Name: _____ Date: _____

INTRODUCTION TO POLYMERS

Part A: Definitions and Examples

Go to the website: https://www.thoughtco.com/definition-of-polymer-605912 and answer the questions below:

1. Define ***polymer***

2. List three properties of polymers and explain these properties

3. Give three examples of biopolymers and three examples of their functions

4. Give three examples of synthetic polymers and their applications

5. Complete the table below that compares and contrasts thermoset plastics with thermoplastic polymers:

	Thermoset	**Thermoplastic**
Rigidity		
Reaction to heating		
Bonding		

Examples		

Part B: Plastics

Go to the website https://www.thoughtco.com/plastic-chemical-composition-608930 and answer the questions below:

1. Define ***plastic***
    a. What is the raw material for most industrial plastics?

        _____

    b. List the two types of plastics _____ and

        _____

    c. What is the property that ***plasticity*** describes?

2. What are some different types of additives in plastics and what are some properties that they affect?

3. Complete the table:

	Thermosets	**Thermoplastics**
Shape		
Structure		
Molecular weight		

4. Give three examples of plastics and where you may have encountered them (you may do additional research in other websites if you can't think of three)

5. Properties of plastics depend on three factors. List them.

6. Define the following:
    a. Monomer

    b. Homopolymer

    c. Copolymer
7. Describe the following:
    a. Conductivity of plastics

    b. Characteristics of ***glassy*** polymers

    c. Rate of degradation of polymers

Part C: Structures of Polymers

Go to the website and answer the questions below:

https://plastics.americanchemistry.com/plastics/The-Basics/

1. Describe each of the three different types of networks that polymers can form

2. What type of network is found in
    a. Thermoset polymers _____
    b. Thermoplastic polymers _____
3. Describe the "backbone" of many polymers

4. What is the difference between polymers such as polyethylene and polystyrene when compared with polymers such as polyvinyl chloride and Teflon?

5. Why are polymers such as nylons, polyesters and polycarbonates considered to be inorganic polymers?

6. Contrast polymers that have an amorphous arrangement with those that have a crystalline arrangement in terms of structure and properties

7. Give at least two reasons why polymers are used for the following:
    a. Containers for cleaning products such as Windex

    b. Coffee cups

    c. Body armor

    d. Two-liter pop bottles

    e. Kitchen countertops

8. What is the advantage of making a paper plate from a cellulose material versus the most common way of making polymers?

9. What is a major challenge in the disposal of waste plastics?

10. Determine the following (from 2005 statistics):
    a. Percentage of trash by weight for plastics

       _____

    b. Pounds of polyester recovered from bottles recycled

       _____

    c. Pounds of high density polyethylene recovered from bottles recycled

       _____

11. What are some uses for
    a. Recycled plastics

    b. Plastic from pop and water bottles

    c. Non-recyclable plastics

12. What is a problem associated with disposal of plastics in landfills? How is this problem alleviated?