

Nanomaterials and the nanoscale: structure strip

Learning objectives

- 1 Explore the topic of nanomaterials and the nanoscale.
- 2 Understand how to calculate orders of magnitude and surface area to volume ratio.
- 3 Practise drafting extended responses.

Introduction

Nanomaterials are becoming more and more important in everyday life and in scientific research. In this activity, you will develop your skills in reading and writing about nanomaterials and the nanoscale.

Instructions

Stick the structure strip in the margin of your exercise book/paper and follow the prompts to write your answer. Take care to write in full sentences, describing the question within your answer and using appropriate keywords.

Extended response

Answer this question once you have completed the structure strip.

Gold nanoparticles can be used as catalysts. They cost £120 for a 25 cm³ bottle as a suspension. A lab orders bottles of 30 nm and 80 nm gold nanoparticles. Evaluate the use of these two sizes of nanoparticles including appropriate calculations.

Extension

When choosing catalysts, cost is a key factor, yet gold is not cheap. Many different transition metal nanoparticles can be similarly used as catalysts. Discuss other factors that may need to be considered.

Keywords

Nanoscale, nanometre, nanomaterial, fine, coarse, particle, atom, property, surface area.

Nanomaterials and the nanoscale	Nanomaterials and the nanoscale	Nanomaterials and the nanoscale	Nanomaterials and the nanoscale	Nanomaterials and the nanoscale
Explain the term 'nanometre'.	Explain the term 'nanometre'.	Explain the term 'nanometre'.	Explain the term 'nanometre'.	Explain the term 'nanometre'.
Define the term nanoscience and compare nanoparticles to coarse particles and fine particles.	Define the term nanoscience and compare nanoparticles to coarse particles and fine particles.	Define the term nanoscience and compare nanoparticles to coarse particles and fine particles.	Define the term nanoscience and compare nanoparticles to coarse particles and fine particles.	Define the term nanoscience and compare nanoparticles to coarse particles and fine particles.
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Show, using an example, how to calculate the surface area (SA): volume (V) ratio of a cube shaped nanoparticle. Explain why SA:V ratio is an important property.	Show, using an example, how to calculate the surface area (SA): volume (V) ratio of a cube shaped nanoparticle. Explain why SA:V ratio is an important property .	Show, using an example, how to calculate the surface area (SA): volume (V) ratio of a cube shaped nanoparticle. Explain why SA:V ratio is an important property .	Show, using an example, how to calculate the surface area (SA): volume (V) ratio of a cube shaped nanoparticle. Explain why SA:V ratio is an important property .	Show, using an example, how to calculate the surface area (SA): volume (V) ratio of a cube shaped nanoparticle. Explain why SA:V ratio is an important property.
Describe the structure and bonding of a carbon nanotube. You may support your answer with a sketch. <ul style="list-style-type: none"> What are the properties of carbon nanotubes and how are they related to their structure and bonding? Where do they sit on the nanoscale? 	Describe the structure and bonding of a carbon nanotube. You may support your answer with a sketch. <ul style="list-style-type: none"> What are the properties of carbon nanotubes and how are they related to their structure and bonding? Where do they sit on the nanoscale? 	Describe the structure and bonding of a carbon nanotube. You may support your answer with a sketch. <ul style="list-style-type: none"> What are the properties of carbon nanotubes and how are they related to their structure and bonding? Where do they sit on the nanoscale? 	Describe the structure and bonding of a carbon nanotube. You may support your answer with a sketch. <ul style="list-style-type: none"> What are the properties of carbon nanotubes and how are they related to their structure and bonding? Where do they sit on the nanoscale? 	Describe the structure and bonding of a carbon nanotube. You may support your answer with a sketch. <ul style="list-style-type: none"> What are the properties of carbon nanotubes and how are they related to their structure and bonding? Where do they sit on the nanoscale?