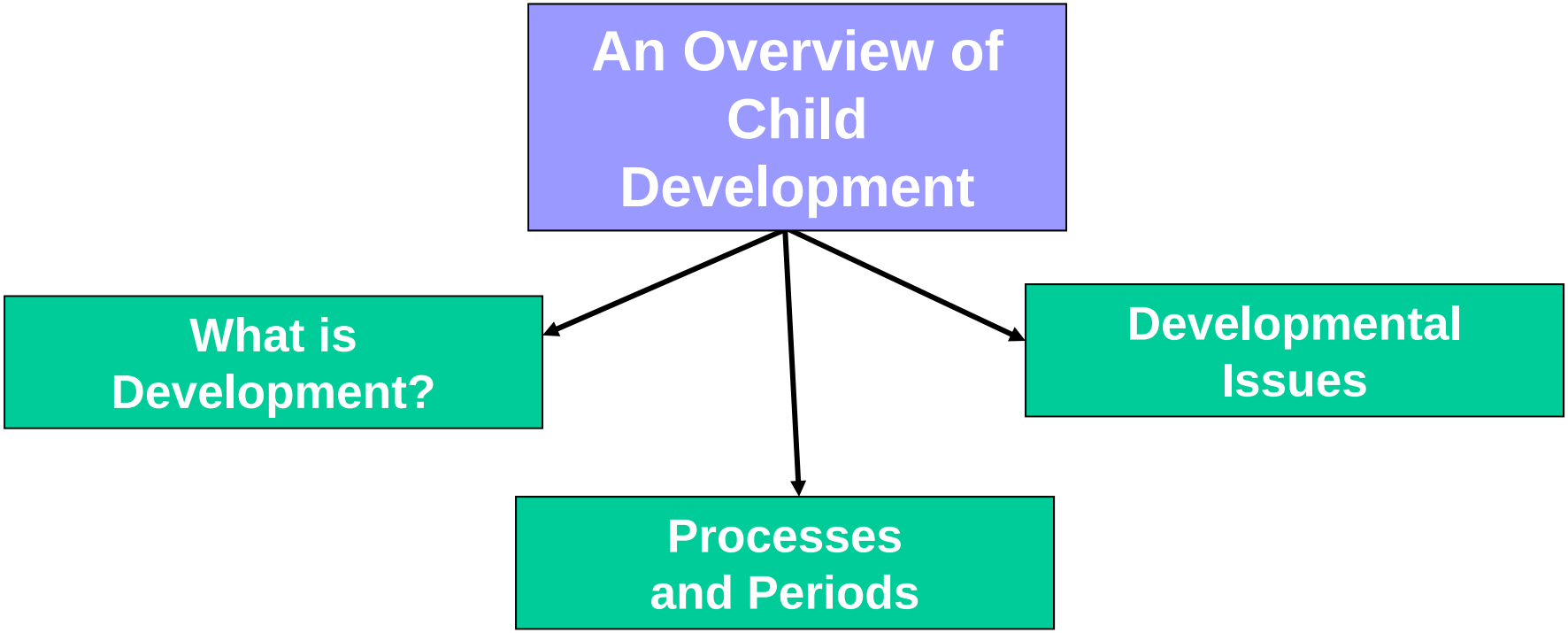
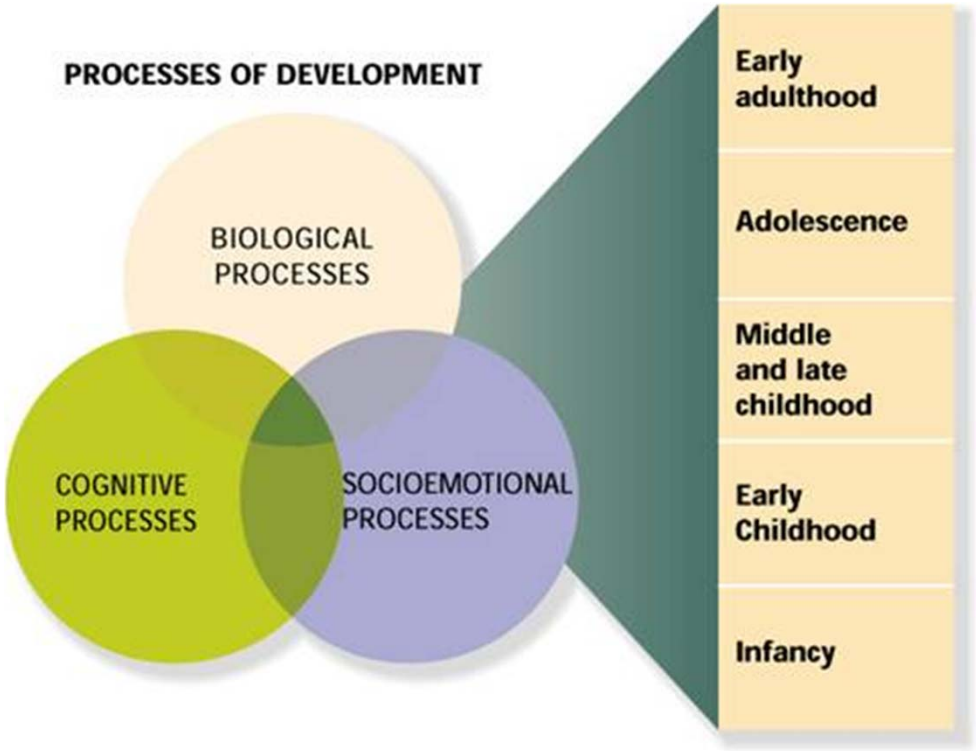
Cognitive and Language Development



An Overview of Child Development



Development: The pattern of biological, cognitive, and socioemotional changes that begins at conception and continues through the life span.

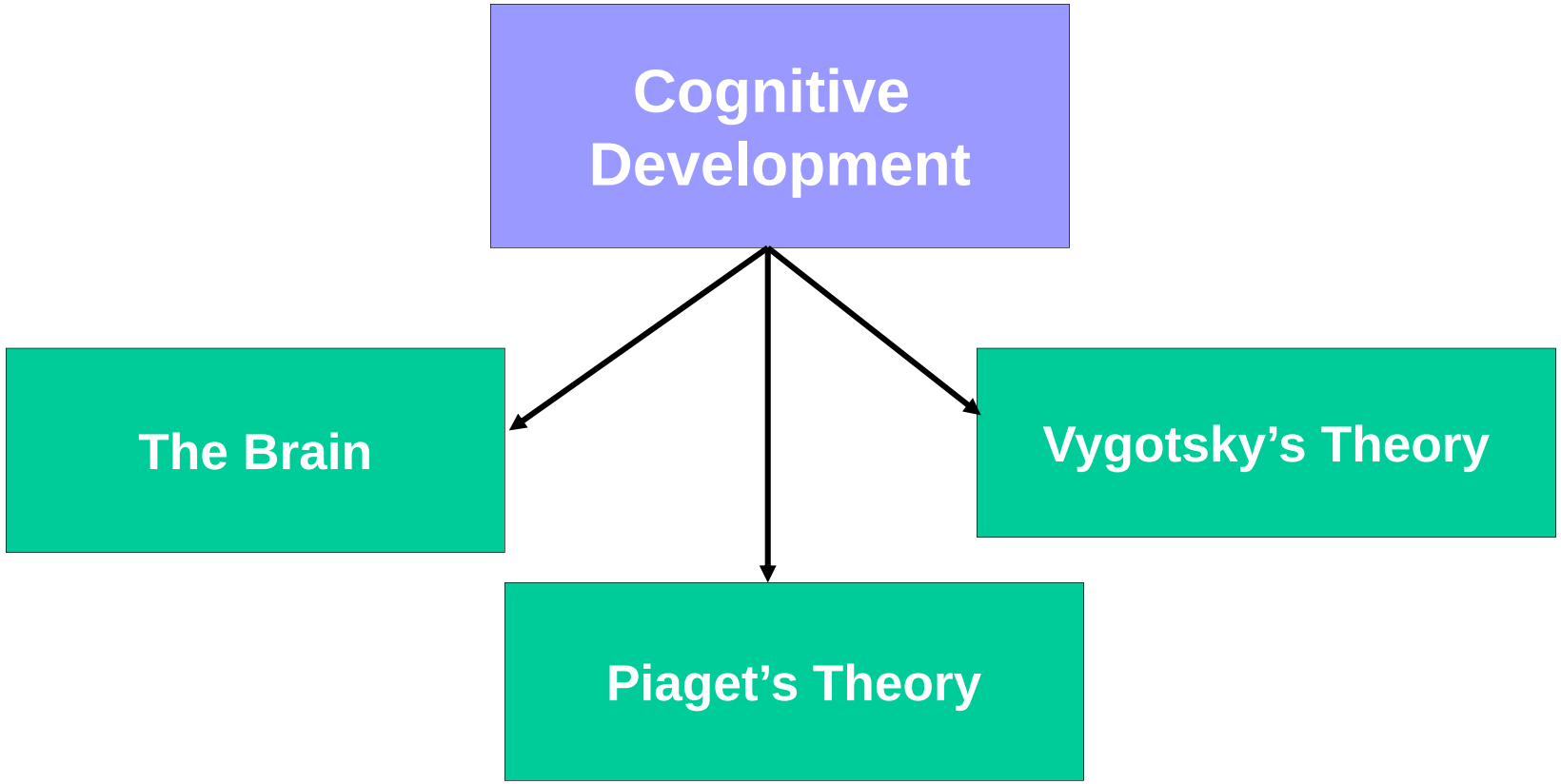
Developmental Issues

Nature-Nurture Issue

Continuity-Discontinuity Issue

Early-Later Experience Issue

Cognitive and Language Development



Brain Development

- Role of early and later experiences
- Myelination of Neurons with age
- Dramatic changes in synaptic connections
- Prefrontal cortex development into adolescence
- Brain functioning occurs along specific pathways and involves integration of function

Brain and Children's Education

- Early & later experiences, including educational experiences, influence brain development
- Development at the highest level of the brain – the prefrontal cortex, continues at least through the adolescent years
- There is a great of hype and hyperbole about brain development & learning in the media

Piaget's Theory – Basic Concepts

Schemas	Actions or mental representations that organize knowledge
Assimilation	Incorporating new information into existing schemas
Accommodation	Adjusting existing schemas to fit new information and experiences
Organization	Grouping isolated behaviors and thoughts into a higher-order system
Equilibration	A shift, a resolution of conflict to reach a balance

Example of Assimilation & Accommodation

A two year old encounters a man who is bald on the top of his head and has long, frizzy hair growing out from each side. The child gleefully shouts "*Clown, clown.*"

Dad tells his child that the man is not a clown, even though his hair is like a clown's. The man was not wearing a funny costume and wasn't trying to make people laugh.

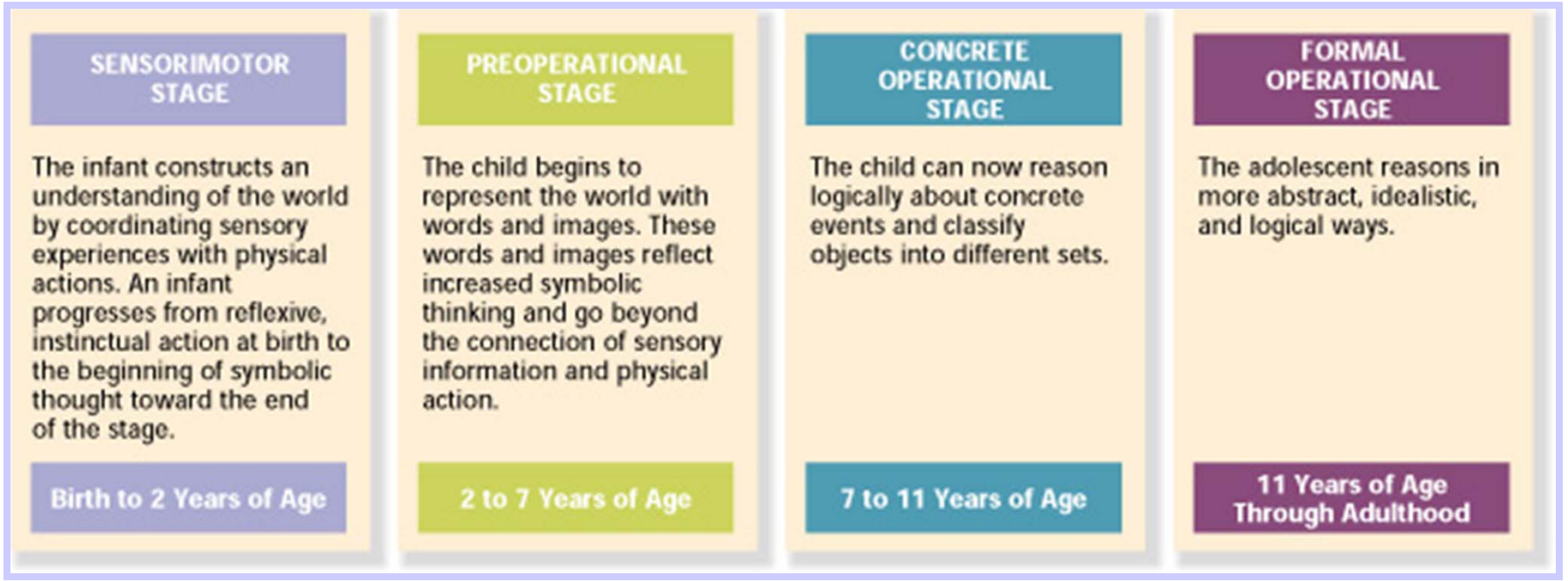
Child initially assimilates the man to his concept of a clown. After feedback from Dad the child accommodates his idea of "clown" to the concept's standard meaning.

Piaget's Stage Model

Cognition unfolds in a sequence of four stages.

- Each stage is age-related and distinctive.
- Each stage is discontinuous from and more advanced than the previous.

Piaget's Four Stages



Piaget's Sensorimotor Stage

Coordination of **sensory experiences** with **motor actions.** *"Thought is Action"*

Object permanence involves the realization that objects continue to exist over time.

Piaget's Preoperational Stage

Symbolic Thought: Ability to represent mentally an object that is not present.

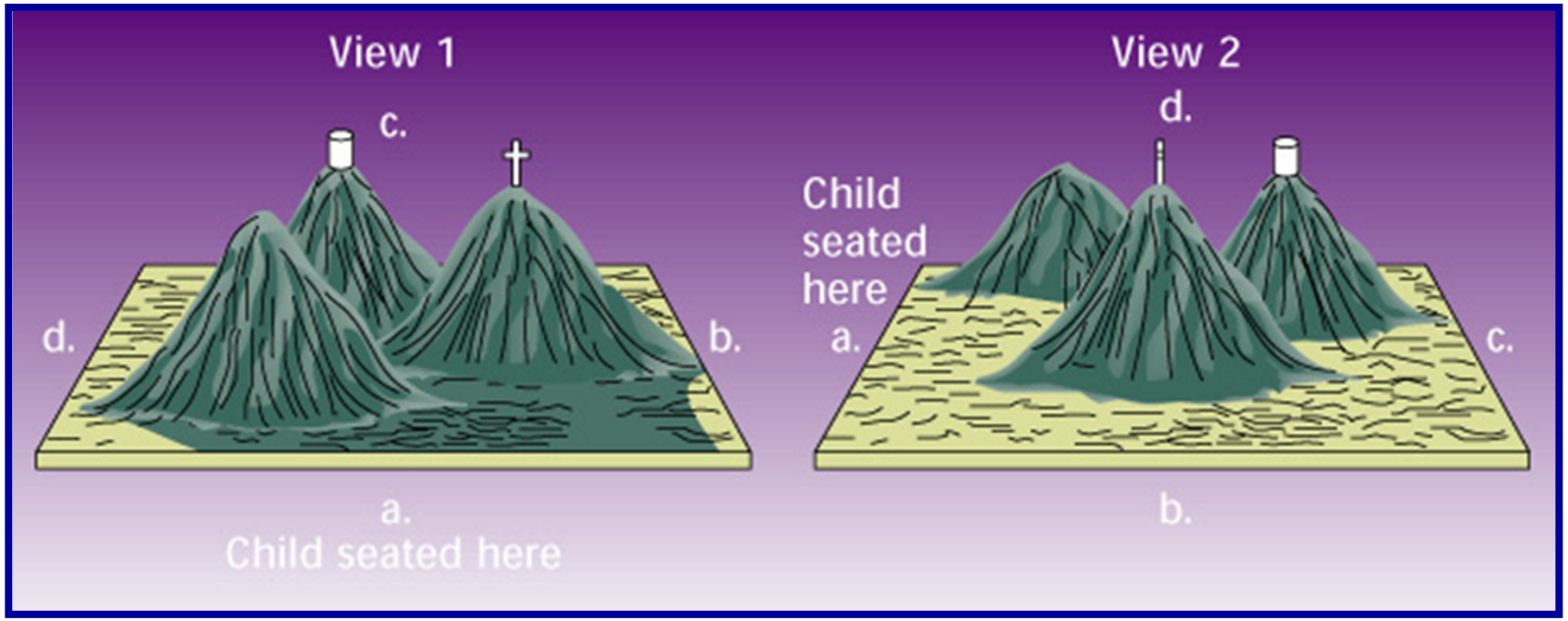
Limitations:

- **Egocentrism**: The inability to distinguish between one's own perspective and someone else's perspective.

  Problems with spatial perspective taking

  Problems with social perspective taking

The Three Mountain Tasks



Pre-operational Period: Egocentric Speech

Mary: They wiggle sideways when they kiss.

John: (vaguely) What?

Mary: My bunny slippers. They are brown and red and sort of yellow and white.

John: I have a piece of sugar in red pieces of paper. I'm gonna eat it and maybe its for a horse.

Mary: We bought them. My mom did. We couldn't find the old ones. They were in the trunk.

John: Can't eat the piece of sugar, not unless you take the paper off.

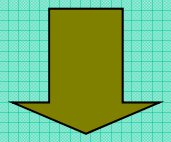
Mary: And we found Mother Lamb. Oh, she was in Pough-keepsie in the trunk in the house in the woods.

John: Do you like sugar? I do, and so do horses.

Piaget's Preoperational Stage

More Limitations:

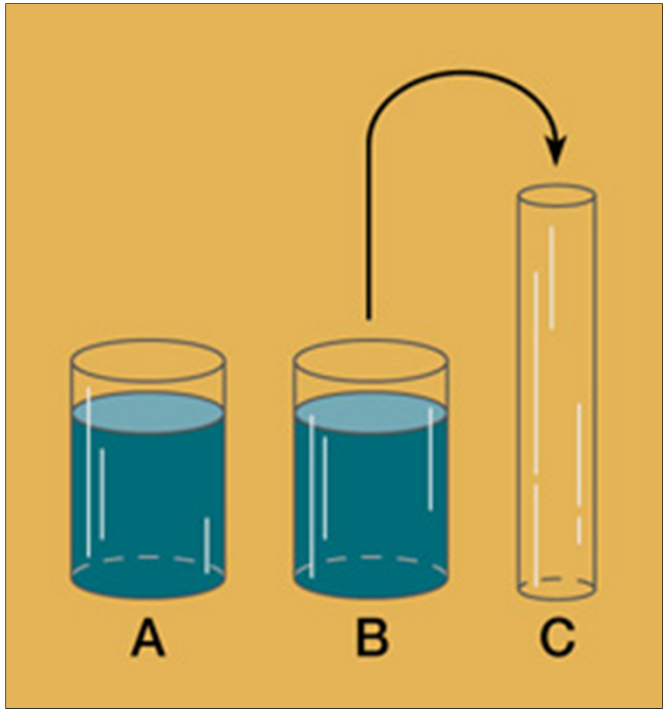
- **Centration:** Focuses on one characteristic to the exclusion of others.

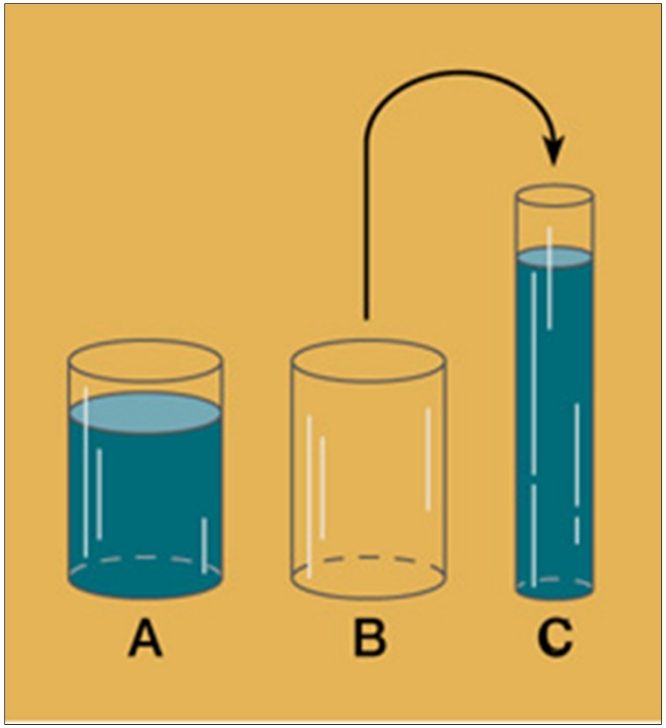


Lack of Conservation

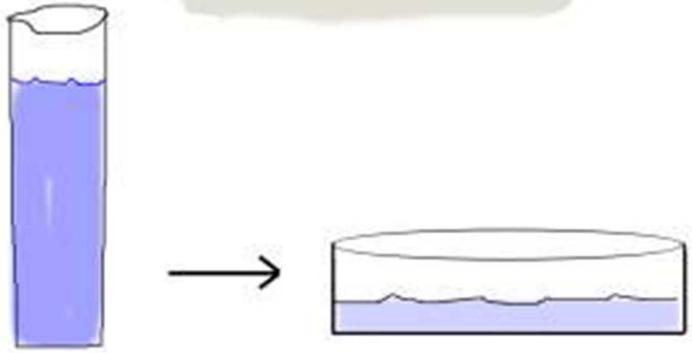
Classification: Ability to classify objects according to only *one* characteristic *at a time*.

Conservation of Liquid

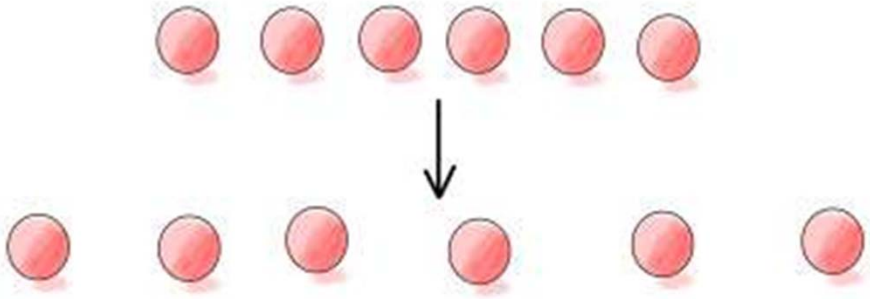




Conservation of Solid Substance: Is there more, less, or same amount of clay?



Conservation of Liquid Substance: Is there more, less, or same amount of blue liquid?



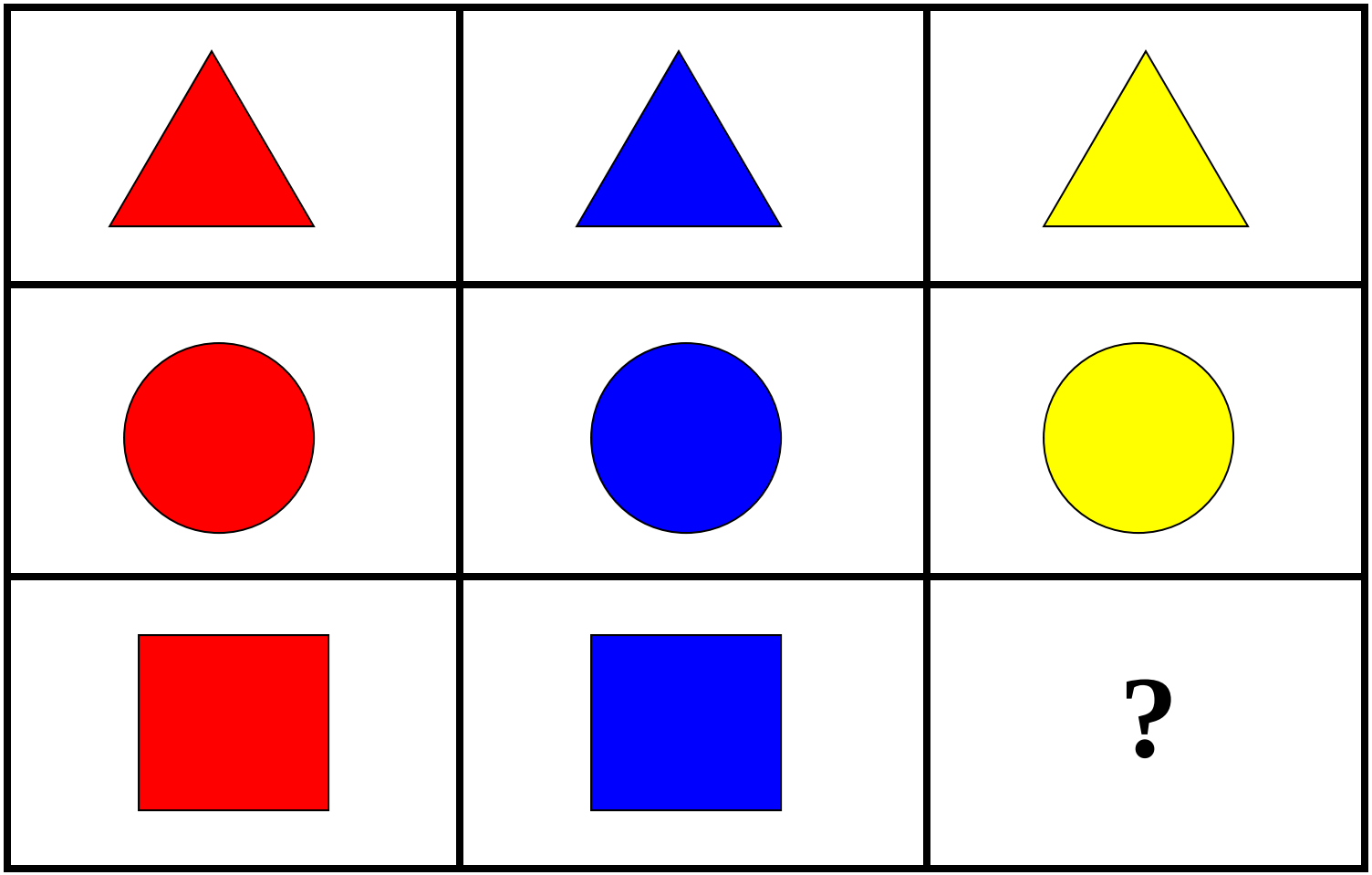
Conservation of Number: Are there more, fewer, or same number of spheres?

Piaget's Concrete Operational Stage

Logical reasoning replaces intuitive reasoning, but only in **concrete** situations.

Conservation	The idea that some characteristics of an object stay the same even though the object might change in appearance.
Classification	Coordinate several characteristics rather than focus on a single property of an object.
Seriation	Order stimuli along some quantitative dimension.
Transitivity	Combine relations to understand certain conclusions. If **A>B,** and **B>C,** then **A>C.**

Understanding Classes & Relations



Piaget's Formal Operational Stage

Abstract reasoning: Think in abstract, idealistic, and logical ways.

Hypothetical-deductive reasoning: Ability to develop hypotheses about ways to solve problems and *systematically* reach a conclusion.

Metacognition: Ability to reflect on one's own cognitive activities.

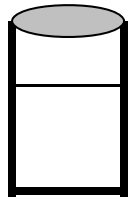
Adolescent egocentrism: Heightened self-consciousness and a sense of personal uniqueness.

Classic Problem

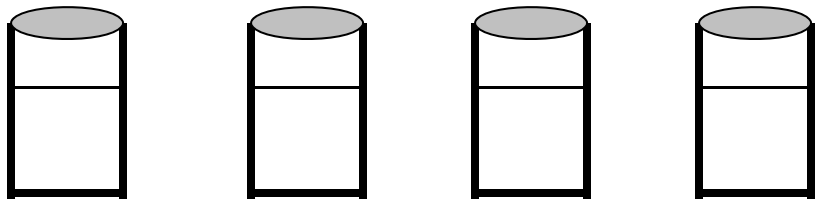
Jean Piaget: Mixing Colors Problem

- 1,2,3,and 4 contain colorless, odorless liquids.
- X contains an “activating solution”.
- Some combination of liquids (always including X) will give a YELLOW color.
- How can you find the combination that makes YELLOW?

Jean Piaget (1896-1980)
Children’s Cognitive Development
University of Geneva



X



1 2 3 4

Classic Problem

Jean Piaget: Mixing Colors Problem

1+x	1+2+x	1+2+3+x	1+2+3+4+x
2+x	1+3+x	1+2+4+x	
3+x	1+4+x	1+3+4+x	
4+x	2+3+x	2+3+4+x	
	2+4+x		
	3+4+x		

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Piaget's Key Contribution

Vision of children as active, constructive thinkers

Criticisms of Piaget's Theory

- Estimates of children's competence
- Stages
- Training children to reason at a higher level
- Culture and education

Overall Teaching Recommendations - Piaget

- Take a constructivist approach
- Facilitate rather than direct learning
- Consider the child's knowledge and level of thinking
- Turn the classroom into a setting of exploration and discovery