PARKTOWN BOYS' HIGH SCHOOL
DEPARTMENT OF SCIENCE

**Name: _____ Class: ___**

# NATURAL SCIENCES

# –Science–

## 21 June 2017

***Examiner:*** Mrs I Pelser ***Moderator:*** Mrs P Mercier

## GRADE 8

**TIME: 1 h** **MARKS: 70 Marks**

**This paper consists of 10 pages and a Data Sheet of 2 pages**

| Q 1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q8 | Q9 | Q10 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 25 | 13 | 8 | 9 | 8 | 12 | - | - | - | 70 |

**GENERAL INSTRUCTIONS. Please read these instructions carefully.**

1. ***Non-programmable calculators may be used.***
2. ***Appropriate mathematical instruments may be used.***
3. ***The borrowing/lending of any material is FORBIDDEN.***

# QUESTION 1: MULTIPLE CHOICE

**INSTRUCTIONS**

***Circle the correct answer on this sheet.***

1.1 Which task would the laboratory equipment shown be most useful for?

A measuring 450 milliliters of water
B measuring 5 milliliters of vinegar
C weighing 200 grams of baking soda
D transferring powered chemicals from a bottle

1.2 Which activity involves only a physical change?

A grinding coffee beans
B baking cookies
C acid bubbling on rock
D exploding fireworks

1.3 As water is heated, the motion of the water molecules will generally:

A decrease.
B increase.
C remain the same.
D temperature does not influence the movement of the particles.

1.4 Which of the following defines matter?

A Anything without mass
B Anything with mass and takes up space
C Anything with mass but doesn't take up space
D Anything without mass and doesn't take up space

1.5 If a black ball is denser than a white ball of the same size, the black ball has:

A less volume.
B more volume.
C more matter taking up the same space.
D less matter taking up the same space.

1.6 A(n) . . . . is a positively charged particle in an atom's nucleus.

A electron
B neutron
C plasma
D proton

1.7 What happens to the particles when a piece of rock is heated up?

A They get bigger
B They get smaller
C They stay the same size
D They move closer together

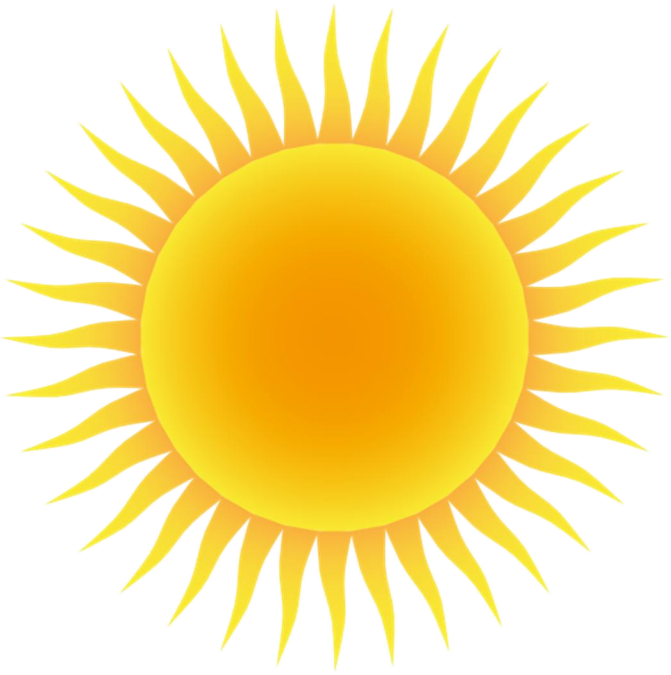
**[14]**

# QUESTION 2

Read through the section on the sun and answer the questions that follow:

The sun lies at the heart of the solar system, where it is by far the largest object. It holds 99.8 percent of the solar system's mass and is roughly 109 times the diameter of the Earth — about one million Earths could fit inside the sun.

The core extends from the sun's centre to about a quarter of the way to its surface. Although it only makes up roughly 2 percent of the sun's volume, it is almost 15 times the density of lead and holds nearly half of the sun's mass



Just like most other stars, the sun is made up mostly of hydrogen, followed by helium. Nearly all the remaining matter consists of seven other elements — oxygen, carbon, neon, nitrogen, magnesium, iron and silicon. For every 1 million atoms of hydrogen in the sun, there are 98,000 of helium, 850 of oxygen, 360 of carbon, 120 of neon, 110 of nitrogen, 40 of magnesium, 35 of iron and 35 of silicon. Still, hydrogen is the lightest of all elements, so it only accounts for roughly 72 percent of the sun's mass, while helium makes up about 26 percent.

2.1 What type of matter is mainly found in the sun?

_____ (1)

2.2 Write down the name and the symbols of 5 these particles mentioned in this section.

_____

_____

_____

_____

_____ (5)

2.3 Name three diatomic molecules mentioned in this section.

_____

_____

_____ (3)

2.4 Draw a labeled diagram of a helium atom that contains two electrons and three neutrons.

(3)

2.5 The density of lead is 11370 $kg.m^{-3}$. Determine the density of the centre of the sun.

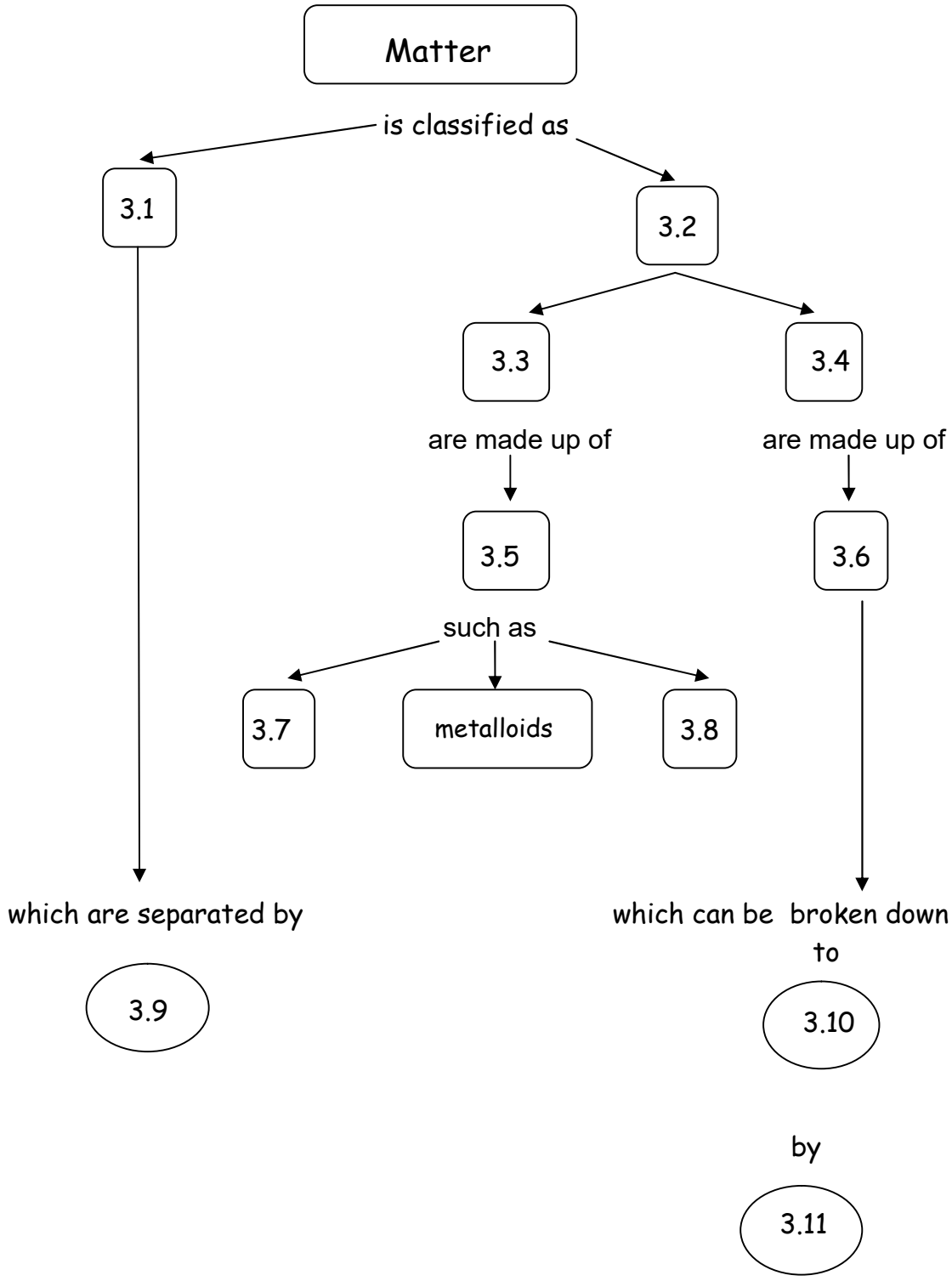
_____

_____ (2)

**[14]**

# QUESTION 3:

Complete the summary of matter below using the space provided **ON THE NEXT PAGE:**



3.1 _____

3.2 _____

3.3 _____

3.4 _____

3.5 _____

3.6 _____

3.7 _____

3.8 _____

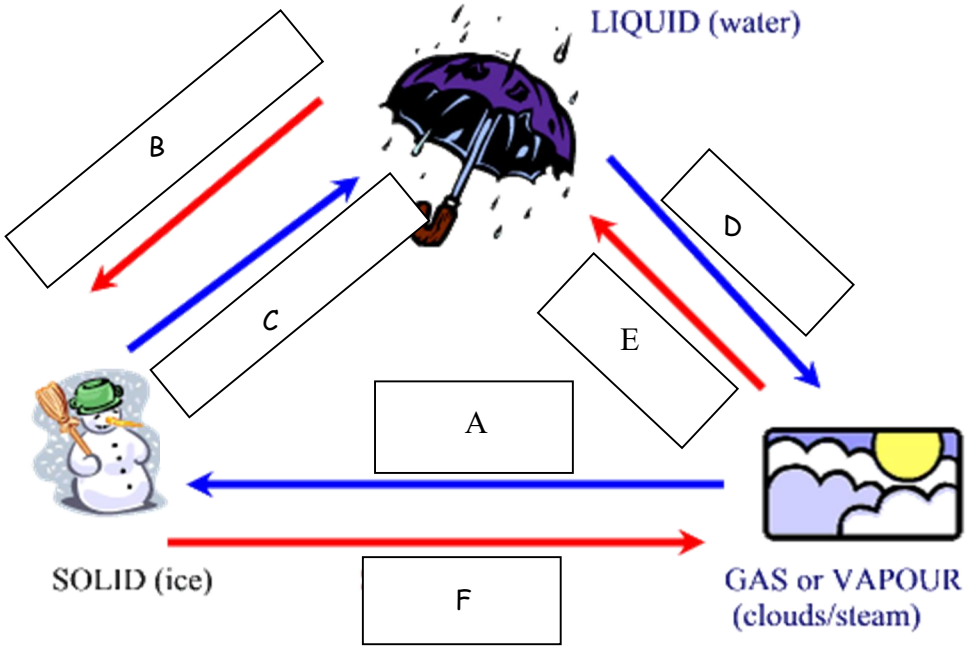
3.9 _____

3.10 _____

3.11 _____

**[11]**

# QUESTION 4




4.1 What phase change is represented by D?

_____ (1)

4.2 What happens to the water molecules in order to change from a solid to a liquid?

_____

_____ (2)

4.3 What happens to the volume of the water when it is heated up?

_____ (1)

4.4 State three methods in which the pressure of a gas can be increased.

_____

_____

_____ (3)

**[7]**

# QUESTION 5

5.1 Use the Table of Densities in the Data Sheet and the following photo to answer the following questions:


Complete the following sentences:

5.1.1 _____ has the highest density.

5.1.2 _____ has the lowest density.

5.1.3 A soda cap will _____ in corn syrup.

5.1.4 Milk will _____ in lamp oil.

5.1.5 A cherry tomato and a ping pong ball are both dropped into water.

The cherry tomato _____

and the ping pong ball _____. (6)

5.2 What is the density of an object that has a mass of 184 g and has a length of 10 cm, height of 10 mm and a width of 5 cm? Show all your formulas and calculations.

_____

_____

_____

_____

_____

_____

_____

_____

_____ (7)

**[13]**

# QUESTION 6

**Consider the following chemical reaction:**

$$Zn(s) + H_2SO_4(aq) \rightarrow ZnSO_4(aq)) + H_2(g)$$

6.1 Name all the elements (not compounds!) present in the chemical reaction described.

_____

_____ (2)

6.2 Write down the symbols of the reactants

_____

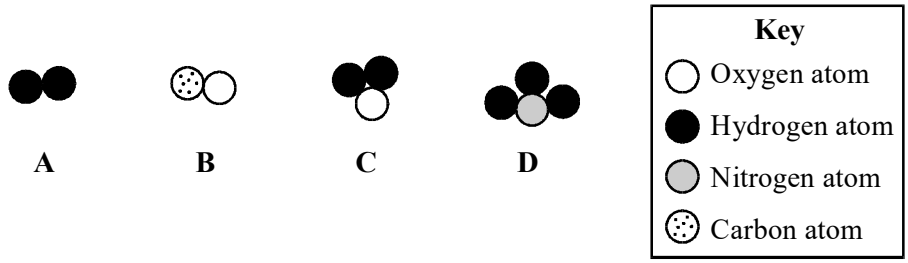
_____ (2)

6.3 What does the "→" in the chemical equation represent?

_____ (2)

The Periodic Table on the Data Sheet might help you to answer this question.

4.4 Study the following diagram, and then fill in the table that follows.




| Molecule | Name | Formula |
|---|---|---|
| **A** | Hydrogen | $H_2$ |
| **B** | | |
| **C** | | |
| **D** | Ammonia | |

(5)

**[11]**

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**TOTAL SECTION B: [56]**

**TIME: 1 h** **GRAND TOTAL:70**
**Marks**

# DATA FOR PHYSICAL SCIENCES GRADE 8

## TABLE 12: FORMULÆ

**DENSITY**

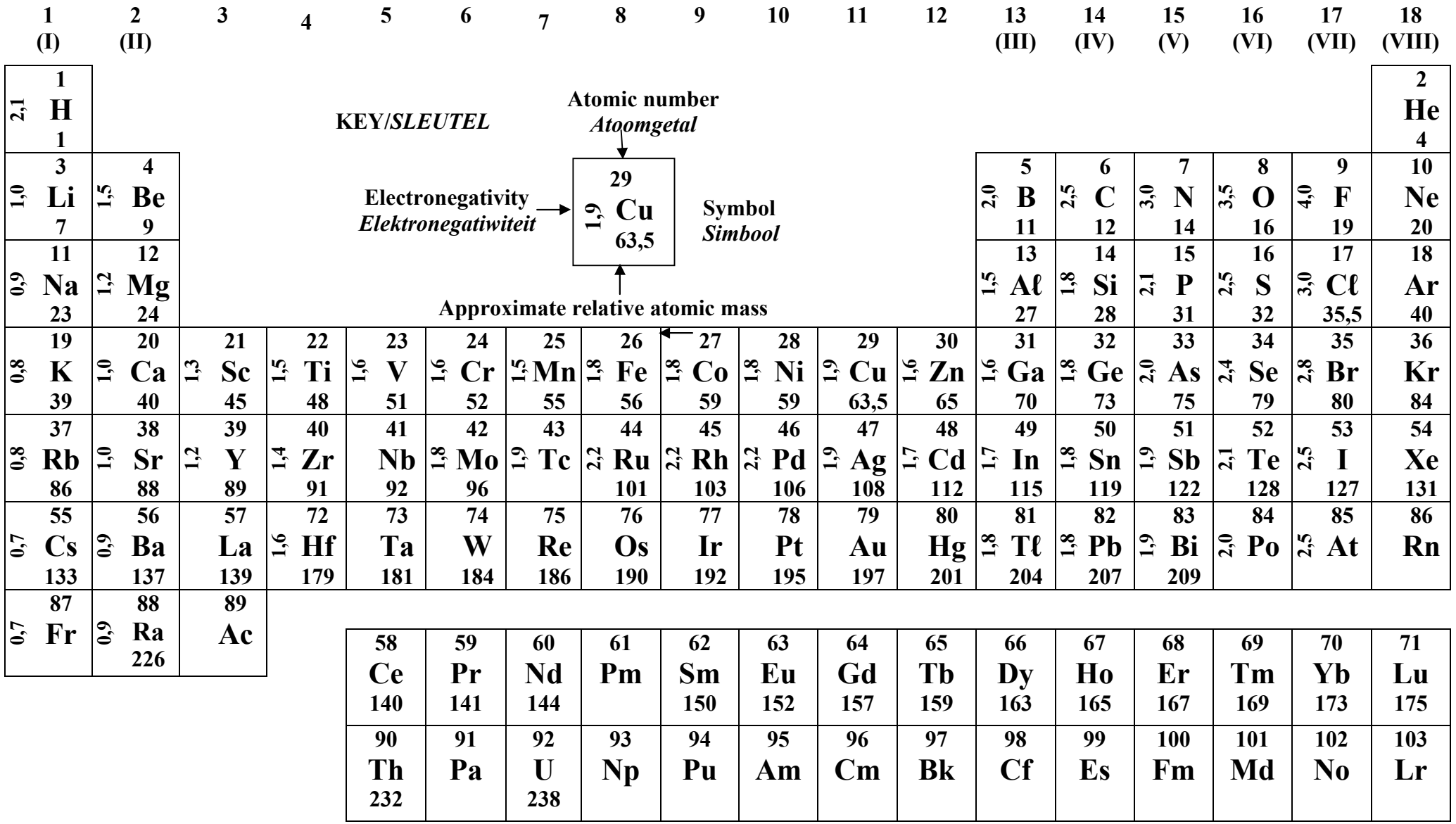
| | |
|---|---|
| $\rho = \frac{m}{V}$ or $d = \frac{m}{V}$ | |

## TABLE 2: TABLE OF DENSITIES

**Densities of common substances**

| Substance | Density ($g.cm^{-3}$) |
|---|---|
| Lamp oil | 0.68 |
| Wood | 0.72 |
| Rubbing alcohol | 0.79 |
| Methylated Spirits | 0.81 |
| Paraffin | 0.85 |
| Benzene | 0.90 |
| Ice | 0.91 |
| Vegetable oil | 0.92 |
| Water | 1.00 |
| Sea water | 1.03 |
| Milk | 1.03 |
| Glycerin | 1.26 |
| Carbon | 1.90 |
| Glass | 2.50 |
| Aluminium | 2.70 |
| Diamond | 3.50 |
| Zinc | 7.10 |
| Iron | 7.70 |
| Copper | 8.70 |
| Silver | 10.50 |
| Lead | 11.30 |
| Mercury | 13.60 |
| Gold | 19.30 |
| Platinum | 21.50 |

# TABLE 3: THE PERIODIC TABLE OF ELEMENTS




| 1 (I) | 2 (II) | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 (III) | 14 (IV) | 15 (V) | 16 (VI) | 17 (VII) | 18 (VIII) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,1 H 1 | | | | | | | | | | | | | | | | | 2 He 4 |
| 1,0 Li 7 | 1,5 Be 9 | | | | | | | | | | | 2,0 B 11 | 2,5 C 12 | 3,0 N 14 | 3,5 O 16 | 4,0 F 19 | 10 Ne 20 |
| 0,9 Na 23 | 1,2 Mg 24 | | | | | | | | | | | 1,5 Aℓ 27 | 1,8 Si 28 | 2,1 P 31 | 2,5 S 32 | 3,0 Cℓ 35,5 | 18 Ar 40 |
| 0,8 K 39 | 1,0 Ca 40 | 1,3 Sc 45 | 1,5 Ti 48 | 1,6 V 51 | 1,6 Cr 52 | 1,5 Mn 55 | 1,8 Fe 56 | 1,8 Co 59 | 1,8 Ni 59 | 1,9 Cu 63,5 | 1,6 Zn 65 | 1,6 Ga 70 | 1,8 Ge 73 | 2,0 As 75 | 2,4 Se 79 | 2,8 Br 80 | 36 Kr 84 |
| 0,8 Rb 86 | 1,0 Sr 88 | 1,2 Y 89 | 1,4 Zr 91 | Nb 92 | 1,8 Mo 96 | 1,9 Tc | 2,2 Ru 101 | 2,2 Rh 103 | 2,2 Pd 106 | 1,9 Ag 108 | 1,7 Cd 112 | 1,7 In 115 | 1,8 Sn 119 | 1,9 Sb 122 | 2,1 Te 128 | 2,5 I 127 | 54 Xe 131 |
| 0,7 55 Cs 133 | 0,9 56 Ba 137 | 57 La 139 | 1,6 72 Hf 179 | 73 Ta 181 | 74 W 184 | 75 Re 186 | 76 Os 190 | 77 Ir 192 | 78 Pt 195 | 79 Au 197 | 80 Hg 201 | 1,8 81 Tℓ 204 | 1,8 82 Pb 207 | 1,9 83 Bi 209 | 2,0 84 Po | 2,5 85 At | 86 Rn |
| 0,7 87 Fr | 0,9 88 Ra 226 | 89 Ac | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 Ce 140 | 59 Pr 141 | 60 Nd 144 | 61 Pm | 62 Sm 150 | 63 Eu 152 | 64 Gd 157 | 65 Tb 159 | 66 Dy 163 | 67 Ho 165 | 68 Er 167 | 69 Tm 169 | 70 Yb 173 | 71 Lu 175 |
| 90 Th 232 | 91 Pa | 92 U 238 | 93 Np | 94 Pu | 95 Am | 96 Cm | 97 Bk | 98 Cf | 99 Es | 100 Fm | 101 Md | 102 No | 103 Lr |