

SPN 1022
LEARNING IN SCIENCE AND MATHEMATICS

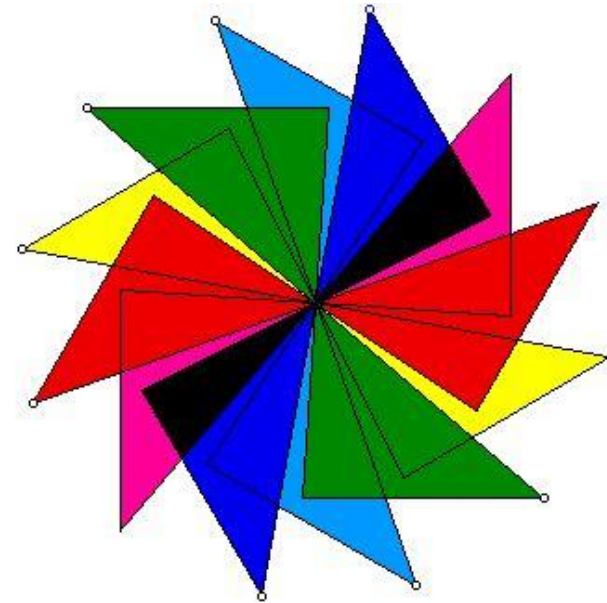
Introduction

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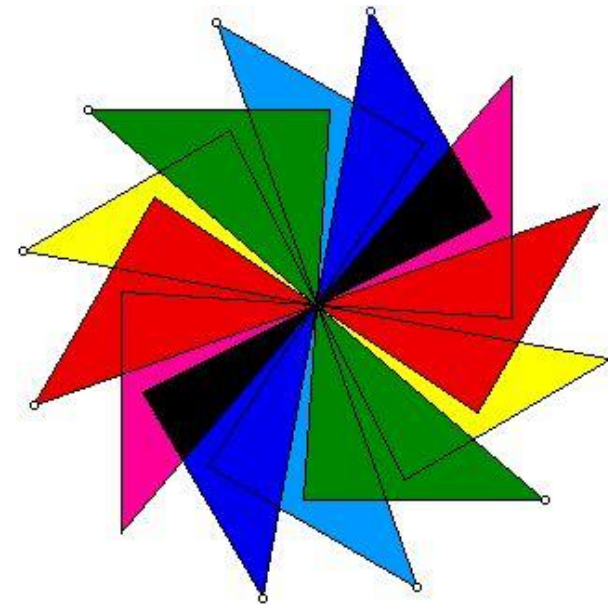
Discussion

- How did your mathematics teacher teach mathematics?
- How did you learn mathematics?
- Which comes first? Theories of learning or theories of teaching?

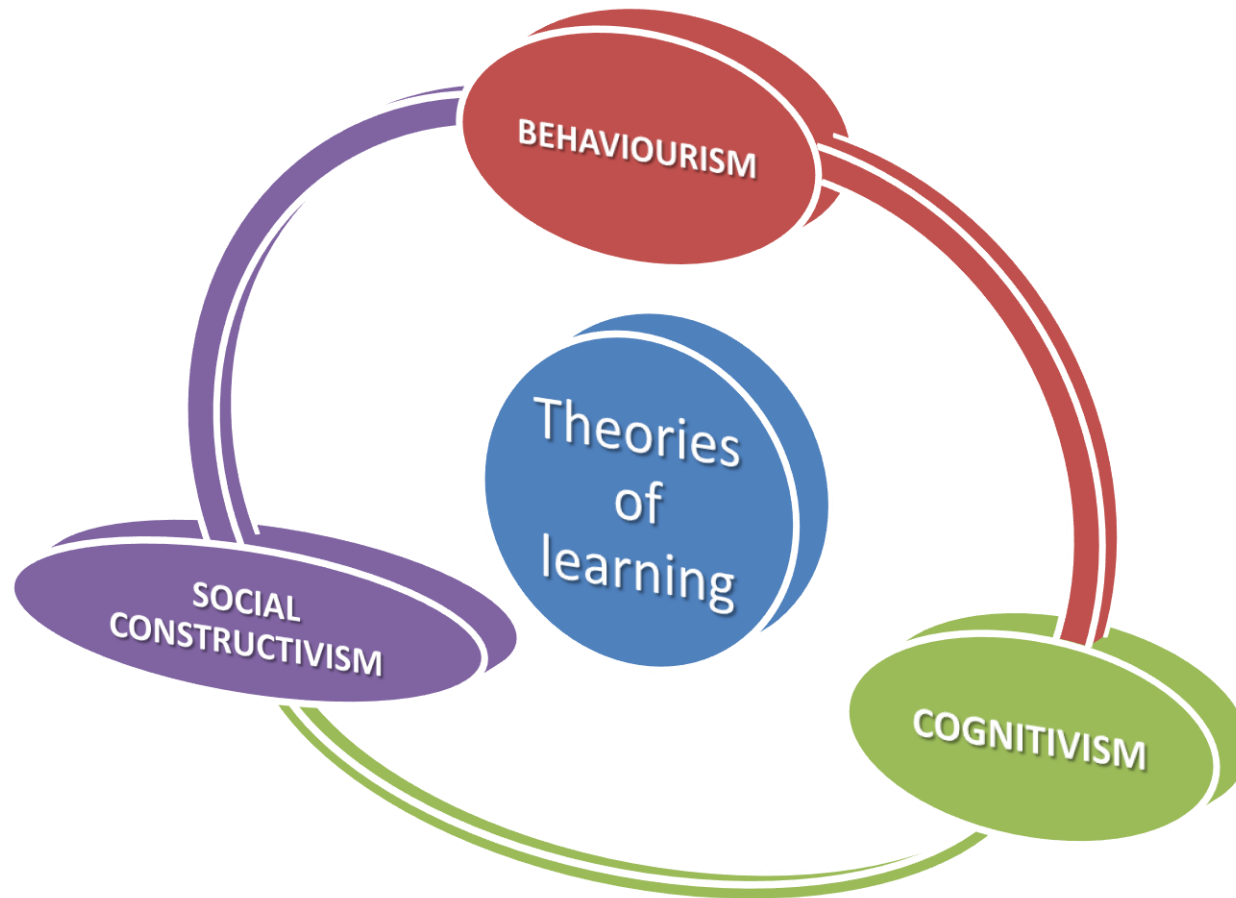


Discussion

- How did your Science teacher teach science?
- How did you learn science?
- Which comes first? Theories of learning or theories of teaching?

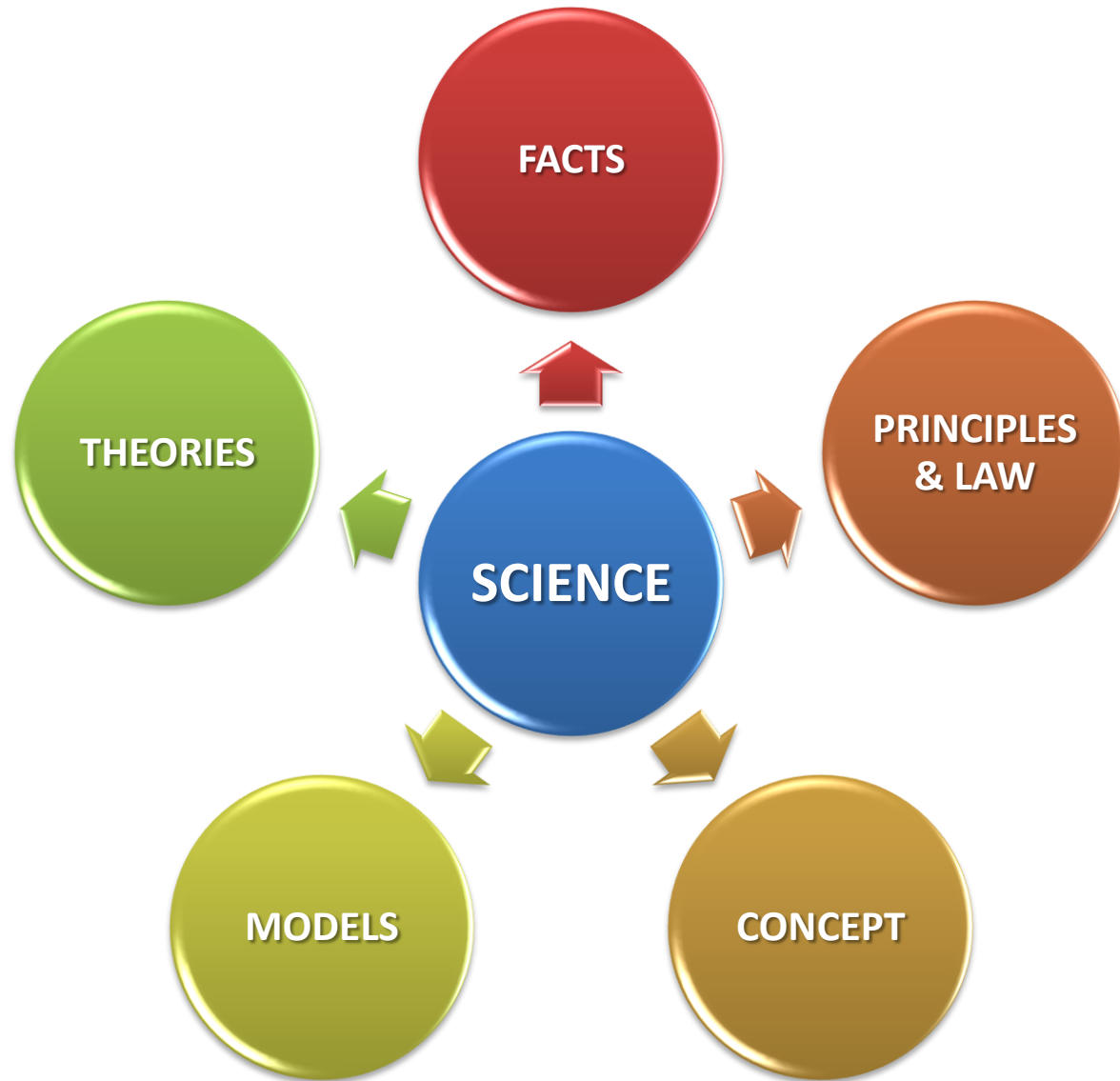


Theories of learning



Science as a Body of Knowledge

- Collection of ideas pertaining to the natural and physical worlds is organized into astronomy, biology, chemistry, physics, geology and so on.
 - Facts
 - Concepts
 - Principles and Laws
 - Theories
 - Models



Fact

- The specific statement about existing objects or actual incidents.
- Facts are acquired after making observations and measurements and can be confirmed.
- Example: As many as 30 coins can be put into glass without altering the curvature of the water surface.

Concept

- An abstract idea which is generalised from facts or specific experiences.
- The concept is formed based on similar characteristics which exist in objects or specific incidents.
- Eg: Water have the surface tension concept.

Principle

- A complex idea based on related concepts.
- The relationship between specific concepts is generalized to form a principle.
- Example: 'hot air expands' is a principle which relates the concepts of air, heat and expansion.

Law

- A law is a more stable principle of science that is generally more widely accepted, even though a law is still tentative.
- Example: The law of conservation of energy.

Theory

- A scientific theory is a wide framework which relates facts, concepts and principles.
- A theory is a model, an imaginative picture about how the universe becomes one.
- Examples: The geocentric theory.