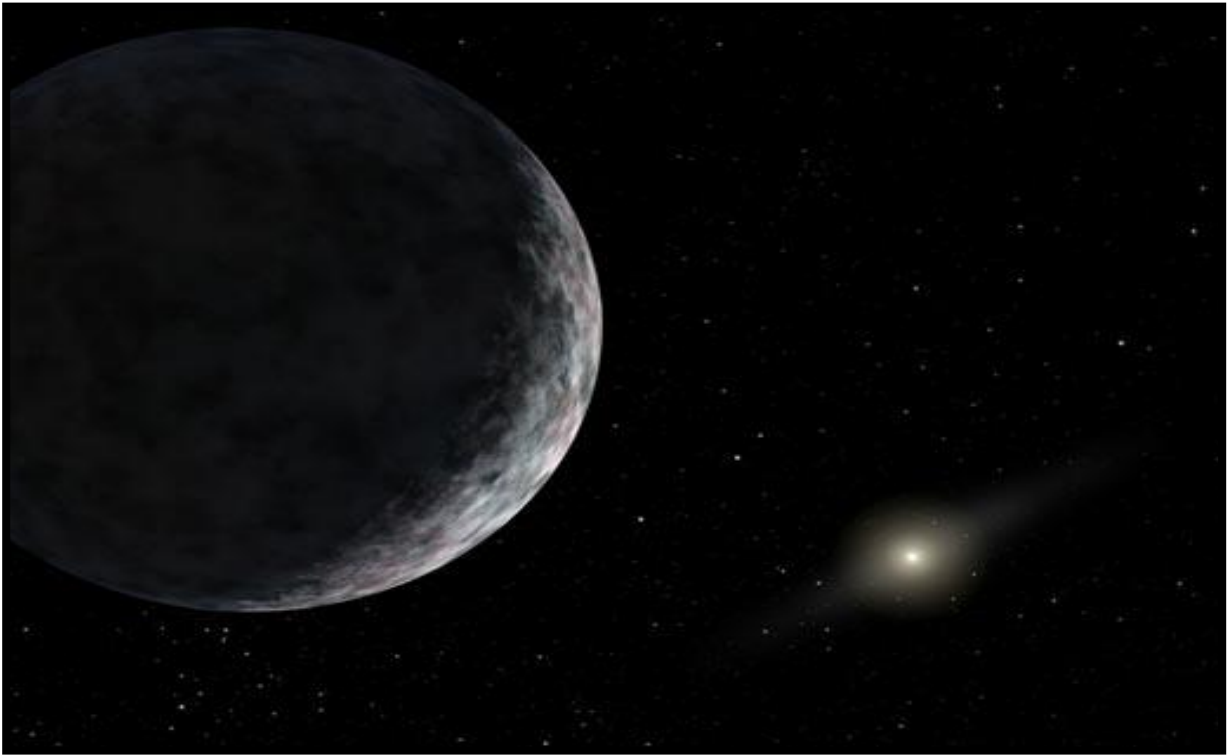




# Brain Twister

2016 - Driftwood Education Center



## **Class Description:**

*In 2003, NASA landed the “Opportunity” rover on Mars. Now scientists are gearing up to launch the “Insight” rover in May of 2018 and they want students to create a Lander that will survive the drop down to the surface of Mars. Using limited government funds, students will buy their supplies, then build and test their Lander!!*

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## Table of contents and outline:

### I. Pre-class set-up

1. Check to see if we have enough water balloons.
2. Set up a tall ladders on basketball court and draw targets with chalk on ground for landing zones.
3. Set up “store” in Brown Center using a table. Find various materials and come up with prices.

### II. Introduction, overview, and assessment

1. Explain mission objectives  
-To land resources safely on the surface of Mars  
-Keep spending to a minimum, low cost is best
2. Hand out material bags
3. Explain budget guidelines and shopping

### III. Main Objectives

1. Create and build lander
2. Stay within budget guidelines
3. Have fun

### IV. Conclusions and Wrap-up

1. Whose lander survived the impact?
2. Which teams lander survived the impact and cost the least to build?

### V. Additional Information and help

1. “Mars Rover Opportunity Busy Through Depth of Winter”  
- NASA News

#### Georgia Performance Standards met:

##### 4th. S4P3.

Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces.

#### South Carolina Standards:

##### 4<sup>th</sup> 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> :

**4.S.1A.2** Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

#### Florida Standards:

**4<sup>th</sup> SC.4.P.12** The motion of objects can be changed by forces.  
**5<sup>th</sup> and 6<sup>th</sup> SC.5.P.13** It takes energy to change the motion of objects.

#### Next Generation Science Standards

##### 3<sup>rd</sup>- 5<sup>th</sup> 3-5-ETS1-1 Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

##### 3-5-ETS1-3 Engineering Design

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

##### 3-5-ETS1-2 Engineering Design

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

**6<sup>th</sup>-8<sup>th</sup> : .MS-PS2-4.** Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.

**6MS-PS3-2 Energy** When the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system