Science 9
Unit D: Electrical Principles and Technologies
Lesson 15
Practice Worksheet 49: Energy Forms and Changes

Use the link in the online course to open the Energy Forms and Changes simulation.

Experiment with the various options of:

- Energy sources (water tap, sun, tea kettle, bicycle)
- Generation (turbine, solar panel)
- Energy output (water heater, incandescent light bulb, compact fluorescent bulb)

Then, complete the following questions.

Question 1

Which **energy sources (input)** cause the turbine (wooden wheel) to spin and generate electrical energy?

Question 2

Which **energy sources (input)** cause the solar panels to generate electrical energy?

Question 3

Which **energy output** objects work with the turbine?

Question 4

Which **energy output** objects work with the solar panels?

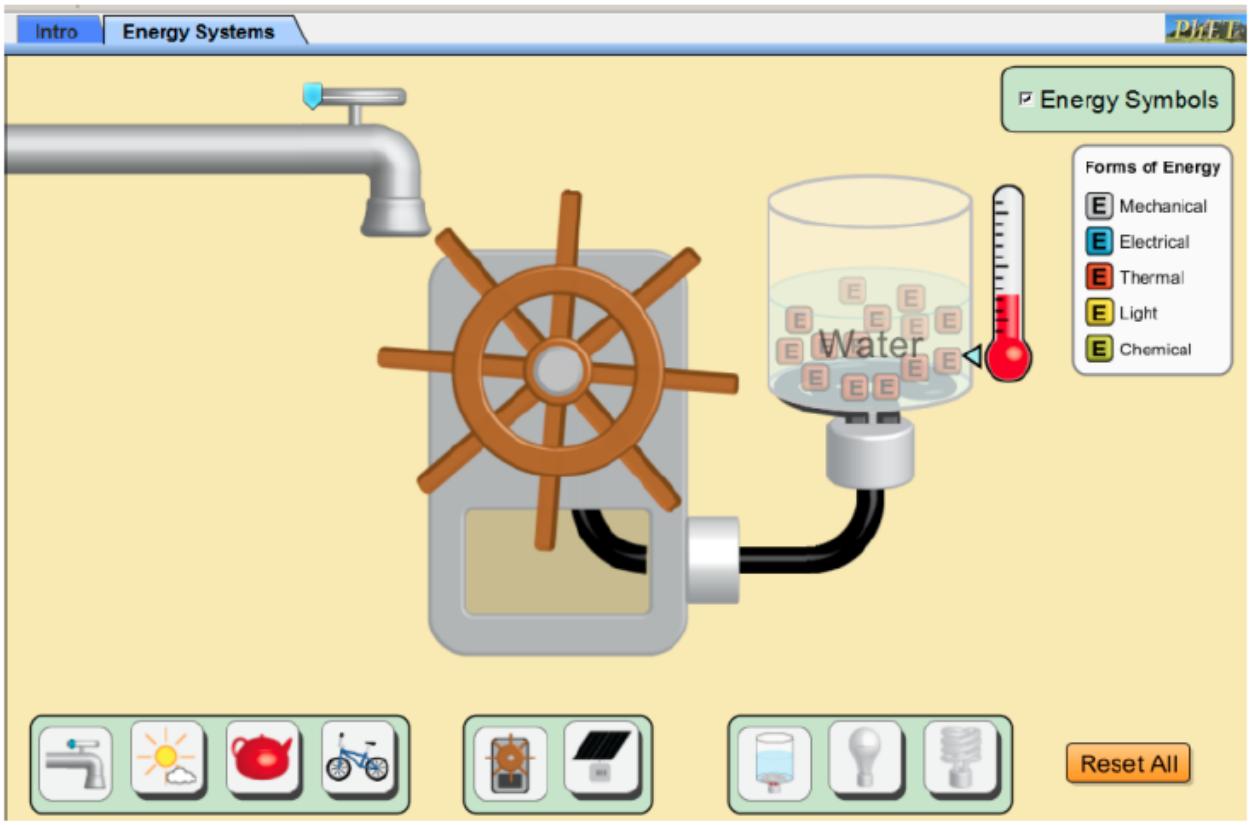
Question 5

On the simulation, test the situations listed in the table. Does the amount of electrical energy generated increase or decrease? Write your answer in the table.

Situation	**Effect on Amount of Electrical Energy Generated** **(Write increase or decrease)**
Water faucet on high	
Water faucet on low	
No clouds	
Many clouds	
Low heat on the kettle	
High heat on the kettle	
Girl pedals slowly	
Girl pedals quickly	

Question 6

Set up a system of a medium flow faucet moving a turbine connected to a water heater. The system should look like the picture below. Let it run for a while.



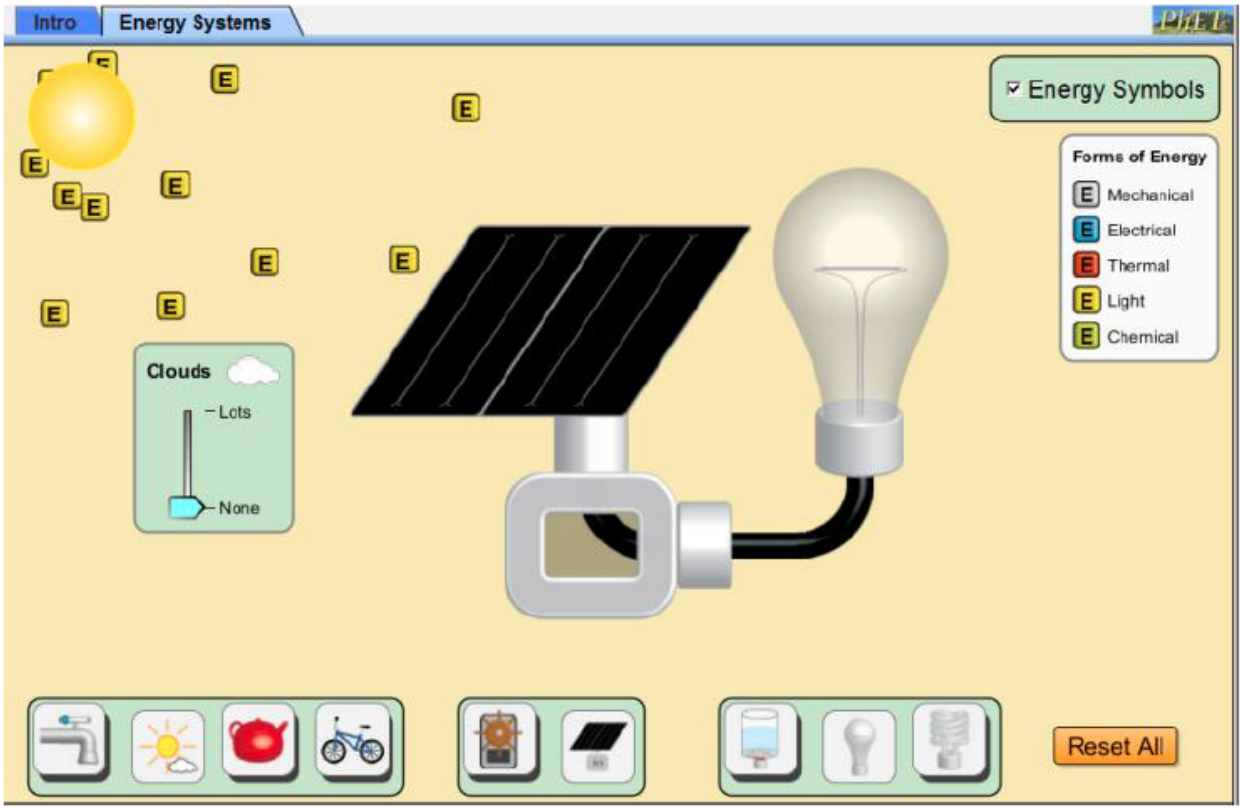
The table describes the order of energy transformations in the system. Complete the table with the correct type of energy at each step. Use the energy symbols in the simulation to help you see the flow of energy within each system.

Energy Transformations	Type of Energy
Energy from the moving water of the faucet that turns the turbine	
Energy of the spinning turbine	
Energy that the spinning turbine generates	
Energy that causes the temperature of the water to increase	

Energy that steam adds to the atmosphere	

Question 7

Set up a system of sunlight hitting a solar panel to power an incandescent light bulb. The system should look like the picture below. Let it run for a while.

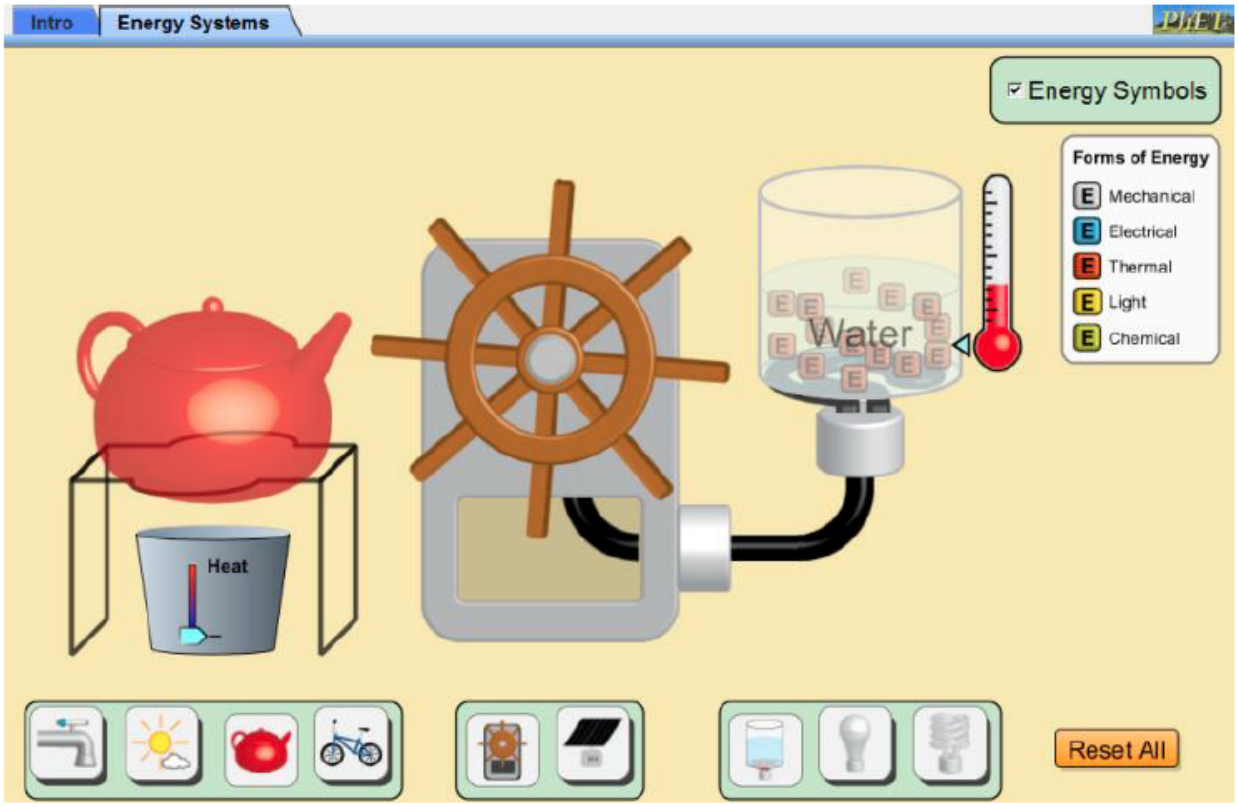


The table describes the order of energy transformations in the system. Complete the table with the correct type of energy at each step. Use the energy symbols in the simulation to help you see the flow of energy within each system.

Energy Transformations	**Type of Energy**
Energy from the sunlight	
Energy produced by the solar panel, that flows into the incandescent light bulb	
Two types of energy produced by the incandescent light bulb	

Question 8

Set up a system of steam moving a turbine connected to a water heater. The system should look like the picture below. Let it run for a while.



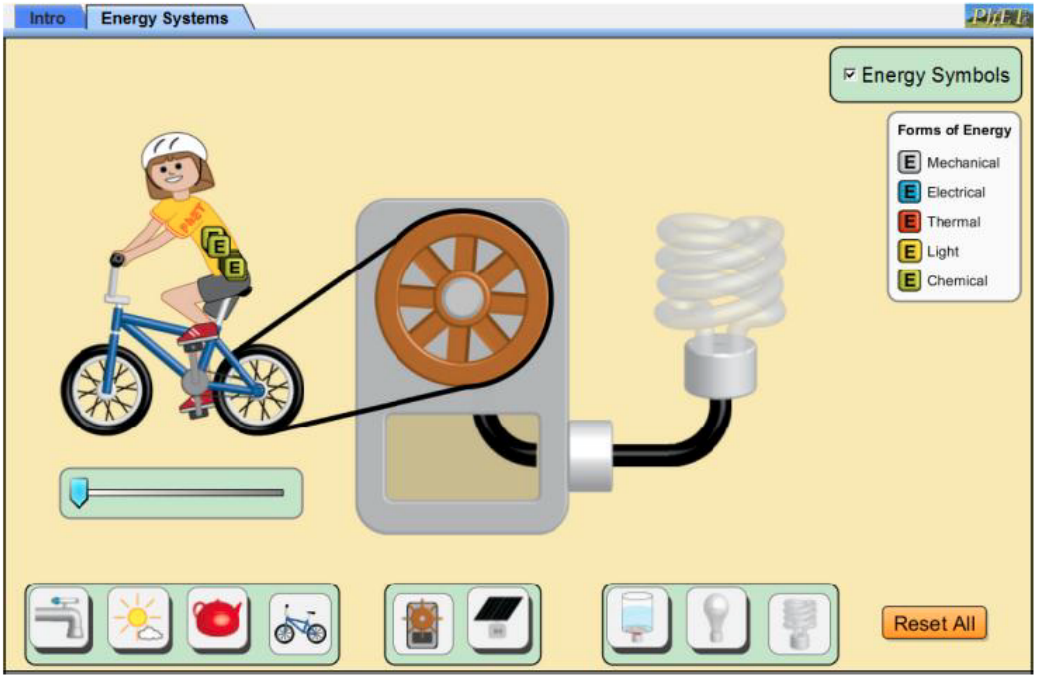
The table describes the order of energy transformations in the system. Complete the table with the correct type of energy at each step. Use the energy symbols in the simulation to help you see the flow of energy within each system.

Energy Transformations	Type of Energy
Energy transferred from the flames of the fire to the kettle, causing the liquid to become steam	
Energy of the moving steam that spins the turbine	

Energy generated by the turbine that increases the temperature of water, turning it into steam	
Energy of the steam that is transferred to the atmosphere	

Question 9

Set up a system of a cyclist pedalling at medium speed moving a turbine connected to a fluorescent light bulb. The system should look like the picture below. Let it run for a while.



The table describes the order of energy transformations in the system. Complete the table with the correct type of energy at each step. Use the energy symbols in the simulation to help you see the flow of energy within each system.

Energy Transformations	**Type of Energy**
Energy from the cyclist	
Energy from the cyclist is converted to a small amount of this type of energy in the atmosphere	
Energy from the cyclist is converted to a large amount of this type of energy in the	

bicycle wheel	
Energy from the turning bicycle wheel that spins the turbine	
Energy generated by the turbine	
Two types of energy produced by the fluorescent light bulb	

Question 10

Which bulb is more efficient: the incandescent bulb, or the fluorescent bulb? Why?

Congratulations! You have completed this practice worksheet.

Now it's time to carefully compare your answers to the suggested answers in the online course. When comparing, you should feel free to make changes to your answers or make extra notes.

Keep this practice worksheet for study purposes. Using practice worksheets as a study tool to review for exams is a great idea.

If you unsure about any of the questions or answers, or you just want more feedback, share this practice worksheet with your teacher and ask for assistance. You can do that by emailing the teacher, or by submitting it in the Course Questions Forum in the online course. If you are using this practice worksheet in Google Drive, don't forget to change the sharing settings so that anyone can view it before sending the link to your teacher.
