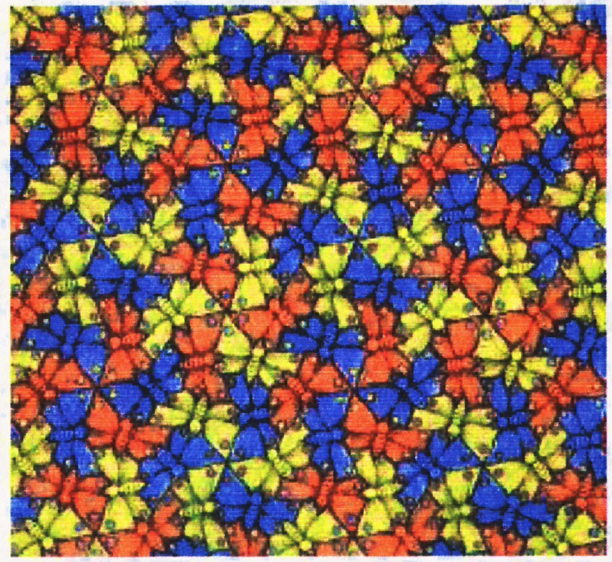
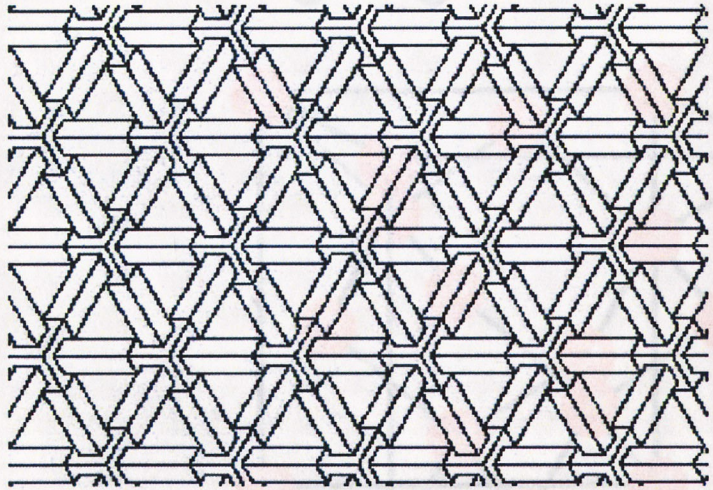
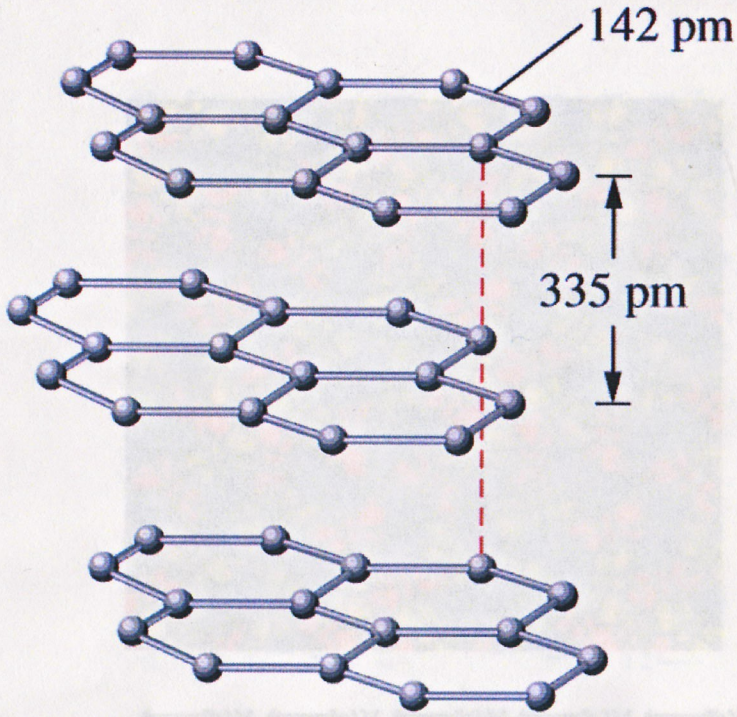
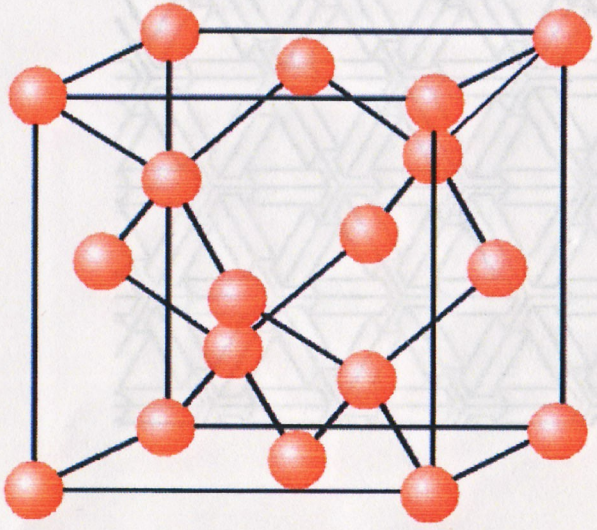
2. Find the primtive unit cells of each pattern . How many faces, butterflies, animals or rods are there in each unit cell?



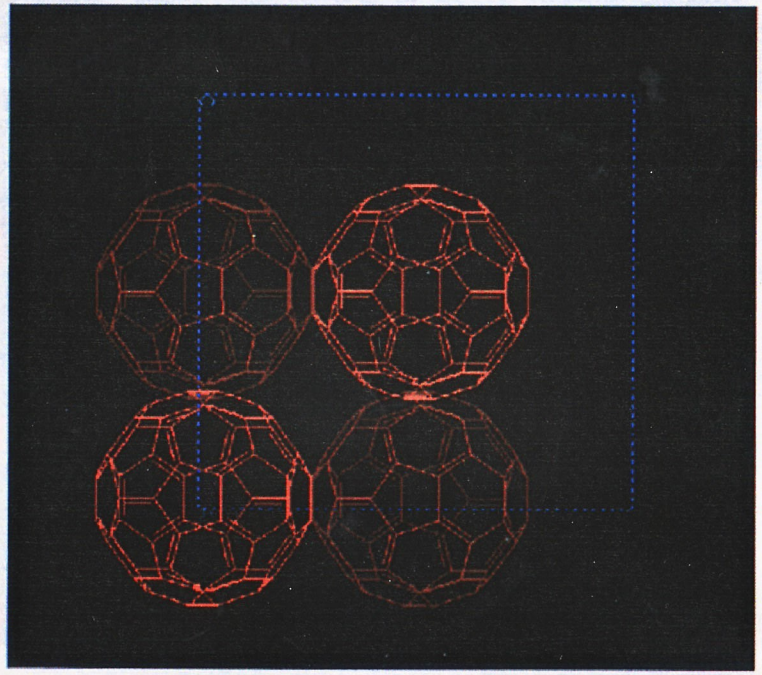


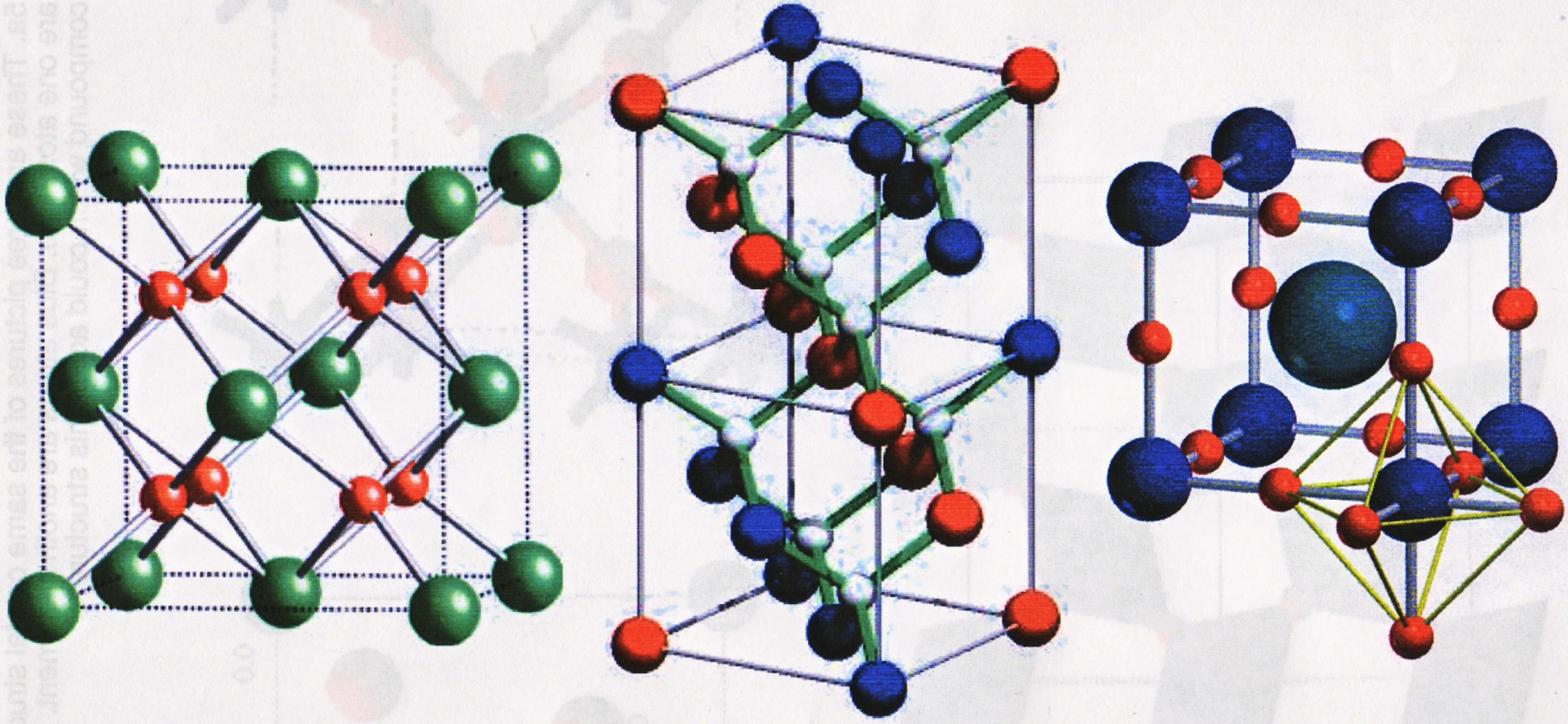




3. The pictures on this page are three of the known forms of carbon: diamond, graphite and fullerene. Which picture goes with which type of carbon? In the picture on the left find a unit cell with three orthogonal axes.

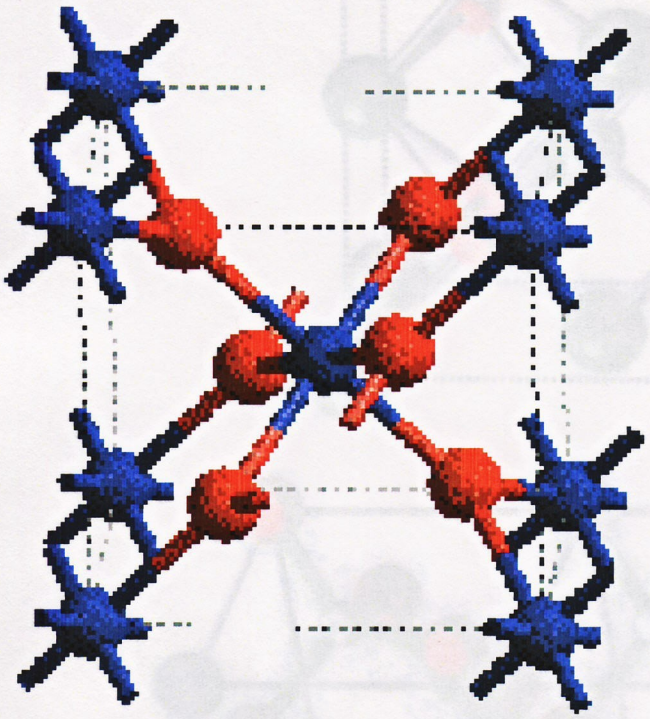
How many carbon atoms are there in each unit cell? For the picture on the bottom right is there a relationship between this structure and fcc, bcc or hcp? If so to which one, and what is the relationship? Finally, for each of the three types, which localization scheme sp, sp^2 or sp^3 is most appropriate?

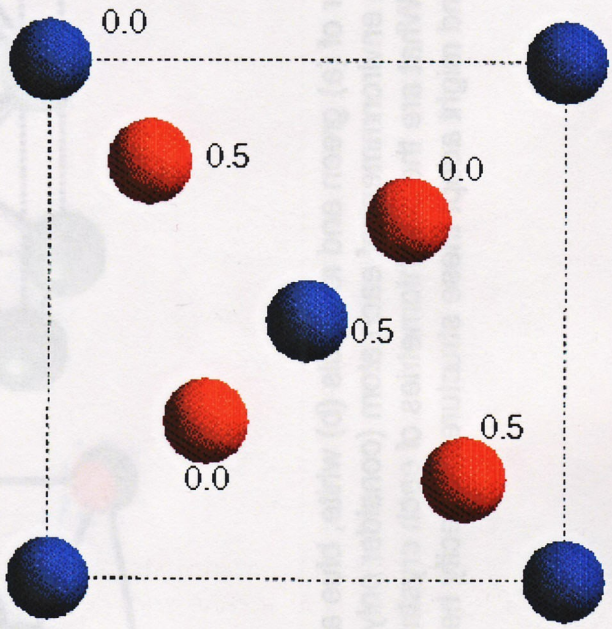


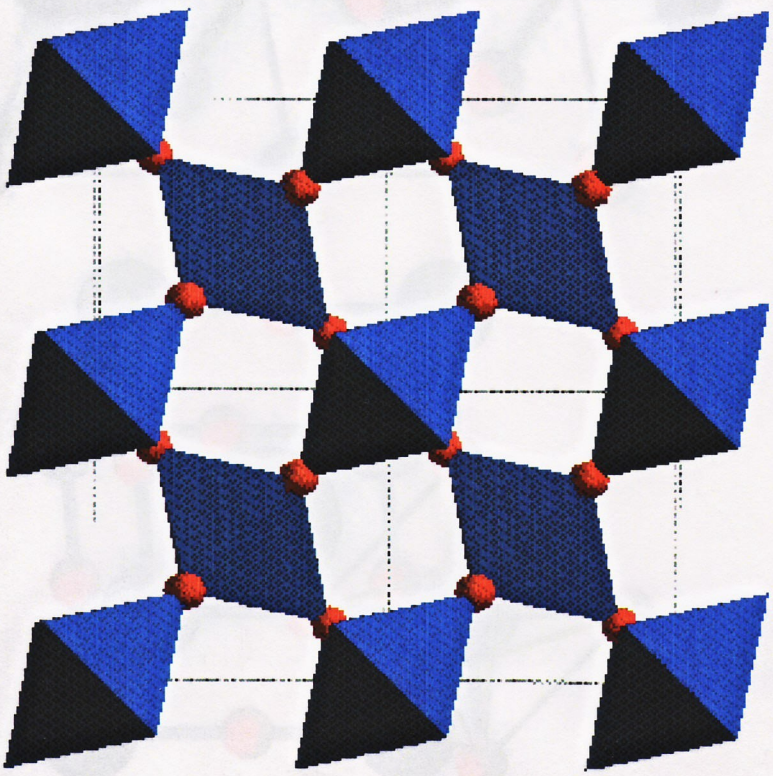


4. Find the number of (a) green and red balls (b) white, blue and red balls and © red, blue and aqua balls per unit cell. What is the coordination environmment of each atom (consider only nearest neighbors)? How many first nearest neighbors does each atom have? What are the stoichiometries of each crystal? And finally, and this is hard, guess for each crystal structure what true compound might adopt these structures. Specify here exact elements.

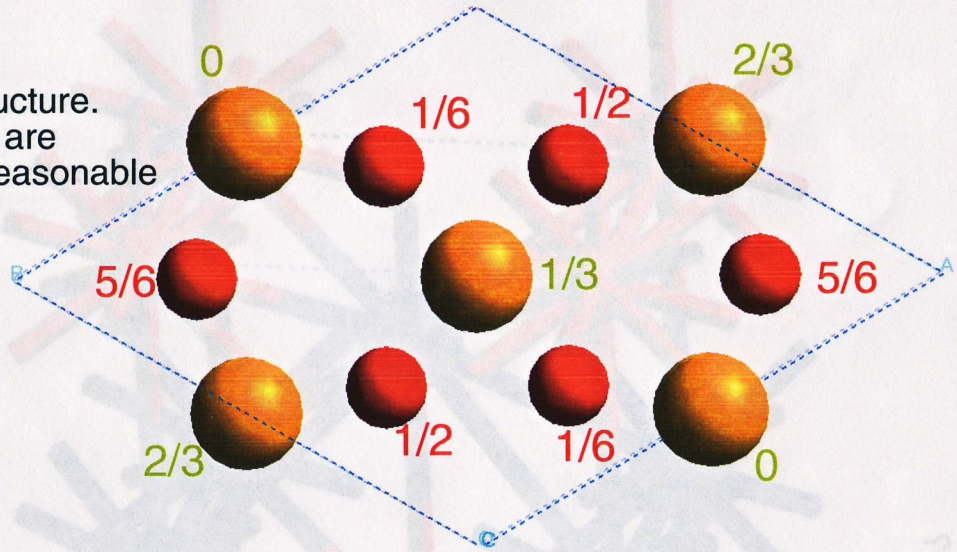
5a. These are three pictures of the same crystal structure. Red atoms are one atom type. Blue atoms are another element. What is a reasonable compound which could adopt this structure?

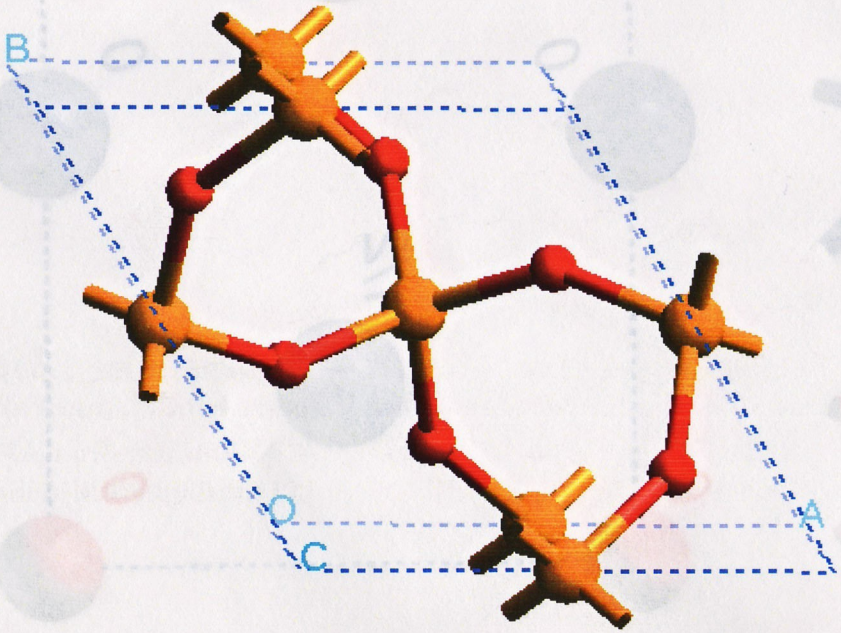


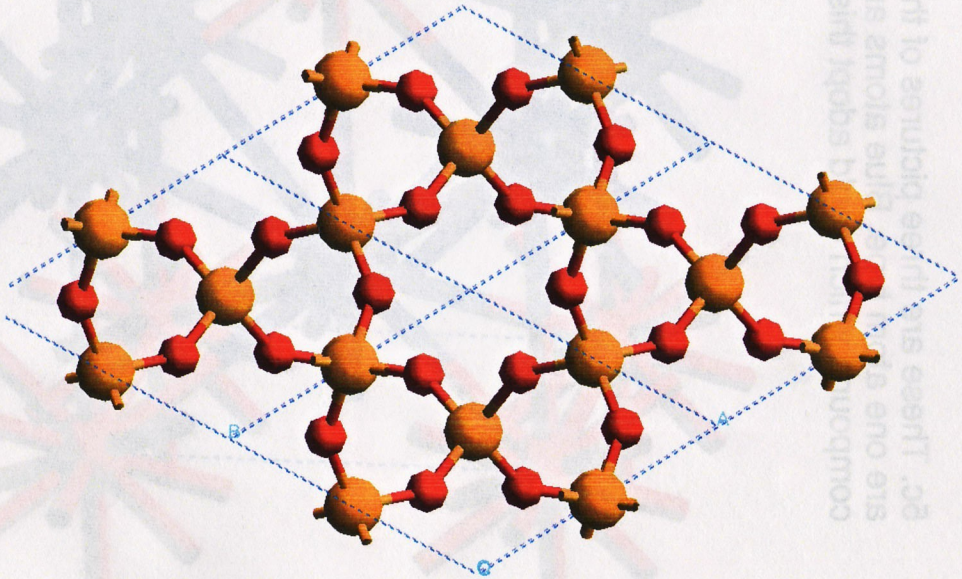




5b. These are three pictures of the same crystal structure. Red atoms are one atom type. Gold–colored atoms are another element (not necessarily gold) . What is a reasonable compound which could adopt this structure?







5c. These are three pictures of the same crystal structure. Red atoms are one atom type. Blue atoms are another element. What is a reasonable compound which could adopt this structure?