GRADE 10 PHYSICS LESSON PLANS TERM 2 - SPOTLIGHT
WEEK 1: LESSON 1

SCHOOL	LEVEL	LEARNING AREA	DATE	TIME	ROLL
	GRADE 10	PHYSICS			

Strand: Mechanics and Thermal Physics
Sub Strand: Energy, Work, Power and Machines - Definition and Calculating Work
Specific Learning Outcomes:
By the end of the lesson, students should be able to:
- Define work as the product of force and displacement.
- State the SI unit of work as joule.
- Differentiate between work done and no work done.
- Calculate work done in lifting and pushing objects.

Key Inquiry Question(s):
- When do we say work is done in Physics?

Learning Resources:
- Spotlight Physics Learner's Book pg. 105
- Spring balance
- Metre rule
- Stopwatch

Organisation of Learning:
Introduction (5 minutes)
- Review the previous lesson on energy and its forms.
- Guide learners to read page 105 in the Spotlight Physics Learner's Book and discuss in pairs the definition of work, emphasizing the key concepts of force and displacement.

Lesson Development (35 minutes)
Step 1: Define Work
- Introduce the formula for work: Work (W) = Force (F) × Displacement (d).
- Discuss the SI unit of work (joule) and relate it to practical examples.
- Engage students by asking: "If you push an object but it does not move, is work done? Why or why not?"

Step 2: Understand Work Done vs. No Work Done
- Differentiate between scenarios where work is done (e.g., lifting an object) and where no work is done (e.g., carrying an object at a constant height).
- Use real-life examples, such as pushing a grocery cart across the floor, to illustrate when work is done.

Step 3: Calculating Work Done in Lifting an Object
- Demonstrate how to calculate work done when lifting an object using the spring balance to measure force (weight of the object).
- Example Calculation: If a student lifts a 10 kg object, calculate the work done. (Use $W = F \times d$, where $F = mg$ and d = height lifted.)

Step 4: Calculating Work Done in Pushing an Object
- Present a scenario where a student pushes an object along a surface. Measure the applied force with the spring balance and the distance moved using the metre rule.
- Example Calculation: If a 5 kg box is pushed with a force of 20 N over a distance of 3 m, calculate the work done.

Conclusion (5 minutes)
- Summarize key points: definition of work, SI unit, work done vs. no work done, and practice calculations.
- Conduct a brief interactive activity: Have students discuss in pairs a scenario where they think work is done and one where it is not, and share with the class.
- Preview the next session: "Next class, we will explore energy transformations."

Extended Activities:
1. Experiments: Encourage students to conduct a simple experiment at home or in the lab that involves lifting or pushing objects, measuring the force and distance, and calculating the work done.
2. Research Project: Assign students to research different types of machines that use work and how they make tasks easier, e.g., levers, pulleys, etc., and present their findings.
3. Real-Life Applications: Have students create a poster that illustrates various everyday activities where work is performed, labeling forces and displacements involved.

Teacher Self-Evaluation:

WEEK 1: LESSON 2
Strand: Mechanics and Thermal Physics

SCHOOL	LEVEL	LEARNING AREA	DATE	TIME	ROLL
	GRADE 10	PHYSICS			

Sub Strand: Energy, Work, Power and Machines - Energy and its Forms

Specific Learning Outcomes:
By the end of the lesson, the learner should be able to:
- Define energy as the ability to do work.
- Identify different forms of energy.
- Connect energy forms to household appliances like heaters, bulbs, and motors.

Key Inquiry Question:
- What enables us to do work?

Learning Resources:
- Spotlight Physics Learner's Book, pg. 108
- Various objects (e.g., toy cars, light bulbs, batteries)
- Pictures of energy sources (solar panels, wind turbines)
- Digital resources (videos and interactive simulations)

Organisation of Learning:

Introduction (5 minutes)
- Begin with a brief review of the previous lesson on work and force.
- Ask students to share what they remember about work and its relationship with energy.
- Guide learners to read and discuss relevant content from the learning resources, highlighting key concepts about energy.

Lesson Development (35 minutes)
- Step 1: Definition of Energy
- Engage the class by asking, "What is energy?"
- Introduce the definition of energy as "the ability to do work."
- Use examples from everyday life (e.g., lifting objects, running) to illustrate this concept.

- Step 2: Identifying Forms of Energy
- Discuss different forms of energy, such as kinetic, potential, thermal, chemical, and electrical energy.
- Show pictures of various energy sources (solar, wind, fossil fuels) and ask students to identify which form of energy each represents.

- Step 3: Energy in Action
- Use various objects to demonstrate energy in action. For instance, push a toy car (kinetic energy) and lift a textbook (potential energy) to illustrate the concepts.
- Encourage student participation by asking them to identify the type of energy being used in each demonstration.

- **Step 4:** Connecting Energy Forms to Household Appliances
- Have students brainstorm common household appliances (like heaters, bulbs, and motors) and categorize them based on the form of energy they use.

- Discuss how these appliances convert energy from one form to another (e.g., electrical energy to thermal energy in a heater).

Conclusion (5 minutes)
- Summarize the key points discussed in the lesson: the definition of energy, different forms of energy, and real-life applications.
- Conduct a brief interactive activity, such as a "Think-Pair-Share," where students share one household item and the form of energy it utilizes.
- Preview the next session by introducing concepts related to energy conservation and efficiency, asking students to consider ways they can save energy at home.

Extended Activities:
- Research Project: Have students research a specific form of energy (e.g., renewable energy sources like wind or solar) and prepare a short presentation for the class.
- Build a Simple Machine: Students can create a simple machine (like a lever or pulley) and demonstrate how it uses energy to perform work.
- Energy Audit: Instruct students to conduct a mini energy audit of their home, identifying energy sources and consumption in different appliances.

Teacher Self-Evaluation:

WEEK 1: LESSON 3

SCHOOL	LEVEL	LEARNING AREA	DATE	TIME	ROLL
	GRADE 10	PHYSICS			

Strand: Mechanics and Thermal Physics
Sub Strand: Energy, Work, Power and Machines - Definition/calculation of power, Kinetic energy
Specific Learning Outcomes:
By the end of the lesson, learners should be able to:
- Define power as the rate of doing work.
- Calculate power using the formulas $P = W/t$ and $P = F \times v$.
- Compare power ratings of different electrical appliances.

Key Inquiry Questions:
- Why do some appliances consume more electricity than others?

Learning Resources:
- Spotlight Physics Learner's Book pg. 108
- Stopwatch
- Spring balance
- Known masses

Organisation of Learning:
Introduction (5 minutes)
- Begin by reviewing the previous lesson on energy and work.
- Encourage learners to read the relevant section from the Spotlight Physics Learner's Book.
- Highlight the definition of power and its importance in everyday life.

Lesson Development (35 minutes)
Step 1: Define Power
- Define power as the rate at which work is done.
- Discuss how power can be calculated using the formula $P = W/t$ (Power = Work done / Time taken).
- Provide examples, such as lifting a book versus lifting a heavy box, to illustrate varying power requirements.

Step 2: Relate Force, Velocity, and Power
- Introduce the formula $P = F \times v$ (Power = Force × velocity).
- Conduct a demonstration using a spring balance and known masses to measure force.
- Ask students to calculate the power required to lift these masses at different speeds (using the stopwatch to measure time).

Step 3: Calculate Power
- Give students practice problems that require them to calculate power using both formulas.
- Encourage collaborative work by pairing them up to solve problems together.

Step 4: Compare Power Ratings
- Discuss various electrical appliances (e.g., a refrigerator, a microwave) and their power ratings.
- Ask students to research and present their findings on why some appliances require more power compared to others.

Conclusion (5 minutes)
- Summarize key points: the definition of power, how to calculate it, and why power ratings differ among appliances.
- Conduct a brief interactive quiz or activity to reinforce the main concepts.
- Introduce the next session's topic with questions like, “What happens to power when we change the speed of work being done?”