

Heating costs so much. What can we do?

Developer: Teachers at Vikingaskolan (Contact through Johan Krantz and Per-Magnus Persson)

Institute: Vikingaskolan

Country: Sweden

Subject: Mathematics, Science, Biology, Chemistry, Domestic Science, Physics.

Grade level: 9 – 12

Objectives/competencies: Students are expected to be able to:

- Seek and select appropriate information related to the cost of different methods of heating from books, computers networks and web pages.
- Explain the advantages and disadvantages of different methods of heating, relating the explanation to the impact these methods have on climate, quality of air in the vicinity and economy.
- Propose a way of calculating (in grade 12) or estimating (in grade 9) the costs of using different building and isolating materials and different heating methods, with respect to the design of the house.
- Decide, with reasons, which way of building the house, choosing building and isolating materials and methods of heating is most suitable with respect both to a household's economy and long-term environmental effects.

Teacher guide

Heating is a problem in both temperate climate and the subtropics, in the cold season. The method of heating is important for both the well-being and economy of the inhabitants, and the global climate. The role played by the use of fossil or renewable fuels and different methods of producing electric power is important. The way to build and isolate the house has bearing on the need of heating. Citizens, in their capacity of consumers have here a possibility of influencing the trends in the construction industry to favour building methods which contribute to a sustainable development and do not enhance global warming. The cost of heating and ways to bring it down plays an important role in decision making by individuals and municipalities. Students – as future consumer – should attain the knowledge permitting them to lead informed discussion of which sort of building methods and heating can be cost-efficient.

Learning outcomes by lesson

Lesson 1

At the end of this lesson, students are expected to be able to:

- Discuss the scenario and the problem
- Put forward suggestion of where to seek information.

Lesson 2

At the end of this lesson, students are expected to be able to:

- Suggest advantages and disadvantages of different methods of building, isolating and heating houses.
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Lesson 3/ 3 and 4 in grade 12

At the end of this lesson, students are expected to be able to:

- [Calculate, in grade 12] Estimate [in grade 9] the costs of different methods of building, isolating and heating houses for the individual household, depending on climate and the design of the house.
- Estimate the long-term environmental effects of different methods of building, isolating and heating houses.

Lesson 4 / 5

At the end of this lesson, students are expected to be able to:

- Discuss which method of building, isolating and heating the house is appropriate with respect both to a household's economy and long-term environmental effects.
- Make decision
- Write the report

Teaching strategies

The teacher:

Pose the problem to the students given by the scenario

- Prepare students for the task injecting in the students a feeling of labour responsibility, activity for which we also have to prepare them.
- Introduce the group work through which students determine the source of information needed for their investigation, being critical as regards the texts/internet etc to be used, valuing them from the scientific point of view.
- Facilitate the reading and interpretation of the bibliography consulted, as well as the interchange of ideas among members of the same group and others.
- Guide the discussion on the methods of calculation; and also guide the students making the calculations.
- Direct the plenary debate, encouraging the questions and analysis of findings, which each groups got, with the aim to get a general conclusion.
- Suggest the criteria to taking account to elaborate the final report to be given to Ms. Jones.

Scope of the objectives

Objective	Achieved by means of
1. Seek and collect information relate to the study of building and isolating materials and fuels, from the books, computers networks and web pages.	<ul style="list-style-type: none"> Seeking, presentation and analysis of information, from the collected material.
2. Explain the advantages and disadvantages of different building and isolating materials and fuels with respect both to a household's economy and long-term environmental effects.	<ul style="list-style-type: none"> Construction of comparatives tables and charts, with the information gotten from different sources.
3. To explain the connection of the design of the house and heat losses, efficiency of heating etc.	<ul style="list-style-type: none"> Discussing in group the possible factors influencing the heat losses, efficiency of heating etc.
4. To cooperate with partners in the group in calculating the costs of using different building and isolating materials and heating methods, with respect to the design of the house.	<ul style="list-style-type: none"> Group work in calculating/ estimating the costs.
5. Decide, with reasons, how Ms. Jones should build her house.	<ul style="list-style-type: none"> Discussion of the findings and writing the final report for Ms. Jones in which the reasons for the decision made is given.