

### Awareness and recognition of Engineering Habits of Mind in early childhood educational settings

#### Background

- ❖ Today, students and teachers seem to be shying away from Science, Technology, Engineering, and Mathematics (STEM) fields. This research highlights some STEM concepts by recognizing engineering habits of mind (EHM), which occur naturally when preschool age children are allowed to freely explore in their surroundings (Brenneman, 2009).
- ❖ With children's positive attitudes toward math and science during their preschool years, this seems to be the time to introduce them to logical thinking and problem solving that can be associated with EHM.
- ❖ It is important for early childhood teachers to be familiar with EHM, so that engaging students using their natural curiosity to think about science and math can happen throughout the classroom.

#### Measures

##### Early Engineering Observation Tool

- The tool that was used to gather statistics and anecdotal notes on the Engineering Habit of Mind observed, the learning setting, grouping, teacher role and response, child gender, and preceding events leading up to the Engineering Habit of Mind example.

##### Location

- Children were observed on the location that the engineering habits of mind occurred— blocks, art, dramatic play.

##### Group Size

- The grouping of children was documented based on whether they were playing alone, in a small group of children, or a large group/ whole class activity?

##### Gender

- I documented if the engineering habit of mind behavior came from a male individual or group, a female individual or group, or a group made up of male and female children.

#### Discussion

- ❖ The data collected in this study will help to shape the way early childhood classrooms are set up. For example, students should be provided with toys as well as a variety of materials to stimulate engineering habits of mind. Teachers can also use this knowledge of engineering habits of mind to encourage students when teachers observe that students are thinking in a similar fashion.
- ❖ Additionally, the study will be able to guide others in learning about what the engineering habits of mind are and how teachers can facilitate this type of thinking in their students in the way they structure their classroom. It is important for teachers to be comfortable with identifying and observing engineering habits of mind, so that they can help the students in their classroom develop math and science skills. With this comfortability, teachers will be able to implement and facilitate students and groups of students in behaviors that could lead to engineering habits of mind without being afraid of the content involved.

#### Research Questions

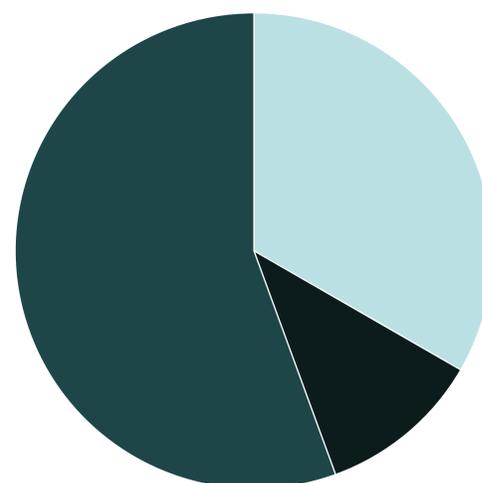
1. Do engineering behaviors happen more in group or individual activities/play?
2. In what area/with what toys (ex. dramatic, imaginative, building) does engineering happen most?
3. Who engages in engineering behavior more, boys or girls?

#### Methods

- ❖ I collected data using the Early Engineering Observation Tool (EEOT) over five observation periods of 60 minutes in the Iowa State University Lab School observing 3, 4, and 5-year-olds, carrying out two cycles of data collection for each observation.

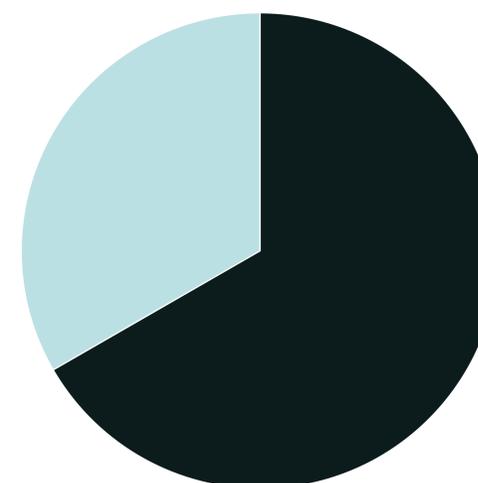
#### Results

Location



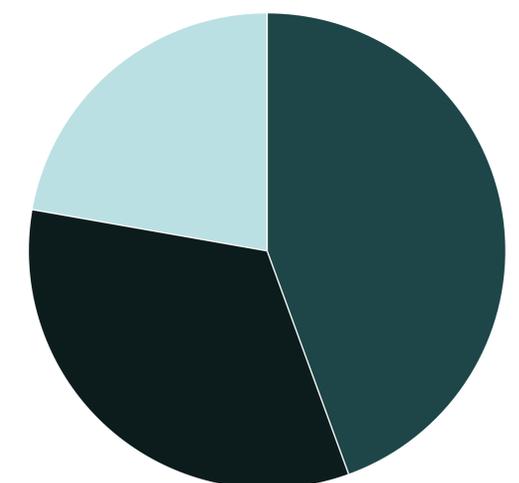
■ Art ■ Dramatic Play ■ Blocks

Group Size



■ Small Group ■ Individual

Gender



■ Both ■ All Males ■ All Females