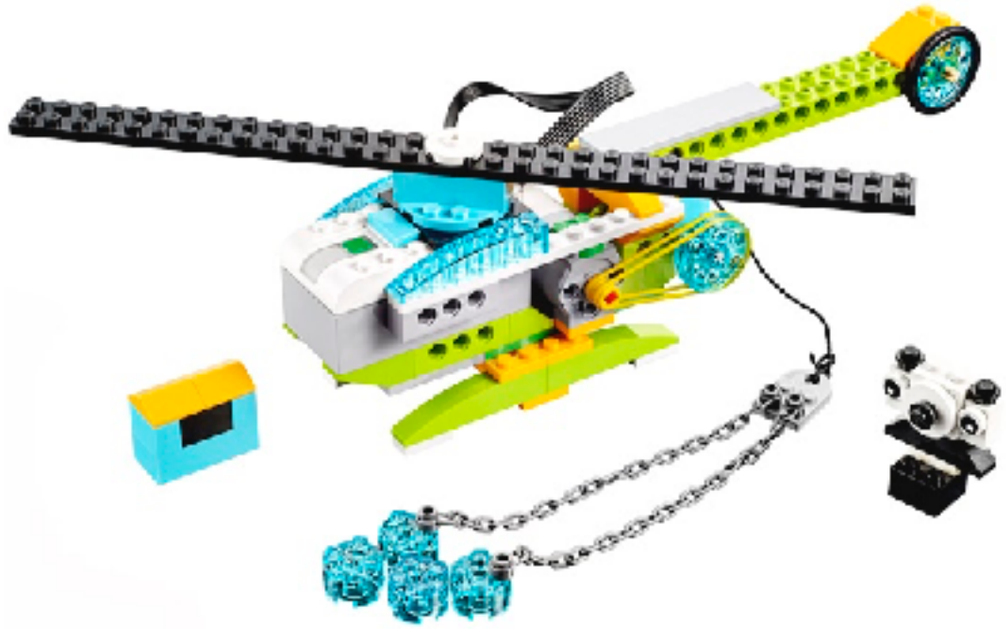

# WeDo Science

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10/26/2017

kidsengineer.com

# Introduction

- Elementary Science focus with integrated engineering and math
- Some background, research, and rationale
- MILO build and program
- Activity try outs


ATM
insert card


Bell

# Tap creative play

- Are we tapping into the so important creative play of children in school, especially the kind associated with building?

# Tap creative play

- It's more fun to actually be building something.  If you took a class in robots and just learned about things, if the teacher just drilled information into your head, it would not be as fun as building and experiencing it to learn.

- *Grade 6 Girl 2*

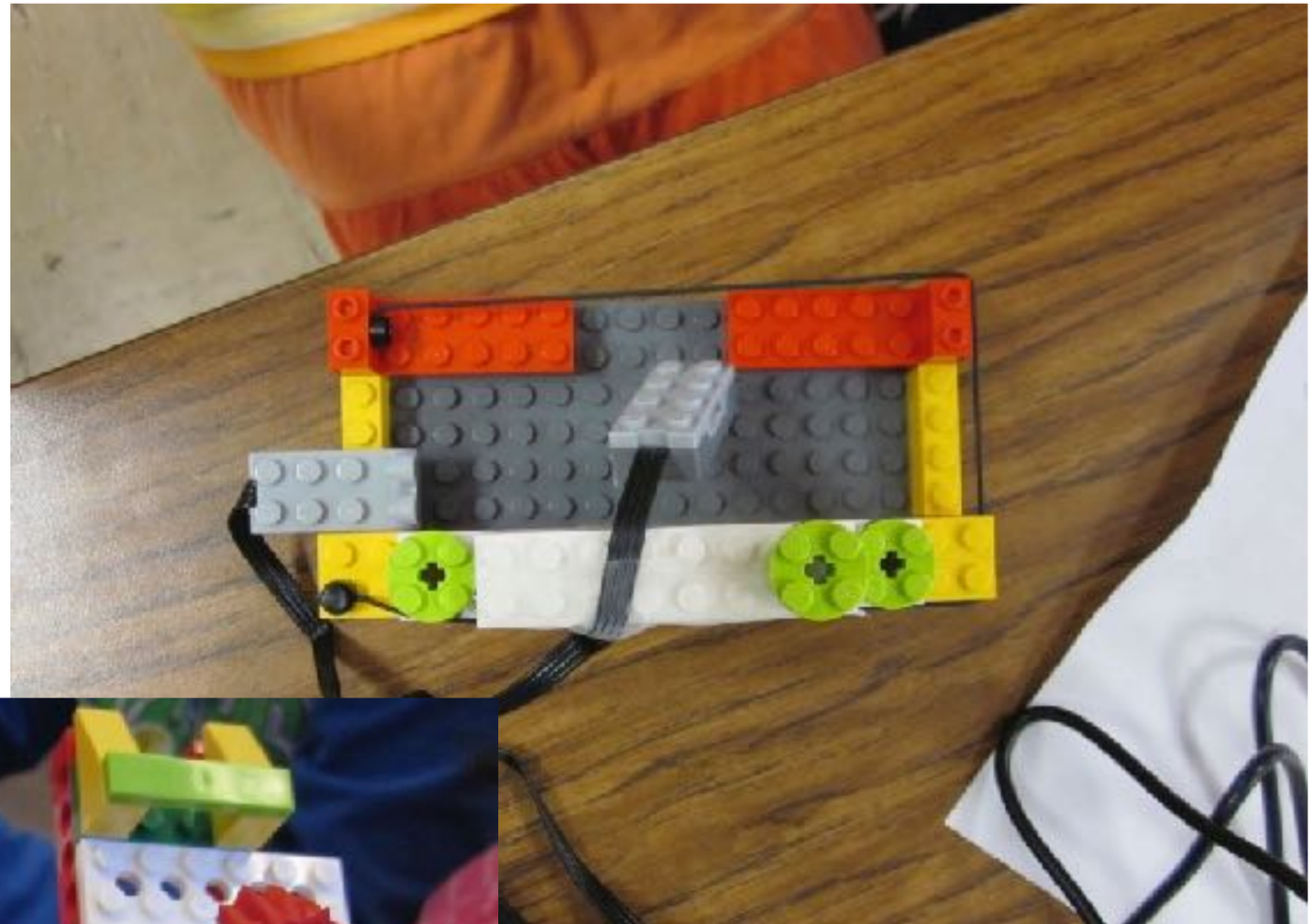
# Tap creative play


- Who is tapping into creative play? Are we?

Lego Robots directly tap into the creative play urge of children in a healthy and educational way.  A PK-6 robotics curriculum (such as Elementary Engineering Curriculum) is needed to support and sustain the natural engineering instincts of young children until formal engineering education starts.

# WHY ROBOTS?

- Engineering can be taught in many ways, why Lego Robots?
- Familiar, fun, fantasy
- They can be programmed, adds “life”
- Tech component built in
- Math, science, ELA as well



# Year 1 Clever Solution



**Open ended challenges**

# Quotes

- I didn’t think you would use all that math and science to build that robot.  Grade 6 Girl 2
- It’s more fun [than usual schoolwork.]  It’s a lot different – sometimes mathematical.  You have to think in a different way. This would make this, would make this,  happen.  Each step is connected.  Grade 4 Boy Team

# NGSS Practices

1. Asking questions (for science) and defining problems (for engineering).
2. Developing and using models.
3. Planning and carrying out investigations.
4. Analyzing and interpreting data.
5. Using mathematics and computational thinking.
6. Constructing explanations (for science) and designing solutions (for engineering).
7. Engaging in argument from evidence.
8. Obtaining, evaluating, and communicating information.

# MA ETS G3 Standards

- 3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.

- 3.3-5-ETS1-2. Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.

- 3.3-5-ETS1-4(MA). Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution.

# Animal Expression

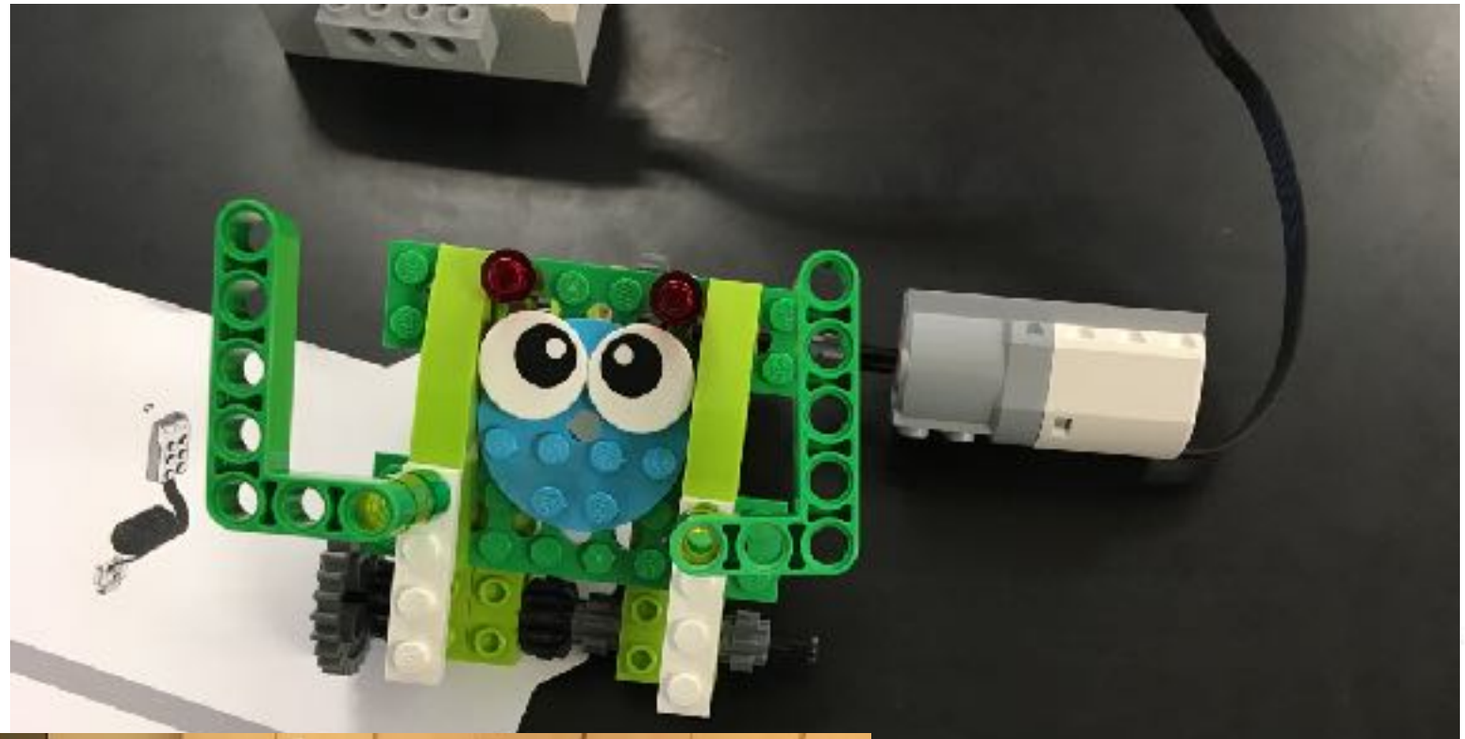
- Design, build, test, and present an example of an animal species you and partner design that communicates with other members of its species with:  movement, sound, and looks

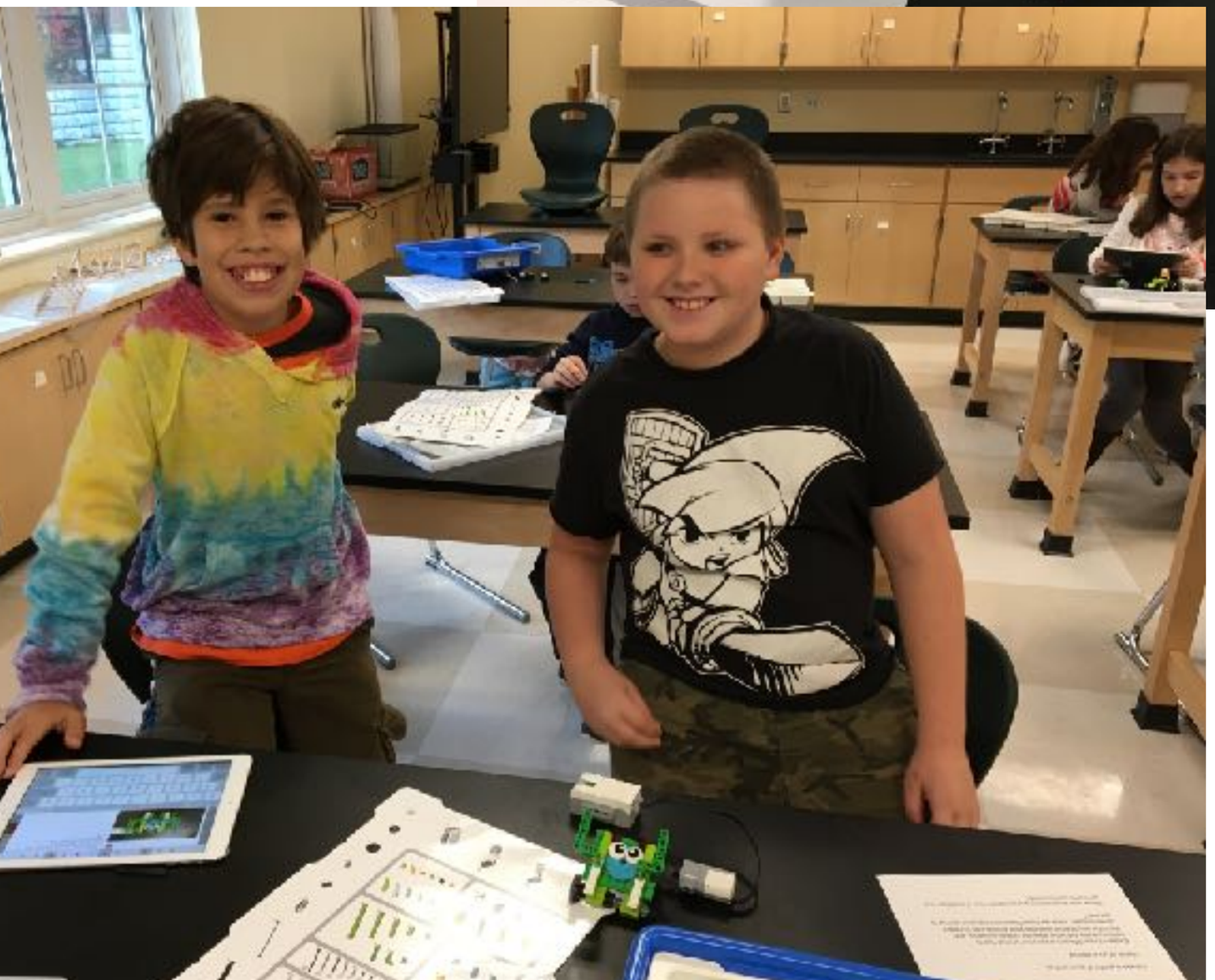
- Present your animal example to the rest of the class using the content editor and show examples of how (and why) the animal communicates.  Show your program.

# Applicable NGSS Standards

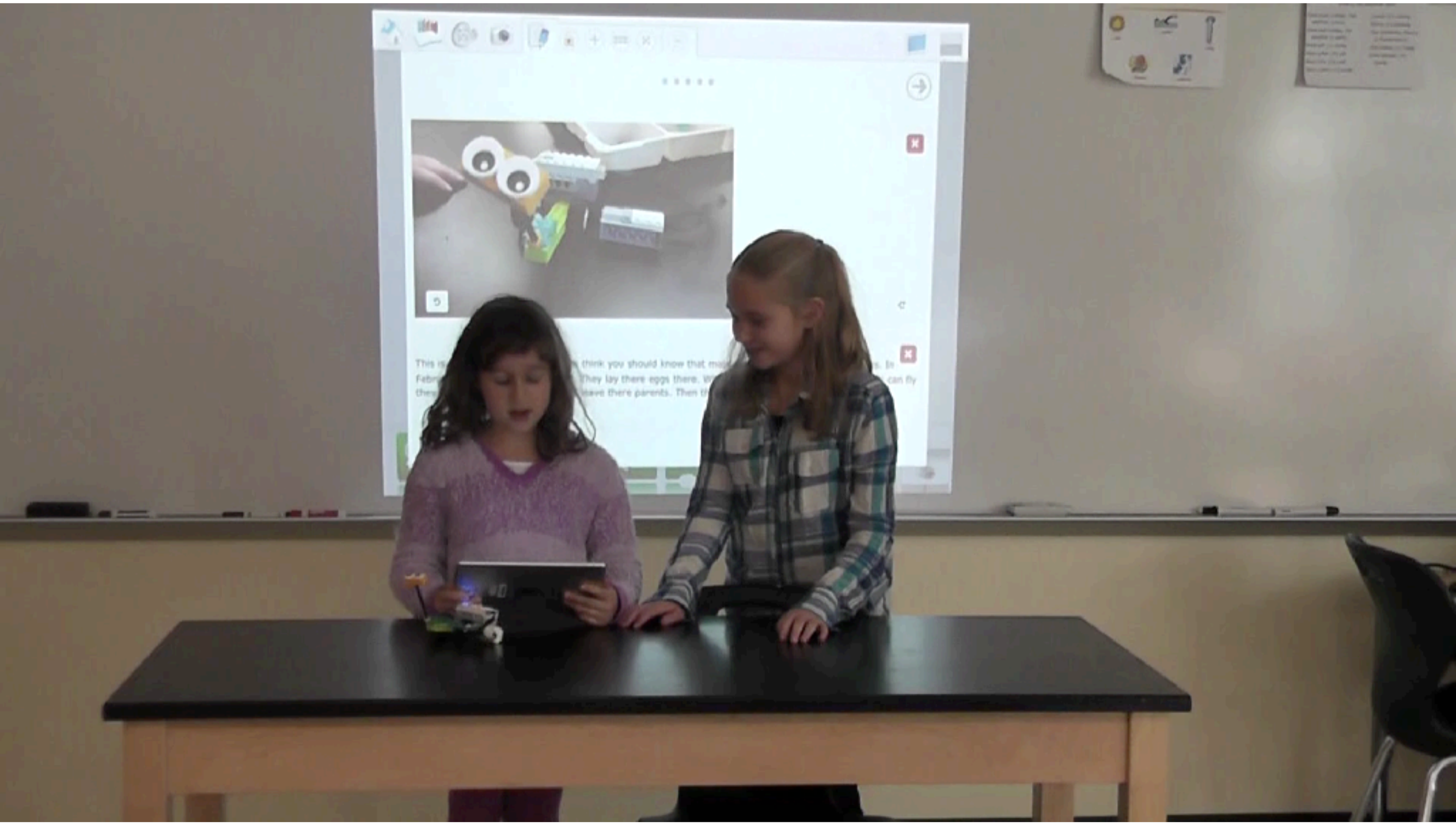
- NGSS
  3-LS4-2: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
  4-LS1-2: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
  4-PS4-3: Generate and compare multiple solutions that use patterns to transfer information.

- Common Core State Standards for English Language Arts
  CCSS.ELA-Literacy.SL.3.1.D: Explain their own ideas and comprehension in light of the discussion.

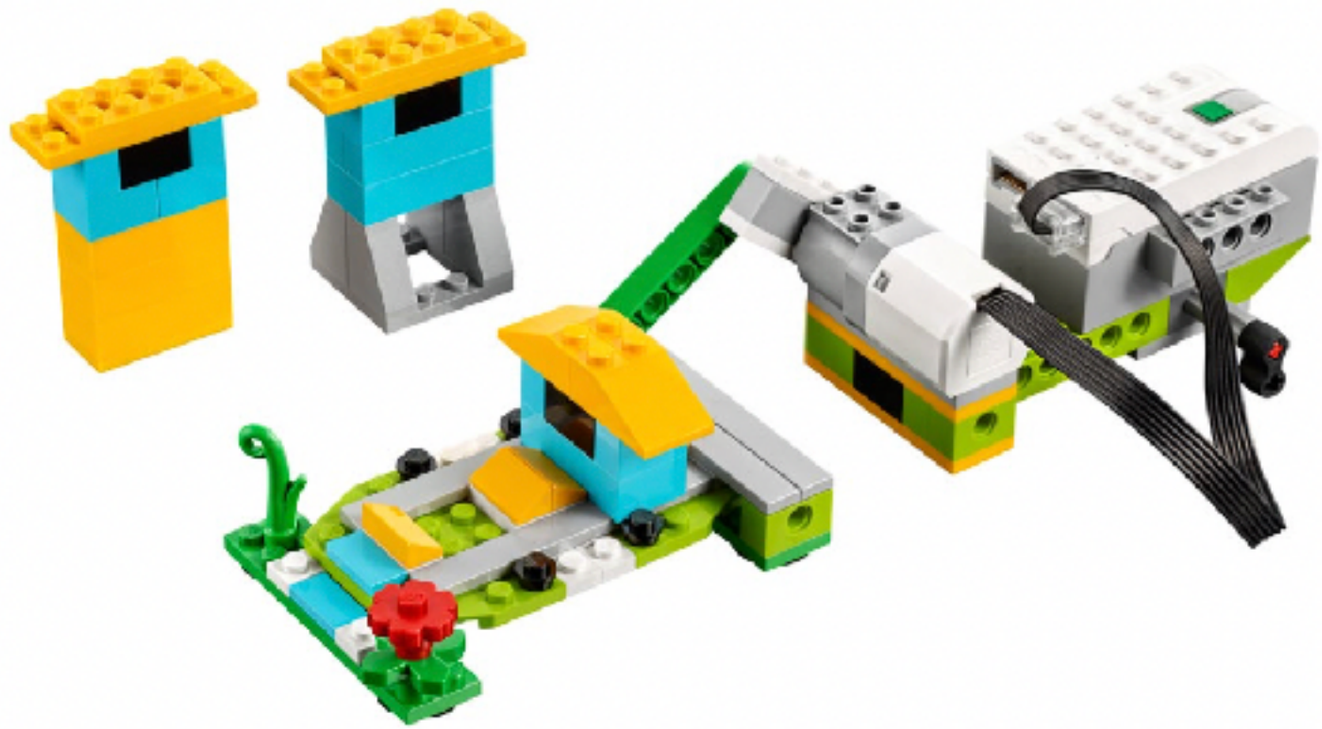




# Animal Expression Presentation



# Robust Structures



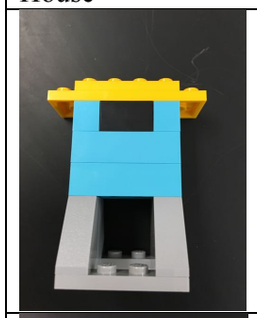
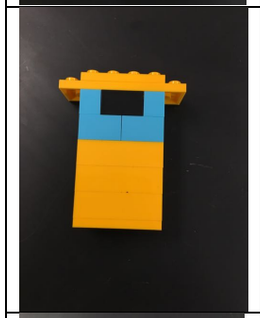
- Earthquake Simulato.

- Includes engineering/science experiment

LEGO Earthquake Simulator Results

NAME _____ DATE_____

For each trial, write the earthquake strength when the house first failed.

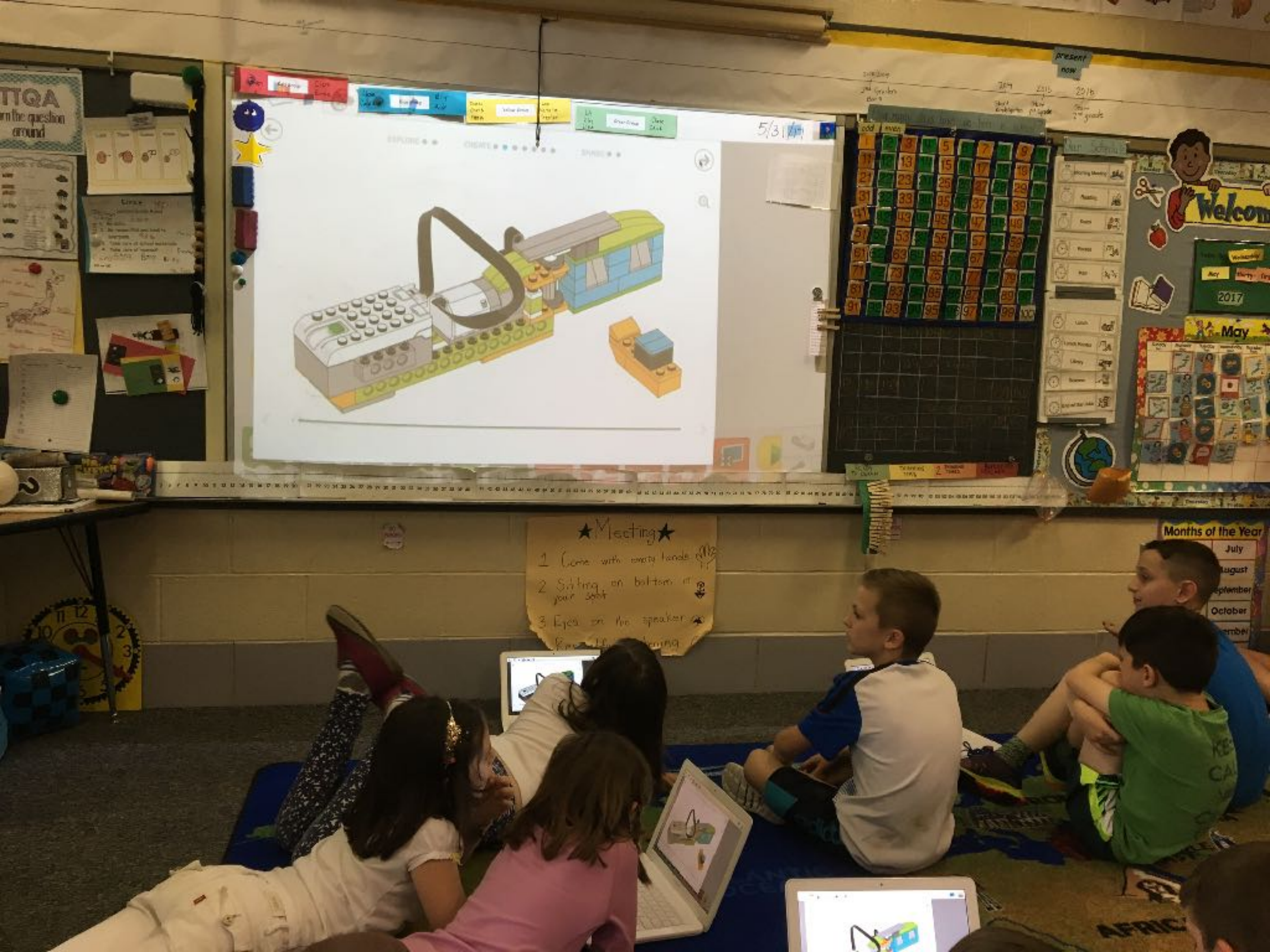
| House | Trial 1 | Trial 2 | Trial 3 |
|---|---|---|---|
|  | | | |
|  | | | |
|  | | | |
| Our House (Draw) | | | |

# Lessons Learned

- Need additional science content/materials
- Need teacher scaffolding to connect to science concepts (cite)
- Need to figure out sequence (grade 2 to grade 4)

# Prevent Flooding

# Prevent Flooding


TTQA
rn the question
around
Meeting
1 Come with empty hands
2 Sitting on bottom of your spot
3 Eyes on the speaker
Months of the Year
July
August
September
October
May
2017

# WeDo 2 Basics

- Bluetooth connection to tablet or computer
- Untethered
- New pieces
- New NGSS curriculum (50-70% grades 2-4)

# Lobby and Content Editor

- New Lobby, content editor, help  (quick tour)

# Curriculum

- Different levels of support:  getting started, guided, open, base models (quick tour)

# Free Explore

- Look at kit pieces, connect bluetooth, try software, check out curriculum, help, lobby, Teacher’s Guide (click Info icon), build MILO

# Sample Project (Together)

- Robust Structures

# Curriculum and NGSS Standards

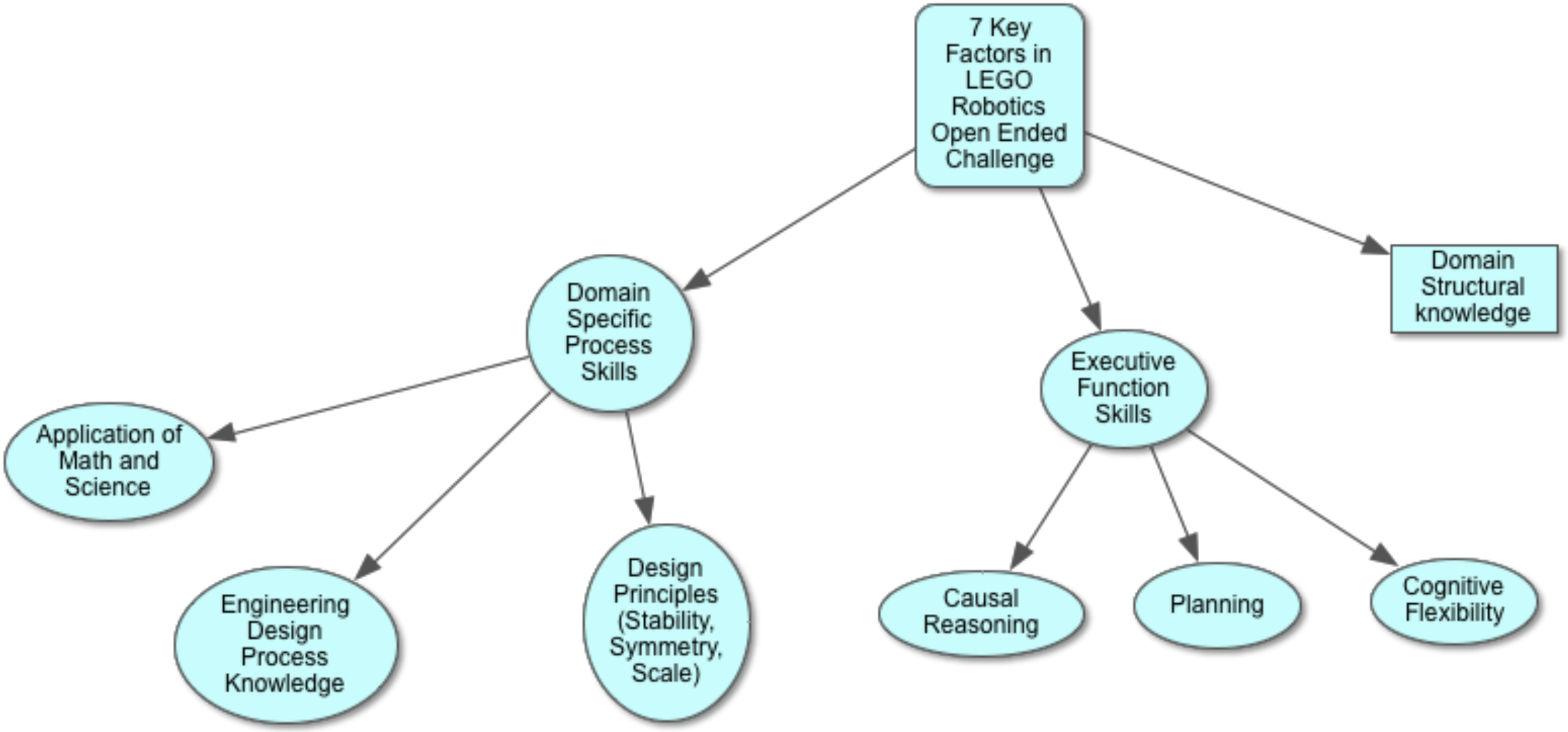
- See pages 20-21 in TG for list of projects
- See pages 22-26 in TG for list of NGSS standards
- Not included in MA standards: 2-ESS1-1, 2-LS2-2, 3-LS2-1, 3-PS2-2, 4-LS1-2

# Next Projects (2x)

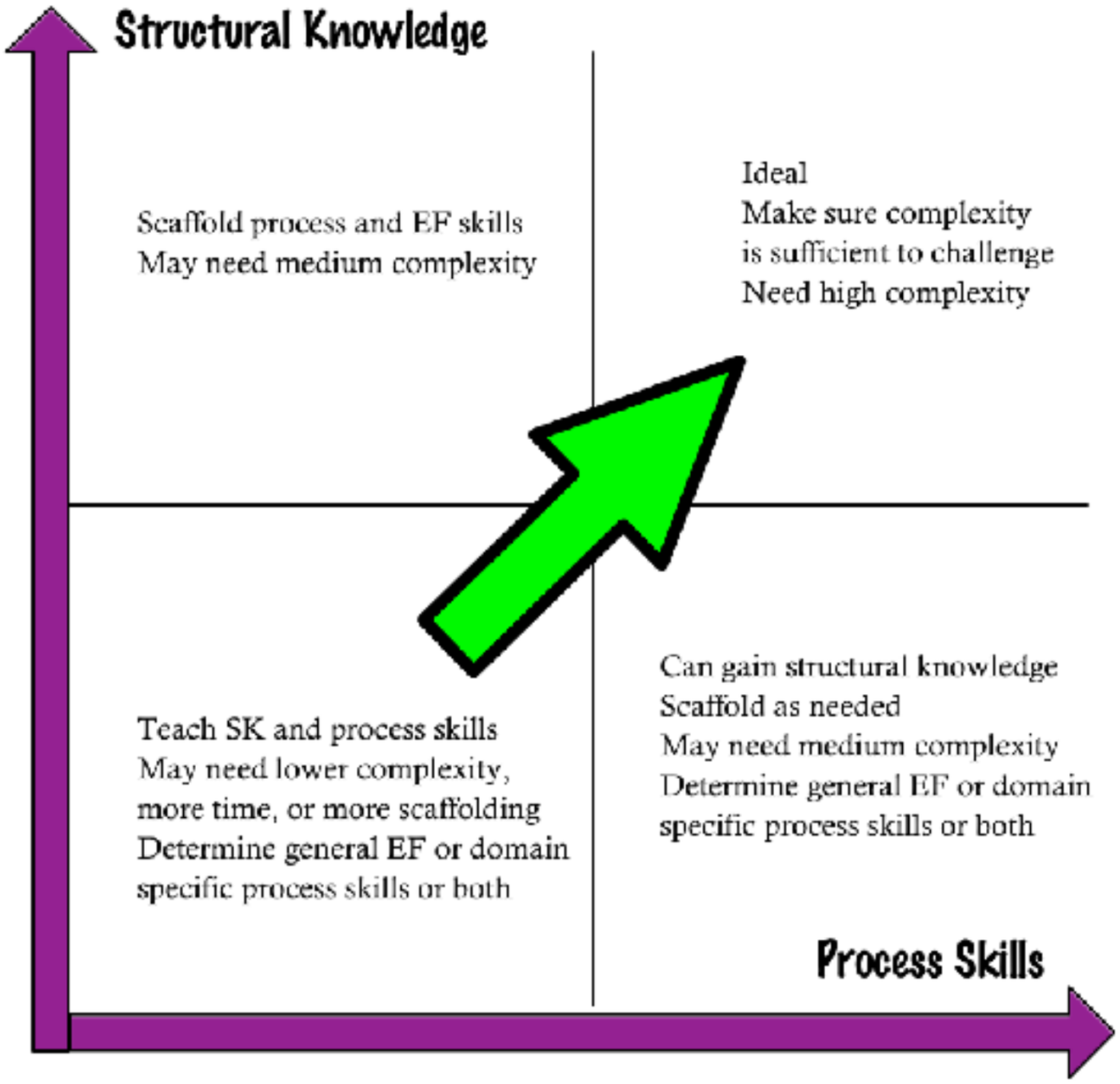
- Pick a open or guided project that would be good for your grade level

- Report out

# 7 Key Factors in Elementary Engineering



# Knowledge and Skills



# Final Thoughts?

- What is the most important thing you learned?
- What will be a challenge for you?
- How will this program benefit your students?

# Resources

- johnsheffernan99@gmail.com
- http://www.kidsengineer.com/

# Materials List

- Handouts - slides X (post to KE)
- Laptop, dongle, HDMI cable, and power cord
- Teacher’s Guide (hardcopy) - selected pages (see slides)?
- Teacher’s Guide (PDF)
- WeDo 2 Kits?  LEGO
- Extra batteries? LEGO
- iPads?  LEGO