



# **(ENG) Atoms through exercise and IT skills**

Introduction

Step 1 - Motivational Stage

Step 2 - Investigational Stage

Step 3 - Consolidation Stage

# Introduction

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#Online activity #In-class activity #Experiential learning  
#Simulation #Artwork #Teamwork

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In this activity, through a functional task, we get to know the existence of atoms in various goods, products, the environment, the world and the universe. In addition, the pupils get to know the dimensions of both atoms and the size of the universe with the help of simulation.

## Learning Objectives



understand the existence of atoms in different contexts.



interpret the dimensions of the structural parts of atoms with the help of simulation.

## ACTIVITY DETAILS

### Activity Details

#### Connection of the activity with Art —

Getting to know the subject through art.



#### Link to local, national School Curriculum —

Chemistry General/Atoms



## Equipment required —

- Internet connection
- computers or tablets for pupils
- the teacher has a projection screen or an electronic display on which to project the computer's view
- printer
- paper on which the names and sign of the elements are printed
- laminating pockets and machine (optional).



## Duration of activity —

45 minutes



## Sources —

## Step 1 - Motivational Stage

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**i** The lesson is suitable to be held after the basics of atoms have been covered.

Terms and concepts related to atoms often have other meanings in everyday life. Assign pupils to search the Internet (e.g., Pinterest and commercial sites) for fun nuclear-themed t-shirts. Go through together what their joke is based on. Pupils can use the ideas to make a standup speech of their own.

## Step 2 - Investigational Stage

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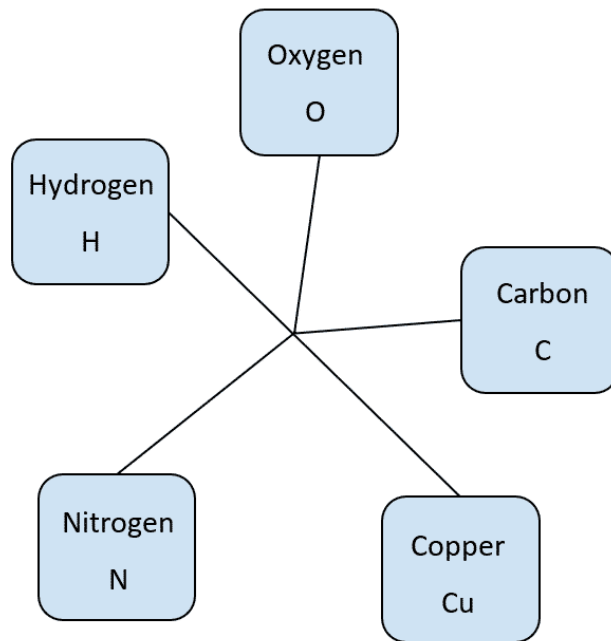


### STUDENTS' TASKS

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#### Task 1 - What element?

Place printed "elemental islands" of your choice on the classroom floor or outside. The islands can be, for example, printed notes and a layout like below:



**Tell different statements that fit one or more of the island's elements** (see sample list below).

You can choose the elements yourself. The pupils, on the other hand, have to go to the element that they think fits the thesis, as an individual or group work. When the pupils have decided on their choice, they still have to justify their choice. The teacher does not directly say that someone is right or wrong: the idea is to discuss why a certain answer is more correct in the pupils' opinion.

### **Example statements:**

- **Go to the element that is most abundant in the air.**
  - 78% Nitrogen (N), 21% Oxygen (O), 0.9% Argon (Ar), the rest other



- **Go to the element, which is the ingredient of pure water.**
  - Oxygen (O) and hydrogen (H).
  
- **Go to the element that is the basis of life.**
  - Carbon (C), which is mentioned in several textbooks. However, water, i.e. hydrogen (H) and oxygen (O) are also accepted as answers. At the same time, amino acids are also the basis of life, so nitrogen (N) is also accepted as an answer.
  
- **Go to the element, which is metal.**
  - Of the above examples, copper (Cu) is the only metal.
  
- **Go to the element found in the periodic table.**
  - All elements can be found in the periodic table, so pupils can be tested by asking a follow-up question: what element is not found in the periodic table?
  
- **Go to an element that was used as money in the Middle Ages.**
  - Copper (Cu), gold (Au), silver (Ag).
  
- **Go to the element, which is abundant in our body.** (<https://www.news-medical.net/life-sciences/What-Chemical-Elements-are-Found-in-the-Human-Body.aspx>)
  - 65% oxygen (O), 18% carbon (C), 10% hydrogen (H), 3% nitrogen (N), 1.4% calcium (Ca), 1.1% phosphorus (P), 1% potassium (K), the rest other elements.
  
- **Go to the most abundant element in the universe.** (<https://astronomy.swin.edu.au/cosmos/c/Chemical+Composition>)

- 73% hydrogen (H), 25% helium (He), the rest other elements
- **Go to the element most abundant in the Sun.** (<https://www.space.com/14745-sun-composition.html>)
  - 95.1% hydrogen (H), 4.8% helium (He), 0.1% other elements
- **Go to the element that is as common on Earth as possible.**  
([https://en.wikipedia.org/wiki/Abundance\\_of\\_the\\_chemical\\_elements](https://en.wikipedia.org/wiki/Abundance_of_the_chemical_elements))
  - 32% iron (Fe), 30% oxygen (O), 15% silicon (Si), 14% magnesium (Mg), the rest other elements
- **Go to the element that is found in the earth's crust as much as possible.**  
(<https://www.weforum.org/agenda/2021/12/abundance-elements-earth-crust/>)
  - 46% oxygen (O), 28% silicon (Si), 8% aluminum (Al), 6% iron (Fe), 4% calcium (Ca), 2% sodium (Na), magnesium (Mg) and potassium (K), the rest other elements
- **Go to the element that is found in abundance in seawater.** (<https://en.wikipedia.org/wiki/Seawater>)
  - 86% oxygen (O), 11% hydrogen (H), 2% chlorine (Cl), 1% sodium (Na), the rest other elements

## Task 2 - Proportions

Direct pupils to <https://htwins.net/scale2/>.

Ask the pupils to measure the sizes of different pieces using the scale they found out (the exact size can be displayed by clicking on the piece). At the same time, they can familiarize themselves with the scale in general.

What size is it

1. Largest bacteria (Largest Bacteria)
2. Skin cell
3. Smallest object visible to the naked eye
4. Mist droplet
5. DNA
6. Glucose Molecule
7. Cesium atom (Cesium atom)
8. Carbon atom
9. Hydrogen atom (Hydrogen atom)
10. Helium atom (Helium atom)
11. Proton (proton)
12. Neutron (neutron)

The task can be continued with a selection of pieces of space that go to the other side of the scale and the size of the universe.

## Step 3 - Consolidation Stage

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At the end of the tasks, discuss what perhaps surprised the pupils in the scale and whether they had any questions related to the task.

### End of the activity

EXIT