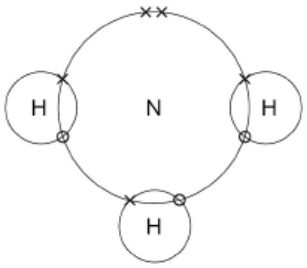
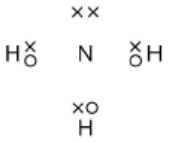
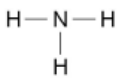
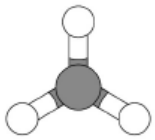
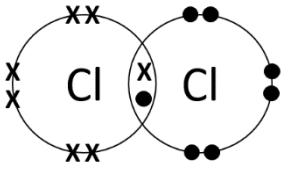
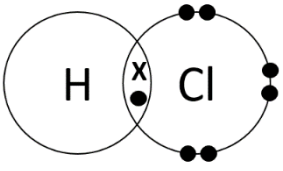
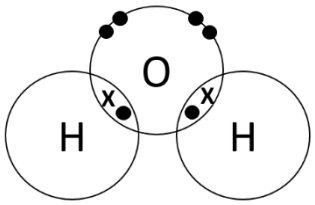
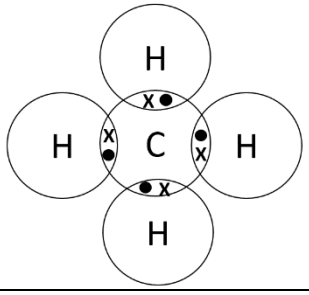
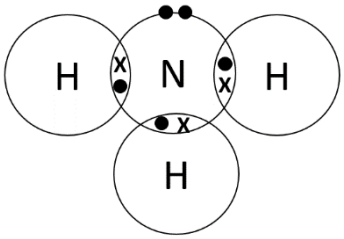
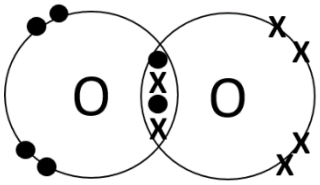
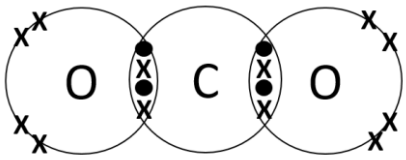
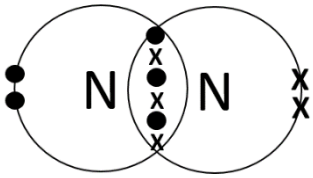
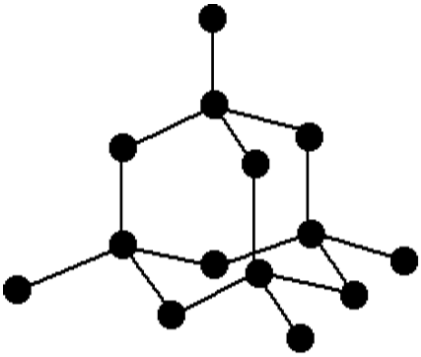
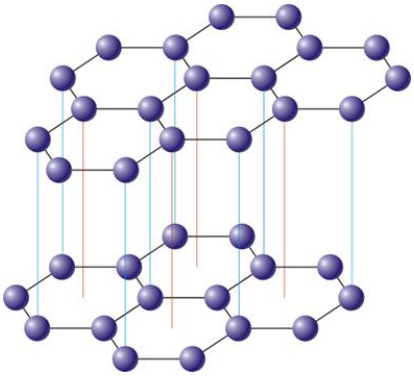
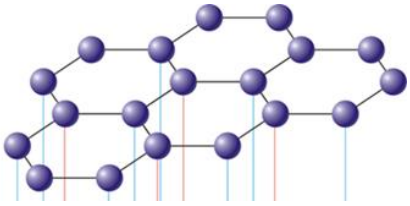
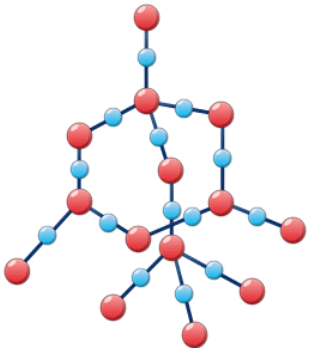
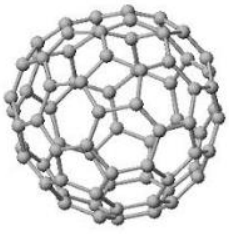
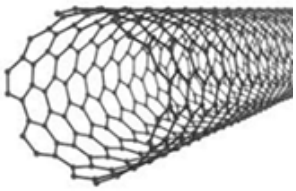
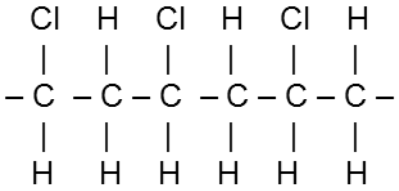
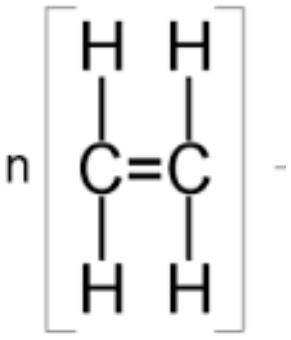
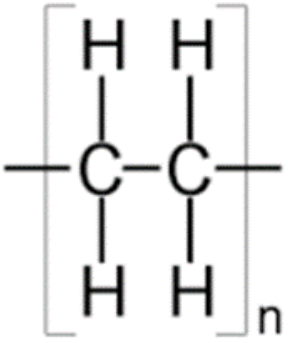
C3 Covalent and Metallic Bonding

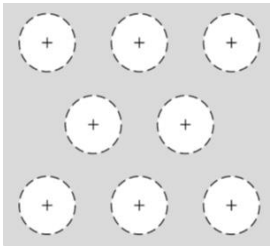
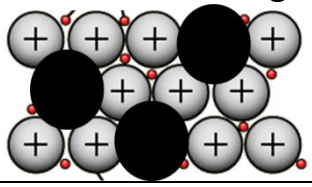
Covalent bonding	
1. What do atoms do to make a covalent bond?	**Share electrons**
2. Covalent bonds happened between a ____ and another _____	**Non-metal and non-metal**
3. What type of bonds are shown in the diagrams below?   and/or  and/or 	**Covalent**
4. Are covalent bonds strong or weak?	**Strong**
5. What is the formula for oxygen?	**O_2**
6. What is the formula for carbon dioxide?	**CO_2**
7. What is the formula for water?	**H_2O**
8. What is the formula for nitrogen?	N_2
9. What is the formula for chlorine?	Cl_2
10. What is the formula for methane?	CH_4
11. What is the formula for ammonia?	NH_3
12. Draw a dot and cross diagram to show Cl_2	
13. Draw a dot and cross diagram to show HCl	

14. Draw a dot and cross diagram to show H_2O	
15. Draw a dot and cross diagram to show CH_4	
16. Draw a dot and cross diagram to show NH_3	
17. Draw a dot and cross diagram to show O_2	
18. Draw a dot and cross diagram to show CO_2	
19. Draw a dot and cross diagram to show N_2	
Properties of covalent compounds	
20. Describe the melting and boiling points for small molecules. Explain why	• Low • Because there are weak intermolecular forces
21. Why do larger molecules have higher melting and boiling points?	They have stronger intermolecular forces
22. Why don't small covalent molecules conduct electricity?	The don't have delocalised electrons

Giant covalent structures	
23. Name 3 giant covalent structures made of carbon	• **Diamond** • **Graphite** • **Graphene**
24. What type of bond is there in diamond, graphite and graphene?	**Covalent**
25. What do we call 1 layer of graphite?	**Graphene**
26. What is diamond used for?	• **Jewellery** • **Drills**
27. What is graphite used for?	• **Pencils** • **Electrodes in electrolysis**
28. What is graphene used for?	Circuits
29. Name this molecule 	**Diamond**
30. Name this molecule 	**Graphite**
31. Name this molecule 	**Graphene**

32. How many bonds does each carbon atom have in diamond?	**4**
33. How many bonds does each carbon atom have in graphite?	**3**
34. How many bonds does each carbon atom have in graphene?	**3**
35. Why is diamond very hard?	Strong covalent bonds
36. Describe the melting point of diamond	**High**
37. Why does graphite conduct electricity?	**It has delocalised electrons**
38. Why is graphite useful in pencils?	• Soft • Because it is made of layers • Which can slide over each other
39. Name this molecule 	Silicon dioxide (you can tell it is not diamond because it is made of 2 different types of atom)
Nanoparticles	
40. What element are fullerenes and nanotubes made of?	**Carbon**
41. Name the first fullerene to be discovered	**Buckminsterfullerene**
42. Fullerenes are molecules with a ___ shape	**Hollow**
43. Name this molecule: 	**Fullerene**

44. Name this molecule: 	**Nanotube**
45. List uses of fullerenes and nanotubes	• **Catalysts** • **Lubricants** • **Delivering drugs to the body** • **Making compost materials strong**
Polymers	
46. What type of molecule does this diagram show? 	**Polymer**
47. What is made when lots of monomers bond together?	**Polymer**
48. What type of bond holds monomers together?	**Covalent**
49. Describe the structure of polymers	• Long chains of monomers • Joined by covalent bonds
50. What state of matter are polymers at room temperature? Why?	• Solid • Strong intermolecular forces
51. Draw the structure of the polymer made from n monomers shown below 	
52. What does the 'n' in the diagrams above mean?	A very large number
53. What polymer is made from ethane?	Polyethene

Metals	
54.What is this a diagram of? 	**Metal**
55.Describe the structure of metals	• **Layers of positive ions** • **Surrounded by a sea of delocalised electrons**
56.What do we call electrons that are free to move through the metal?	**Delocalised**
57.Why can metals conduct electricity?	• **They have delocalised electrons** • **Which can move through the metal**
58.Why can metals conduct heat?	• **They have delocalised electrons** • **Which can move through the metal**
59.Why do metals have high melting points?	Strong metallic bonds
60.Why can metals be bent and shaped?	• **Made of layers** • **Which can slide over each other**
61.What is an alloy?	**Mixture of metals**
62.Why are metals made into alloys?	**Alloys are harder than pure metals**
63.What is this a diagram of? 	**Alloy**
64.Why are alloys harder than pure metals?	• **Made of different sized atoms** • **So layers are distorted** • **So layers cannot slide**