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| **Learning Planner** |
| **Subject** | *General science* | **Week** | *15* | **Duration** | *180 mins* | **Form** |  *SHS 1* |
| **Strand** | VIGOUR BEHIND LIFE | **Sub-Strand** | Powering the future with energy forms. |
| **Content Standard** | Demonstrate understanding of forms of energy, sources, their generation and effects on the environment. |
| **Learning Outcome(s)** | Relate forms of energy to their sources and their generation |
| **Learning****Indicator(s)** | Design and build Solar panel using locally available materials. |
| **Essential Question(s)**  | Are there advantages of solar energy to life in Ghana?How is the implementation of solar energy/panel initiatives impacting the country’s economic growth and sustainability?What materials will be needed to demonstrate to learners powering the future with energy forms. |
| **Pedagogical Strategies** | * Collaborative learning
* Talk-for-learning approaches
* Demonstration
* Think-pair share
* Project-based approach
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| ***Teaching & Learning Resources*** | * Prototypes of solar panels
* Charts, pictures, and simulations of various forms of electricity generation.
* Internet resources such as (https://www.youtube.com/watch?v=9BgDt407uQc; https://www.youtube.com/watch?v=lxoHqV2fMK4)
* Different appropriate materials from the environment.
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| ***Key Notes on Differentiation*** |
| 1. *Learning Tasks:*
* *Compile a list of at least three economic benefits related with the adoption of solar energy in Ghana.*
* *Analyse how the implementation of solar energy initiatives impacts the country's economic growth and sustainability.*
* *Disadvantages of solar energy, etc.*
1. *Pedagogical Exemplars*
* *Put the learners into small groups and assign each group a specific advantage of solar energy to the economy of Ghana, such as increased energy access or reduced reliance on fossil fuel imports. Have each group research and discuss their assigned advantage, then present their findings to the class. This activity encourages collaboration, critical thinking, and in-depth exploration of the economic benefits of solar energy*
* *Engage learners in mixed ability groups to focus on different disadvantage like high initial costs or intermittent sunlight exposure. Have learners become experts on their assigned topic, then reshuffle the groups so that each new group has an expert from every initial expert group. This way, students can share their knowledge and insights on the disadvantages of solar energy before presenting a comprehensive overview to the class*
* *Provide case studies showcasing successful implementation of solar energy projects in Ghana, highlighting the economic benefits experienced by communities and businesses. Assign different case studies to individual learners or small groups based on their interests or learning styles. Students can analyse the economic impact, challenges faced, and lessons learned from each case study. This differentiated approach allows students to engage with real-world examples at their own pace and depth, catering to their diverse learning preferences, etc.*
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| **Keywords** | Connect, voltage, encapsulate, design, Solar panel/cell, precautions, output, overlapping, etc. |
| **Lesson 1****Identification and Explanation of Concepts Associated with Forces** |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** |
| ***Teacher Activity***  | ***Learner Activity*** |
| **Starter *Activity (10 minutes)*** ***Ask learners to sing the National Anthem*** |
| ***Introductory Activity (15minutes)***1. *Put learners into mixed gender and mixed ability groups*
2. *Discuss the project senerio and the expectation with the learners.*

***Project Senerio******The Government of Ghana, in her quest to provide sustainable and clean energy to her citizen, has awareded a contract to intall solar panel at Abura Community. What advantages will this project have on the people of Abura?******Activity 1 (40 minutes)***In their mixed-gender and mixed ability groups, ask learners to search the internet and note down the advantages of solar energy to the people of Abura and the Ghana as a whole.***Activity 2 (40 minutes)****Ask each group to present their findings* | ***Introductory Activity****I. Learners seated in their mixed-gender and mixed ability groups.**II. Learners note the project senerio and what is expected of them.****Activity 1***1. Learners search the internet and note down the advantages of solar energy to the people of Abura and the Ghana as a whole.

***Activity 2***Learners present their findings to the class |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** |
| Level 3: Investigate and describe the environmental benefits of utilising solar energy as a renewable alternative in Ghana |
| **Lesson Closure** ***In completing this part, refer to the Essential Questions to check that learning has taken place.*** |
| ***Activity (15 minutes)*** *Using Pass-that-question, ask learners to write any question on the lesson.**Summarize the lesson highlighting the salient points.*  |
| **Reflection & Remarks** |
| *Reflection**Remarks* |
| **Lesson 2****Identification and Explanation of Concepts Associated with Forces** |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** |
| ***Teacher Activity***  | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  *Ask learners to reciete the National pledge* |
| ***Introductory activity (25 minutes)****I.Put learners into mixed gender and mixed ability groups* *II.Discuss the project senerio and the expectation with the learners****Project Senerio******The Government of Ghana, in her quest to provide sustainable and clean energy to her citizen, has awareded a contract to intall solar panel at Abura Community. What disadvantages will this project have on the people of Abura?*** ***Activity 1 (40 minutes)***I.In their mixed-gender and mixed ability groups, ask learners to search the internet and note down the advantages of solar energy to the people of Abura and the Ghana as a whole.***Activity 2 (40 minutes)****Ask each group to present their findings* | ***Introductory activity (25 minutes)****I. Learners seated in their mixed-gender and mixed ability groups.**II. Learners note the project senerio and what is expected of them.****Activity 1***1. Learners search the internet and note down the advantages of solar energy to the people of Abura and the Ghana as a whole.

***Activity 2***Learners present their findings to the class |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** |
| Level 3: Investigate and describe the challenges of utilising solar energy as a renewable alternative in Ghana. |
| **Lesson Closure** ***In completing this part, refer to the Essential Questions to check that learning has taken place.***  |
| ***Activity (15 minutes)*** *Using Pass-that-question, ask learners to write any question on the lesson.**Summarize the lesson highlighting the salient points.* |
| **Reflection & Remarks** |
| *Reflections**Remarks* |