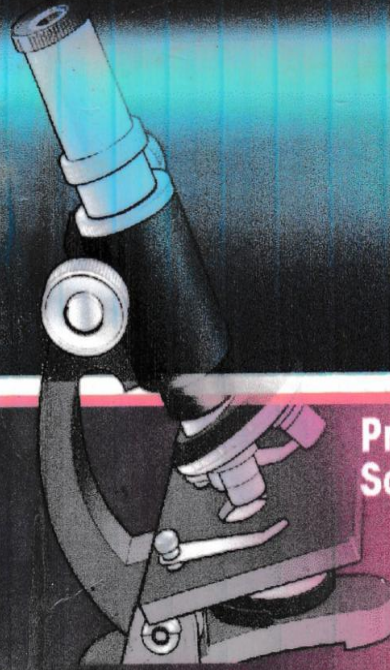


# SCIENCE TEACHERS ASSOCIATION OF NIGERIA (STAN)

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# Enhancing The Teaching And Learning Of Simple Machines In Primary Science Curriculum Using Daily Experiences

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## Introduction

The goals of primary education include laying a solid foundation for scientific and reflective thinking and arousing natural curiosity in pupils through practical, exploratory and experimental approaches (FME, 2004). According to Njoku (2007), the learner at this level is active and learns through experiences, observations and activities in his/her social and physical environment. Researchers advocate the linking of teaching/learning to everyday life activities to make abstract concepts real and meaningful to learners. (NTI 2005, Jwakdak & Bukar 2005; Udo, 2006). The current 9year Basic Education Curriculum lays emphasis on practical, concrete, hands-on experiences and ICT for productive life skills from the foundation level.

Researchers report of pupils poor performance, lack of interest and negative attitude towards primary

school science. (Jwakdak & Bukar 2005, Udoh 2006). Ogunniyi (1982) opines that the failure of some primary science programmes are largely due to the teaching methods used by the teachers. For effective teaching and learning of STM at primary level, the use of experimentation and demonstration methods have been considered appropriate. (Eyetsemitan 2002).

One of the science concepts teachers find difficult to teach at primary level is simple machine. A practical approach to the teaching and learning of simple machines requires the use of relevant science equipment, real objects and everyday life experiences. Daily activities like sweeping, grass cutting, digging and raking involve use of simple machines. The question is what are simple machines?

Machines are devices which transform energy to work. A simple machine is an object or device that makes work easier and convenient. This is done by increasing the force applied or changing the direction of force or increasing the speed.

## Classes Of Simple Machines

Simple machines are classified based on their functions. They include levers, inclined plane, pulleys, screws, heel and axle, are wedge.

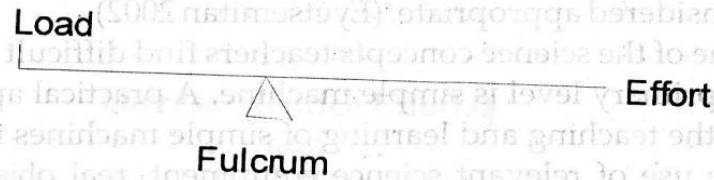
**LEVERS:** - These are the oldest and most commonly used simple machines. Levers consist of 3 parts namely fulcrum or pivot, load and effort. The fulcrum is the point on which the lever turns or rocks forward and backward; the load is the object (resistance) to be moved while the effort is the force applied to move the load.

Levers are classified into three categories based on the position of the fulcrum with respect to the load and

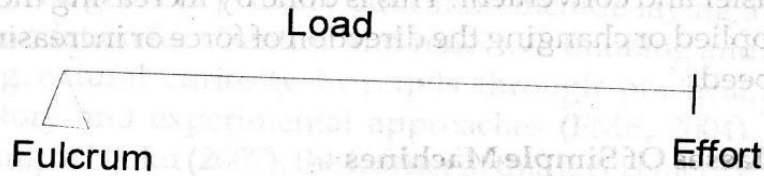


effort. These are first class, second class and third class levers.

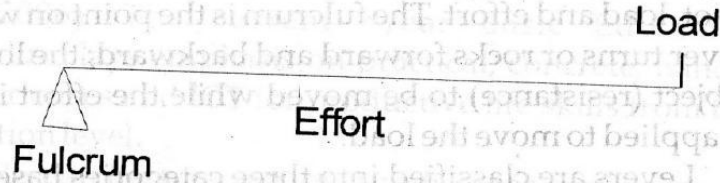
(a) **First Class Levers-** In the first class levers, the fulcrum lies between effort and the load e.g. pliers, and seesaw.



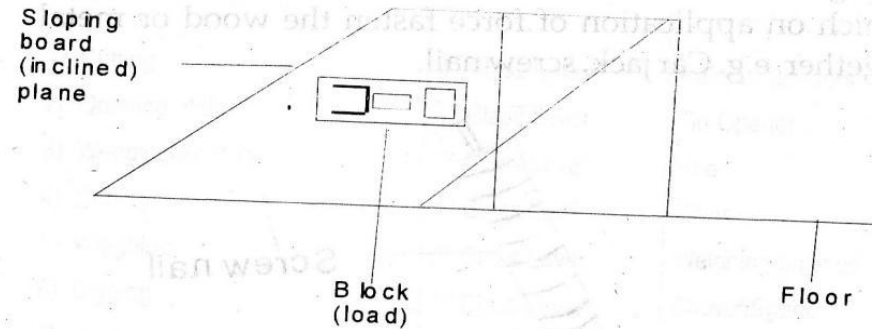
(b) **Second Class Lever:-** In second levers, the fulcrum lies at one end of the lever with the load in the middle and the effort at the other end of the lever. e.g. wheel barrow and bottle opener.



(c) **Third class lever:-** In third class levers, the effort is located between the fulcrum and the load e.g. broom.

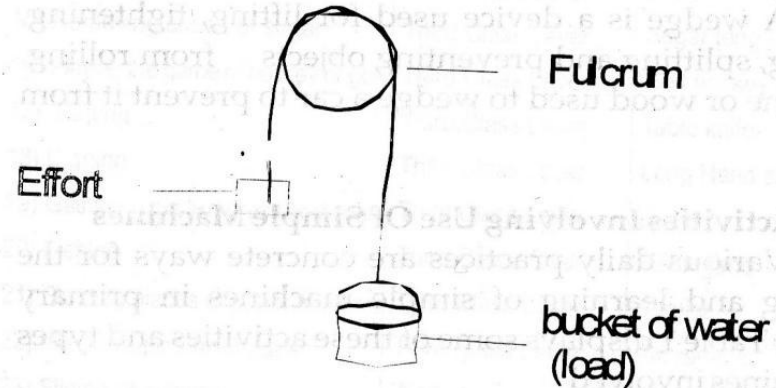


**Incline Planes:** - This is a plank or ramp leaned against something which slopes at one end. It is used to move objects to a higher or lower plane. It is usually used to carry heavy loads into a vehicle.



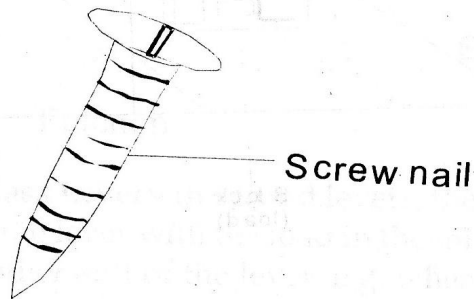
### Pulleys

Pulleys are simple machines with a groove around the rim and a rope fitted to the wheel. A pulley can be movable or fixed. A fixed pulley has the rope attached to a stationary object and is capable of changing the direction of force to make work convenient. e.g. raising a flag on a flagpole and drawing water from a well.



## Screws

Screw is a thin metal like a nail with threads or spiral line on it which can be pressed into wood or metal using screw driver. Screws work like inclined planes which on application of force fasten the wood or metal together. e.g. Car jack, screw nail.



## Wheel And Axle

Wheel and axle this is a simple machine with a circular wheel that turns round a post called axle e.g. door knob.

## A Wedge

A wedge is a device used for lifting, tightening, pushing, splitting and preventing objects from rolling. E.g. stone or wood used to wedge a car to prevent it from rolling.

## Daily Activities Involving Use Of Simple Machines

Various daily practices are concrete ways for the teaching and learning of simple machines in primary science. Table 1 displays some of these activities and types of machines involved

**Table 1: Daily Activities and Simple Machines.**

Daily Activities	Simple Machine involved	Types of Machine
1) Cutting	1 <sup>st</sup> Class Lever	Pairs of Scissors
2) Opening of tin	1 <sup>st</sup> Class Lever	Tin Opener
3) Weeding/Sowing	1 <sup>st</sup> Class Lever	Hoe
4) Cutting	1 <sup>st</sup> Class Lever	Pliers
5) Weighing	1 <sup>st</sup> Class Lever	Weighing balance
6) Digging	1 <sup>st</sup> Class Lever	Shovel/Spade
7) Use by nursery school for playing	1 <sup>st</sup> Class Lever	Seesaw
8) Writing	1 <sup>st</sup> Class Lever	Pen
9) Making hole on paper	1 <sup>st</sup> Class Lever	Perforator
10) Picking or holding thing	1 <sup>st</sup> Class Lever	Forceps
11) Carrying Loads	Second class Lever	Wheel barrow
12) Opening of bottles	Second class Lever	Bottle Opener
13) Cracking or breaking nut	Second class Lever	Nut cracker
14) Sweeping	Third Class Lever	Broom
15) Removing cubes of sugar	Third Class Lever	Sugar tong
16) Playing the game of hockey or golf	Third Class Lever	Golf hockey stick
17) Cutting	Third Class Lever	Table knife
18) Digging	Third Class Lever	Long Hand shovel
19) Gathering dirt like grass or leaves	Third Class Lever	Rake
20) Fishing	Third Class Lever	Fishing rod
21) Stapling pieces of paper together	Third Class Lever	Stapler
22) Remove pins from paper	Third Class Lever	Pin remover
23) Slicing or splitting	Wedge	Knife blade

24) Splitting	Wedge	Chisels
25) Splitting of Fire wood	Wedge	Axe
26) Slicing or splitting	Wedge	Razor
27) Sewing pieces of cloth	Wedge	Needle/Pins
28) Breaking or nailing	Wedge	Hammer
29) Splitting	Wedge	Matchet blade
30) Hoisting flag	Pulley	Pole of Nigerian flag
31) Drawing water from well	Pulley	Rope rounds wheel
32) Sharpening pf pencil	Wheel and axle	Sharpener
33) Opening of door	Wheel and axle	Door knob
34) Driving	Wheel and axle	Car steering
35) Ridding the bicycle	Wheel and axle	Bicycle wheel
36) Tightening pieces of wood	Screw	Screw nail
37) Lifting the car	Screw	Car jack

### Suggested Class Activities.

**Topic** Simple Machine

**Class** Primary six

**Time** - 80 minutes.

**Unit** - Levers

**Aims** - To demonstrate application of levers in daily activities

2. Distinguished first, second and third class levers.  
**Teaching Method** Guided inquiring/  
 Demonstration  
**Objective** To demonstrate the use of simple machines in day to day activities.

**Materials** Broom, needle, bottle opener, pen, paper, scissors shovel, knife, banana, pieces of cloth, thread, bannana, nail, bottle of coke, wheel-barrow, hoe, cutlass and plank.

### Activities

- 1) Opening coke or beer bottle.
- 2) Sweep the floor with broom
- 3) Cutting a piece of cloth with a pair of scissor
- 4) Carrying a jerry can of water using wheel barrow.
- 5) Cutting banana into pieces using table knife
- 6) Open a tin of tomato using tin opener
- 7) Opening a book
- 8) Move the forearm
- 9) Weeding grass using hole
- 10) Cutting using cutlass
- 11) Digging a hole using shovel
- 12) Lifting an object using hand

### Conclusion

Primary science is activity oriented. It is imperative for primary school science teachers to use teaching strategies that would enhance learning through active participation. The development of scientific knowledge, will help to satisfy the natural curiosity of the child. The various day to day activities in the teaching/learning of

simple machines to make it less abstract, interesting and meaningful for sustainable development and quality assurance.

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