STEM with the Standards
20 Challenges for $20

Clare Kaplan

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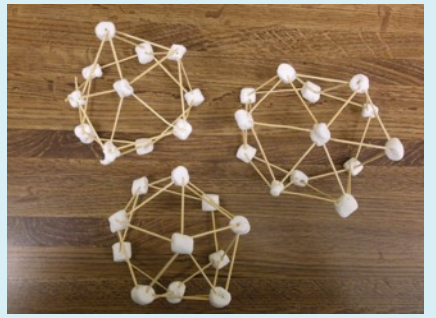
Agenda



- Introduction and Engineering Design Process
- Setting up a STEM Lab
- How to Align Challenge with Standards
- Supplies and Challenges
- Hands-on with Challenges
- Reflection

Preparing Students for Future Careers

Introduction

STREAMS -

- Science
- Technology
- Reading
- Engineering
- Art
- Math
- Standards

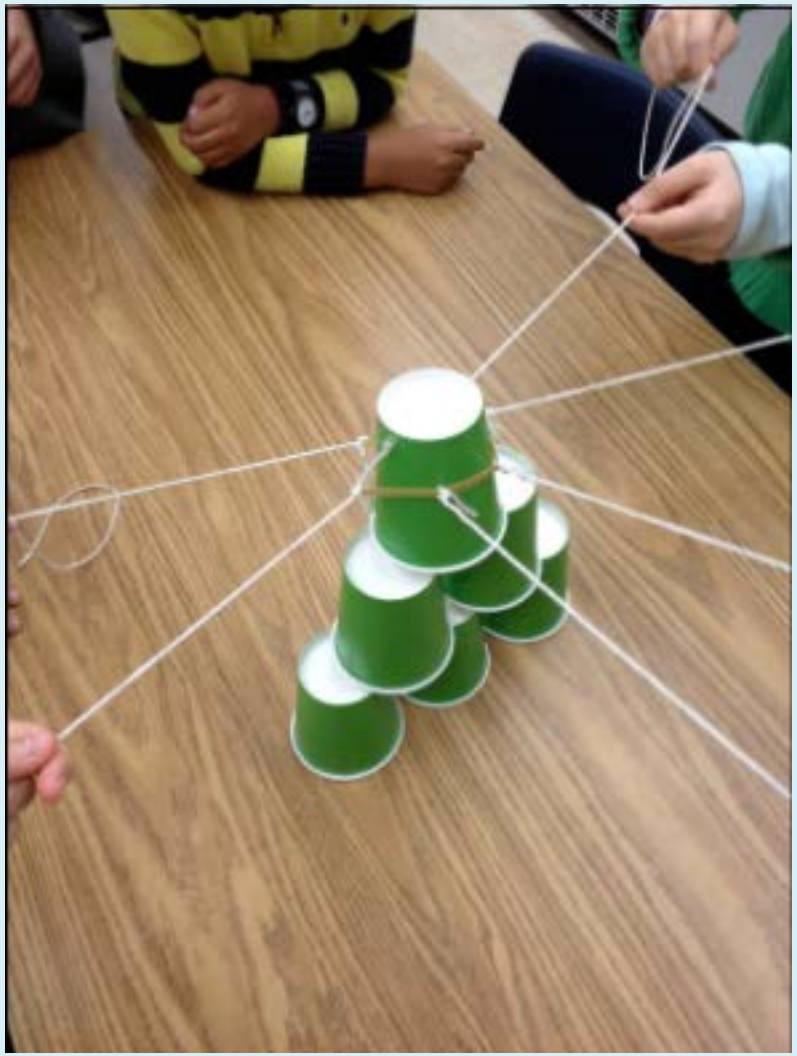
Application -

- RTI – Enrichment
- Hands-on extension for understanding the standard
- To engage students

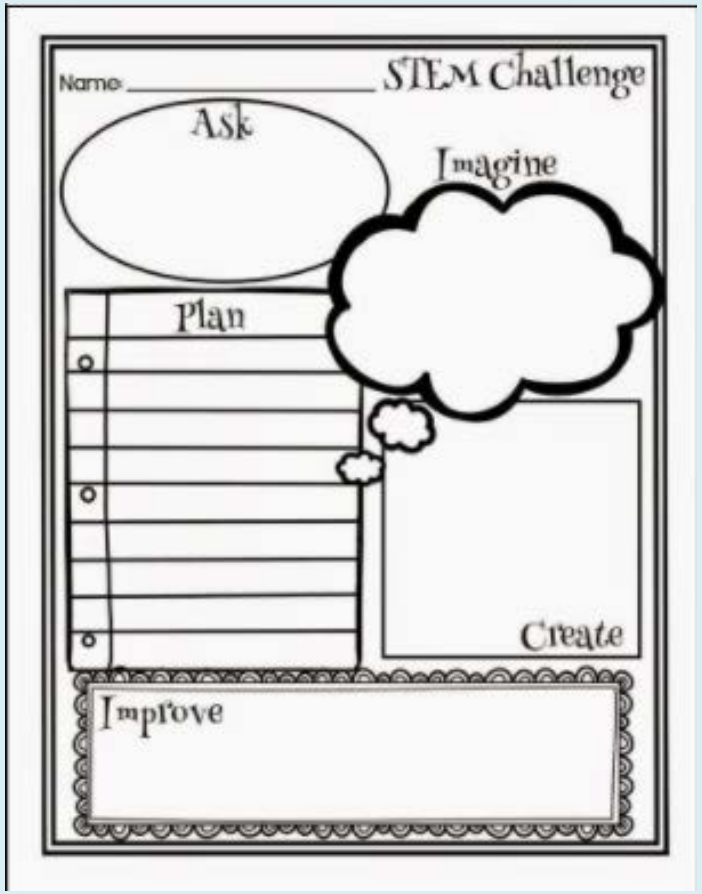
Cup Challenge

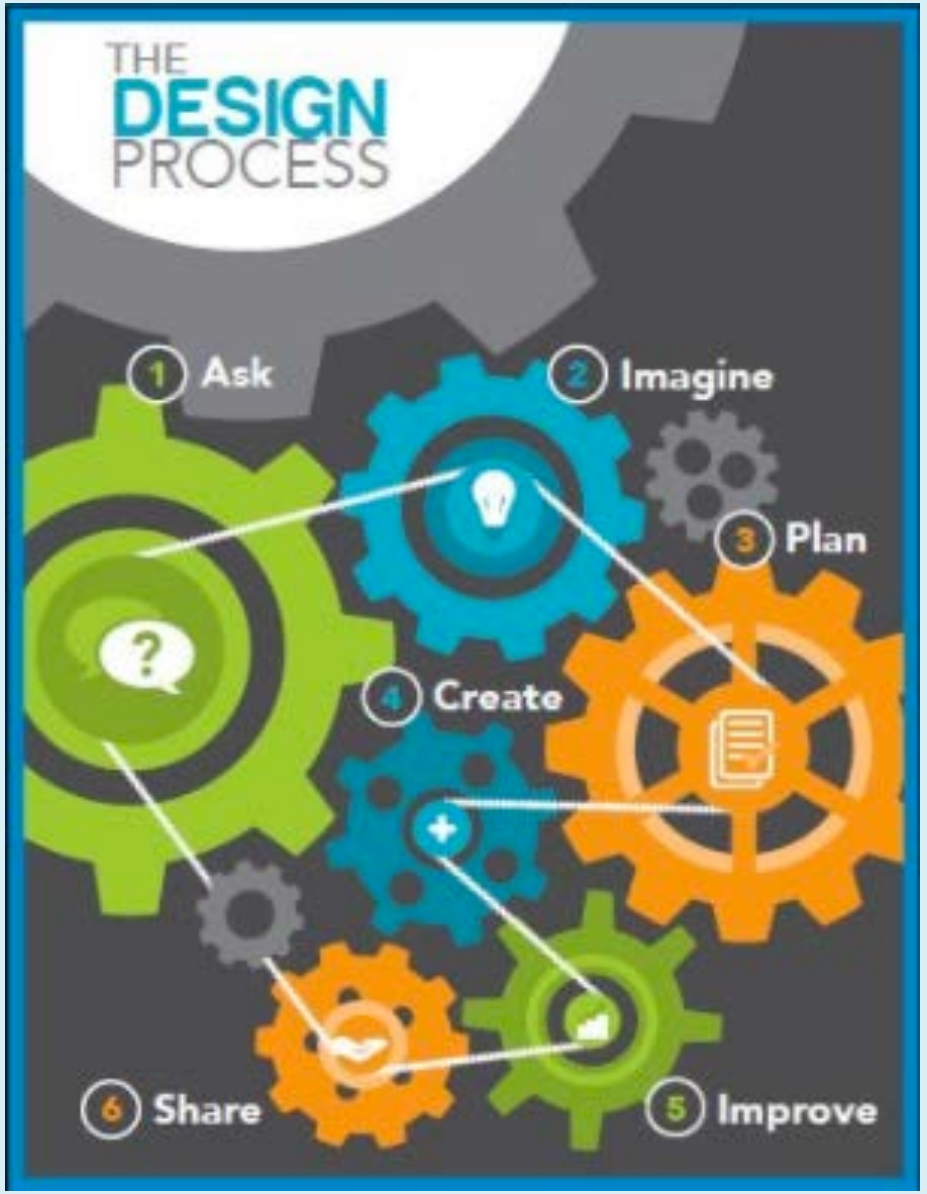
Cup Challenge Rules

- Build a pyramid with only the string and rubber bands!
- You may NOT touch your partners string at anytime! Otherwise you will have to restart.
- You may NOT touch your rubber band at anytime! Otherwise you will have to restart.
- If you drop your cup on the floor, you may pick it up and place it on the corner of your desk to continue.
- Your hands may NOT touch the cups anytime they are on the table. Otherwise you will have to restart.
- No switching of strings during the challenge!



Engineering Design Process





[STEM Careers – Why aren't kids interested in them?]

SMART Goals

GOAL _____ (# of Smarties stacked)

ACTUAL PERFORMANCE _____

SCORE _____

MADE THE GOAL

10 POINTS FOR EACH OF THE SMARTIES IN THE STACK

5 POINTS FOR ANY OVER THE GOAL

DIDN'T MAKE THE GOAL

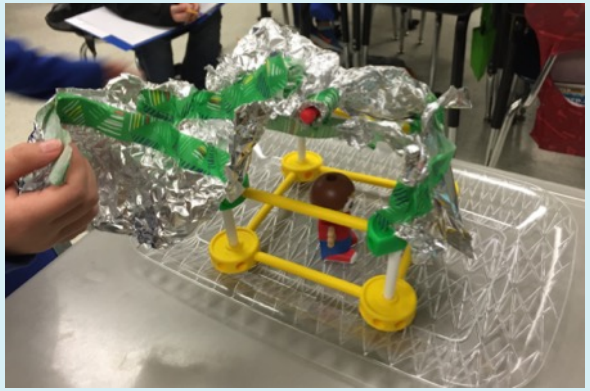
5 POINTS TO EACH SMARTIES IN THE STACK

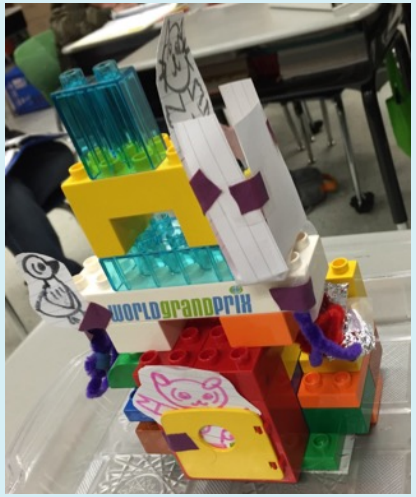
IF YOU DID NOT MAKE YOUR GOAL

Setting up a STEM Lab

- Create a STEM area for supplies, group baskets, and binders.
- Train students how to collect supplies and put them away.
- Explain group roles and expectations.
- Begin by creating SMART Goals.
- Model a STEM challenge for students and have them complete it on their own. (Straw Rockets are great for this.)
- Move into group STEM challenge with Save Fred.
- Develop Engineering Process and continue with simple challenges.
- Don’t Give Up!

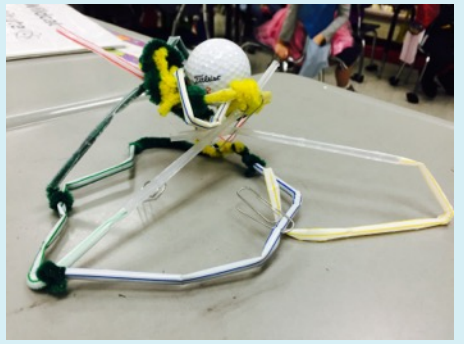
Align Challenge with Standards





- This is my favorite part. What comes first the standard or the challenge? That is the question.
- ELA – Use a Wonders weekly story such as Wolf. Follow your routine, but add a challenge at the end of the lesson. For example, you could read the Three Little Pigs to compare and contrast. Have students write to compare and contrast the stories. Next, have students build houses out of straws, sticks, and bricks that must face the Big, Bad, Hairdryer. Students need to write using the Engineering Process sheet. The challenge can depend on the level of students. Add in area and perimeter of the house. (Guided Reading Rotation)

Align Challenge with Standards



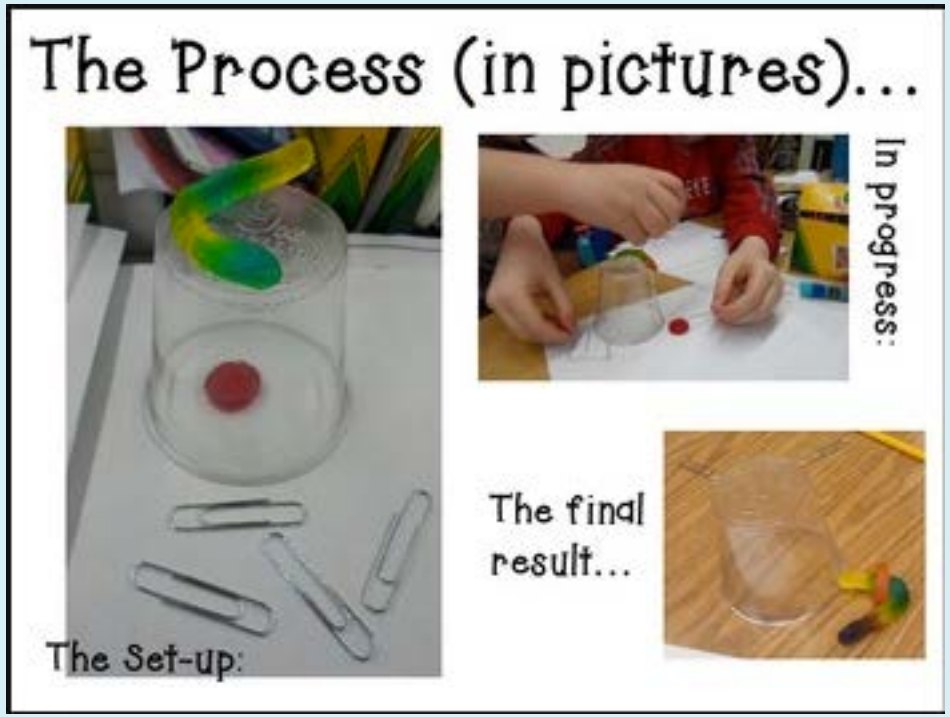
- RTI Enrichment – Create a program for advanced learners to integrate STEM and standards based on essential skills and Common Formative assessments.
  - Fiction and Nonfiction paired reading challenges
  - Invention Convention and Genius Hour
- RTI Enhancement – Develop a deeper understanding of math and science standards for struggling learners with hands-on challenges.
  - Place Value Towers
  - Pet Rock - Science, Writing, and fun

Lab Tips from Bunsen and Beaker.

- Do not eat or drink in the Lab.
- Do not taste the experiment no matter how tempting it may be.

Save Fred

- Let's save Fred. You can decide how much you want the students to know ahead of time.
- If Fred is saved quickly, build and aluimnum boat to help him reach safety.



Supplies

- Pipe cleaners
- String
- Lifesavers
- Q-tips
- Index cards
- Spaghetti
- Marshmallows
- Plastic spoons
- Balloons
- Straws
- Clear tape
- Masking tape
- Gummy worms
- Gummy lifesavers
- Aluminum foil
- Ping pong balls
- Gumdrops or Dots
- Copy paper and cardstock
- Roll of pennies
- Food coloring
- Solo cups
- Wooden craft sticks
- Rubber bands
- Marbles

Extra Supplies

- Trays
- Baskets
- Plastic Tubs
- Legos
- Magna-Tiles
- K’Nex
- KEVA Planks
- Go Mouse
- Hex Bugs
- Lincoln Logs
- Hot Wheels Race Track

Challenges

- 1. Save Fred
- 2. Puff mobiles
- 3. Straw rockets
- 4. Balloon rockets
- 5. Marshmallow bridges
- 6. Pipe cleaner tower
- 7. Paper airplanes
- 8. Cup towers and pyramids
- 9. Aluminum boats
- 10. Mazes
- 11. Geodomes
- 12. 3D shapes
- 13. Gumdrop structures
- 14. Levitating Ping Pong
- 15. Walking water rainbow
- 16. Marshmallow Catapult
- 17. Hoop glider
- 18. Milk Fireworks
- 19. Spinning penny
- 20. Ocean currents
- 21. Ping Pong Pressure
- 22. Marble run
- 23. Brown bag stem
- 24. Slime or Oobleck

Build-On Challenges

- **Improves student success**
- **Creates independence**

Set 1 – Bags 1, 2, 4

- **Bag 1 –** Straw Rocket, Paper Airplane, and Hoop Glider
- **Bag 2 –** Balloon Rocket, Puff Mobile, and Balloon Racer
- **Bag 4 –** Gumdrop Structure, Geodome, and Milk Fireworks

Set 2 – Bags 3, 5, 6

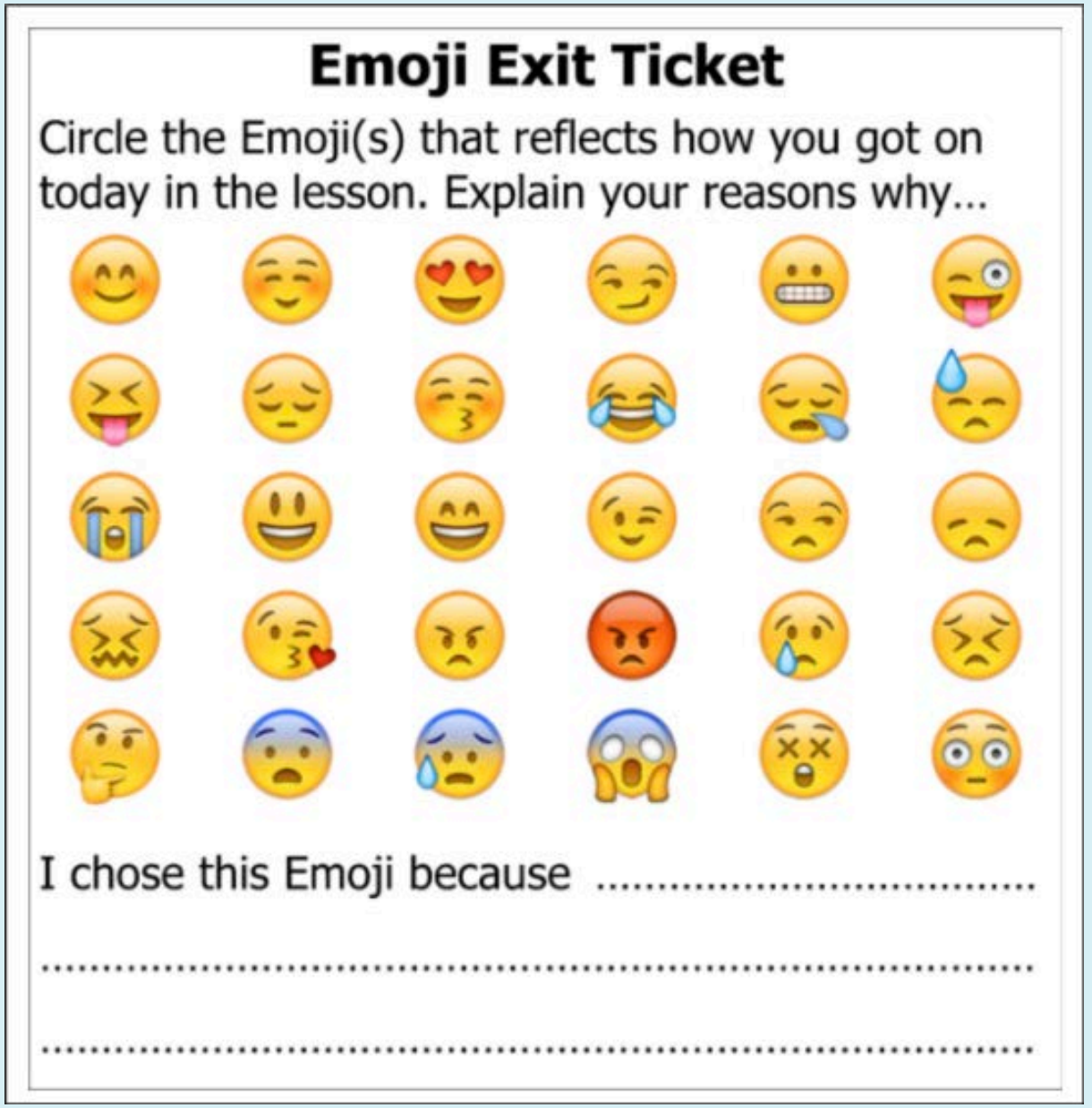
- **Bag 3 –** Parachute, Save Fred, Hex Bug Maze
- **Bag 5 –** Marshmallow Bridge, Marshmallow Shapes, and Marshmallow Popper
- **Bag 6 –** Levitating Ping Pong, Zip Line, and Tall Tower

Build On Challenges

- **If you finished your set, pick a different activity to try.**
- **Come up to the supply desk and gather the items you need.**
- **Fill out a STEM Challenge sheet.**
- **Check out the books and ideas on display.**

Reflection

- Pick an Emoji that reflects how you feel about using some of these STEM activities in your classroom.
- Take a minute and discuss with a neighbor.



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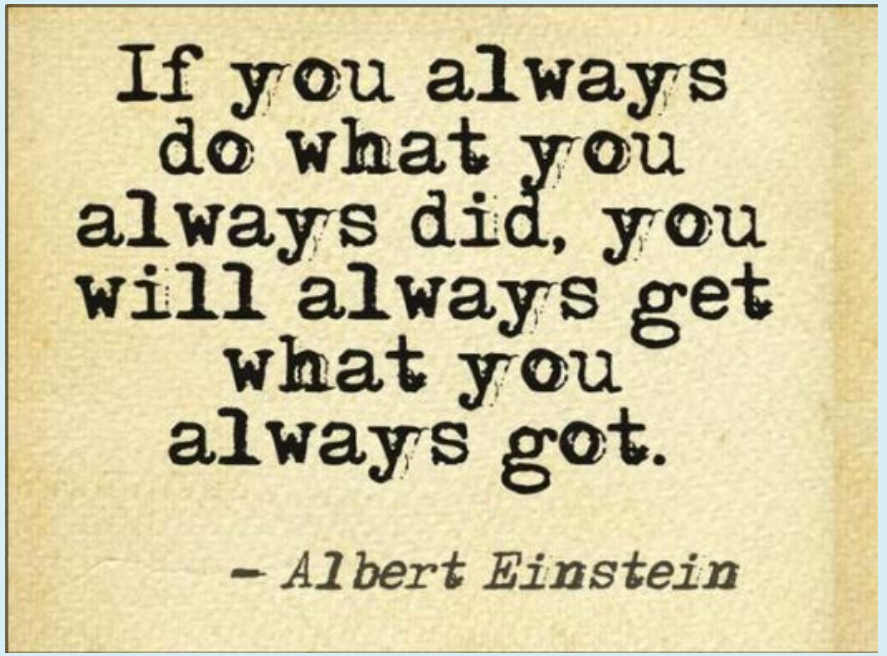

Please contact me for more information.
Send me pictures and examples of what you have done in your classroom.