Year 9 · Unit 1 · 1.3 Bohr model · Worksheet B

Bohr diagram card sort: answers

Complete and arrange the cards

1. Cut out the 20 cards. Do not use a periodic table until step 6.
2. Each card has one clue. Use it to fill in the numbers and the electron arrangement. Draw the electrons as crosses (×) on the rings. You will not need every ring on every card.
3. Some clues give a group and period instead of a number. If you are stuck, leave that card and come back to it after step 4.
4. Arrange the cards into groups and periods. Write each atomic number in the grid.
5. Answer the two questions below.
6. Now check with a periodic table. Fill in the element and symbol on each card.

Marks: 1 for each card with every box and the Bohr diagram correct, 1 for each question.

The grid

Group / Period	1	2	3	4	5	6	7	8 (0)
1	1							2
2	3	4	5	6	7	8	9	10
3	11	12	13	14	15	16	17	18
4	19	20						

Questions

A What do the atoms of elements in the same group have in common? **[1]**

They have the same number of outer electrons.

B What do the atoms of elements in the same period have in common? **[1]**

They have the same number of shells.

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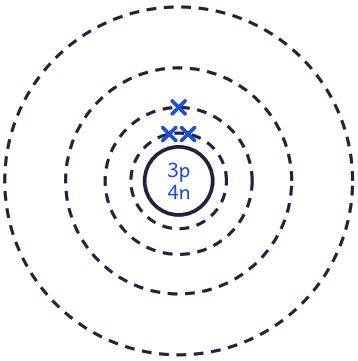
Clue: group 1, period 2

Element: Lithium — Symbol: Li

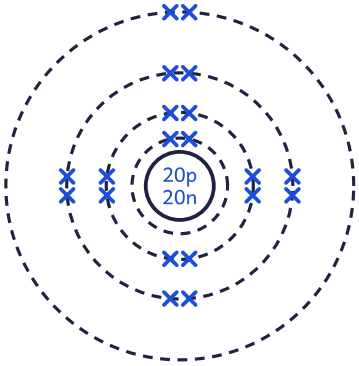


Mass no.	**7**
Atomic no.	3
Protons	3
Neutrons	4
Electrons	3
Group	1
Period	2

Arrangement: 2, 1

Clue: group 2, period 4

Element: Calcium — Symbol: Ca

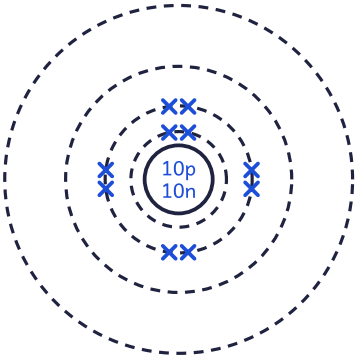


Mass no.	**40**
Atomic no.	20
Protons	20
Neutrons	20
Electrons	20
Group	2
Period	4

Arrangement: 2, 8, 8, 2

Clue: 2 shells, outer shell full

Element: Neon — Symbol: Ne

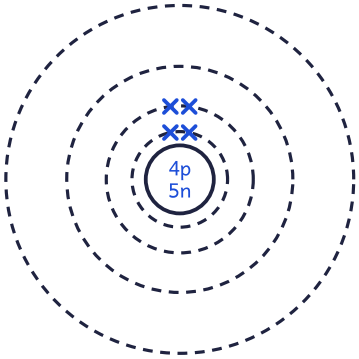


Mass no.	**20**
Atomic no.	10
Protons	10
Neutrons	10
Electrons	10
Group	8 (0)
Period	2

Arrangement: 2, 8

Clue: atomic number 4

Element: Beryllium — Symbol: Be

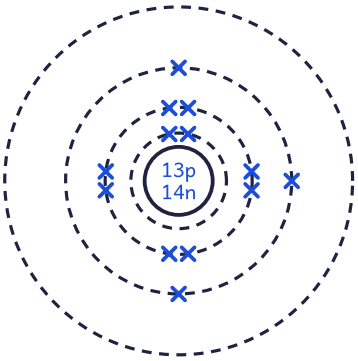


Mass no.	**9**
Atomic no.	4
Protons	4
Neutrons	5
Electrons	4
Group	2
Period	2

Arrangement: 2, 2

Clue: 3 shells, 3 outer electrons

Element: Aluminium — Symbol: Al

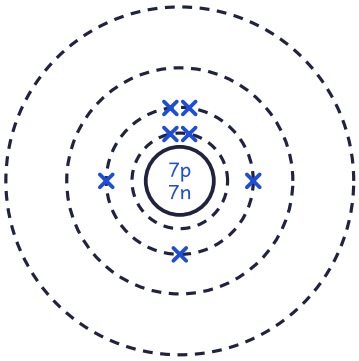


Mass no.	**27**
Atomic no.	13
Protons	13
Neutrons	14
Electrons	13
Group	3
Period	3

Arrangement: 2, 8, 3

Clue: 7 electrons

Element: Nitrogen — Symbol: N



Mass no.	**14**
Atomic no.	7
Protons	7
Neutrons	7
Electrons	7
Group	5
Period	2

Arrangement: 2, 5

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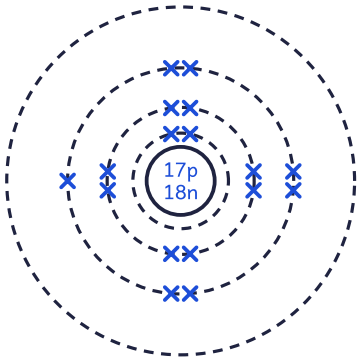
Clue: group 7, period 3

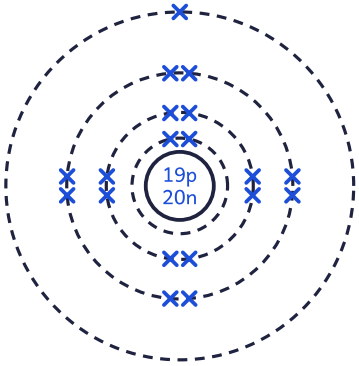
Element: Chlorine — Symbol: Cl



Mass no.	**35**
Atomic no.	17
Protons	17
Neutrons	18
Electrons	17
Group	7
Arrangement	2, 8, 7
Period	3

Clue: atomic number 19

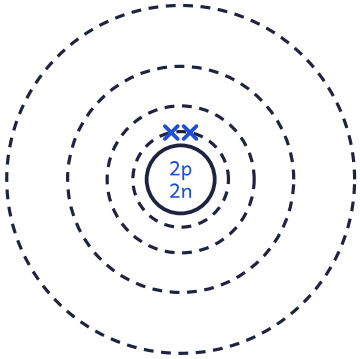
Element: Potassium — Symbol: K



Mass no.	**39**
Atomic no.	19
Protons	19
Neutrons	20
Electrons	19
Group	1
Arrangement	2, 8, 8, 1
Period	4

Clue: group 8 (0), period 1

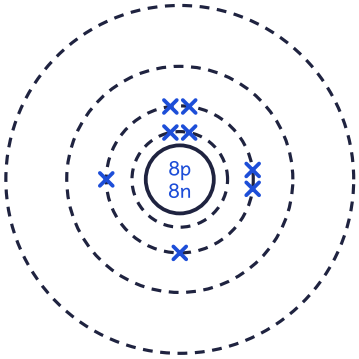
Element: Helium — Symbol: He



Mass no.	**4**
Atomic no.	2
Protons	2
Neutrons	2
Electrons	2
Group	8 (0)
Arrangement	2
Period	1

Clue: 8 protons

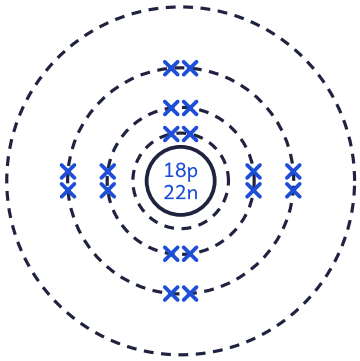
Element: Oxygen — Symbol: O



Mass no.	**16**
Atomic no.	8
Protons	8
Neutrons	8
Electrons	8
Group	6
Arrangement	2, 6
Period	2

Clue: group 8 (0), period 3

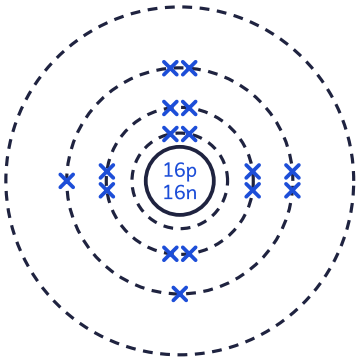
Element: Argon — Symbol: Ar



Mass no.	**40**
Atomic no.	18
Protons	18
Neutrons	22
Electrons	18
Group	8 (0)
Arrangement	2, 8, 8
Period	3

Clue: 16 protons

Element: Sulphur — Symbol: S



Mass no.	**32**
Atomic no.	16
Protons	16
Neutrons	16
Electrons	16
Group	6
Arrangement	2, 8, 6
Period	3

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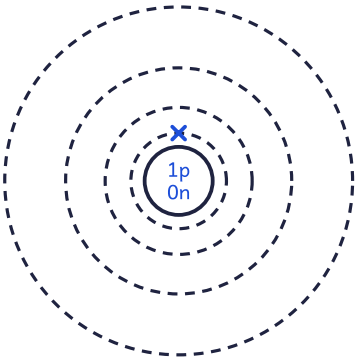
Clue: 1 proton

Element: Hydrogen — Symbol: H

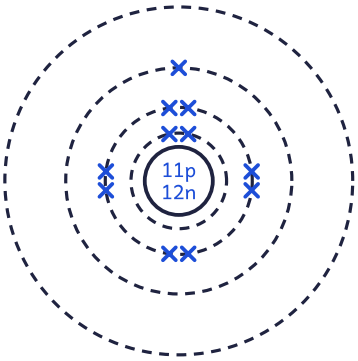


Mass no.	**1**
Atomic no.	1
Protons	1
Neutrons	0
Electrons	1
Group	1
Period	1

Arrangement: 1

Clue: atomic number 11

Element: Sodium — Symbol: Na

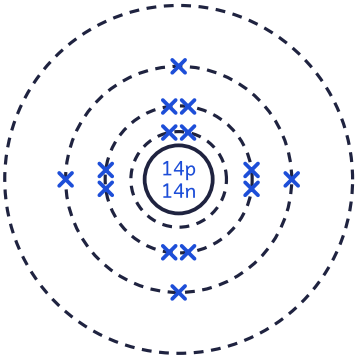


Mass no.	**23**
Atomic no.	11
Protons	11
Neutrons	12
Electrons	11
Group	1
Period	3

Arrangement: 2, 8, 1

Clue: 14 electrons

Element: Silicon — Symbol: Si

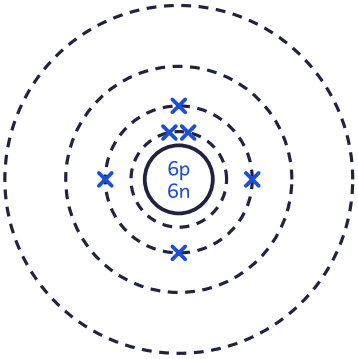


Mass no.	**28**
Atomic no.	14
Protons	14
Neutrons	14
Electrons	14
Group	4
Period	3

Arrangement: 2, 8, 4

Clue: 2 shells, 4 outer electrons

Element: Carbon — Symbol: C

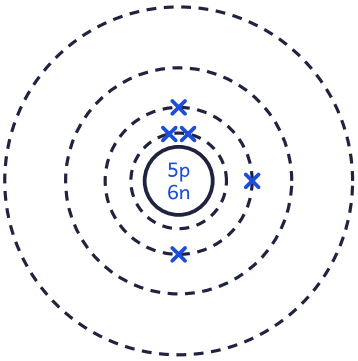


Mass no.	**12**
Atomic no.	6
Protons	6
Neutrons	6
Electrons	6
Group	4
Period	2

Arrangement: 2, 4

Clue: 2 shells, 3 outer electrons

Element: Boron — Symbol: B

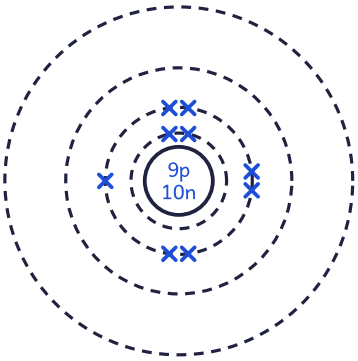


Mass no.	**11**
Atomic no.	5
Protons	5
Neutrons	6
Electrons	5
Group	3
Period	2

Arrangement: 2, 3

Clue: group 7, period 2

Element: Fluorine — Symbol: F



Mass no.	**19**
Atomic no.	9
Protons	9
Neutrons	10
Electrons	9
Group	7
Period	2

Arrangement: 2, 7

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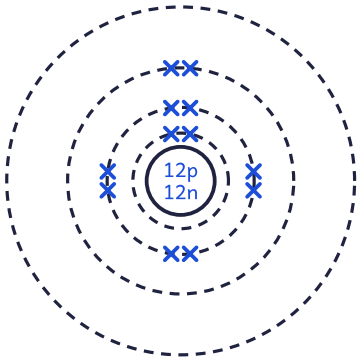
Clue: group 2, period 3

Element: Magnesium — Symbol: Mg

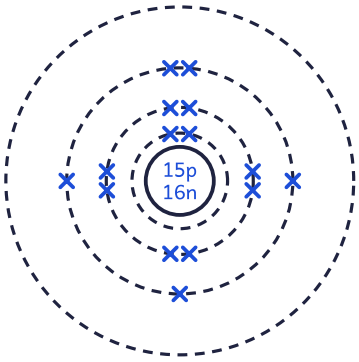


Mass no.	**24**
Atomic no.	12
Protons	12
Neutrons	12
Electrons	12
Group	2
Period	3

Arrangement: 2, 8, 2

Clue: 3 shells, 5 outer electrons

Element: Phosphorus — Symbol: P



Mass no.	**31**
Atomic no.	15
Protons	15
Neutrons	16
Electrons	15
Group	5
Period	3

Arrangement: 2, 8, 5

How to mark

One mark for each card where every box is right and the Bohr diagram matches the arrangement: 20 marks. One mark for each question: 2 marks. Total 22.

Check the diagrams for the slot rule: one cross in each of the four places (top, right, bottom, left) before any place gets a second cross, so carbon shows four single crosses and oxygen shows two pairs and two singles. An outer shell with exactly two electrons is drawn as a pair (beryllium, magnesium, calcium, as for helium). Group 8 (0) can be written as 8 or 0.

How to revise this

Look at the grid and the arrangements on the cards. Cover them. Write the arrangements for the first 20 elements from memory. Check against the cards. Repeat only the ones you missed.