

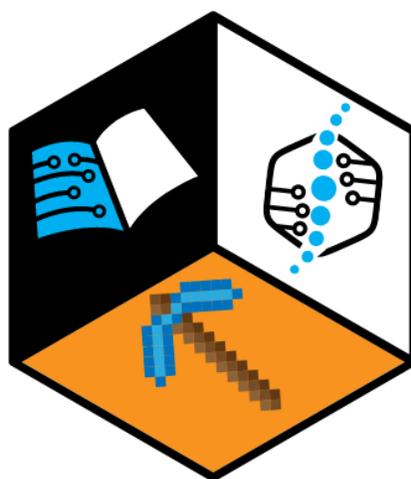
# NANOWARE Curriculum

**MODULE 5: NANOTECHNOLOGY IN OUR LIVES**

**ASSESSMENT**

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**DELIVERABLE: R1/T1.1**



## NANOWARE

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Learning Seed

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# 1. Assessment

The following sections aim to support you in the self-reflection process of your knowledge and skills. Answer the questions wisely based on what you have learned. Tips and feedback will be provided to motivate you learn more about the topic!

## 1.1 Knowledge Assessment

This part includes quiz-like questions for you to reflect on your knowledge!

Take your time to answer the ten (10) following questions!

Question 5.1(true/false):

We use nanotechnology in our daily lives

**[Correct answer 1]: True**

[Generic feedback]: Many normal commercial merchandise available on the market rely on nanotechnology. The obvious nanoparticles or membranes on computer monitors, cameras and glasses (The Scientific World, 2019).

Question 5.2 (true/false):

Nanotechnology is part of Science, Technology, Engineering, and Mathematics (STEM) education.

**[Correct answer]: True**

[Generic feedback]: Nanotechnology is considered as an integral part of "Science, Technology, Engineering, and Mathematics (STEM) education". Just as engineering practice is no longer limited to university students, so also nanotechnology. Everyone - including children, teachers,



and graduate students - can benefit, enjoy, and learn this technology (The Scientific World, 2019).

Question 5.3 (multiple choice):

Can water filters with 15-20 nanometers remove all viruses and bacteria?

**[correct answer]: Yes, they can**

[answer 2]: Yes, they can but only the water filters with 5-10 nanometers

[answer 3]: They water filters can't remove viruses and bacteria

[Generic feedback]: Water filters (15-20 nanometres) can remove all viruses and bacteria. This is an innovative cost-efficient water treatment system. Many countries need urgently to get the quality of drinking water improved.

Question 5.4 (multiple answers correct):

A huge variety of chemical sensors can be programmed to detect a particular chemical at amazingly low levels. This capability is ideal for surveillance and security systems at:

**[labs]**

**[airports]**

[farms]

[churches]

[Generic feedback]: Thanks to nanotechnology, a huge variety of chemical sensors can be programmed to detect a particular chemical at amazingly low levels—for example, a single molecule out of billions. This capability is ideal for surveillance and security systems at labs, industrial sites, and airports



Question 5.5 (multiple answers correct):

From those below, where nanotechnology is used?

**[Sunscreen]**

[Rings]

[Books]

**[Glasses]**

[Generic feedback]: Most sunscreens today are made from nanoparticles that effectively absorb light, including the more dangerous ultraviolet range. They also spread more easily over the skin. These same nanoparticles are also used to reduce UV exposure.

Question 5.6 (multiple answers correct):

How can nanotechnology improve a tennis racket?

[The tennis rackets can be bigger]

[The tennis rackets are more comfortable for the athlete]

**[They bend less]**

**[Nanotechnology increases the force and accuracy of the delivery]**

[Generic feedback]: A tennis racket made with carbon nanotubes bends less during impact and increases the force and accuracy of the delivery. Nanoparticle-treated tennis balls can keep bouncing twice as long as standard tennis balls

Question 5.7 (multiple answers correct):

How do nanoparticles improve the quality of the fabrics?

[The nanoparticles make the colors of the fabric look brighter]

[The nanoparticles make the fabrics thicker and as a result they have better quality]



**[The nanoparticles in fabrics are water resistance]**

**[The nanoparticles in fabrics are flame resistance]**

[Generic feedback]: Nanoparticles in fabrics are stain, water, and flame resistance. They do not increase such properties of fabrics as weight, thickness, or stiffness (The NYU Dispatch, 2020. You can find more [here](#)).

Question 5.8 (matching):

Match the terms with their definitions.

Carbon nanotubes: Carbon nanotube is s a tube made of carbon with diameters typically measured in nanometers (definition by Wikipedia)

Nanoparticles: A nanoparticle is a small particle that ranges between 1 to 100 nanometres in sizena (definition by twi-global.com)

Circuits: They are made from carbon nanotubes and could be vital in maintaining the growth of computer power.

Nanospheres: They are small vesicles used to transport drugs (definition by José Juan Escobar-Chávez)

Nanoemulsions.: They are nano-sized emulsions, which are manufactured for improving the delivery of active pharmaceutical ingredients (Manjit Jaiswal, Rupesh Dudhe, and P. K. Sharma)

[generic feedback]: The learners now have a clearer picture of important terms related to the nanotechnology.

Question 5.9 (matching):

Match the concepts with their explanations.

Nanobiotix: Nanotechnology has helped to detect some diseases through this sensor.



Optical tweezers: pairs of tiny glass beads are brought together or moved apart using laser beams

Solar Cells: They are electronic devices that convert the energy of light directly into electricity by the photovoltaic effect

Thermal Energy: It is produced when a rise in temperature causes atoms and molecules to move faster and collide with each other (SolarSchools.net)

Non-reflective materials: Materials that reflect no light, must either absorb all light that hits them

[generic feedback]: The learners now have a better understanding of concept related to the nanotechnology and therefore they can easily understand the use of it in daily life.

Question 5.10 (matching):

Match the problems with their solutions.

[Problem 1]: How can we add stain resistance to clothing and fabric? : Nanotechnology could help with millions of microscopic nanowhiskers (The Scientific World, 2019).

[Problem 2]: How could we sift emissions from industrial plants? : With tiny wastewater filters eliminating even the smallest residues before they are released into the environment

[Problem 3] : How sunscreens today can effectively absorb light, including the more dangerous ultraviolet range? : Nanoparticles can be used.

[Problem 4]: How drink bottles have good resistance to permeation by oxygen and moisture ? : They contain nanoclays

[Problem 5] : How can we clean up oil spills? : Nanoparticles could be used (Catherine Brahic and Mike Shanahan, 2005).

[generic feedback]: Learners can understand better the concept of nanotechnology and how is applied in everyday life.



## 1.2 Skills Assessment

This is the part where your knowledge is being put into action!

Train your brain with the skills you gained through this module and think through a possible answer to the following assignment!

**How many objects can you find in your room in which nanotechnology is used?**

Since nanotechnology is used to our daily life, it would be easier for a learner to search and identify all the things around him that nanotechnology is used. Especially for young people, this is one of the easiest ways to learn and prompts them to seek and explore more.