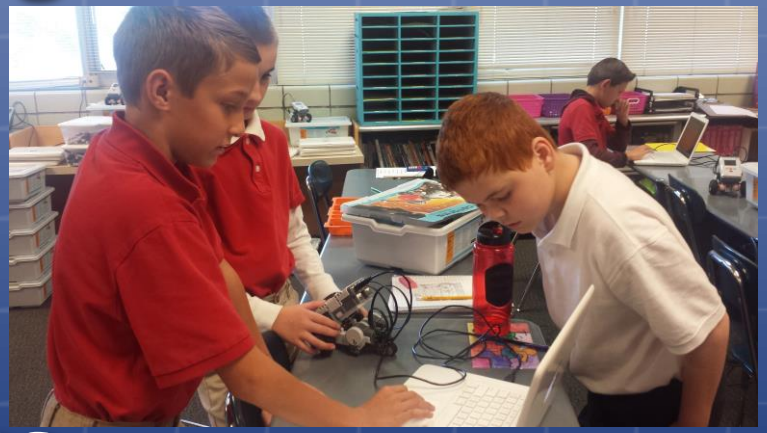
Joyce Smith
Hutchinson Magnet School

Hutchinson STEM Magnet School

- 300 students
- 73% free and reduced lunches
- K – 6
- Magnet School

STEM

- Hands-on activities
- Cooperative learning
- Open-ended trials
- Critical thinking
- Real-life applications



Hutchinson Magnet School at Allen is a STEM school of design and discovery. Our school is committed to nurturing a challenging inquiry-based learning environment, dedicated to the advancement of science, technology, engineering and mathematics for the 21st Century.

Imagining Today… Creating Tomorrow

Our Journey

- Researched elementary level STEM schools
- Designed our mission and vision statements
- Determined our STEM model
  - STEM Focus
  - Grade Levels
  - Time Structure
  - Curriculum/Resources

We believe…

- The purpose of STEM education is to generate student interest, increase STEM knowledge, and provide opportunities for students to think critically in the fields of Science, Technology, Engineering, and Mathematics.

Operational Definitions

- Science – deals with knowing and understanding the natural world.
- Technology – everything in our environment that is human-made or human altered.
- Engineer – a person who uses science, technology, and mathematics to solve problems.
- Engineering – the application of science, technology, and mathematics to design products, systems, or processes to meet the wants and needs of humans.

Design Loop – Design Process

The graphic representation of the problem solving process.

Design Loop

ASK – What is the problem or challenge?

IMAGINE – Brainstorm and research solutions. Choose the best solution.

PLAN – Sketch your solution. How will you build it? What materials are needed?

CREATE – Make it, follow your plan, test your solution

EVALUATE – Did it work? Was it the best solution? What would make it even better?

Design Brief

Background:

Design Challenge:

Criteria:

Materials:

Tools:

Marshmallow Tower Challenge

Background Statement
Supporting structures hold themselves and other things up.

Challenge Statement
Design and build a freestanding tower that is at least 20 inches tall in 18 minutes or less using only the materials listed below

Criteria
Your tower must –

- Be completed before the time runs out (18 minutes)
- Be free standing
- Be at least 20 inches tall
- Use only the materials listed below
- **The marshmallow needs to be on top**

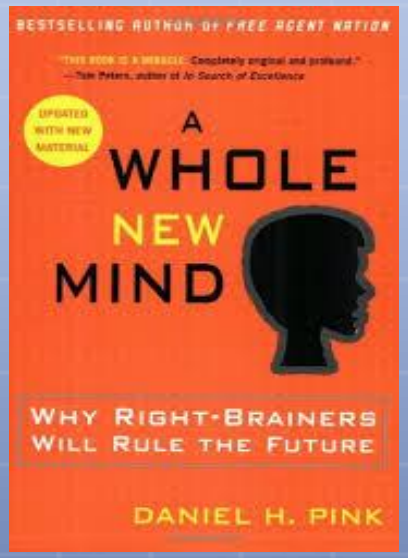
Materials
20 sticks of spaghetti
one yard of tape
one yard of string
one marshmallow

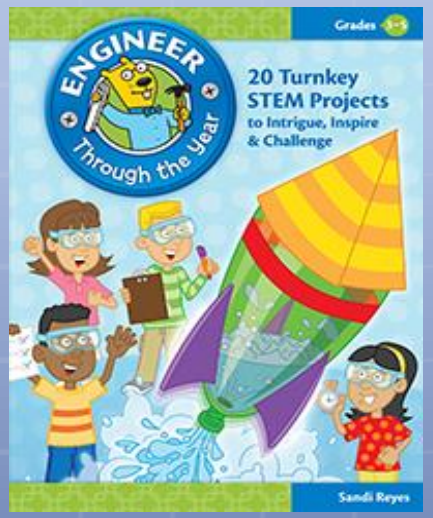
Tools

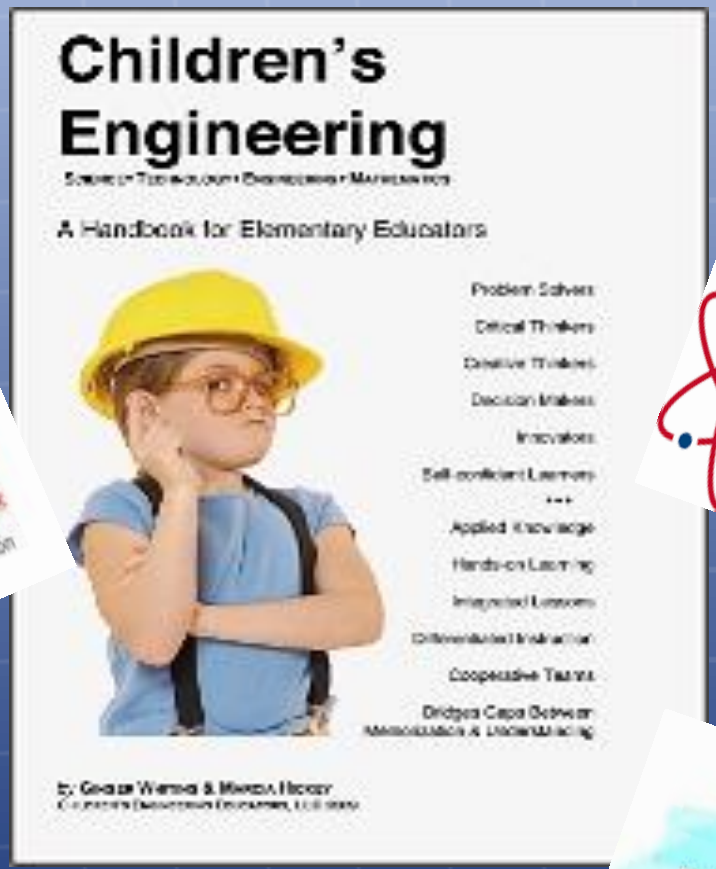
- Scissors
- Pencil
- Ruler

Design Brief

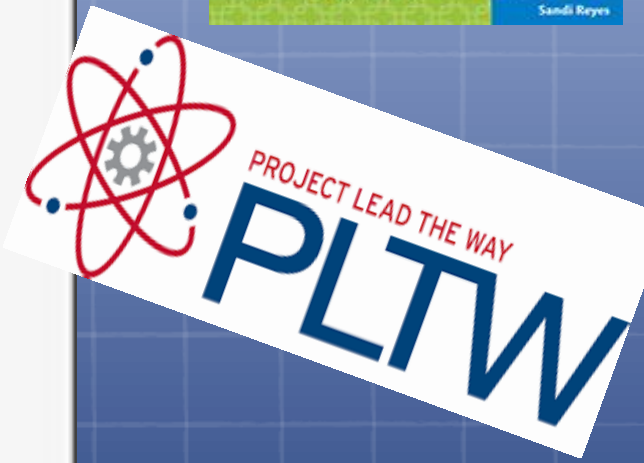
Resources


BESTSELLING AUTHOR OF FREE AGENT NATION
A WHOLE NEW MIND
WHY RIGHT-BRAINERS WILL RULE THE FUTURE
DANIEL H. PINK


ENGINEER Through the Year
Grades
20 Turnkey STEM Projects to Intrigue, Inspire & Challenge
Sandi Reyes


Children's Engineering
A Handbook for Elementary Educators
Problem Solvers
Critical Thinkers
Decision Makers
Innovators
Applied Knowledge
Hands-on Learning
Cooperative Teams


EiE
Engineering is Elementary
Developed by the Museum of Science, Boston


PROJECT LEAD THE WAY
PLTW


LEGO


VCEC

Planned Change

- Vision
- Skills
- Incentives
- Resources
- Action Plan

Action Plans

Teachers	**Professional Development**	**PLC/Coaching/Co-Teaching**	**Teachers Share Email, staff meetings, PLCs**
Support Staff	**Overview of STEM**	**Inclusion in STEM Activities**	
Communication	**Parents (STEM Night)**	**School Board**	**Community Partners**
School	**Culture Change**	**Visual Displays**	**Identify**
Resources	**Year 1 Children's Engineering**	**Year 2 Simple Machines Lego and K'nex Robotics**	**Year 3 Project Lead the Way Engineering is Elementary**

Kansas Volunteer Commission Grant

- STEM Mentoring Initiative (VGF) Grant
  - Increased ability among mentees to see themselves in a STEM career
  - Place 32-36 mentors - engineers to align with the curriculum of Engineering is Elementary and Project Lead the Way

Civil	Chemical	Industrial	Green
Optical	Materials	Electrical	Environmental
Green	Aerospace	Mechanical	

Grants

- Lego – 21st Century Grant
- Project Lead The Way
- STEM Mentoring Initiative (VGF) Grant

Helping STEM Take Root

- Create an action plan
- Provide ongoing professional development
- Involve parents and community
- Create a level of sustainable and reinforced infrastructure

STEM Coordinator

- Emerging position in STEM Schools.
- Beneficial in the first years of implementation.
- Specialized content knowledge to support teachers.
- Keeping up to date with current research and resources.
- Centralized position to answer questions, solve problems, and spark ideas relating to STEM in the classrooms.

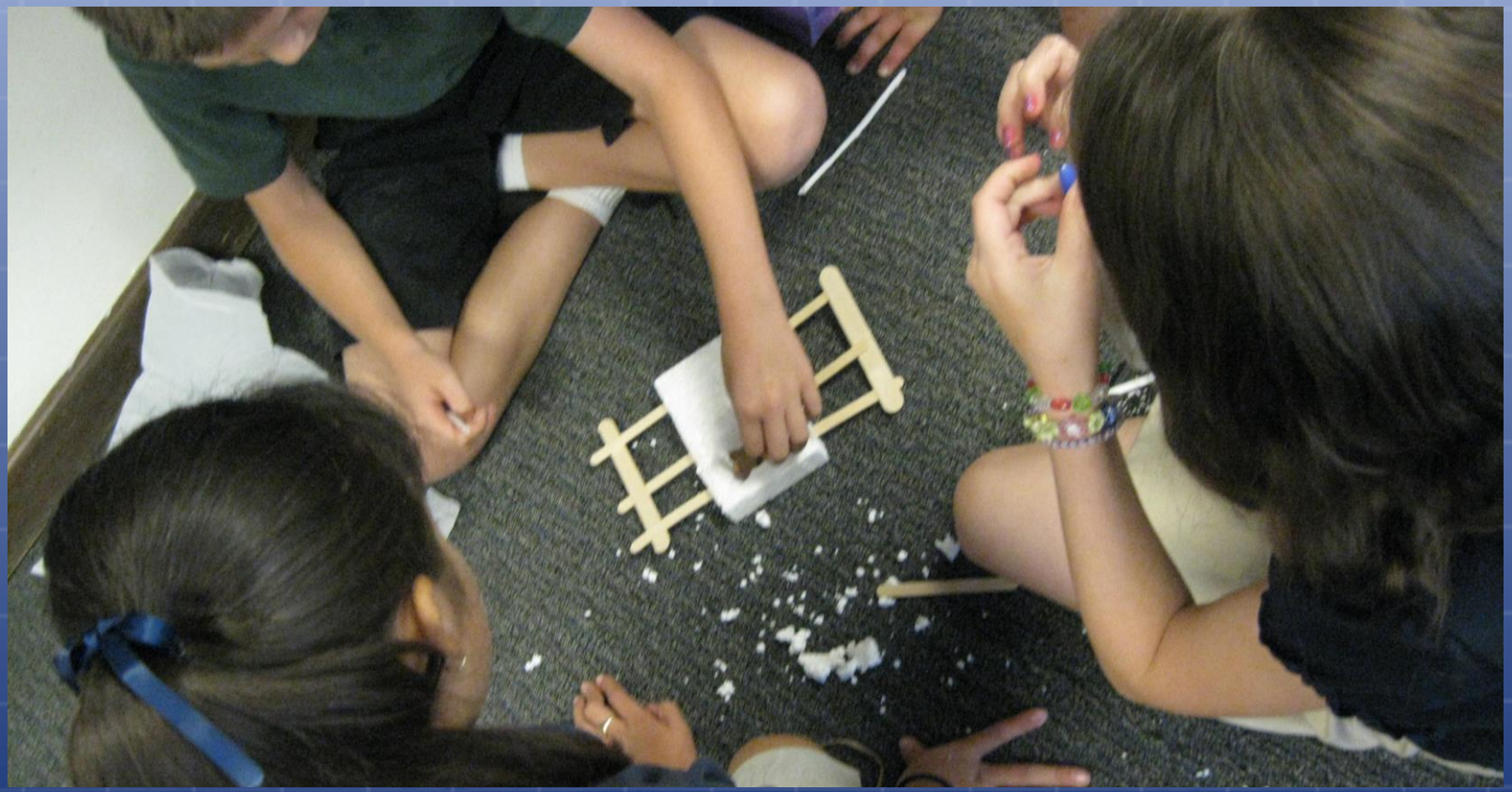
STEM Coordinator

- Professional Development
- Co-teaching
- Direct instruction with students
- Evaluating and recommending materials
- Event planning
- Grant writing
- Support and share leadership with the principal

Problem Solving

Collaborating

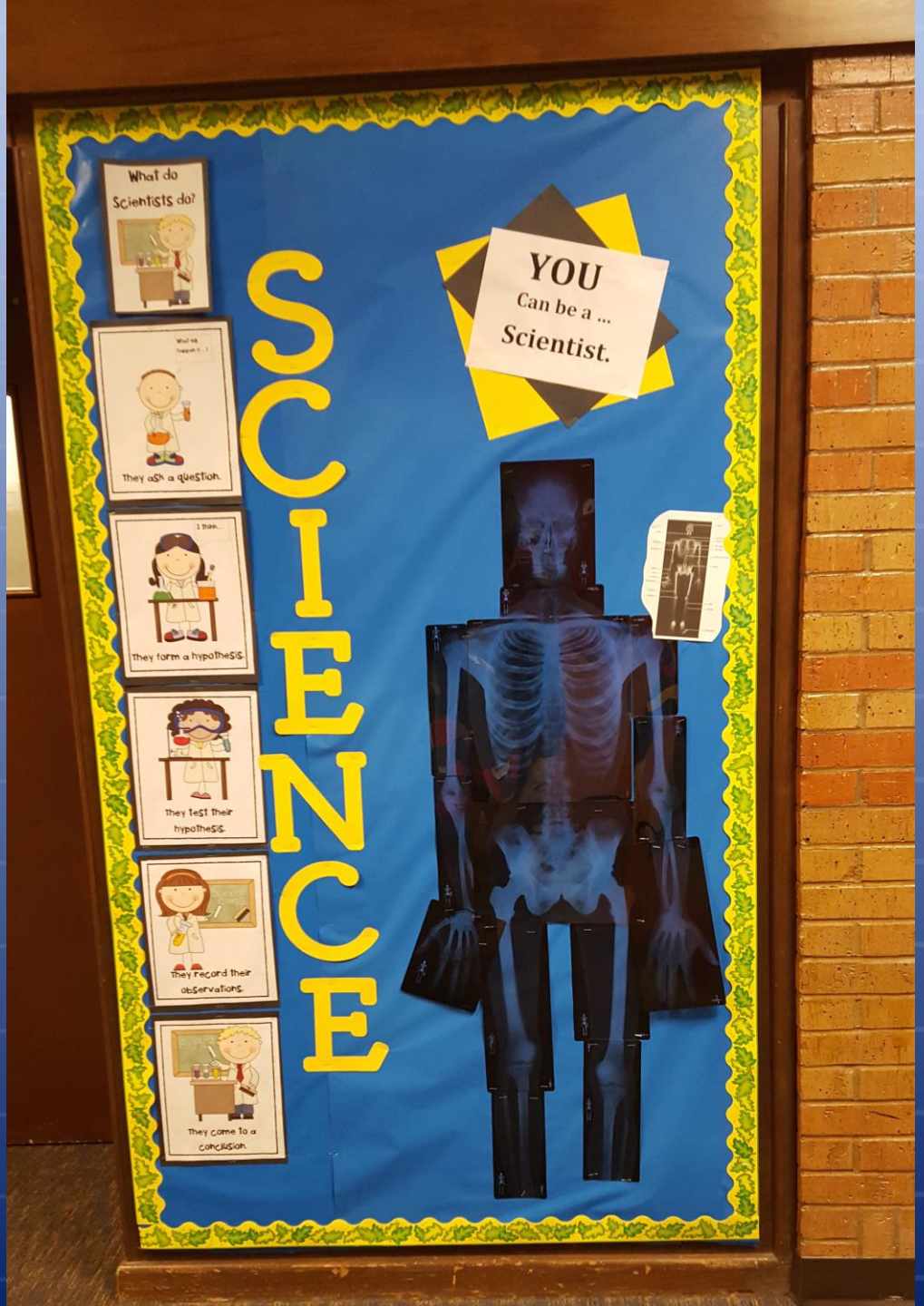
Creating

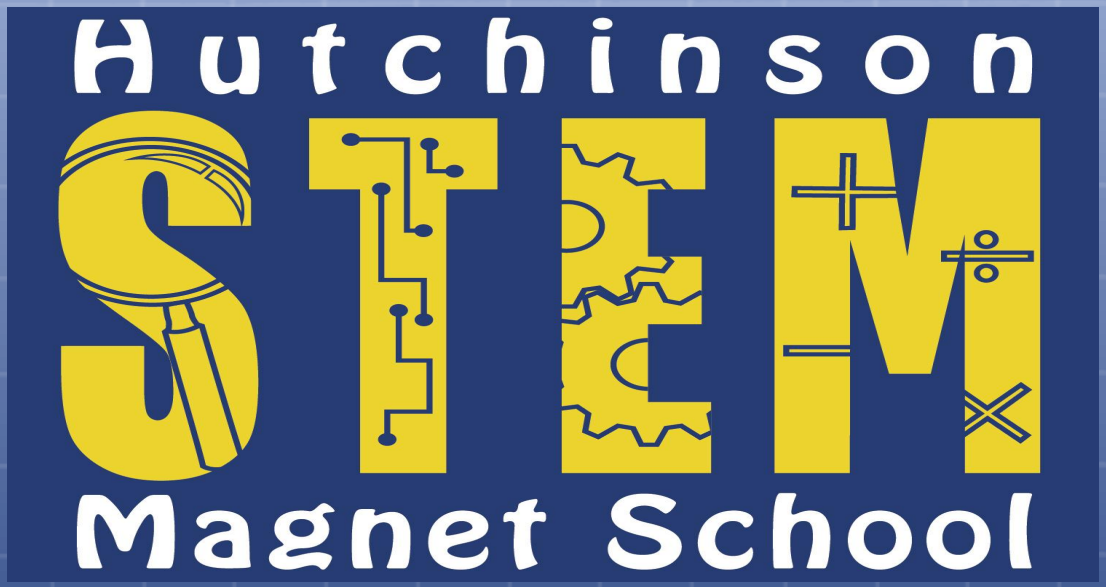


Experimenting

Discovering

Family STEM Night


What do Scientists do?
They ask a question.
I think...
They form a hypothesis.
They test their hypothesis.
They record their observations.
They come to a conclusion.
SCIENCE
YOU
Can be a ...
Scientist.


Hutchinson
STEM
Magnet School

Year 4

- Challenges and Changes
  - New Staff
  - Reduction of the STEM Coordinator Position
- Opportunities and Improvements
  - Communities that Care
  - Next Generation Science Standards
  - New Staff

Moving Forward with Elementary STEM in Kansas

- Guidelines for STEM schools
- A system of sharing ideas
- Kansas K- 6 STEM Symposium

We believe…

- The purpose of **STEM** education is to generate student interest, increase **STEM** knowledge, and provide opportunities for students to think critically in the fields of **Science, Technology, Engineering, and Mathematics.**

Thank you for attending -

Joyce Smith
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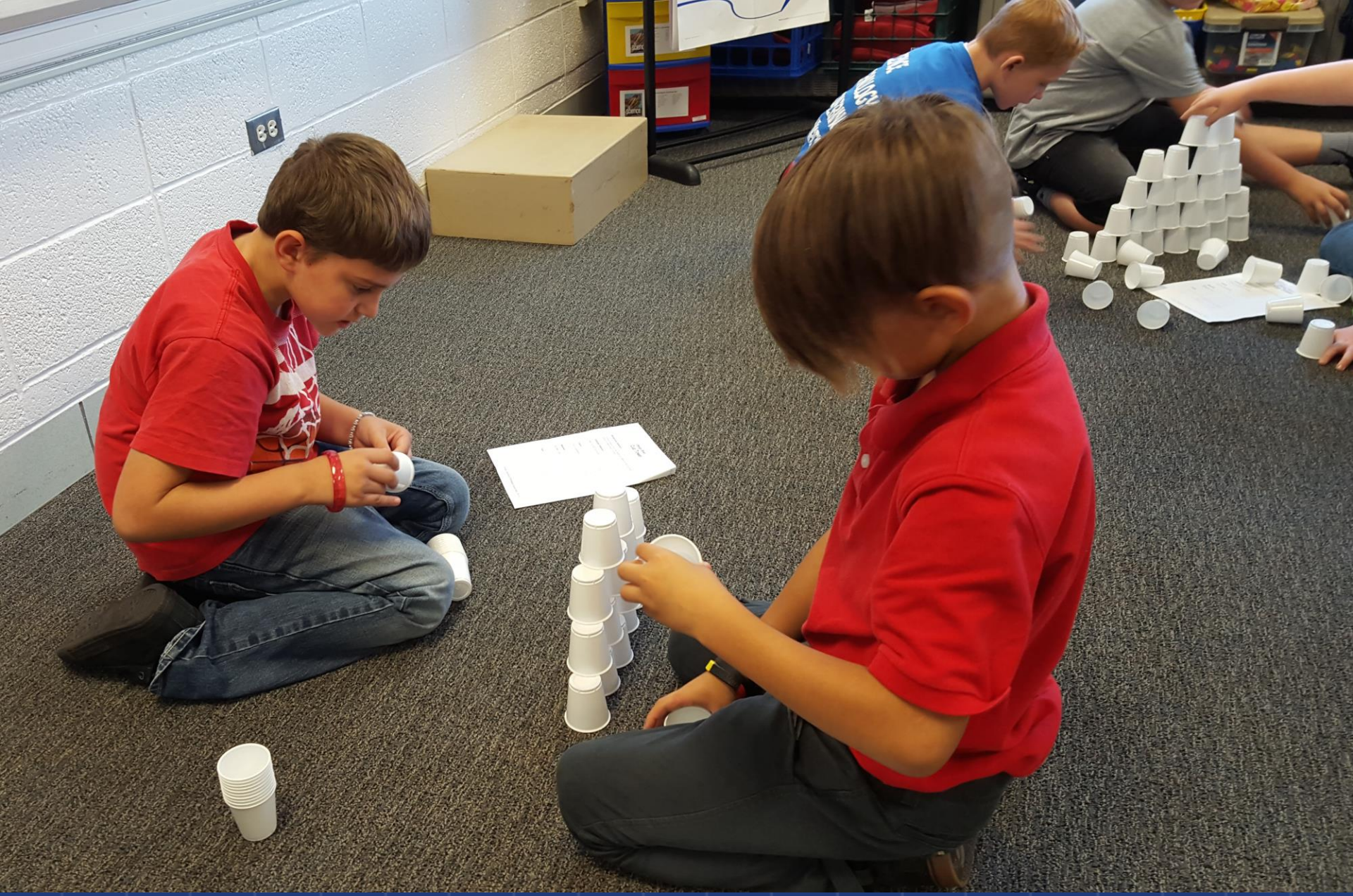
Goldilocks and the Three Bears
Hutchinson STEM Magnet School
Background: We have learned the 5 structures. In today's challenge you will be constructing a supporting structure.
Challenge Statement: After reading Goldilocks and the Three Bears, design and build a new chair that is "just right" for Baby Bear.
Criteria:
-All chairs must have four legs and a back.
-All chairs must be free standing.
-All chairs must support Baby Bear (a can of pop) successfully for one minute.
-Baby Bear's chair must be no larger than 6" in any one direction.
Materials:
-3 straws
-1 coffee filter
-2 feet of string
-1 piece of copy paper
-pipe cleaners
- toothpicks
Tools:
-1 can of pop
-stopwatch or cellphone
-scissors
-tape
-glue
The Design Process
Challenge
Ask:
Imagine:
Plan:
Evaluate:


STEM
STARTS
HERE
Kindergarten
STEM
*Apple
Baskets
*First Letter of
our Name
Now You're Cooking:
Designing Solar
Ovens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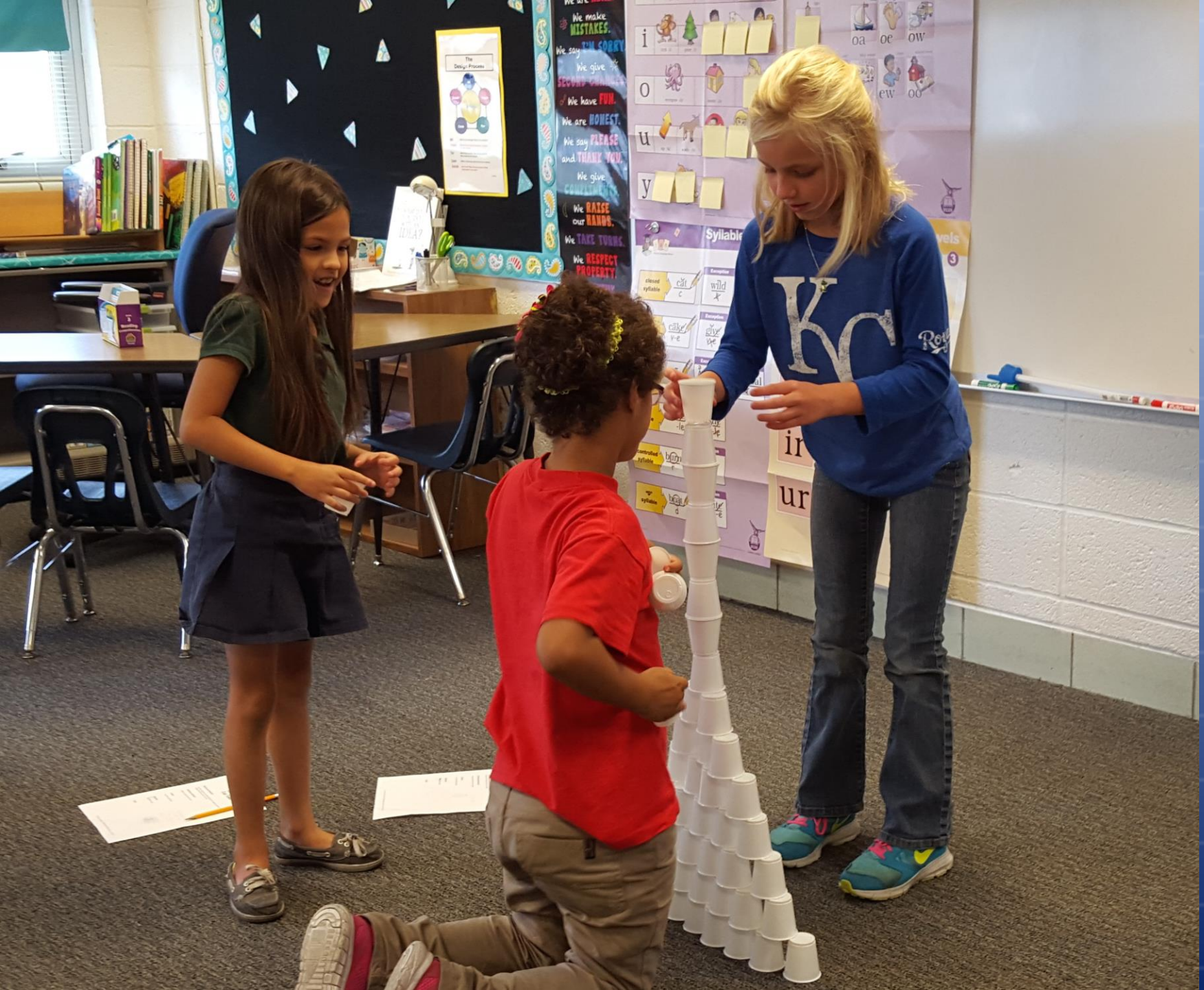
We make MISTAKES.
We have FUN.
We are HONEST.
We say PLEASE and THANK YOU.
We RAISE our HANDS.
We TAKE TURNS.
We RESPECT PROPERTY.
Syllable
oa oe ow
ew oo