

Evaluate

Throughout the lesson, we documented children's knowledge and development. We collected photographs of works-in-progress and completed works. We talked with students about their ideas and designs. Several of our students have difficulties with verbal communication. Therefore, we interpreted nonverbal gestures to help us understand students' skills, designs, and levels of understanding. We also took time to notice students' preferences and interests. Some students showed preferences for programming. Other students showed preferences for designing or story-telling. We provide a checklist we used to document students' learning and interests.

Integrated STEM Lesson Assessment Checklist

Engagement / Attention

- ☐ Sustained attention examining and exploring technology: number of minutes _____
- ☐ Explored technology by observing, touching, pushing, or imitating
- ☐ Explored robots by pushing buttons and observing the results
- ☐ Communicated observations about robots through words or gestures
- ☐ Expressed a personally-meaningful discovery in words or gestures
- ☐ Persisted with more than one try to get the robot to accomplish a goal

Programming / Mathematical Reasoning

- ☐ Programmed robot to go forward
- ☐ Programmed robot to go backward
- ☐ Connected button pushing with distance robot moved
- ☐ Used numbers in a purposeful way.
- ☐ Counted button pushes
- ☐ Counted units the robot moved
- ☐ Programmed robot movement with intention and purpose
- ☐ Programmed one step (15 cm) movement
- ☐ Programmed two steps (30 cm) movement
- ☐ Estimated distance, or number of button pushes needed, to reach a destination
- ☐ Programmed robot to turn
- ☐ Programmed three or more steps
- ☐ Made a hypothesis about how to control a robot and tested the hypothesis
- ☐ Revised programming action based on observation
- ☐ Used what they learned in an attempt to revise their program (button pushes)

Science of Structure and Function

- ☐ Compared robots to other robots, to items in nature, or other forms of technology
- ☐ Identified parts (structures) of robots linked to movement or other actions
- ☐ Identified functions of robots through words, gestures, actions
- ☐ Included a structure in a robot design for the function of movement
- ☐ Communicated in words or actions how a robot design structure connected to a function
- ☐ Incorporated biomimicry in a robot design

Science-in-Society

- ☐ Created a robotic design
- ☐ Showed or told how a robot might be helpful
- ☐ Showed or told how a robot might be harmful
- ☐ Demonstrated a preference for activity: programmer, designer, storyteller