

# Build an Atom

**Talk to a Teacher**

**<http://spoken-tutorial.org>**

**National Mission on Education through ICT**

**<http://sakshat.ac.in>**

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# Learning Objectives



# Learning Objectives

- ▶ Demonstrate **Build an Atom**,  
Interactive PhET simulation



# Pre-requisites



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- ▶ **Learners should be familiar with topics in high school science**



# System Requirement



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- ▶ **Ubuntu Linux OS v 14.04**



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- ▶ **Java v 1.7.0**





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- ▶ **Ubuntu Linux OS v 14.04**
- ▶ **Java v 1.7.0**
- ▶ **Firefox Web Browser v 53.02.2**



# Learning Goals



# Learning Goals

- ▶ **Build an atom using protons, neutrons and electrons**



# Learning Goals

- ▶ **Build an atom using protons, neutrons and electrons**
- ▶ **Identify an element and its position on the periodic table**



# Learning Goals

- ▶ Build an atom using protons, neutrons and electrons
- ▶ Identify an element and its position on the periodic table
- ▶ Determine whether an atom is neutral or an ion



# Learning Goals

- ▶ Build an atom using protons, neutrons and electrons
- ▶ Identify an element and its position on the periodic table
- ▶ Determine whether an atom is neutral or an ion
- ▶ Predict the charge



# Learning Goals



# Learning Goals

- ▶ **Determine the mass of an atom or ion**





# Learning Goals

- ▶ **Determine the mass of an atom or ion**
- ▶ **Determine the stability of atom or ion created**



# Learning Goals

- ▶ Determine the mass of an atom or ion
- ▶ Determine the stability of atom or ion created
- ▶ Represent the atomic symbols



# Learning Goals

- ▶ Determine the mass of an atom or ion
- ▶ Determine the stability of atom or ion created
- ▶ Represent the atomic symbols
- ▶ Create Isotopes of an element



# Composition Of An Atom



# Composition Of An Atom

- **Atoms are fundamental building blocks of matter**



# Composition Of An Atom

- ▶ **Atoms are fundamental building blocks of matter**
- ▶ **Each atom consists of a small, dense, positively charged nucleus**



# Composition Of An Atom

- ▶ Atoms are fundamental building blocks of matter
- ▶ Each atom consists of a small, dense, positively charged nucleus
- ▶ Nucleus is surrounded by much lighter, negatively charged electrons



# Composition Of An Atom





# Composition Of An Atom

- **Nucleus may also contain neutrons**



# Composition Of An Atom

- ▶ **Nucleus may also contain neutrons**
- ▶ **Neutron has same mass as proton but it has no charge**



# About Atom



# About Atom

- ▶ **Number of protons in the nucleus of an atom defines the chemical element**



# About Atom

- ▶ Number of protons in the nucleus of an atom defines the chemical element
- ▶ Chemical properties of an element arise due to number & arrangement of electrons



# PhET Simulation-Link



# PhET Simulation-Link

<https://phet.colorado.edu>



# Isotopes





# Isotopes

- **Atoms of the same element that differ in neutrons are called Isotopes**



# Isotopes

- ▶ **Atoms of the same element that differ in neutrons are called Isotopes**
- ▶ **Isotopes of same element have same chemical properties**



# Isotopes Of Hydrogen



# Isotopes Of Hydrogen

**Hydrogen has three Isotopes,  
Protium, Deuterium and Tritium**



# Isotopes Of Hydrogen

**Hydrogen has three Isotopes,  
Protium, Deuterium and Tritium**

► **Protium (1 proton)**



# Isotopes Of Hydrogen

**Hydrogen has three Isotopes,  
Protium, Deuterium and Tritium**

- ▶ **Protium (1 proton)**
- ▶ **Deuterium (1 proton + 1 neutron)**



# Isotopes Of Hydrogen

Hydrogen has three Isotopes,  
Protium, Deuterium and Tritium

- ▶ Protium (1 proton)
- ▶ Deuterium (1 proton + 1 neutron)
- ▶ Tritium (1 proton + 2 neutrons)



# Assignment





# Assignment

**As an assignment,**

- ▶ **Create a neutral carbon atom**
- ▶ **Show isotopes of carbon**



# Atomic Number And Mass Number



# Atomic Number And Mass Number

- ▶ The number of protons in an atom is its **atomic Number**
- ▶ The total number of protons and neutrons in an atom is its **mass Number**



# Summary



# Summary

**We have learnt,**



# Summary

We have learnt,

- ▶ How to use Build an Atom, Interactive PhET simulation



# Summary



# Summary

- ▶ **Build models of Hydrogen and Helium atoms**
- ▶ **Add or remove electrons to create ions**
- ▶ **Add or remove neutrons to create isotopes**





# Assignment

1. Create a neutral oxygen atom
2. Add two electrons to the neutral atom
3. Observe the change in parameters on various panels
4. Try to remove electrons from the inner shells, observe the results



# About the Spoken Tutorial Project

- ▶ Watch the video available at [http://spoken-tutorial.org/What\\_is\\_a\\_Spoken\\_Tutorial](http://spoken-tutorial.org/What_is_a_Spoken_Tutorial)
- ▶ It summarises the Spoken Tutorial project



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- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



# Spoken Tutorial Workshops

## The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)



# Forum for specific questions

- ▶ Do you have questions in **THIS Spoken Tutorial?**
- ▶ Please visit  
<http://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ Someone from our team will answer them



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- ▶ This project is partially funded by  
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National Mission on Teachers and  
Teaching**



# Acknowledgements

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- ▶ It is supported by the National Mission on Education through ICT, MHRD, Government of India
- ▶ More information on this Mission is available at

<http://spoken-tutorial.org/NMEICT-Intro>

