Research Article

Teaching in Physics "Electrical Instruments in the House". Saving Electricity

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Abstract

This article provides additional methodological materials for teaching the school physics course "Electrical appliances in the home, saving electricity." Also disclosed and clarified the education of the initial concept of frugality of students; education in their minds caring for nature, underground, aboveground, water, electricity and other resources of the nation's wealth, as well as the wise use of them.

Keywords: Physics, students, energy, energy saving, incandescent light bulb, energy-saving light bulb, electricity.

Introduction

The importance of physical education in school is determined by its role in the development of science and technology, industries and daily life. Teaching physics in general secondary schools is the formation and development of students' ability to apply their knowledge of physics in practice by generalizing their life ideas and practical activities.

Non-repetition of educational materials studied in physics education in general secondary schools in academic lyceums and professional colleges, age and psychological characteristics of students, compliance with general secondary education, as well as physics the gradual formation of concepts from simple to complex is taken [1].

At school, first of all, students can learn to save, to cultivate in their minds the care of the environment, the fact that surface and underground resources, water and other resources are a national wealth, the qualities of their rational use. Saving means not wasting time, valuing it, and being able to use each national resource (water, gas, electricity) in moderation [2].

Methodology

Students should be taught to be careful with electricity, to save electricity, to turn off the lights during the day, not to use light bulbs in vain, and to use them wisely. At the same time, we

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teach students the secrets of saving by teaching physics, as well as the development of these skills.

Teachers need to explain to students that light bulbs are the result of great invention and that they serve to keep homes, streets, alleys, schools, businesses, and all organizations always lit by light bulbs. It should be explained that energy-saving lamps consume 80% less energy than conventional lamps, and the use of energy-saving lamps not only saves energy but also reduces the load on the conductor, which prevents the risk of fire [3,4,5]. It is advisable to provide additional knowledge and skills on the proper use of electric lamps, to teach to save electricity (Figure 1).

In this situation, examples from several household items should be given to help the student understand more quickly, such as informing students that air conditioners are a cool device in summer and a heater in winter. Refrigerators account for 30-40% of the electricity consumed in homes. It should be noted that the correct choice of their effective mode of operation, adherence to the rules of operation and their proper use are beneficial to human health and lead to savings in electricity [6,7]. There are also savings on the use of irons, ovens, stoves and other appliances. Of course, it is recommended that the above materials be combined with topics such as "Electric heaters".

It is also important to organize a quiz on "Saving electricity" to make it more interesting for students. The main purpose of the quiz is to demonstrate the knowledge acquired by students, to correctly interpret nature and its phenomena, to explain the importance of electricity in life and technology [8,9]. The event can be organized as follows: students are divided into 2 groups and explained to them the conditions of the game. There are 3 main conditions for this.

Basic conditions:

1. In this case, about electricity - 4 questions.
2. Knowledge test - in this condition a test is given based on the topics.
3. The "smart puzzle" in this condition is aimed at saving electricity. At the end of the event, the winning teams will be identified and encouraged, emphasizing once again that saving is a requirement of the time.

For example, in the 6th-grade physics class, "Electrical appliances in the home. Teaching "Saving electricity" is another proof of this.

The textbook states that there is a charge for the use of energy. The amount depends on the amount of electricity consumed. You can learn the full meaning of the concept of energy in the upper grades. The electricity consumed in the home is determined by an electronic meter. The numbers indicate the amount of electricity consumed [9,10]. There are other types of electricity meters. You need to save money on electricity bills. There is no need to turn off the lights or turn up the volume when working in an adjoining room unless necessary. Playing computer games for a long time consumes a lot of energy, but it is also bad for your health.

Another effective way to save energy is to replace incandescent light bulbs with energy-saving light bulbs. Such lamps allow you to save several times more electricity [2,7].

Given the above knowledge, we believe that it would be appropriate to teach the following. One such method is to encourage students to increase their interest in science without changing their teaching hours based on their knowledge of mathematics, and to gain confidence that they will achieve scientific success and convenience in life. The incandescent and energy-saving light bulbs from inattentive light bulbs independently create a vital issue about their energy consumption, giving students information such as their appearance, structure, lighting brightness, safety, energy-saving can be one of the teacher's efforts in shaping a harmoniously developed generation. It is also useful to calculate the energy savings of energy-saving light bulbs as follows.
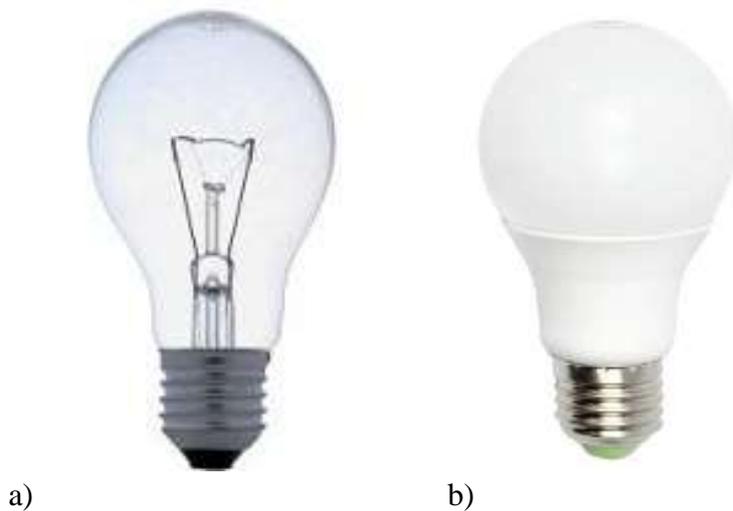

a)   b)

Figure 1. Tips of Lamp: a) Incandescent Light Bulb; b) Energy Saving (modern) Light Bulb

Currently, the average cost of a modern energy-saving light bulb is 12,000 sums, and the average price of an incandescent light bulb is 3,000 sums. Incandescent light bulbs are not guaranteed if they are sold with a warranty for a certain period, depending on the manufacturer of energy-saving light bulbs. If we look at their energy savings, we can see that a 12-watt energy-saving light bulb used to light the hallways of our homes is more energy-efficient than a 60-watt incandescent light bulb. Today, the cost of one kilowatt of electricity is 295 sums, the average daily burning time of light bulbs is 12 hours, and the annual electricity consumption for both light bulbs is calculated in sums [3].

$295 \cdot 12 \cdot 12 \cdot 365 = 15505.2$ sums
$295 \cdot 60 \cdot 12 \cdot 365 = 77526$ sums

Based on our calculations, we calculate the difference between the bills paid when the bulbs are lit. 77526 sums – 15505.2 sums = 62020.8 sums

Now, if we add the value of the light bulbs to the energy they consume, we get the cost of both light bulbs a year.

15505.2 sums + 12000 sums = 27505.2 sums
77526 sums + 3000 sums = 80526 sums

Although the difference in the selling price of light bulbs (12000 sums - 3000 sums = 9000 sums) is 9000 sums, if we take into account the savings of the family when using modern light bulbs, it is 80526 sums – 27505.2 sums = 53020.8 sums. This amount is equal to the money you saved if you used a modern light bulb for a year, which seemed expensive to buy instead of a low-cost incandescent light bulb in your home.

Results and Discussion

Energy-saving light bulbs are guaranteed by their manufacturers for 8,000 to 30,000 hours, or 6 to 18 months. The lifespan of an incandescent light bulb is about 1,000 hours. If we assume that the average life of an energy-saving light bulb is ((8000 + 30000): 2 = 19000) 19000 hours, then the service life of one energy-saving light bulb corresponds to the service life of 19 incandescent bulbs.

1 energy-saving 12-watt light bulb 12,000 sums;
19 incandescent bulbs 19 × 3000 sums = 57000 sums.
57,000 sums -12,000 sums = 45,000 sums.

We calculate the difference in energy consumption by multiplying the average service life of an energy-saving light bulb by the power of the bulbs and the cost of electricity:

Energy consumption of the energy-saving light bulb
- 19000 ·12 · 295 = 67260 sums;

The energy consumption of an incandescent light bulb
- 19000 · 60 · 295 = 336300 sums;

The difference between the amounts spent on electricity
- 336300 sums – 67260 sums =269040 sums.

The difference between the price of the two types of light bulbs and the price of electricity is as follows:
- energy saving light bulb 12000 sums + 67260 sums = 79260 sums;
- incandescent light bulb 57000 sums + 336300 sums = 393300 sums;
- cost difference 393300 sums - 79260 sums = 317040 sums.

From the above analysis, it can be seen that a dozen incandescent light bulbs bought for 9,000 sums cheaper are actually more expensive than energy-saving light bulbs. This means that an energy-saving light bulb saves both electricity and money. In addition, by saving electricity,

we will protect the environment from greenhouse gases and other harmful substances in the production of electricity. We can also use the energy saved for a longer period of time.

At the end of the textbook, students are given the following task. Observe the operation of the electricity meter when connecting one of the appliances in the house to the mains. Notice which one consumes the most energy. Talk to your parents about saving electricity. Write your suggestions in a notebook [2,5,9].

The student explains to the parents what he/she has observed in the lesson based on the material suggested by the teacher and on the assignment. Students are praised by their parents for mastering the knowledge imparted. This incentive will increase the student's interest in learning physics. The student acquires theoretical and practical knowledge through direct observation and application in practice.

Conclusion

From the above, it is clear that through such additional information, the complementarity of textbook material and teaching methods, as well as the coexistence with life, play an important role in improving the effectiveness of the lesson. In addition, the lesson will be lively and interesting, students will master the topic, and the acquired knowledge will be combined with practice. There are also interdisciplinary and interdisciplinary links in physics teaching.

Acknowledgement

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