STEM, STEAM, STREAM

Dolores Underwood, Ferry Pass Middle School
Innovation Specialist,
dunderwood@Escambia.k12.fl.us

Michelle White, Escambia County School District
Coordinator of Media Services,
mwhite5@Escambia.k12.fl.us

STEM vs Makerspace

- Text
- Challenge
- Test prototype
- Modification
- Reflection
- Can be teacher or student directed

- Personalized Projects
- Student Directed
- Learn and discover while creating and exploring

Library of the Future, Makerspace, & STEAM Lab

What's the difference?

Makerspace

A DIY space for exploration where people can gather to create, invent, & learn.

Library of the Future

A space that is a cornerstone of creativity, a learning environment for individuals to gather research, & for teams of people to plan innovation through technological means.

STEAM Lab

A place for teachers to lead pre-planned, guided content that integrates Science, Technology, Engineering, Arts & Math standards.

Adapted from: https://educationcloset.com/2017/01/10/libraries-makerspaces-steam/

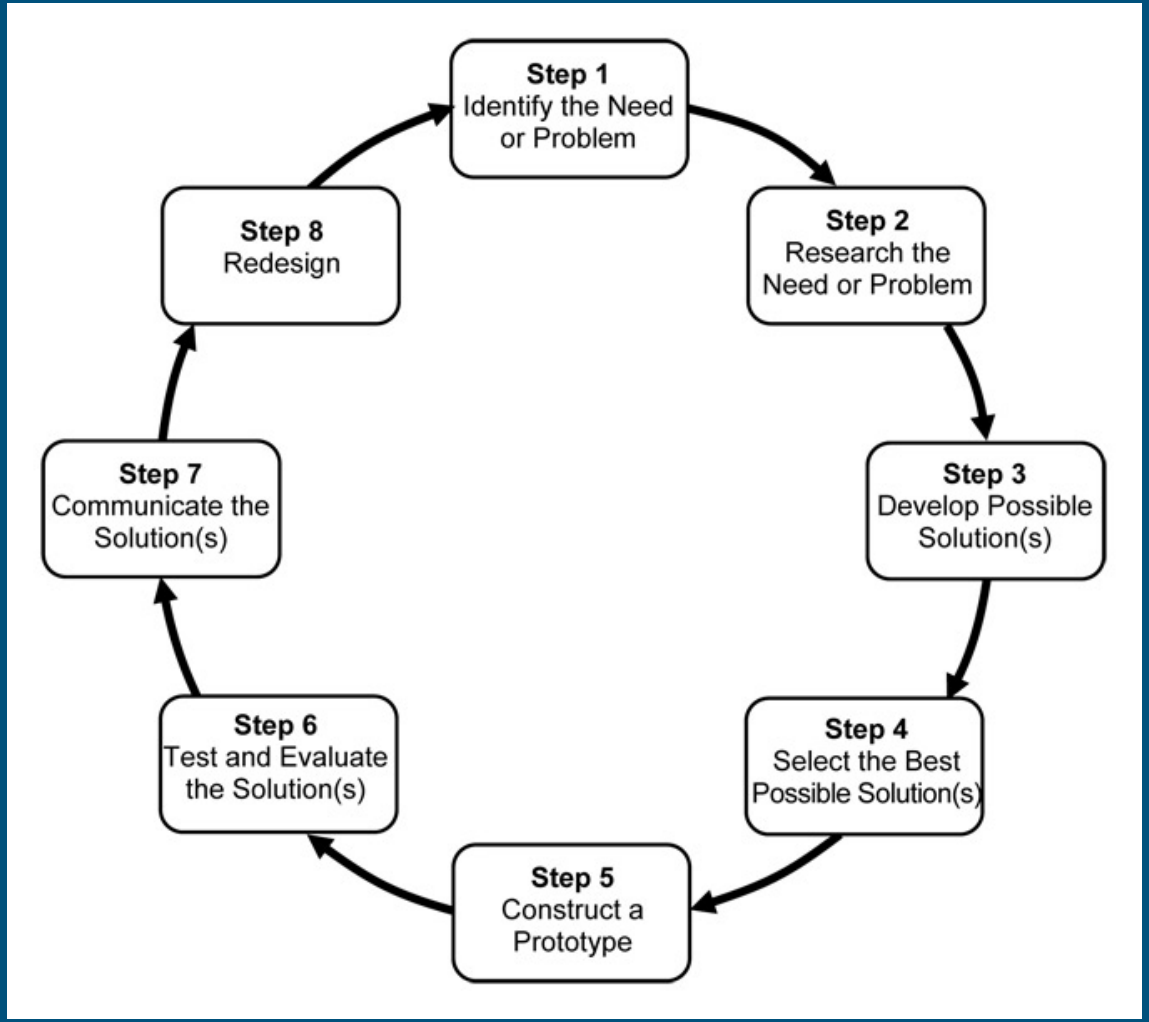
Future Ready → Vision 2020

Personalized learning empowers students with voice and choice in the learning process. It is a student-centered approach that is facilitated by the teacher based on each learner's mastery of the standards. A personalized approach will take into account each learner's unique learning style, abilities, and interests. It is built on the premise that learning happens anywhere, anytime, and in flexible learning spaces.

Innovation Centers!

Problem Solving and Collaboration

- Collaborate with Faculty
  - Tie books to STEAM lessons
  - Provide space
  - Provide expertise for research
- Promote student problem solving
  - Design model
  - Planning and Reflection
- Promote student collaboration
  - Teamwork - everyone has a role and responsibility


Step 1
Identify the Need or Problem
Step 2
Research the Need or Problem
Step 3
Develop Possible Solution(s)
Step 4
Select the Best Possible Solution(s)
Step 5
Construct a Prototype
Step 6
Test and Evaluate the Solution(s)
Step 7
Communicate the Solution(s)
Step 8
Redesign

Names:

Project/Book Title STREAM Recording and Reflection Sheet

1. Challenge:	2.Brainstorm / Plan: (Talk about how you will build the spinning top.)	3.Design / Create/ Build: Draw a model of your spinning top.
4.Test: Did it work?	5. Reflect & Investigate (Think about how it can spin longer.)	6. Redesign/ Improve:

7. What did you discover? Think and discuss:

The Dozen
Cooperative Learning Roles

Encourager

Encourage teammates to participate and do well.

Praiser

Show appreciation for teammates' ideas and contributions.

Cheerleader

Lead the team in celebrating individual or team accomplishments.

Gatekeeper

Make sure everyone is participating about equally.

Coach

Coach teammates on solving a problem.

Question Commander

Check if any teammates have a question.

Checker

Check to make sure everyone has learned the material.

Focus Keeper

Keep the team focused on task.

Recorder

Record the team's answers or ideas, or make sure they get recorded.

Reflector

Lead the team in looking back on how well the team worked together.

Quiet Captain

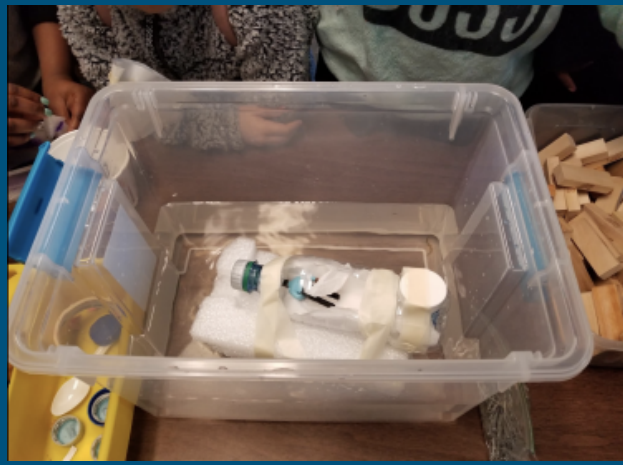
Keep the team's volume level down.

Materials Monitor

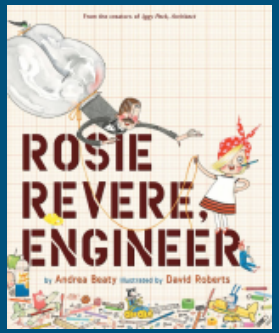
Get and return team supplies. Leads the team clean-up.

Elementary Example

Where the Wild Things Are - create a boat that will float and hold the most weight



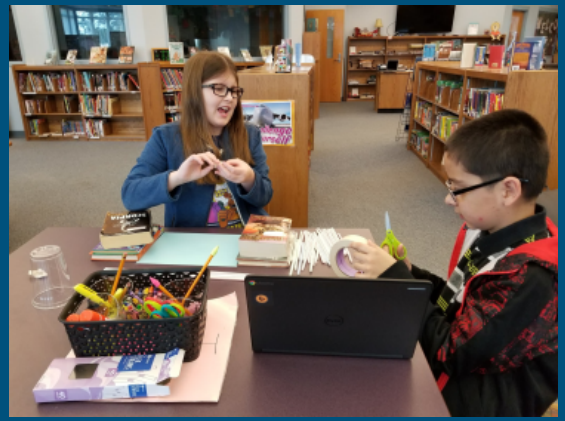
Elementary Example



Rosie Revere, Engineer - create the tallest tower using only spaghetti, marshmallows and tape

Elementary Example

Iggy Peck, Architect - create a bridge using straws and tape that will hold the most weight



Let's Work!

Queen of the Falls - create a device that would protect an egg from a fall

Steps:

- Use Planning Sheet - complete steps 1-3
- Bring paper with completed steps 1-3 to get supplies
- 10 minutes to create container and test
- Complete reflection

Roles:

- Materials Monitor
- Recorder
- Reflector
- Focus/Time Keeper

Names:

Project/Book Title STREAM Recording and Reflection Sheet

1. Challenge: Create a device that will protect an egg from a fall.	2.Brainstorm / Plan: (Talk about how you will build the protection device)	3.Design and Choose Materials:: Draw a model of your egg protection device using your chosen materials.
4.Build and Test: Did it work?	5. Reflect & Investigate (Think about how it can spin longer.)	6. Redesign/ Improve:

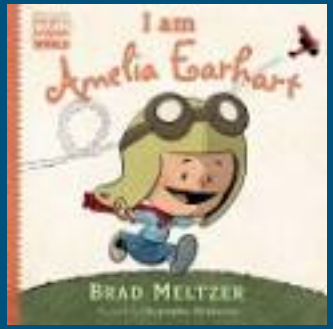
7. What did you discover? Think and discuss:

Look at the materials below pick what you would like to build your egg safety basket with and add them up to equal 20

Use the materials carefully, as they will not be replaced if you damage them.

Material	Cost ($)	Quantity	Cost
2 Paperclips 	2		
2 Straws 	2		
3 Cotton Balls 	3		
3 Pipe Cleaners 	3		
2 Rubber Bands 	5		
2 Sheets of Paper 	5		
1 Sandwich Bag 	5		
1 Sheet of Newspaper 	5		
	Total=		

Let's Work!

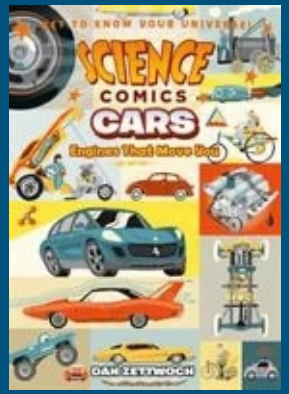


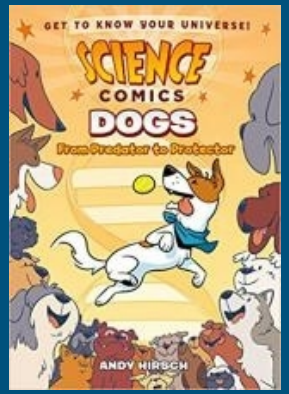
- I am Amelia Earhart – follow directions and make a glider
- Follow the directions, make a glider, test and record distance on the back
    - https://sciencebob.com/the-incredible-hoop-glider/
    - https://sciencebob.com/wp-content/uploads/2015/02/Incredible_Hoop_Glider1.pdf
- Make at least 1 change to the design, test and record the results on the back
- Roles:

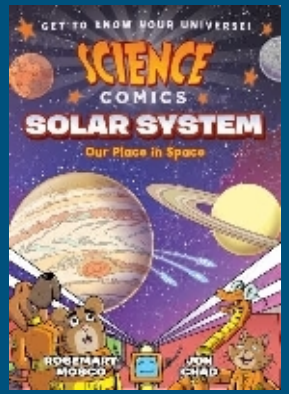
- Builder
- Recorder

Faculty Collaborations in Middle School

- Displaying literature to enhance classroom activities.



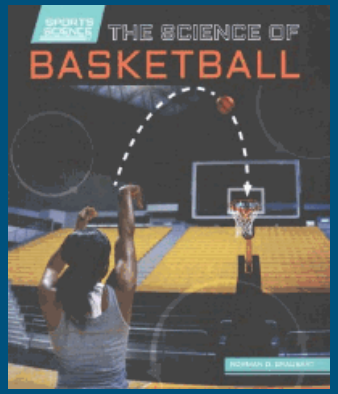


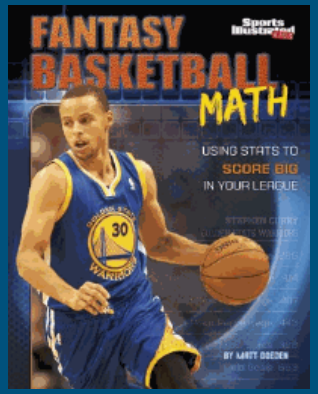


Faculty Collaborations in Middle School

- FAMILY MATH AND SCIENCE COLLABORATIONS
- COLLABORATION WITH PUBLIC LIBRARY

REWARD ACTIVITIES FOR READING





High Touch High Tech®

Science Experiences That Come To You

Basketball STEM activity

Supplies:

*** makes 1 basketball hoop and 1 shooter ***

- Cardboard piece (3 x 4 inches)
- 2 x Chenille stems
- Nylon net fabric (10 x 10 inches)
- 6 x Jumbo craft sticks
- 6 x Regular craft sticks
- 1 x Dowel stick (6 inches long, 3/8 inch diameter)
- 3-4 feet Masking tape
- 1 x Large straw
- 1 x Cardboard tube
- 3-4 Rubber bands
- 1 x 3oz. or 6 oz. cup

https://sciencemadefun.net/downloads/basketball_STEM.pdf