**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.

**Getting Started with Technology PGS. 2-17**

**Getting Started Down the Right Track PGS. 18-26**

**Vocabulary and Organization PGS. 27-56**

**The MagLev Store PGS. 57-69**

**The Engineering Notebook/Journal PGS. 70-86**

**Resources and Background Information PGS. 87-94**

**English Language Arts PGS. 95-133**

**Mathematics PGS. 134-173**

**Science PGS. 174-180**

**Health and Safety PGS. 181-185**

**Social Studies PGS. 186-193**

**Careers PGS. 194-203**

**Bulletin Boards and Centers PGS. 204-230**

**Bibliography PGS. 231-232**

**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 initial testing on Tuesday, April 30th and for final testing with an improved time on Thursday, May 2nd.

**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 selected theme.
* Your locomotive must include a train conductor that is appropriate in scale to the size of your locomotive. The engineer will ‘drive’ the train during testing. Bonus: Use TinkerCAD to design and 3D print your conductor.
* 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.
* You must complete the graph of materials purchased during the challenge and your calculated total cost.

|  |
| --- |
| *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 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 3D printed 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: |

