

Living and non-living things: the seven characteristics (MRS GREN) and 50 things sorted

	Characteristic	In an animal	In a plant
M	Movement	walking, swimming, flying, a heartbeat	leaves turn to the light, roots grow down, flowers open
R	Respiration: releasing energy from food in every cell	breathing brings the oxygen; respiration is in the cells	plants respire too, day and night
S	Sensitivity: sensing and responding	eyes, ears, skin; a cat jumps at a noise	shoots grow to light, roots to water, mimosa folds when touched
G	Growth: more cells, development	a puppy becomes a dog	a seed becomes a tree
R	Reproduction: new individuals of the same kind	eggs, live young	seeds, spores, runners, bulbs, cuttings
E	Excretion: getting rid of waste made inside	urine, carbon dioxide, sweat	oxygen by day, carbon dioxide by night, waste in dropped leaves
N	Nutrition: taking in or making food	eating plants or animals	making sugar by photosynthesis

A living thing shows ALL seven (and is made of cells; US textbooks add homeostasis). A car moves and uses fuel but does not grow, reproduce or sense: not alive. Three groups for young children: living, dead (once alive: wood, paper, a fallen leaf), never alive (a stone, water).

Fifty things sorted

Living	Once-living (dead)	Non-living (never alive)
a dog, a tree, grass, a mushroom, mould on bread	a wooden table, paper, a dead leaf	a rock, water, air, the Sun
yeast, a bacterium, a worm, a seed (dormant), a fertilised egg	a fossil, leather, cotton cloth, a bone on the beach	a cloud, fire, a car, a robot, a computer
coral polyps, a sponge, a jellyfish, a cactus, moss and lichen	a shell, a log, a feather, a pearl, wool	a crystal, sand, a mountain, a river
an elephant, a baby, an oak sapling, plankton, a tardigrade	a dried flower, coal, honeycomb wax, silk, a pressed herbarium sample	a plastic toy, glass, a magnet, a battery, a soap bubble, a volcano, the Moon

The middle column is the hard one: was it ever made of living cells? Wood, paper, cotton, wool, leather, bone, shell and coal were; a rock, water and a car never were.

From

sciencewithshobha.com/blog/living-and-non-living-things-the-seven-characteristics-of-life-mrs-gren-examples-the-tricky-cases-fire-viruses-seeds-robots-and-a-sorting-activity/ · 1-on-1 online physics and chemistry, free 30-minute first class.

The tricky cases, a sorting activity, and practice

Thing	Why it seems alive	The verdict
fire	moves, grows, spreads, consumes fuel, uses oxygen	not alive: no cells, no reproduction (spreading is the same reaction), no sensing; a chemical reaction
a virus	has genes, reproduces, evolves	reproduces only inside a living cell; alone does nothing; most biologists: non-living, on the border of life
a seed	looks dry and dead	alive: a dormant embryo of living cells; respire slowly; grows when watered
a crystal	grows, regular shape	grows by adding layers from outside, not by making cells
a robot	moves, senses, responds, uses energy	no cells, respiration or growth; made, not born
a car	moves, feeds on fuel, gives off exhaust	no cells, growth, reproduction or sensing
a cloud, a river	moves, grows, changes shape	no cells; moved by wind, gravity and heat
a dead leaf, a log	part of a plant	once-living: its cells are dead
coral	looks like rock	the reef is built by living polyps; the hard part is once-living
a sponge	does not move	an animal: feeds, respire, grows, reproduces
a dried-out tardigrade	shows nothing for years	alive: revives with water, like the seed

Sorting activity: write L (living), D (dead, once-living) or N (never alive)

a cat []	a brick []	a log []	a snail []
a cloud []	paper []	a seed []	a robot []
mould []	a feather []	ice []	a daisy []
a shell []	fire []	a bacterium []	a plastic cup []
wool []	a frog []	the Moon []	a mushroom []
coal []	a worm []	a candle flame []	a fossil []

Answers

cat L, brick N, log D, snail L, cloud N, paper D, seed L, robot N, mould L, feather D, ice N, daisy L, shell D, fire N, bacterium L, plastic cup N, wool D, frog L, Moon N, mushroom L, coal D, worm L, candle flame N, fossil D

Practice

1. List the seven characteristics. 2. A car moves and uses fuel: why is it not alive? 3. A wooden chair: living, dead or non-living? 4. One way a plant moves and one way it senses. 5. Is a seed alive? 6. Why is fire not alive though it grows and spreads? 7. Which characteristic do plants show by making food, and the process? 8. Why do some scientists say viruses are not alive? 9. Is breathing the same as respiration?

Answers

1) movement, respiration, sensitivity, growth, reproduction, excretion, nutrition 2) no growth, reproduction, cells or sensing 3) dead: once part of a tree 4) leaves turn to light; shoots grow to light 5) yes, a dormant living embryo 6) no cells, no reproduction, no sensing 7) nutrition; photosynthesis 8) they reproduce only inside a host cell 9) no: breathing moves air; respiration releases energy in every cell