

THERMODYNAMICS

1st Lesson Plan (Scenario)

Lesson title: Thermodynamics

Subject: Physics

Level: Secondary School

Suggested time: 3 x 45 minutes

Equipment needed:

- Computers
- Video projector
- Internet connection

Lesson 1 (45 minutes)

Teaching Unit: Introduction to Thermodynamics, Pressure, Temperature, Internal Energy, Heat

Teaching Methods: discussion, instruction, exercises (online), individual work, collaboration

Teaching Methodologies: ex-cathedra learning, directive learning, exploratory learning

Learning Tools: electronic textbook and electronic workbook, slides, forum

Equipment: computer classroom, projector, internet connection

Lesson Objectives:

Functional:

- students develop their ability of logical thinking
- students develop their ability of pragmatic and meaningful reasoning
- students systematically upgrade their knowledge of basic concepts and their characteristics
- students solve problems from e-workbook independently

Educational:

- students acquire basic concepts, i.e. pressure, temperature, internal energy, heat
- students systematically upgrade their knowledge

Sequence of Lesson Stages:

1. Motivation
2. Introduction to the topic
3. Main activities
4. Exercises (individual)
5. Final activities

Teacher's Activities	Student's Activities
1. Motivation The teacher presents some examples from everyday life to the students (AppliedTD1.pdf). The introduced examples are cases of common use of thermodynamics, or can be explained by principles of thermodynamics.	Students listen and watch the presentation and accompanying video material.
2. Introduction to the topic The topic is announced: <i>Today's topic is thermodynamics. We will learn about temperature, pressure, heat, and internal</i>	While listening to the initial motivation, students prepare for discussion on the new topic.

<i>energy. We will perform some simulations and also solve exercises to consolidate our knowledge.</i>	
3. Main activities The teacher explains the first five topics from the material (electronic textbook). For each topic, the teacher first presents the topic, and then demonstrates the corresponding simulations, which are followed by a short discussion and explanation of results. Afterwards, the students are given short exercises and/or few quizzes on that topic.	Students listen to the explanation, watch simulations, try simulations by themselves, and actively participate in debate on explanation of results. Students do the exercises and answer the questions or solve quizzes. They can compare their answers and results, and further discuss the topic.
4. Exercises (individual) Students are given exercises in the electronic workbook, which they solve individually. The correct answers are discussed together.	Students individually solve exercises. Students participate in discussion, explaining correct/wrong answers.
5. Final activities The teacher uses forum to further discuss the topic, answer the question, counsel students, and give support regarding their homework.	If students do not finish the exercises, they get these exercises as homework. Students use forum to discuss the correct answers and ask the teacher for help.