- Stage 5: Tertiary Circular reactions (10-18 months)
  - Intrigued by the many properties of objects and by the many things they can make happen to objects
    - "little scientists"
  - "Now what can I do with this?"
  - Able to search in several places for hidden object
  - Purposefully explores new possibilities with objects
    - Ex- using a teething ring as a bracelet
- 6th stage: Internalization of schemes (18-24 months)
  - Primitive symbols
  - Mental representations of images and concepts
  - Experimenting with actions inside head
  - Deferred imitation: the ability to remember and copy behavior or models who aren't present
    - Ex- picking up a pen and pretending to write
    - Imitates behavior long after it's been observed
      - Ex- make believe play

- Mental Representations
  - Internal, mental depictions of objects, people, events, information
    - Can manipulate with mind
    - Allow deferred imitation and make-believe play
- Object Permanence
  - Understanding that objects continue to exist when out of sight
  - According to Piaget, develops in Substage 4
  - Incomplete at first: A-not-B search error (an infant sees an object placed under a specific location multiple times, then the object is placed in a new location to see if the infant will find it there)
- Piaget and Research Methods
  - Advanced research tools (i.e., habituation and fMRI), have shown that aspects of Piaget's sensorimotor intelligence actually occur earlier for most infants than Piaget predicted.
  - These findings do not negate Piaget's work, only update it.
- Evaluation of Sensorimotor Stage
  - Some developments happen at time Piaget described:
    - Object search, A-not-B, make-believe play
  - Many appear to happen sooner than Piaget thought:
    - Object permanence, secondary circular reactions, deferred imitation, problem solving by analogy
  - Deferred Imitation
    - Piaget: Develops at about 18 months
    - Newer research: Present at 6 weeks – facial imitation
    - 6 – 9 months – copy actions
  - Research
    - Many cog changes in infancy are gradual and continuous, not abrupt & stage like.

- These ideas form the basis for another major approach to cog dev:
    - Information Processing
        - In class example with wasabi peas
- Information Processing Approach
    - Looks at intelligence by breaking it down into its component processes
    - Paying attention to a stimulus
    - Encoding Info
    - Retrieving Info from memory
    - Comparing Different Pieces of Info

- Changes in Info Processing During 1st 2 years of life
    - Attend through Senses
        - Information first enters the sensory register, where sights and sounds are stored briefly before they decay or are transferred to short-term memory.
        - As attention abilities increase, baby becomes more efficient attenders
    - Attention
        - During the first year, infants pay attention to novel (new) events
            - Infants gradually become more efficient at managing their attention, taking information in more quickly with age.
            - By 4 months, infants' attention becomes more flexible, and they are better able to disengage or shift attention from one stimulus to another.
        - Sustained attention improves with the transition to toddlerhood and increasing capacity for intentional behavior
    - Encoding information
        - Encoding Information: convert information into code
        - Mental Representations
            - Internal, mental depictions of objects, people, events, information
    - Memory
        - Encoding advances allow information to be stored into memory more efficiently
        - But memory improves too
        - Operant conditioning research shows that infants' memories increase dramatically during infancy and toddlerhood—
            - 2-6 month old kick-to-activate mobile
        - Even very young infants (3 months) can remember IF:
            - Experimental conditions are "real life"/"life like"
            - Motivation is high
            - Special measures aid memory retrieval (repetition and reminders)
        - Example: Rovee-Collier's mobile experiment
            - The Research of Carolyn Rovee-Collier
                - Infant and toddler memory processing is largely nonverbal

        - They rely heavily on nonverbal memory techniques, such as visual images and motor actions and senses
    - Recognition (noticing whether a stimulus is identical or similar to one previously experienced, is the simplest form of memory)
    - Recall—more complex, involves remembering a stimulus without perceptual support, by generating a mental image of the past experience. (recalling the code or representation of the stimulus)
    - Infants can engage in recall by the end of the first year
    - Long term recall requires brain growth
        - Depends on connections among multiple regions of the cerebral cortex—neural circuits that develop rapidly in the second year
        - Despite infants' surprising memory skills – infantile amnesia
            - Most people don't remember anything before age 3
            - Students in our class seemed to have earliest memories between 2 and 6 years old
- Organization/Categorization
    - Even young infants organize their physical, emotional, and social worlds by categorizing similar objects and events into a single representation
    - By 6 months, infants can categorize based on two features (ex- shape, color)
    - Earliest categories are perceptual (based on shape, size, other physical properties), but by the second half of the first year, more categories are conceptual (based on common function & behavior)
    - In the second year, children actively categorize items during their play.
        - Exploration of objects and expanding knowledge of the world contribute to older infants' capacity to move beyond physical features and group objects by their functions and behaviors
            - Ex- inside and outside toys
    - Categorization aids in
        - Encoding
        - Memory storage
        - Recall/retrieval from long term memory
    - Language builds on and facilitates categorization
- Also: Increase in Speed of Information Processing
    - As children grow, they process information faster
    - Due to myelinization of axons
    - Pruning leading to more efficient and stronger pathways
        - "use it or lose it"

- Language Development
    - Lang dev clip
        - Language is receptive and expressive