

Carbon Chemistry – Teacher Demonstration

Carbon is the 12th most common element on Earth. To know how it will behave within global systems we need to first understand how its' chemistry is controlled by its atomic structure.

What is an element? _____

What is the symbol for the element carbon? _____

Find carbon on the periodic table below and draw an arrow to it.

Group →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
↓ Period																			
1	1 H																		2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne	
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr	
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe	
6	55 Cs	56 Ba		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn	
7	87 Fr	88 Ra		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo	
Lanthanides	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu				
Actinides	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr				

Using the information from the periodic table provided:

How many protons does carbon have? The atomic number or number of protons lies above each element's symbol in the periodic table. _____

How many electrons **must** a neutral atom of carbon have? _____

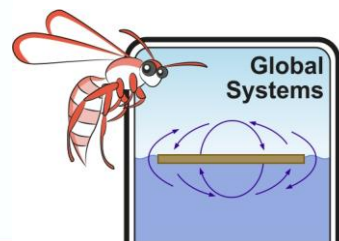
If its Atomic Weight is usually 12, how many neutrons **must** it have? _____

Interesting facts



Carbon black or lampblack is pure carbon that is finer than soot having a larger surface area to volume ratio. Medieval monks used it to colour ink. The inscriptions are still clearly legible. Up to Early Victorian times lampblack was used to make the best and longest lasting dark pigment for writing and painting. Anything organic was burned in an oxygen poor environment and the fine black soot-like residue remaining was mixed with water and gum. After Mid-Victorian times coal and crude oil were burned. Children of the poor were employed because fumes from oil combustion and fine carbon particles ruined their lungs within about four years. Like coal miners at that time, they died of "black lung". Carbon black is still being produced though under much healthier conditions. It is commonly used as a filler and colouring agent in car tyres and other artificial rubber products.

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Teacher demonstration or student activity

AIM To test for the presence of carbon by combustion

Materials

- Bunsen burner
- Tongs
- Safety Glasses
- Bench protector
- Bowl of water to extinguish flames
- Strips of material to burn (organic and inorganic)
- Fume cupboard or hood if possible



You may choose to use: Thin strips of wood (pop stick) and newspaper, a metal washer, woollen cloth or wool, a rock, a piece of coal, a piece of fruit, aluminium foil (cooking foil). After combustion, most material containing carbon becomes black.

Method

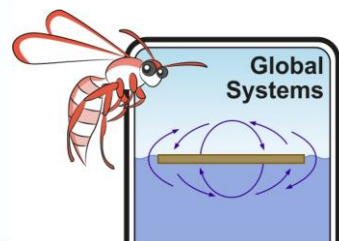
1. Students should check on safety procedure when using a lit Bunsen burner.
2. Pick up each specimen and place in Bunsen flame for 5 seconds.
3. Remove from Bunsen and extinguish any flames.
4. Write your observations in the table provided.

Observations

Substance	Origin	Before burning	Burned	Is carbon present?
Wood	Tree	Solid, Brown/grey colour -	Solid, black Gas grey	Yes

Conclusion

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Discussion

How did you know if carbon was present as a product of combustion (burning)? _____

What was common to all the materials that burned to leave black soot? _____

Extension: “Flames are just energy trapped from past sunlight”.

Explain what this statement means

