquid or a gas and does not change in shape or volume.
sonorous	/ˈsɒnərəs/ adj a sound that is sonorous is deep and strong in a pleasant way.
spade	/speɪd/ noun [C] a tool used for digging with a handle and a flat part that you push into the earth.
spanner	/ˈspænə(r)/ noun [C] a metal tool that is used for turning small pieces of metal called nuts.
spiral	/ˈspaɪrəl/ noun [C] a shape like a set of circles made by one line curving around a central point.
steel	/stiːl/ noun [U] a strong metal made from a mixture of iron and carbon: <i>stainless steel</i> / ˈsteɪnləs stiːl/.
strong	/strɒŋ/ adj material like metal that is powerful and robust.
thermometre	/θə(r)ˈmɒmɪtə(r)/ noun [C] a piece of equipment with a scale that measures temperature.
thread	/θred/ noun [C] the raised line that curves around a screw in a continuous spiral.

tin	/tɪn/ noun [U] a chemical element that is a soft light silver metal. Symbol: <i>Sn</i> .
tongs	/tɒŋz/ noun [plural] a metal object with two connected arms that you push together in order to pick something up.
tool	/tu:l/ noun [C] a piece of equipment that you hold to do a particular type of work: <i>a set of tools</i> .
trowel	/ˈtraʊəl/ noun [C] a small tool with a curved blade that is used in gardens for digging.
T-square	/ti: skweə(r)/ noun [C] a tool in the shape of the letter T that is used for drawing parallel lines, or squares.
turn	/tɜ:(r)n/ verb [I/T] to make a circular movement, or to make something move in a circle.
watering can	/ˈwɔ:t(ə)rɪŋ ,kæn/ noun [C] a container used for pouring water on plants with a handle and spout.
wedge	/wedʒ/ noun [C] a piece of wood, plastic, or other material that is thin at one end and wider at the other. You press it into a space to hold something in place or to force things apart.
wind	verb [T] to wrap or twist something around something else.
wheel	/wi:l/ noun [C] a circular object that turns round in order to make a car, bicycle, or other vehicle move.
wheelbarrow	/ˈwi:l ,bærəʊ/ noun [C] a large open container with a wheel at the front and handles at the back. You use it outside for moving things such as dirt, wood, or supplies.
workbench	/ˈwɜ:(r)k ,bentʃ/ noun [C] a large strong table where you work with tools.
zinc	/zɪŋk/ noun [U] a chemical element that is a blue-white metal. It is used to make alloys and as a surface layer to protect other metals, especially iron and steel. Symbol: <i>Zn</i> .

Key:

1. a) machine, b) push, c) force, d) lever, e) seesaw, f) pivot
2. 1) g, 2) a, 3) f, 4) b, 5) e, 6) d, 7) h, 8) c
3. a) 4, b) 3, c) 1, d) 5, e) 2
4. a) screw, b) groove, c) turn, d) thread, e) push, f) multiplies, g) wind
5. a) inclined plane, b) lever, c) screw, d) wedge, e) wheel and axle
6. a) magnetic, b) copper, c) pipes, d) Al, e) resistant, f) mercury, g) dull, h) Au
7. a) lustrous, b) dense, c) conduct, d) ductile, e) malleable, f) solid
8. a) brass, b) bronze, c) coins, d) aircraft, bicycles, e) steel, f) iron, chromium, g) solder, h) joining metals
- 9.



10. **Across:** 1) saw, 4) jack, 5) hammer, 6) hoe, 10) knife, 12) spanner, 13) trowel, 14) clamp; **Down:** 1) spade, 3) machete, 7) milking, 8) pincers, 9) seesaw, 11) bellows
11. a) care, b) cleaning, c) function, d) grease, e) maintenance, f) sharpen, g) strong, h) tool, i) workbench, j) galvanize