

# AGE-APPROPRIATE SCIENCE AND ENGINEERING PRACTICES

## INFANT AND TODDLER COGNITION FOUNDATIONS

- Cause and Effect
- Spatial Relationships
- Problem Solving
- Number Sense
- Classification
- Symbolic Play
- Attention Maintenance
- Understanding of Personal Care Routines

## FOUR STRANDS OF SCIENCE IN PRESCHOOL LEARNING FOUNDATIONS

1. Scientific Inquiry
2. Physical Sciences
3. Life Sciences
4. Earth Sciences

## K-12 NGSS SCIENCE STANDARDS

- NGSS Science and Engineering Practices
- Disciplinary Core Ideas
- Cross Cutting Concepts

## AGE-APPROPRIATE SCIENCE AND ENGINEERING PRACTICES

ADAPTED FOR INFANT & TODDLER	ADAPTED FOR TK-2	AS STATED IN THE STANDARDS
“Continue to search for an object even though it is hidden under something distracting . . . ” (8 mos.) (Memory)’	Wondering (science) Deciding the “rules” (engineering)	Asking questions (science) Defining problems (engineering)
“Use two items that go together; for example, brush a doll’s hair with a brush, put a spoon in a bowl, or use a hammer to pound an object through a hole.” (9 - 15 mos.; Parks 2004, 26-27) (Symbolic Play)	Drawing diagrams, building models, and discovering ways to think about how things work	Developing and using models
“Drop different objects from various heights to see how they fall and to hear the noise they make when they land.” (12-18 mos.; Ginsburg and Oppen 1988, 56) (Cause and Effect)	Doing “experiments”	Planning and carrying out investigations
“Sort primary-colored blocks into three piles: a red pile, a yellow pile, and a blue one.” (33 mos. +: Parks 2004, 79) (Classification)	Comparing and looking for patterns	Analyzing and interpreting data
“Makes a big pile of trucks and a little pile of trucks.” (18 mos.) (Number Sense)	Counting and measuring	Using mathematical and computational thinking
“Notice how the infant care teacher makes a toy work makes a toy work and then push the same button to make it happen again.” (6-9 mos.; Lerner and Ciervo 2003) (Imitation)	Describing what happened (science) /Tinkering (engineering)	Constructing explanation (science)/ designing solutions (engineering)
“Anticipate and participate in the steps of a nap routine.” (18.; Fogel 2001, 368) (Memory)	“I think because I see _____ or know _____.”	Engaging in argument from evidence.
“Use words such as big and little.” (25-30 mos.; Parks 2004, 82, 36 mos.; Meisels and others 2003, 73) (Spatial Relationships)	Writing, drawing, or talking (acting out) about what we know, read, and understand new discoveries (things) (ELA connections)	Obtaining, evaluating, and communicating information

Adapted from 2016 California Science Framework (Chapter 2, pp. 78 Table 2.1) (2009) CA Infant and Toddler Learning & Development Foundations.