Deformation: Foam Compression Worksheet Answer Key

Pre-Activity Define stress and strain.

Stress is: The amount of force exerted on a given area.

Strain is: The change in dimensions of an object when influenced by an external force
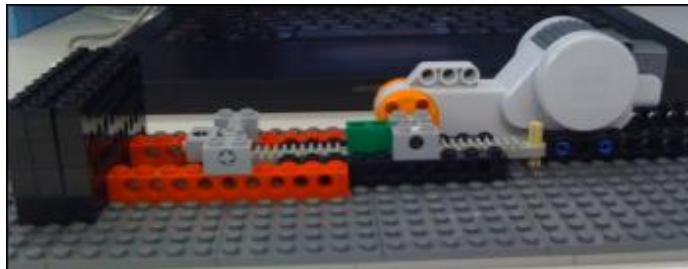
Hypothesis

What type of object, hard or soft, requires the most compression? Why?

Harder objects require the most compression because they are more difficult to compress, compared to softer objects.

List Materials

- calculator
- ruler
- piece of Play-Doh®
- marshmallow (small)
- piece of foam
- piece of bread
- NXT brick and software
- LEGO MINDSTORMS base set

Write the Procedure

1. Measure the amount of rotations for an object using the MINDSTORMS data logging program.

2. Calculate strain by measuring the initial length and change in length using a ruler and Equation 1.

3. Once all data has been obtained for one object, begin to look at other objects and calculate strain with Equation 1.

## Data Collection

$$Equation\ 1: \qquad Strain = (L_{change})/L$$

example data

Object (hard or soft)	Number of motor rotation for compression (power)	L (cm)	L_{change} (cm)	Strain	Does the object go back to its original shape?
Play-Doh	**5**	**1**	**0.5**	**2**	**no**
bread	**4**	**3**	**0.8**	**3.75**	**yes**
marshmallow	**7**	**1.2**	**0.9**	**1.33**	**yes**
foam	**6.5**	**1.8**	**0.7**	**2.57**	**no**

Graphing

Create a graph of the number of rotations vs. the strain for the objects listed in the above table

Rotations vs. Strain
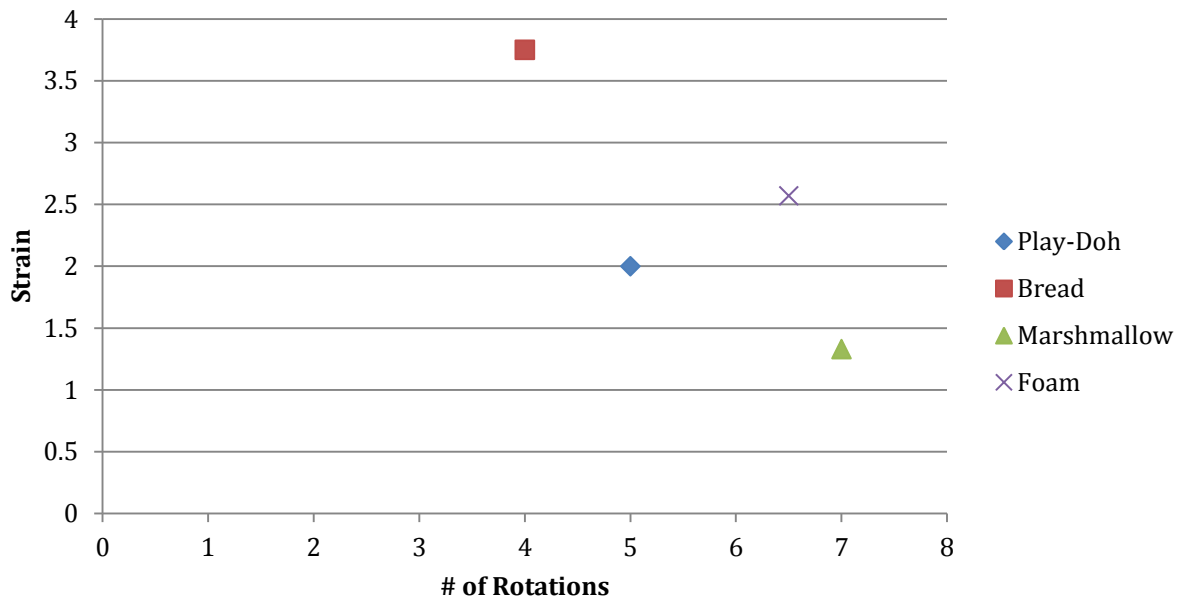
Results & Conclusions

1. Which object had the greatest strain/deformation?

    Bread had the greatest strain.

2. Which object had the most rotations?

    Marshmallow had the largest number of rotations.