

Name: _____

Period: _____

Types of Materials

Link #2: Alloys: <http://www.explainthatstuff.com/alloys.html>

1. What properties make aluminum difficult to use by itself? (Think of aluminum foil.)
2. What is the best definition for an alloy?
3. Why do engineers use alloys? How do they compare to pure metals?

Link #3: Plastics and Polymers: <http://www.nobelprize.org/educational/chemistry/plastics/readmore.html>

1. In your own words, what are plastics?
2. Define a monomer vs. a polymer.
3. The site states that all “plastics are polymers, but polymers don’t have to be plastics.” Give 3 examples of naturally occurring polymers.

Link #4: Structure and Properties of Polymers:

http://www.bbc.co.uk/schools/gcsebitesize/science/ocr_gateway_pre_2011/carbon_chem/6_designer_polymers4.shtml

1. What kind of chemical bonds are in a polymer chain?
2. What two factors determine the physical properties of the polymers?
3. Describe the differences between polymer chains (thermoplastics) and cross-linked polymers (thermosets)

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Shape Memory Alloys & Polymers

Link #5: How shape memory works: <http://www.explainthatstuff.com/how-shape-memory-works.html>

1. How are shape memory alloys different from regular alloys and metals (i.e. in a spoon)?

2. Explain the difference between elastic and plastic deformations.

3. What is superelasticity?

4. Give 2-3 examples of how shape memory alloys are used.

5. What are the benefits of shape memory polymers and shape-changing polymers?

Extra Resources on Polymers, Elastomers, and Shape Memory:

- Video from Science 101: What are Polymers? (2 minutes):
<https://www.youtube.com/watch?v=bJi8x7bKHqQ>
- Video from MIT on Shape Memory Materials (5 minutes):
<https://www.youtube.com/watch?v=s62PL5vmfNw>
- Muscle Wires (application of shape memory):
<http://www.jameco.com/Jameco/workshop/ProductNews/musclewire.html>
- Explanation connecting Lewis Dot Structures, intra- and intermolecular forces to polymers:
http://www.uwosh.edu/faculty_staff/mihalick/materials/Chapter5.pdf
- How Rubber Works: <http://science.howstuffworks.com/rubber2.htm>