CLIMATE BOX

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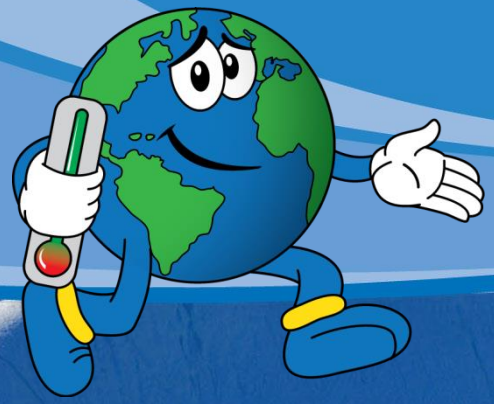
Module 2. Topic 2.3.2.
Tests and tasks for analyzing students' learning of the material in the section "Climate box" "Energy efficiency and energy saving"



UNDP
2020

ANALYSIS OF STUDENTS' KNOWLEDGE OF THEORETICAL MATERIAL IN THE "ENERGY SAVING" SECTION

Integrated test No. 1

1. Give some examples of how energy helps a person in life.
2. Why do different types of energy have different qualities?
3. What types of energy are of higher quality and why?
4. What is the meaning of the expression "energy loss"?
5. Is it possible to turn low-quality energy into high-quality energy?
6. What is the efficiency factor?
7. What is the difference between renewable and non-renewable energy sources?
8. Why are renewable sources called alternatives?
9. Why can the modern world economic system be called nature-destroying?
10. What is sustainable human development?

11. Is there a relation between energy consumption and the standard of living?
12. What energy sources can be used to regulate energy production over time?
13. What is the energy crisis?
14. What are the "greenhouse gases"?
15. What factors increase the greenhouse effect?
16. Name the energy sources that will reduce greenhouse gas emissions.
17. How can the use of local energy resources reduce greenhouse gas emissions?
18. What harm is caused to nature, in addition to emissions of harmful substances into the atmosphere, by energy facilities?
19. Give examples of useful energy use.
20. What does the term "energy saving" mean?
21. Why is it necessary to use energy more wisely?
22. How can we solve the problem of energy saving?
23. What can you do to improve energy efficiency?

ANALYSIS OF STUDENTS' KNOWLEDGE OF PRACTICAL MATERIAL IN THE "ENERGY SAVING" SECTION

Integrated test No. 2

1. Give examples of renewable and non-renewable energy sources. What energy sources are used in your region and why?
2. Which industry of our country consumes the most electricity? Heat?
3. In your opinion, what are the reasons for increased air pollution in some regions?
4. Is there a logical connection between "greenhouse effect" and "viral diseases"?
5. What types of environmental pollution by energy facilities prevail in your locality?
6. Why is energy saving not just a technical problem?
7. Why use triple glazing of windows?

8. Why is luminescent lamp better than incandescent lamp?
9. For what purpose do you use energy most often?
10. Think about your personal contribution in greenhouse gas emissions reduction .
11. How do you think energy saving in houses can save the atmosphere?
12. What can you do to reduce the heat loss in your apartment?
13. What are the advantages of independent heat supply system? When is it reasonable to use this system? Is it possible to install this system in your house?
14. Does it make sense to develop public transport?
15. Are locomotives and electric cars absolutely environmentally friendly means of transport?
16. What carbon dioxide emissions rate corresponds to your average monthly electricity consumption?
17. Is it possible to reduce energy consumption without reducing the comfort level? Do you need to change your habits?

ANALYSIS OF THE STUDENTS ' CREATIVE AND PRACTICAL ENERGY SAVING TASKS PERFORMANCE

| A comprehensive survey

1. Rate the practical energy-efficient tasks performance at school and at home:

Table 1

№	Practical tasks	Yes	No	Sometimes
1	Make a note of our energy consumption.			
2	When we leave it, we turn off the light in the room .			
3	The washing machine is always fully filled when we use it.			
4	The refrigerator is in a cool room.			
5	We don't put the furniture in front of heaters.			
6	We started using energy saving light lamps.			
7	We use local lighting.			
8	We aerate quickly and efficiently, just a few minutes.			

Table 1

№	Practical tasks	Yes	No	Sometimes
9	We insulate windows for the winter.			
10	We curtain a window for the night.			
11	We put the pot lid when we cook.			
12	We often defrost the refrigerator.			
13	We use the sink for washing dishes.			
14	We have a shower and don't take a bath.			
15	We walk or ride the bike to school or work.			
16	We lower the temperature in the room when we leave.			
17	We lower the temperature in the room at night.			
18	We reuse glass, paper and metal			
19	We don't buy products that can only be used once.			
20	We do not buy products in large wrappers.			
21	We fix things instead of changing.			

2. Complete the chart

Table 2

Action	Yes	No	Sometimes	I can change that
I turn off the water when I'm lathering up in the shower				
I close the water tap tightly so that no water drips from it.				
I don't turn off the water when I brush my teeth.				
I always use both sides of a paper sheet.				
I turn off the light when I leave the room.				
I turn off the heaters when I don't need them.				
I turn off the stove after finished cooking.				

3. Take the meter readings every evening, during the week, preferably at the same time.

Table 3

Meter reading		Electricity consumed per day (difference in meter readings), kw-hr
Monday kw-hr	Tuesday kw-hr	
Tuesday kw-hr	Wednesday kw-hr	
Wednesday kw-hr	Thursday kw-hr	
Thursday kw-hr	Friday kw-hr	
Friday kw-hr	Saturday kw-hr	
Saturday kw-hr	Sunday kw-hr	
Sunday kw-hr	Monday kw-hr	
Total electric energy consumption in a week		kw-hr
Cost of electricity		rubles
Your family financial electricity expenses for a week		rubles

4. Fill in the table the names of household electrical appliances(or devices), the value of their power, which is indicated in the technical passport, or on the device.

Calculate the average amount of energy consumed by each device for a month
(energy = power × average operate time per month):

Table 4

Household electrical devices	Power, kW	Energy consumption per month (average), kWh

5. Using the data in the table 4, calculate the amount of coal, oil, and gas that you need to burn to get the electricity consumed by your family per day, and the amount of carbon dioxide that will be released during this process:

Table 5

№	Name of the fuel type	Low heating value kWh \ kg or kWh\cu m (for gas)	Specific quantity of carbon dioxide cu m/ kg, or cu m / cu m (for gas)
1	Coal	8.1	1.7
2	Oil	12.8	1.5
3	Natural gas	11.4	1.2

Expended energy is counted according to the formula:

$$\text{Energy} = \text{power} \times \text{working hours}$$

For oil and coal:

$$(\text{Fuel mass}) = \frac{\text{energy}}{(\text{specific heat of combustion})};$$

$$(\text{Carbon dioxide volume}) = (\text{fuel mass}) \times \begin{pmatrix}\text{specific amount}\\ \text{of carbon dioxide}\end{pmatrix}$$

For natural gas:

$$(\text{Fuel volume}) = \frac{\text{energy}}{(\text{specific heat of combustion})};$$

$$(\text{Carbon dioxide volume}) = (\text{fuel volume}) \times \begin{pmatrix}\text{specific amount}\\ \text{of carbon dioxide}\end{pmatrix}$$

6. You have 5 light bulbs in a chandelier in a large room. What is more profitable for you in terms of energy savings: put 3 bulbs of 100 Watt or 5 bulbs of 60 Watt? Will the lighting change?

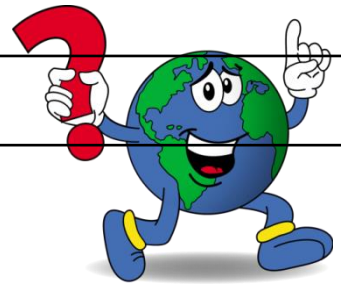
7. It is estimated that when the room temperature decreases from 24 to 20 degrees, 20% of energy is saved. Figure out how much energy you can save if the room is 6 degrees colder?

8. How much should it be colder in the room to save 15% of the heat energy?

9. If the tap is dripping with an intensity of 10 water drops per minute, then up to 2000 liters of water flows out per year. How many liters of water will flow during one day, one month?

ASSESSMENT OF STUDENTS ' LEARNING "ENERGY SAVING" MATERIALS

Students ' knowledge of theoretical material.	
Students ' knowledge of practical material.	
The quality of students' practical and creative tasks performance.	
More than 85 % of correct answers and solutions	Extremely high
From 60% to 84% of correct answers and solutions	Significant
From 45% to 59 % of correct answers and solutions	Low
From 31 % to 44 % of correct answers and solutions	Undefined (currently)
Less than 30 %	Extremely low



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THANKS FOR YOUR ATTENTION!

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