

nanoHUB Kids: Pedagogical Foundation for teaching Nanotechnology to Middle School Students

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Approach: To promote abstract thinking in middle school students in order to understand the underlying concepts of nanotechnology

Process: Abstract thinking can be promoted through pedagogical techniques

Knowledge of the subject matter

Adequate topic-related formal instruction

Integration of previous knowledge

Reasoning strategies

What?

Content: Underlying concepts of nanotechnology

Particulate nature of matter

Concept of scale and measurement

Powers of ten

Decreased surface area-to volume ratio

Forces

Energy

Strategies: as the form to convey the concepts

Integration: attempts to link consistent but unrelated conceptions

Differentiation: attempts to identify differences between related concepts

Mediation: to inspire interest and to guide the learner

Analogies and metaphors: to link previous knowledge to new concepts in a familiar way

Simulation: to present the dynamic representation of the phenomena

Models: to represent partial sections of a non directly observable phenomena with its interacting components

Wider range of examples: for multiple representations of the same phenomena and for consistency

How?

Technology: as the way to deliver the content

Animations

Video games

Images

Videos

Visualizations

Text

Interactive applications