

STEM in the Elementary Classroom: Creating Thinkers





Bryan Cunningham – Principal

Joyce Smith – STEM Coordinator/Instructional Coach

Tabetha Gray – 6th Grade teacher

Deb Field – Special Education teacher

Sarah Rodriguez – School Counselor

Hutchinson STEM Magnet School at Allen

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





Our Journey

- **Researched elementary level STEM schools**
- **Designed our mission and vision**





Our Journey

- **Determined our STEM model**
 - **STEM Focus**
 - **Grade Levels**
 - **Time Structure**
 - **Curriculum/Resources**





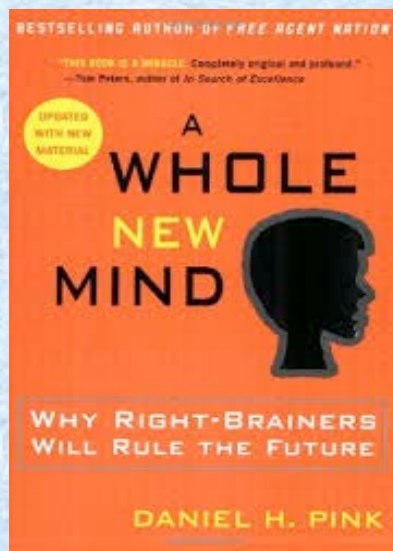
Hutchinson Magnet School at Allen is a STEM school of **design and discovery**. Our school is committed to nurturing a **challenging inquiry-based** learning environment, dedicated to the advancement of science, technology, engineering and mathematics for the 21st Century.

Imagining Today...Creating Tomorrow

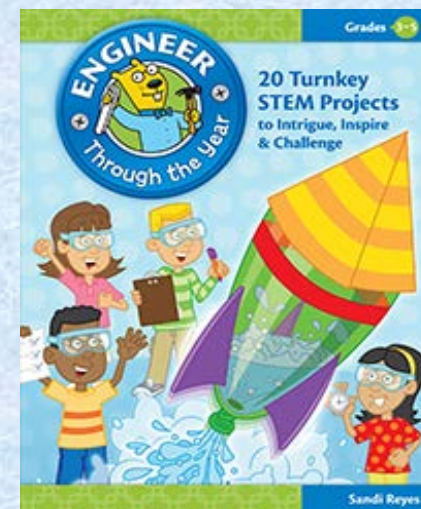
Planned Change

- Vision
- Skills
- Incentives
- Resources
- Action Plan





Resources



Children's Engineering

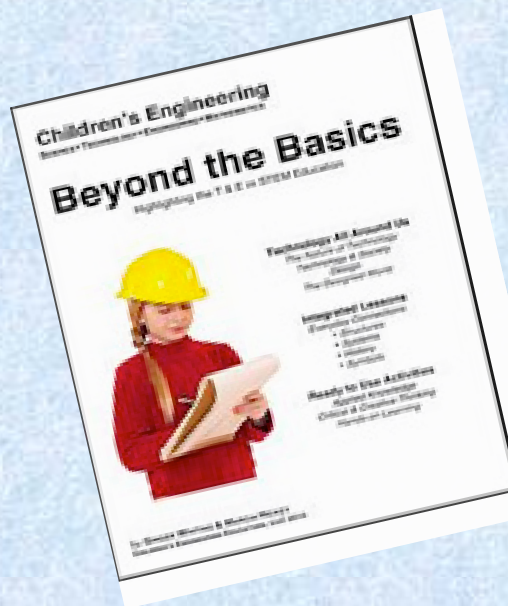
Science • Technology • Engineering • Mathematics

A Handbook for Elementary Educators



Problem Solvers
Critical Thinkers
Creative Thinkers
Decision Makers
Innovators
Self-confident Learners
...
Applied Knowledge
Hands-on Learning
Integrated Lessons
Differentiated Instruction
Cooperative Teams
Bridges Cope (Between Mathematics & Understanding)

by George Winters & Monica Henry
Children's Educational Resources, LLC 2009





Action Plans

Teachers

**Professional
Development**

**PLC/Coaching/Co-
Teaching**

**Teachers Share
Email, staff meetings,
Edmodo**

Support Staff

**Overview of
STEM**

**Inclusion in STEM
Activities**

Communication

**Parents
(STEM Night)**

School Board

Community Partners

School

Culture Change

Visual Displays

Identity

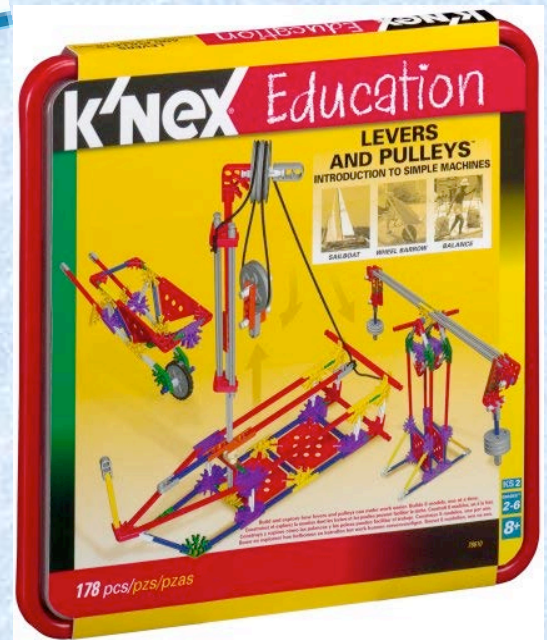
Resources

**Year 1
Structures
Children's
Engineering**

**Year 2
Simple Machines
Lego and K'nex**

**Year 3
Engineering is
Elementary**

YEAR 2





Operational Definitions

- **Science**
- **Technology**
- **Engineering**
- **Mathematics**
- **STEM Notebook**
- **Design Brief**
- **Design Loop**



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

TIME TRAVEL MACHINE

Connections to Literature

The class read Grace and the Time Machine. We then made a list of the components we thought a time machine must have. The students agreed to bring in items that could be used to build a time machine model.

Materials

Cardboard tubes Pipe cleaners Rubber bands
Wire Cellophane Foil Tape Bells Brads Misc. donations
from students Cans Cardboard boxes Balloons Paper
clips modeling clay

Tools

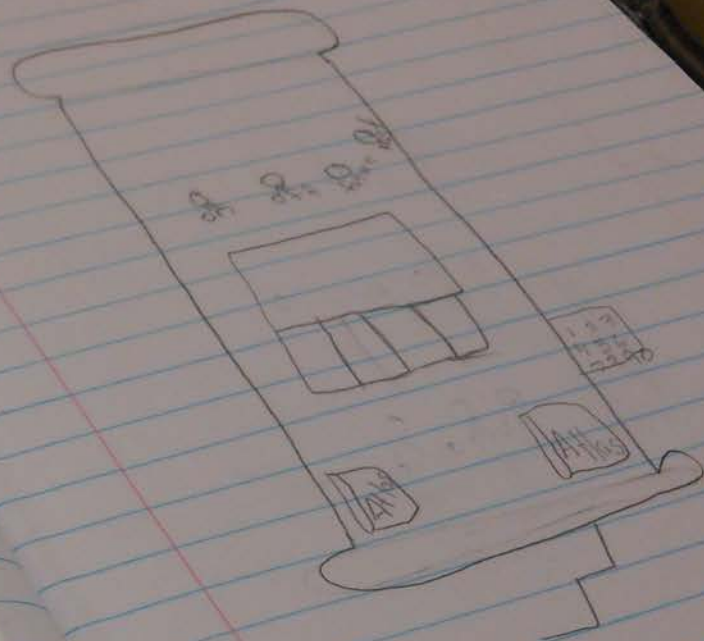
Cardboard flat to hold the supplies
Scissors
Glue
Ruler
Markers
Hole Punch

THE CHALLENGE

Design and build a model of a time travel machine.

CRITERIA

The time machine must have controls.
There must be a place to put the date for the travel
The machine must move and make a sound.
The machine must have a portal and room for more than one.





Design Loop

EVALUATE

ASK

IMAGINE

PLAN

CREATE

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?

Classroom Experiences



6th Grade – Tabetha Gray





10/26/2011



09/27/2011





Special Education – Deb Field

- Learning Disabilities
- Mild to Moderate Cognitive Delays 2-6
- Mild to Moderate Autism K-6

**Right-Brain Learners/Hands On
Modifications and Accommodations
Socialization with Peers
Builds Language Skills
Jobs**

Reinforcing Skill in the Special Education Setting



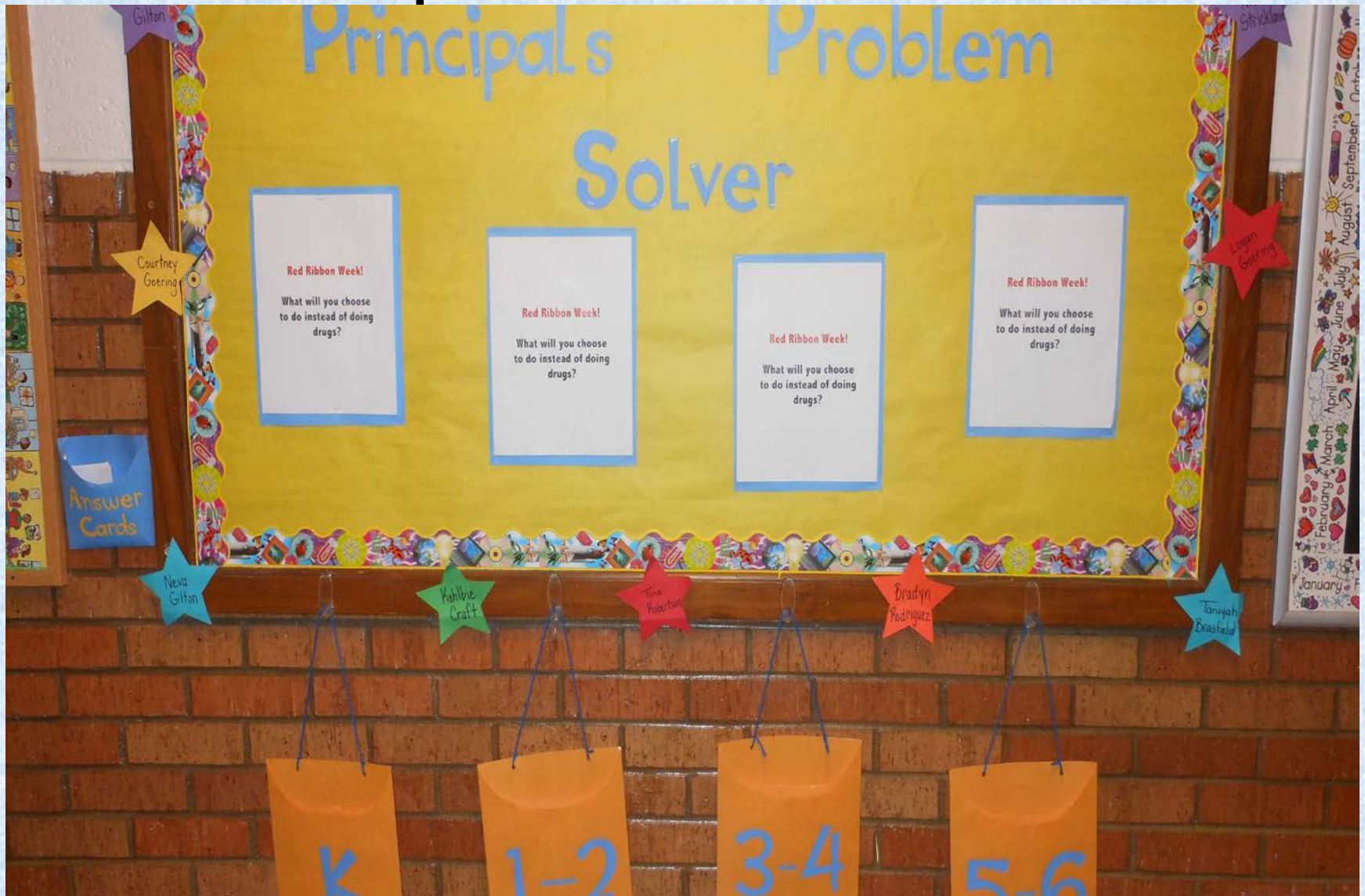




Counselor – Sarah Rodriguez

- **1st Grade Classroom**
- **Counselor**
 - **Morning Meeting**
 - **Principal's Problem Solver**
 - **STEM Stars**
- **Parent**

Principal's Problem Solver



Morning Meeting







**What does STEM look
like in an elementary
classroom?**

Problem Solving



Collaborating



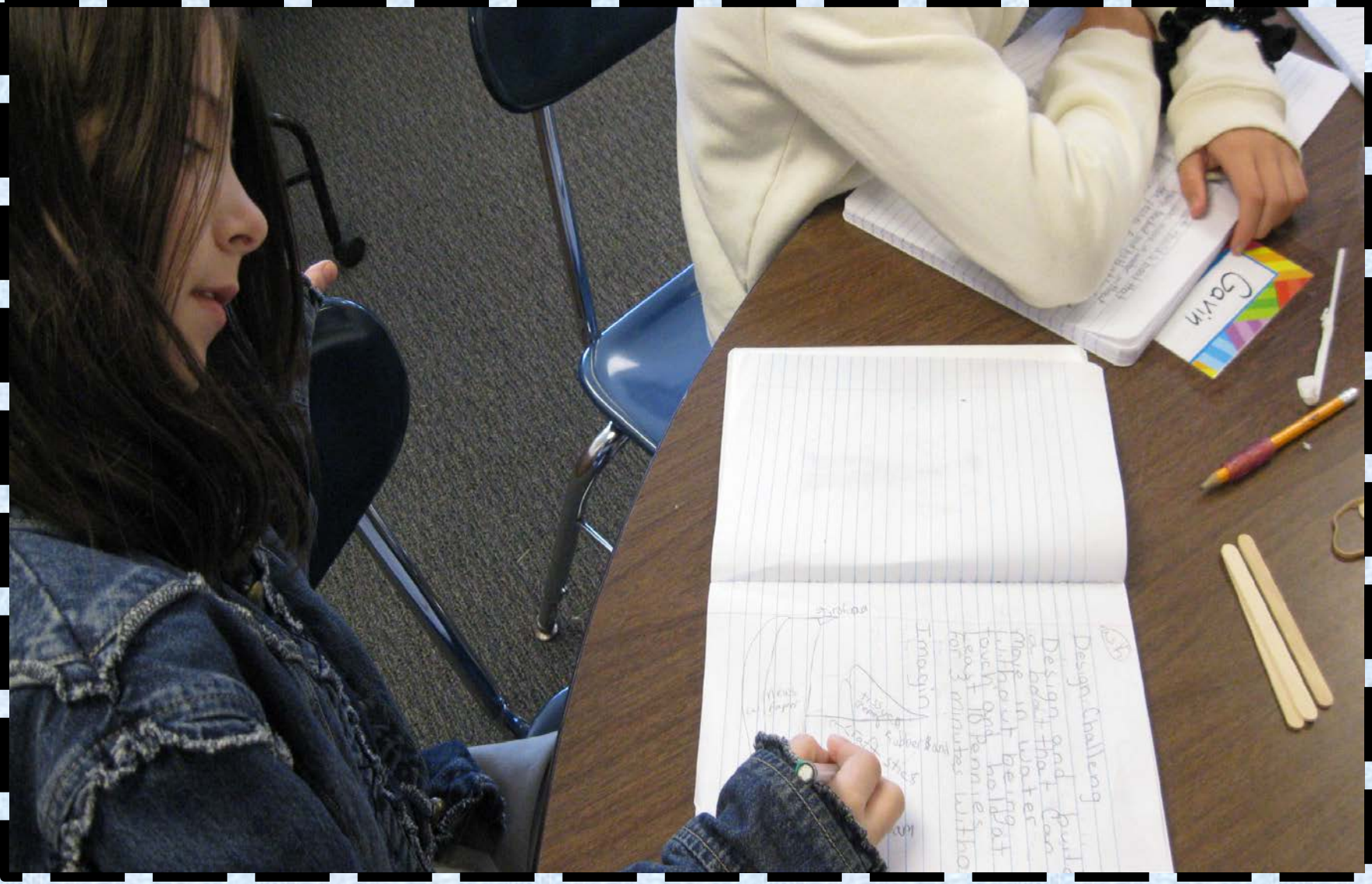
Creating



Experimenting



A student with long dark hair, wearing a denim jacket, is seated at a wooden table, working on a design challenge project. She is using a green marker to draw on a lined notebook. The notebook has the title "Design Challenge" and the subtitle "Design and build a device that can move an object without being touched for 10 minutes with no for 3 minutes with no". She is also drawing a diagram of a device. On the table, there are several wooden sticks, a pencil, and a small card that says "Gavin". Another student in a white shirt is visible in the background, also working on a project.



Speech
STEVE MEIER

The Science of Speech and Language



1. Hearing
2. Vision
3. Reading & Writing
4. Comprehension of Speech
5. Expressive Language

STEM
Imagining Today....
Creating Tomorrow

SCIENTISTS



Observe



Measure



Infer



Hypothesize

Communicate

Classify



Organize Data



experiment



predict



TECHNOLOGY

ENGINEERING

SCIENCE

MATH

Applied
Knowledge

Learning

Journaling

Problem
Based
Learning

Assess

Achieve

Design
Loop

Hands-on

Ask

STEM

PROBLEM
SOLVERS

Building
Team

Collaboration

Innovators

Social
Studies

Risk
Taking

Self-
Confident
Learners

Participation

Brainstorming

Decision
Makers

Experiments

Question

Community

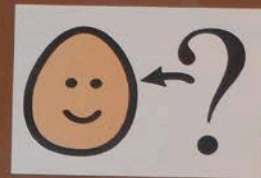
Differentiated
Instruction

Discover

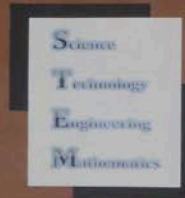
Cooperative
Teams



EVALUATE



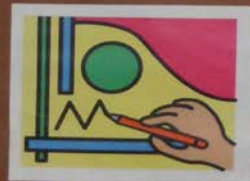
ASK



CREATE



IMAGINE



PLAN

Science



Technology



Engineering



Math



Born

January

5- Miss Beggs

11- Adrianna

February

10- Nathan A

22- Jordan

March

3- Cathlyne

27- Nathan J

April

STEM Family Night













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