Strand:	Forces and Energy	**Sub-Strand:**	Energy

BASIC 9

WEEKLY LESSON PLAN – WEEK 9

Content Standard:	B9.4.1.1 Show understanding of the concept of conservation of energy and ways of conserving energy				
Indicator (s)	B9.4.1.1 .1 List the ways to conserve energy. Examples: ironing in bulk, using energy efficient appliances and switching off appliances when not in use. B9.4.1.1.2 Explain the importance of energy conservation in daily life.		**Performance Indicator:** Learners can apply strategies of conserving energy.		
Week Ending	**01-12-2023**				
Class	B.S.9	**Class Size:**		**Duration:**	
Subject	Science				
Reference	Science Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook				
Teaching / Learning Resources	Word chart, video, Poster, Pictures	**Core Competencies:**	• Creativity and Innovation (CI) • Communication and Collaboration (CC)		

DAY/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Assist Learners to explain the concept "Energy Conservation"	1. Learners brainstorm to explain "energy efficiency". 2. Assist Learners to identify energy conservation techniques. 3. Discuss with the Learners about the difference and relationship between energy conservation and energy efficiency. 4. Learners in small groups to discuss and report to the class on how to save energy at home. 5. Assist Learners to identify examples of energy efficient appliances they use at home. **Benefits of Energy Efficiency;** 1. Protect the environment Energy efficiency is a great way to reduce your carbon footprint. Homes were responsible for 19 percent of national greenhouse gas emissions in 2016, and implementing energy efficiency measures in your home can significantly reduce your emissions contribution. The typical household can reduce its energy use (and, by extension, its greenhouse gas emissions) by 25 to 30 percent by investing in more efficient energy consumption. 2. Significantly reduce your utility bills As a homeowner, energy costs can make up a significant portion of your recurring monthly expenses. With **energy-efficient appliances** and home upgrades, the U.S. Department of Energy	Learners brainstorm to explain 5 benefits of energy efficiency. **Exercise;** 1. What is Energy Efficiency ? 2. State energy conservation strategies .

estimates that you can save anywhere from five to 30 percent on your utility bills. Energy-efficient appliances consume less energy throughout their service lives without sacrificing quality and are an excellent way to save on energy expenditures.

#3. Earn a great return on your investment

Energy efficient purchases should not be viewed as an expense but as an investment with utility savings that add up over the product's service life. Savings can offset the initial price premium on energy-efficient options and offer a significant return compared to conventional, non-efficient alternatives. Furthermore, the return you pocket through savings will only increase over time as energy prices continue to rise in the United States.

4. Increase your property value

In the real estate market, energy-efficient homes frequently sell for a higher price than standard homes with comparable features. Every project that increases your home’s energy efficiency adds a fraction of its cost to the final selling price. In addition, private residences with green certifications have been proven to sell at a premium compared to similar homes in the area. With expectations of reduced utility bills and fewer repair bills, energy efficiency is an attractive feature in any home.

5. Enhance your quality of life

By optimizing your energy use, you can increase the comfort of living in your home and, in many cases, see notable health benefits. When you conduct energy-efficient measures, your home will be warmer, drier, and adequately ventilated, which lowers the risk of illnesses and mold growth. Energy efficiency also prevents the buildup of indoor pollutants, a significant concern in areas with high radon emissions. The financial benefits of energy-efficient buildings yield a benefit-cost ratio of over 4 to 1, and 75 percent of those benefits can be attributed to health advantages.

6. Energy savings tips help you easily cut costs

Energy expenses are often thought of as a fixed cost of owning a home or business, with reductions only possible through pricey renovations. However, you can easily reduce your utility bills through simple energy conservation behaviors or small energy-efficient purchases. Programmable thermostats, advanced power strips, and energy-efficient lighting can decrease your energy expenses with almost no effort on your part.

7. Earn incremental returns on energy efficiency investments

Energy efficiency measures, no matter how small, are capable of generating utility savings over their service lives. However, your

		savings are usually proportionate to the cost of the energy-efficient upgrade – replacing light bulbs will only cost a few dollars but will deliver marginal savings, while upgrading your attic insulation can save hundreds of dollars in heating and cooling bills. Upgrades can range from simply plugging in a smart power strip to an HVAC system overhaul. How little or how much you choose to invest in energy efficiency is entirely up to you.	
THURSDAY	Review Learners knowledge on the previous lesson.	1. Discuss with the Learners on the laws of energy conservation. 2. Show Learners pictures and videos displaying examples of how the law of energy conservation is applied in everyday life. 3. Learners brainstorm to explain the importance of energy conservation. **Law of Conservation of Energy** Energy is required for the evolution of life forms on earth. In physics, it is defined as the capacity to do work. We know that energy exists in different forms in nature. You have learned about various forms of energy – heat, electrical, chemical, nuclear, etc. In this article, we will learn about the laws and principles that govern energy. This law is known as the law of conservation of energy **Daily life examples of Conservation of energy:** 1) Human metabolism, the food we take gives us energy which we use to move, work, exercise, play. 2) When a moving car hits another car which is parked to make it move, energy of the moving car is transferred from the moving car to the parked car. 3) Water is used to produce electricity. Water falls from the sky, converting potential energy to kinetic energy. This energy is then used to rotate the turbine of a generator to produce electricity. In this process, the potential energy of water in a dam can be turned into kinetic energy which can then become electric energy. So, one form of energy is converting into another form and this process continues. 4) When kicking a football which is resting on the ground, energy is transferred from the player's body (leg) to the resting football, setting it in motion. 5) When we play piano, our fingers hitting piano keys transfer energy from our hands to the piano keys.	Reflect on the importance of energy conservation. **Exercise;** 1. State the law of energy conservation. 2. Write 3 importance of energy conservation.

FRIDAY	Through questions and answers, introduce the lesson. Ask questions like; i. Is Energy conservation a necessity? ii. What happens if we don't conserve energy. iii. How does energy conservation help the environment.	1. Discuss with the Learners about the meaning of "renewable energy". 2. Assist Learners to differentiate between renewable and nonrenewable energy. 3. Learners brainstorm to identify examples of renewable energy. 4. Explain to the Learners why using renewable energy is not directly considered as energy conservation. Renewable energy sources; Solar energy Wind energy Hydro energy Tidal energy Geothermal energy Biomass energy How these types of renewable energy work 1) Solar energy  Sunlight is one of our planet's most abundant and freely available energy resources. The amount of solar energy that reaches the earth's surface in one hour is more than the planet's total energy requirements for a whole year. Although it sounds like a perfect renewable energy source, the amount of solar energy we can use varies according to the time of day and the season of the year as well as geographical location. In the UK, solar energy is an increasingly popular way to supplement your energy usage. Find out if it's right for you by reading our **guide to solar power**. 2) Wind energy	Learners in small groups to discuss and present to the class on how the various types of works. **Exercise;** 1. What is renewable energy? 2. State 4 sources of renewable energy.

Wind is a plentiful source of clean energy. Wind farms are an increasingly familiar sight in the UK with wind power making an ever-increasing contribution to the National Grid. To harness electricity from wind energy, turbines are used to drive generators which then feed electricity into the National Grid. Although domestic or ‘off-grid’ generation systems are available, not every property is suitable for a domestic wind turbine. Find out more about wind energy on our wind power page.

3) Hydro energy

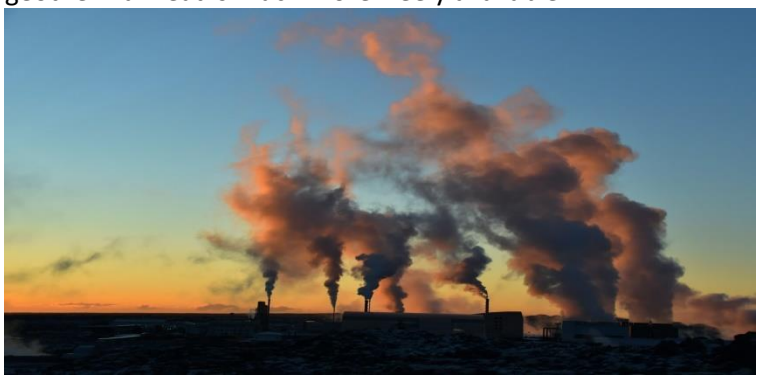
As a renewable energy resource, hydro power is one of the most commercially developed. By building a dam or barrier, a large reservoir can be used to create a controlled flow of water that will drive a turbine, generating electricity. This energy source can often be more reliable than solar or wind power (especially if it's tidal rather than river) and also allows electricity to be stored for use when demand reaches a peak. Like wind energy, in certain situations hydro can be more viable as a commercial energy source (dependant on type and compared to other sources of energy) but depending very much on the type of property, it can be used for domestic, ‘off-grid’ generation. Find out more by visiting our hydro power page.

4) Tidal energy

This is another form of hydro energy that uses twice-daily tidal currents to drive turbine generators. Although tidal flow unlike some other hydro energy sources isn't constant, it is highly predictable and can therefore compensate for the periods when the tide current is low. Find out more by visiting our marine energy page.

5) Geothermal energy

By harnessing the natural heat below the earth's surface, geothermal energy can be used to heat homes directly or to generate electricity. Although it harnesses a power directly below our feet, geothermal energy is of negligible importance in the UK compared to countries such as Iceland, where geothermal heat is much more freely available.



Name of Teacher: **School:** **District:**