

## Data Collection Sheet **Answer Key**

Plastic Type	Original Size		Size after Stretching	
	Length	Width	Length	Width
<b>Plastic A</b> from dry cleaner	<b>12 inches</b>	<b>12 inches</b>	<b>21 inches</b>	<b>7.5 inches</b>
<b>Plastic B</b> from grocery store	<b>12 inches</b>	<b>12 inches</b>	<b>18 inches</b>	<b>9.5 inches</b>
<b>Plastic C</b> from department store	<b>12 inches</b>	<b>12 inches</b>	<b>16.5 inches</b>	<b>10 inches</b>
<b>Plastic D</b> from milk container	<b>12 inches</b>	<b>12 inches</b>	<b>12 inches</b>	<b>12 inches</b>
<b>Plastic E</b> from medical examiner glove	<b>8 inches</b>	<b>3 inches</b>	<b>8 inches</b>	<b>3 inches</b>

**Critical Thinking!** Based on your experimental results, answer the following questions:



Example  
data

1. Which plastic is the strongest?

The plastic in the milk container is the strongest.

2. Which plastic is the most elastic?

The plastic in the medical examiner glove is the most elastic.

3. Which plastic would be the best for making a water bottle? Why?

The plastic from the milk container would be best for making a water bottle because it is the stiffest material that can carry more water without breaking.

4. Which plastic would be the best for making a sandwich bag? Why?

The best plastic for making a sandwich bag is probably the plastic from the dry cleaning bag because it is easily deformed, light and soft so it will not affect what's in the bag.

**Additional Critical Thinking!**

5. In all areas of engineering and business, employees perform cost-benefit analyses to help them make smart decisions. A cost-benefit analysis is simply an investigation of whether the benefit of the item is greater than the cost to produce or purchase it. For example, a carpenter would definitely purchase an expensive tool kit if she planned on using the tools every day. Along the same lines, the factory making the tools would not produce them if the tools cost too much money to manufacture for a price people were willing to pay.

Thinking about the plastics in the activity, suppose that these are the costs of each plastic/pound in the study:

<u>Material</u>	<u>Cost/Pound</u>
grocery store plastic	\$0.50
dry cleaner plastic	\$0.75
department store plastic	\$0.95
milk container plastic	\$1.50
medical examiner glove	\$1.75

**Question A:** You are a department store owner who does not charge customers for bags when items are purchased. If you can no longer purchase the department store bags because of a shortage, which plastic material makes the most sense to use as a substitute?

**I would purchase the dry cleaner plastic.**

**Question B:** What would be the benefits of using the substitute plastic? Would you save money or spend more money? Note: Your store wants to provide its customer with free bags!

**The dry cleaner plastic is cheaper than department store plastic. It is also stronger than the grocery store plastic making it an adequate substitute for the department store plastic. The milk container plastic and medical examiner glove material are both too expensive and not necessary or suitable for carrying department store items. By using the dry cleaner plastic, I am saving 20 cents per pound.**