Data Table – Answer Key

Name of Structure	# of Carbon atoms (balls)	# of bonds between atoms (bars)	Ratio Atoms:Bonds	Observations
Single Carbon Chain Ring	*6*	*6*	*1:1*	*Very flexible, like cooked spaghetti*
4 Carbon Ring Sheet	*16*	*19*	*16:19*	*Still very flexible, but a little stiffer. It will shift shape fairly easily from regular hexagons to long skinny ones.*
Single Carbon Octahedron	*6*	*12*	*1:2*	*Fairly stable; Maintains shape under gentle pressure*
Two Octahedron Chain	*10*	*23*	*10:23*	*Stable under pressure*
Four Octahdron Double Chain	*17*	*44*	*17:44*	*More Stable*
Network Solid (2 octahedra per side)	*19*	*60*	*19:60*	*Highly stable, does not change under pressure*
Network Solid (3 octahera per side)	*35*	*108*	*35:108*	*Even more stable, Bonding increases with size*

Analysis and Conclusions:

1. **Describe what happens to the ratio of atoms to bonds as you made each progressive structure from the top to the bottom of the data table.**

There *was a progressive increase in atoms with more bonds per atom each time. The final stage of a network solid has a 1:12 atom to bond ratio. This makes for a very stable structure with short equally spaced bonds in every possible direction. These bonds are very strong.*

2. **Relate the "pull-strength" of the bonds to the change in ratios. Write a simple statement explaining the change.**

As the bonds per atom increase, the strength of the bonds increases.

3. **Look carefully at the network solid you built. Can you find the hexagonal ring structure from the sheet anywhere in the solid? Describe how this could have gotten this way in nature.**

On the 2 by 2 network solid, look at the side of the square base. There is a six sided hexagonal shape with a carbon in the center. It has 7 atoms with 12 bonds between them. This could only happen if the carbon atoms had been forced together under intense pressure.

4. **Think back to the required conditions for the formation of a diamond as explained in the video. Relate the conditions to the changes you see in the structures you have built in this lab.**

The diamond is formed in the mantle of the earth under conditions of intense pressure and heat. This pressure and heat forces the bonding of each atom to every atom around it in the network solid in a maximum number of bonds.