# Week 7

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| **Learning Planner** | | | | | | | |
| **Subject** | Physics | **Week** | 7 | **Duration** | 240 minutes | **Form** | 1 |
| **Strand** | Mechanics and Matter | **Sub-Strand** | Dynamics | | | | |
| **Content Standard** | Demonstrate knowledge and understanding of pressure. | | | | | | |
| **Learning Outcome(s)** | Recognize pressure as an agent of force. | | | | | | |
| **Learning**  **Indicator(s)** | 1. Explain how pressure changes with depth in a fluid. 2. Explain the operation of brake systems in vehicles and the operation of the hydraulic press. 3. State Pascal's principle**.** | | | | | | |
| **Essential Question(s)** | 1.What practical examples can be used to demonstrate that pressure in liquids increases with depth?  2. What are the factors (quantities) that affect the pressure of liquids in a vessel? How are these quantities related to pressure?  3.How does the Pascal’s principle serve as the fundamental concept behind the operation of the hydraulic systems in various applications? | | | | | | |
| **Pedagogical Strategies** | Talk for learning, Experiential learning | | | | | | |
| **Teaching & Learning Resources** | Audio-visuals, Internet, Projectors, Virtual lab | | | | | | |
| **Key Notes on Differentiation** | | | | | | | |
| **Learning Tasks**  **Lesson 1:**  **1.** Define pressure.  **2.** Explain factors that cause pressure to vary with depth.  **3.** Demonstrate how pressure varies with depth.  **4.** Derive the equation from P=F/A.  **Lesson 2:**  1.State Pascal’s principle.  **2.** Describe an experiment that explains Pascal’s principle.  **3.** State applications of Pascal principle.  **Pedagogical Exemplars**  **Lesson 1.**  **a).** You can start lesson by showing the class a video illustrating the concept of how the force exerted by a body on a surface result in creating pressure. In their mixed ability groupings, task learners to discuss their observation(s) to answer the following questions from the second demonstration;  b). Provide learners with containers with holes at various heights and guide them to fill them with water to the brim and observe the outcome. Guide them to use their outcome to explain why pressure in liquids increase with depth.  c). Lead the class in a whole – class discussion to solve problems on pressure using the relation P = F/A.  **Lesson 2:**  a). Using a projector, show the class a video of how the brake system of vehicles work, and in groups, task the learners to discuss how the brake system of a car works.    b). Show the class a video of how the hydraulic press works. Let the learners search and discuss the various applications of the hydraulic press system.  **Key Assessment**  **Level 1:** State Pascal’s principle.  **Level 1:** State at some applications of Pascal’s principle in industry.  **Level 2:** Describe an experiment that demonstrates Pascal’s principle.  **Level 3:** How does the concept of fluid pressure relate to the operation of both brake systems in vehicles and hydraulic presses? | | | | | | | |
| **Keywords** | Pressure, brake systems, hydraulic press, Pascal's principle. | | | | | | |

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| **Lesson 1: PRESSURE IN A FLUID** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***  Start lesson by showing the class a video illustrating the concept of how the force exerted by a body on a surface result in creating pressure. | |
| ***Introductory Activity (25minutes)***  I. In their mixed ability groupings, task learners to discuss their observation(s) to answer the following questions from the second demonstration;  **a**. what is/are the effect(s) of the flat soled and pointed soled shoe on the surface?  **b**. what is the relationship between the force applied on a surface, the area of the surface and the pressure created?  II. Based on the outcome of their responses, guide the learners to define pressure and state its SI units.  III. Lead the class in a whole – class discussion to solve problems on pressure using the relation P = F/A.  ***Activity 1 (30 minutes)***  I. Still in their groups, provide learners with containers with holes at various height and guide them to fill them with water to the brim and observe the outcome.  II. From their observations, task each group to answer the following questions:  a. describe the length of flow of water from each of the three spots? b. why does the length of flow of water vary from height to height?  c. assuming that a different liquid such as alcohol is used, will the observation at each spot(height) be the same or vary?  III. Guide the learners to state the factors that affect pressure in fluids and establish the hydrostatic pressure equation: *P = gh.*  ***Activity 2 (40 minutes)***  I. Show the class a video that demonstrates Pascal’s principle.  II. In groups, task the learners to describe their observation and answer the following questions:  *a. how will you describe the flow of the water through the holes?*  *b. from your answer in (a), account for the difference in observation in the first experiment and this*  III. Guide the class to state pascal’s principle.  IV. Provide each group with a cartesian diver to demonstrate Pascal’s principle. | ***Introductory Activity (15minutes)***  I.In your groups, discuss your observation(s) to answer the questions from the second demonstration.  II. Define pressure and state its SI unit.  III. Solve problems using the relation P = F/A  ***Activity 1***  I. From the observations of your experiment, answer the following questions:  a. describe the length of flow of water from each of the three spots? b. why does the length of flow of water vary from height to height?  c. assuming that a different liquid such as alcohol is used, will the observation at each spot(height) be the same or vary?  II. State the factors that affect pressure in fluids and establish the hydrostatic pressure equation: *P = gh.*  ***Activity 2***  I. Carefully watch the video on Pascal’s principle.  II. In your groups, answers the given questions from your observations.  III. State Pascal’s principle  IV. Using the materials provided, demonstrate Pascal’s principle. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  *Discuss three ways of applying the Pascal’s principle in everyday life* | |
| **Lesson Closure** | |
| ***Activity (15 minutes)***   1. *End lesson by summarizing main points of the lesson* 2. *Students asks questions to clarify as misunderstanding and consolidate what is learnt* 3. *Give learners assignment* | |
| **Reflection & Remarks** | |
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| **Lesson 2: THE BRAKE SYSTEM AND HYDDRAULIC PRESS** | |
| **Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual** | |
| ***Teacher Activity*** | ***Learner Activity*** |
| **Starter *Activity (10 minutes)***    Begin the lesson by reviewing the concept of Pascal’s principle using question and answer technique. | |
| ***Introductory activity (25 minutes)***  I. Using a projector show the class a video of how the brake system of vehicles work.  II. In their mixed ability groups, task the learners to discuss how the brake system of a car works.  ***Activity 1 (25 minutes)***  I. Using their tablets, guide the learners to search and discuss the components and uses of the brake system.II. Guide the learners using the thought shower technique, to discuss and share the results of their search.  ***Activity 2 (25 minutes)***  I. Using a projector show the class a video of how the hydraulic press works.  II. In their mixed ability groups, task the learners to discuss how the hydraulic press works.  ***Activity 3 (25 minutes)***  I. Using their tablets, guide the learners to search and discuss the various applications of the hydraulic press system.II. Guide the learners using the thought shower technique, to discuss and share the results of their search. | ***Introductory activity (25 minutes)***  I. Watch the video of how the brake system of vehicles work.  II. In your groups, discuss how the brake system of a car works.  ***Activity 1***  I. Using your tablets, search and discuss the components and uses of the brake system.  II. Participate in the discussion and share the results of your search with the class.    ***Activity 2 (25 minutes)***  I. Watch the video of how the brake system of vehicles work.  II. In your groups, discuss how the brake system of a car works.  ***Activity 3 (25 minutes)***  I. Using your tablets, search and discuss the various applications of the hydraulic press system.  II. Participate in the discussion and share the results of your search with the class. |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** | |
| ***Level 3***  Explain one use of hydraulics in an industry of your choice. | |
| **Lesson Closure** | |
| ***Activity (15 minutes)***   1. *End lesson by summarizing main points of the lesson* 2. *Students asks questions to clarify as misunderstanding and consolidate what is learnt* 3. *Give learners assignment* | |
| **Reflection & Remarks** | |
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