

Faculty of Exact Sciences

Department of Physics

First Material Sciences

Unit 5

Einstein's theory of relativity

READING PASSAGE

Theory of Relativity

There has been much talk about the theory of relativity, and how it changed many concepts related to classical physics that prevailed since Newton's time until Einstein's theory appeared

The theory of relativity, which is also called relativity, is a theory of the German scientist Albert Einstein, and the French scientist Henri Poincare, who developed the special theory of relativity, also contributed. It is considered one of the most important physical theories of Modernity, because of its role in changing many physical concepts. Researches related to this theory were published in 1905 by Einstein, which are researches called special relativity, and they were related to answering questions about the properties and behavior of light, and the results of Michelson and Morley's experiment on light. The experiment examined the spread of light in different directions, and its results were in contradiction with the well-known classical laws of velocity. The importance of relativity lies in the fact that it changed the basic physical concepts related to mass, energy, space and time, and made a qualitative leap in space and theoretical physics. It amended Newton's mechanical physics theories that prevailed 200 years ago, where the relativity theory states that the movement of objects is relative with the change of time, and that the concept of time is no longer fixed and definite, and the theory of relativity linked time and space so that it deals with them as one thing called space-time. After they were treated as two different things, and time was linked to the speed of the body and its movement, as there have become concepts of contraction and expansion of time in the universe, and the special theory of relativity consists of assumptions that depend on it, and form the basis of the theory, and these hypotheses are:

- The stability of the speed of light The theory of relativity proves that light has a constant speed regardless of its source and location, and it does not need a carrier medium to move from one place to another as it is in sound waves.
- Time is the fourth dimension. Einstein is the first to put time as a fourth dimension after the length, width, and height of matter. He entered the dimension Fourth in all his accounts.
- He denied the existence of the ether, which is the thing that exists in the universe and has no limits, and all scientists believed in its existence, but Einstein denied the existence of the ether, and said that there is only relative place and relative speed.

Grammar

1-Reported Speech :

1-In the transmitted speech, we turn the near into the far. 2-Convert auxiliary verbs from the present to the past. 3-Turn the speaker into absentee. 4-The spoken word never comes in the form of a question.

| Direct Speech | Reported | | Direct Speech | Reported |
|---------------|-----------|--|-------------------------|----------------|
| I | He, she | | Here | There |
| You | I, me, us | | Now | Then |
| We | They | | Tomorrow | The day after |
| My | His, her | | Yesterday | The day before |
| Our | Their | | Today | That day |
| Am, is | Was | | Open | To open |
| Are | Were | | Don't | Not to |
| Will | Would | | Do, does, did | If |
| Can | Could | | Simple present | Simple past |
| Have, has | Had | | Simple past | Past perfect |
| This | That | | The formula of question | Answer formula |

Examples of reported speech:

- I will travel with my father to London. --- He said he would travel with his father to London.
- We visited the zoo yesterday. --- They had visited the zoo the day before.
- You are having an exam today. --- We were having an exam that day.
- Do you speak English. --- He asked me if I spoke English.

2-Personal Pronouns:

| Personal pronoun | | Possessive: adjective and pronoun | | Reflexive pronoun |
|------------------|-------------|-----------------------------------|--------------------|-------------------|
| Subject form | Object form | Possessive adjective | Possessive pronoun | |
| I | Me | My | Mine | Myself |
| You | You | Your | Yours | Yourself |
| He | Him | His | His | Himself |
| She | Her | Her | Hers | Herself |
| It | It | Its | Its | Itself |
| We | Us | Our | Ours | Ourselves |
| You | You | Your | Yours | Yourselves |
| They | Them | Their | Theirs | Themselves |

Examples of Personal Pronouns:

- My house is small.
- Her father is strong.
- Our room is big.
- Their family is happy.
- The first person you should trust is yourself.

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