Moving Along the Tracks Curriculum Unit

This unit is designed to last approximately two to three weeks in the elementary classroom. The ideal amount of building time is 45 minutes each day.

Challenge:

Working individually, design a maglev locomotive that will travel the fastest down an 8' track. Following the parameters below, each student will construct a maglev locomotive. The completed design will be submitted for final testing on Tuesday, April 6.

Parameters:

- Your locomotive must be no longer than 5" in length and must be enclosed with a top, bottom, front, back, and sides. Each student will select a theme for their locomotive and decorate the locomotive according to your team theme.
- Your locomotive must have a train engineer that is appropriate in scale to the size of your locomotive. The engineer will 'drive' the train during testing.
- You may use any of the tools introduced in the STEM classes.
- You will be allowed to spend no more than $5.00 to construct your maglev racing locomotives.
    - You may only use the materials from the school's Maglev Store.
- Each team must complete the provided engineering journal and graph of materials purchased during the challenge.

The prices of materials are as follows:

Materials	Price
1 - 3/8" X 3/8" X 12" pine wood	50 ¢
1 - 8.5" X 11" construction paper	25 ¢
1 – drinking straw	25 ¢
1 – 3/16" diameter X 12" dowel rod	50 ¢
1 – popsicle stick	10 ¢
1 – magnet	25 ¢
1 – 12" piece of masking tape	15 ¢
1 – 6" X 6" piece of cardboard	50 ¢
1 – balloon	50 ¢
1 – hex nut or washer	$1.00
2 – rubber bands	25 ¢
4 – paper clips	25 ¢
Elmer's Glue	50 ¢ (Per Day)
Hot Glue	$1.00 (Per Day)

Assessment Rubric – Maglev Locomotive Project

	Up to 2.5 points	Up to 5 point	Up to 7 points	Up to 10 points
Parameters	The product meets minimal parameters for size, and enclosure. Project does not include scaled conductor that fits inside maglev train.	The product meets some of the parameters for size, and enclosure. Project does not include appropriate scaled conductor that fits inside maglev train.	The product meets most of the parameters for size, and enclosure. Project includes scaled conductor that fits inside maglev train.	The product meets all parameters for size, and enclosure. Project includes appropriate scaled conductor that fits inside maglev train.
Budget and Materials	The designer did not make budget. The final product resulted in excessive waste of materials. There was no funding available for modifications etc.	The designer could have made some changes to improve spending. There was some waste or unused materials and/or little to no funding available for modifications.	The designer made appropriate use of budget, but had some wasted or unused materials.	The designer made appropriate use of budget and materials in the construction of maglev train.
Aesthetics	Construction lacked thought and planning. Many details need refinement to create an attractive product. Little to no use of creativity and project theme.	Construction process was successful, but 3-4 details could have been refined for a more attractive product. Minimal use of creativity and development of theme.	Construction was careful and accurate but 1-2 details could have been refined for a more attractive product. Strong use of creativity and connection to theme.	Construction demonstrated careful thought and planning in construction process to create a neat and attractive project. Exceptional creativity and use of theme.
	0 points			Up to 20 points
Functionality	The maglev does not function			The maglev is able to complete the challenge
Comments:				Total Points:

Name _____

Graph the maglev train parts you buy.

Maglev Store

Number of items bought

25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Store Items	Pine Wood	Construction Paper	Drinking Straw	Dowel Rod	Magnet	Popsicle Stick	Tape	Cardboard	Balloon	Hex Nut	Rubber Bands	Paper Clips	Total Glue
	.50	.25	.25	.50	.25	.10	.15	.50	.50	.50	.50	.50	.50/$1

What was the total cost

of your maglev locomotive?

How Maglev Trains Work

https://www.youtube.com/watch?v=iaElPV0FWJ0

https://www.youtube.com/watch?v=xsZQnyKyjrw

https://www.youtube.com/watch?v=aIwbrZ4knpg