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Co-funded by the European Union

Expert Lexicon & Resource Bank

Nanoscience, nanotechnology, digital learning, Minecraft World are topics which might contain terms that are hard to understand or even complex definitions science teachers and educators might be unfamiliar with. The aim of this form is to have a compact list of key words and concepts commonly used in such topics together with a simplified explanation or definition. This will allow the target groups to properly understand all the relevant concepts and thus realize the true potential of teaching nanotechnology in class.

No.	Key Words / Phrases	Definition	Reference
			https://www.minecraft.net/en-us/about-
1	Minecraft	Minecraft is a sandbox video game developed by Mojang Studios.	minecraft
		Game-based learning is a teaching method that uses the power of games to define and	https://www.prodigygame.com/main-
2	Game Based Learning	support learning outcomes.	en/blog/game-based-learning/
		Micrometre, also called micron, metric unit of measure for length equal to 0.001 mm, or	https://www.britannica.com > science >
3	Micrometer	about 0.000039 inch. Its symbol is μm.	micrometre
		Microscope, instrument that produces enlarged images of small objects, allowing the	
		observer an exceedingly close view of minute structures at a scale convenient for	https://www.britannica.com/technology/micros
4	Microscope	examination and analysis.	cope
		Eukaryote, any cell or organism that possesses a clearly defined nucleus. The eukaryotic cell	
		has a nuclear membrane that surrounds the nucleus, in which the well-defined	
5	Eukaryote	chromosomes (bodies containing the hereditary material) are located.	https://www.britannica.com/science/eukaryote
			https://dictionary.cambridge.org/dictionary/engl
6	Inaminate	Having none of the characteristics of life that an animal or plant has	ish/inanimate
		Distance between corresponding points of two consecutive waves. "Corresponding points"	
		refers to two points or particles in the same phase—i.e., points that have completed identical	https://www.britannica.com/science/wavelengt
7	Wavelength	fractions of their periodic motion.	<u>h</u>
		Property of certain electromagnetic radiations in which the direction and magnitude of the	https://www.britannica.com/science/polarizatio
8	Polarization	vibrating electric field are related in a specified way.	<u>n-physics</u>
		Nanometer is a unit of length in the International System of Units (SI), equal to one billionth	
9	Nanometer	(short scale) of a metre (0.00000001 m)	https://en.wikipedia.org/wiki/Nanometre
		Electron beam, stream of electrons (as from a betatron) generated by heat (thermionic	
		emission), bombardment of charged atoms or particles (secondary electron emission), or	https://www.britannica.com/science/electron-
10	Electron beam	strong electric fields (field emission).	beam
		A combining form meaning "icy cold," "frost," used in the formation of compound	
11	Cryo	words:cryogenics.	https://www.dictionary.com/browse/cryo-

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		An X-ray, or, much less commonly, X-radiation, is a penetrating form of high-energy	
		electromagnetic radiation. Most X-rays have a wavelength ranging from 10 picometers to 10	
		nanometers, corresponding to frequencies in the range 30 petahertz to 30 exahertz (3×1016	
12	X-ray	Hz to 3x1019 Hz) and energies in the range 145 eV to 124 keV.	https://en.wikipedia.org/wiki/X-ray
		Electron volt, unit of energy commonly used in atomic and nuclear physics, equal to the	
		energy gained by an electron (a charged particle carrying unit electronic charge) when the	
		electrical potential at the electron increases by one volt. The electron volt equals 1.602 x	https://www.britannica.com/science/electron-
13	Electron volt (eV)	10−12 erg, or 1.602 × 10−19 joule.	volt
			https://education.nationalgeographic.org/resou
14	Nanotechnology	The understanding and control of matter at the nanometer-scale.	rce/nanotechnology
	Atomic Force Microscopy		
15	(AFM)	A high-resolution non-optical imaging technique.	https://doi.org/10.1103/physrevlett.56.930
16	Macroscale	The geometry on the order of millimeters and above	https://dlossary.ametsoc.org/wiki/Macroscale
10	Microscale	The scale that refers to submillimeter length scales down to the micrometer range	https://glossary.ametsoc.org/wiki/Macroscale
	Microcodio	This scale (1-100 nm) refers to matter measured in extremely small units of length called	https://education.nationalgeographic.org/resou
18	Nanoscale	nanometers	rce/papotechpology
10	Nanoscale	The technology that erected or used minigture components, equipment, and systems for	https://papabub.org/resources/26676/dowplea
10	Microtophology	multidisciplinary purposes	d/lpt_Soolo_PK12_PC_pdf
19	Microtechnology	munuluscipilitary purposes.	<u>u/III_Scale_FK12_FG.pul</u>
00	Newsynatic	A section of method is between 4,400 cm is discussed	nups://education.nationalgeographic.org/resou
20	Nanoparticie	A particle of matter that is between 1-100 nm in diameter.	rce/nanotecnnology
		Any organic, inorganic, or organometallic material that present chemical, physical, and/or	
21	Nanomaterials	electrical properties that change as a function of the size and shape of the material.	https://doi.org/10.1126/science.aau8299
		Spherical or tubular molecular structures consisting of carbon atoms thickly arranged and	https://education.nationalgeographic.org/resou
22	Fullerenes	strongly bonded, otherwise known as allotropes of carbon.	rce/nanotechnology
			https://www.sciencedirect.com/topics/agricultu
23	Nanotubes	Tubular fullerenes	ral-and-biological-sciences/carbon-nanotubes
		Nanometer-sized carbon molecules shaped like soccer balls—tightly bonded hexagons and	https://education.nationalgeographic.org/resou
24	Buckyballs	pentagons.	<u>rce/nanotechnology</u>
		Complex, treelike nanoparticles built from linked, branched units that compose extremely	https://www.sciencedirect.com/topics/nursing-
25	Dendrimers	strong structures	and-health-professions/dendrimer
			https://education.nationalgeographic.org/resou
26	Nanocomposites	Hybrid materials that combine two or more materials, at least one of which is a nanomaterial	rce/nanotechnology
27	Nanomanufacturing	Synthesizing nanomaterials.	https://doi.org/10.3390/nano11123228
28	Top-down approach	Manipulating bulk materials to create fine particles in nano dimensions.	https://doi.org/10.3390/nano11123228
		Assembling fine particles to create nanomaterials through self-assembly or co-precipitation	
29	Bottom-up approach	methods.	https://doi.org/10.3390/nano11123228
		Oncology using nanotechnology to improve the efficacy of traditional chemotherapy drugs	https://www.ncbi.nlm.nih.gov/pmc/articles/PM
30	Nano-oncology	and increase response rates	C6982820/#B16-molecules-25-00112
31	DNA nanotechnology	The technology used to control molecular self-assembly	https://doi.org/10.1038/natrevmats.2017.68
		Revolutionary pharmaceuticals developed by nanobiotechnology to utilize nanoparticles'	https://link.springer.com/chapter/10.1007/978-
32	Nanopharmaceuticals	unique properties and functions	1-4939-6966-1 5
		The technology that ensures optimal drug delivery targeted cancer treatment antimicrobial	https://link.springer.com/chapter/10 1007/978-
33	Nanobiotechnology	activity, tissue regeneration, nerve protection, etc.	1-4939-6966-1 5
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