Name _____

Beyond the Elements: Indestructible Video Guide

1. Luckily, nearly all elements like to stick together. It's through the _____ of different elements that our world exists.
2. The first main ingredient is _____ _____.
3. Silica is a network of silicon and _____ atoms, where each silicon atom shares electrons with neighboring oxygens in what are called covalent bonds.
4. Calcium carbonate will help to _____ the glass over time.
5. In ice, the water molecules are arranged in a _____ pattern.
6. When glass finally cools down enough, that warped irregular structure becomes locked in place into what's called "an amorphous _____."
7. A lot of materials under compression are very _____, including glass.
8. The miracle of glass is made possible in part by the element _____, the second most common element in the earth's crust, after oxygen.
9. Carbon can also form up to _____ bonds with other atoms, but luckily, it can also form strong bonds with other carbon atoms.
10. Latex found in more than _____ plants including dandelions, but most of the world's natural rubber comes from trees like these, the *Hevea brasiliensis*, better known as the rubber tree.
11. Each noodle is a long molecular chain called a _____.
12. Isoprene is a molecule with _____ carbons bonded to each other and to _____ hydrogens.
13. That vulcanization reaction not only cures the rubber within a compound, it cures across compounds, to connect all of that into one unit. In the end, it's essentially _____ _____.
14. Both the natural rubber and synthetic rubber used in tires are elastomers, polymers with _____ properties.
15. The coating on our power pumpkins is the result of a reaction between two ingredients. The first is a _____ reactive molecule.
16. At each end of its carbon backbone, there's a nitrogen, carbon and _____ group called an isocyanate that acts like a hook to lock onto the second chemical ingredient.

17. Refining also supplies industry with the basic building blocks for another group of synthetic polymers that came to dominate our way of life in the 20th century: _____
18. In a thermoset plastic like Bakelite, the bonds between the polymer chains are extremely _____.
19. Unlike Bakelite, nylon is an example of a thermoplastic, which we can _____ and reform. That's the basis of some plastic recycling.
20. P.H.A.s, polyhydroxyalkanoates, are a type of plastic produced from polymers harvested from certain _____.
21. Attitudes are changing, with engineers and chemists harnessing _____ to combat the problem.