Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Penny for Your Thoughts on Inertia**

**Content objective:** I can learn to apply Newton’s First Law of Motion

**Writing Language Objective:** I can recognize inertial mass as a physical property of matter.

**Essential Question**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Background Information:** the origins of Newton’s Laws of Motion began with the Italian philosopher Galileo Galilei (1564-1642). Galileo broke from the teachings of Aristotle that had been accepted as truth for more than 1,000 years. Where Aristotle and his followers believed moving objects must be steadily pushed or pulled to keep moving, Galileo showed with his experiments that moving things, once moving, continued in motion without being pushed or pulled (forces applied). He called the property of objects to behave this way inertia, which is Latin for “lazy” or “inert”. Isaac Newton born in England on Christmas day in 1642 (the day Galileo died ) refined Galileo’s Principle of Inertia in terms of unbalanced forces and made it his first law of motion.

Newton’s first law of Motion: In the absence of an unbalanced force, an object at rest remains at rest, and an object already in motion remains in motion at a constant speed on a straight line path.

|  |  |
| --- | --- |
| **Phenomena** | An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force. |
| **The essential question** | How have forces led to innovation? |
| **Task** | As a group you must investigate how to get the penny in the cup without lifting the card and only touching it with one finger. |
| **Question** |  |
| **Background information** |  |
| **Materials** | 1 index card  1 plastic cup or beaker  1-10 pennies |
| **Hypothesis**  **Prediction**  **Expected Results** | If….  Then…  Therefore we expect…. |
| **What data will you collect?** |  |
| **Procedure: Step by Step**  **(How will you collect your data?)** |  |
| **How will you analyze your data? (graph or paragraph)** |  |
| **How does this investigation help you understand the phenomenon?** |  |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Investigation approval (Ms. Murphy must approve)

**Directions:** Complete the investigation you designed. Answer the comprehension questions using complete sentences with a restate. Must turn in your outline, data, analysis and questions.

1. Think of the tablecloth challenge, how to magicians use Newton’s First law to their advantage in pulling the tablecloth out from under an entire set of dishes?

2. How is a magician’s tablecloth trick related to a crash dummy falling off the tailgate of a pickup truck as the truck accelerates? (Think of the Understanding Car Crashes video we watched)