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BASIC 8

WEEKLY LESSON PLAN – WEEK 6

<table>
<tr><td>Strand:</td><td colspan="2">Force and Energy</td><td>Sub-Strand:</td><td colspan="2">Force and Motion</td></tr>
<tr><td>Content Standard:</td><td colspan="5">B8.4.4.1 Analyze Newton’s Second law of motion and its application in everyday life.
B8.4.4.2 Demonstrate understanding of complex machines and h</td></tr>
<tr><td>Indicator (s)</td><td colspan="3">B8.4.4.1.1. Explain Newton’s Second Law of motion and demonstrate its application to life.
B8.4.4.2.1 Identify complex machines and describe their functions in life</td><td colspan="2">Performance Indicator: learners can identify the uses of complex machines.</td></tr>
<tr><td>Week Ending</td><td colspan="5">04-08-2023</td></tr>
<tr><td>Class</td><td>B.S.8</td><td>Class Size:</td><td></td><td>Duration:</td><td></td></tr>
<tr><td>Subject</td><td colspan="5">Science</td></tr>
<tr><td>Reference</td><td colspan="5">Science Curriculum, Teachers Resource Pack, Learners Resource Pack.</td></tr>
<tr><td>Teaching / Learning Resources</td><td colspan="2">Word chart, Poster, Pictures, Video</td><td>Core Competencies:</td><td colspan="2">• Digital Literacy
• Critical Thinking and Problem Solving
• Communication and Collaboration.</td></tr>
<tr><td>DAY/DATE</td><td>PHASE 1 : STARTER</td><td colspan="3">PHASE 2: MAIN</td><td>PHASE 3: REFLECTION</td></tr>
<tr><td>MONDAY</td><td>Assist Learners to explain the meanings of keywords and terminologies in the lesson.</td><td colspan="3">1. Discuss with Learners on the second law of motion and its application.
2. Assist Learners to identify some daily life examples of Newton's second law .
3. Demonstrate calculating for motion using newton’s second law of motion.
NEWTON’S SECOND LAW OF MOTION
The acceleration of a system is directly proportional to and in the same direction as the net external force acting on the system and is inversely proportional to its mass. In equation form, Newton’s second law is
$\vec{a} = \vec{F}_{net}/m$</td><td>Assist learners to practice calculating for motion using the Newton’s second law.
Exercise;
Explain 5 examples of newton’s second law of motion in everyday life.</td></tr>
</table>

where $\vec{a}$ is the acceleration, $\vec{F}_{net}$ is the net force, and *m* is the mass. This is often written in the more familiar form

$$\vec{F}_{net} = \sum \vec{F} = m\vec{a}$$

but the first equation gives more insight into what Newton's second law means. When only the magnitude of force and acceleration are considered, this equation can be written in the simpler scalar form:

$$F_{net} = ma.$$

Examples of Newton's Second Law in Everyday Life

This law of Newton applies to real life, being one of the laws of physics that impacts most in our daily lives:

1- Kicking a ball

When we kick a ball, we exert force in a specific direction, which is the direction in which it will travel.

In addition, the stronger that ball is kicked, the stronger the force we put on it and the further away it will go.

2- Capture the ball by hand

Professional athletes move their hands back once they catch the ball as it provides the ball more time to lose its speed, and in turn apply less force on its part.

3- Push a car

For example, pushing a supermarket cart with twice as much force produces twice as much acceleration.

4- Pushing cars

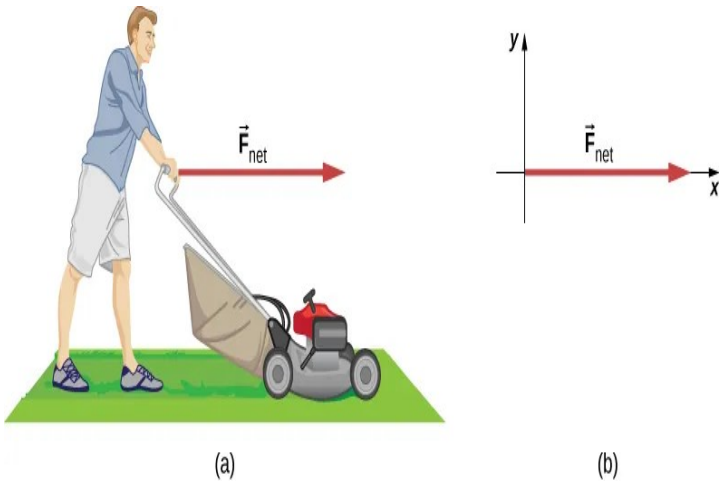
On the other hand, pushing two supermarket trolleys with the same force produces half the acceleration, because this varies inversely.

Example 1;

What Acceleration Can a Person Produce When Pushing a Lawn Mower?

Suppose that the net external force (push minus friction) exerted on a lawn mower is 51 N (about 11 lb.) parallel to

the ground. The mass of the mower is 24 kg. What is its acceleration?



(a) (b)

Strategy

This problem involves only motion in the horizontal direction; we are also given the net force, indicated by the single vector, but we can suppress the vector nature and concentrate on applying Newton's second law. Since Fnet and *m* are given, the acceleration can be calculated directly from Newton's second law as Fnet=ma.

Solution

The magnitude of the acceleration *a* is a=Fnet/m/

Entering known values gives

a=51N/24kg..

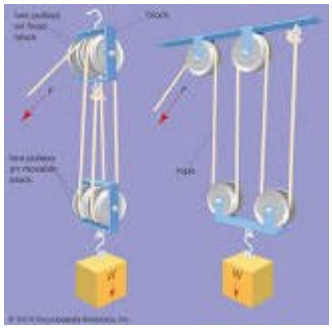
Substituting the unit of kilograms times meters per square second for newtons yields.

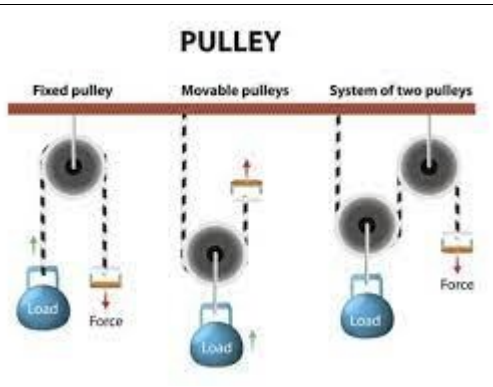
a=51kg·m/s224kg=2.1m

Significance

The direction of the acceleration is the same direction as that of the net force, which is parallel to the ground. This is a result of the vector relationship expressed in Newton's second law, that is, the vector representing net force is the scalar multiple of the acceleration vector. There is no information given in this example about the individual external forces acting on the system, but we can say something about their relative magnitudes. For example, the force exerted by the person pushing the mower must be greater than the friction opposing the motion (since we know the mower moved forward), and the vertical forces must cancel because no acceleration occurs in the vertical direction (the mower is moving only horizontally). The

		acceleration found is small enough to be reasonable for a person pushing a mower. Such an effort would not last too long, because the person's top speed would soon be reached.	
THURSDAY	Review Learners knowledge on the meaning, examples, types and functions of simple machines.	1. Assist learners to identify examples of complex machines in everyday life. 2. Discuss with Learners on the functions of complex machines. 3. Learners brainstorm to differentiate between simple and complex machines. 4. Assist Learners to identify examples of complex machines found in their community. **Complex Machines;** A complex machine is also known as a compound machine, which consist of two or more simple machines, such as levers, wedges, pulleys, screws, wheel and axle and inclined planes. Some examples of complex machines are cars, bicycles, can openers, a wheelbarrow, scissors and a stapler  **Examples of Complex Machines** • Lever-Inclined Plane. • Lever-Wheel and Axle. • Lever-Wedge. • Lever-Pulley. • Lever-Screw. • Inclined Plane-Wheel and Axle. • Inclined Plane -Wedge. • Inclined Plane-Pulley	Reflect on the uses of the various complex machines. **Exercise;** 1. Differentiate between simple and complex machines. 2. State 4 examples of complex machines found in your community.

			
FRIDAY	Review Learners knowledge on the previous lesson.	1. Assist Learners to describe Pulleys and their kinds. 2. Learners brainstorm to identify 5 uses of pulleys in daily life. 3. Discuss with Learners on how motion in a system of pulleys of different sizes is transferred to motion in another system of various gears in the same structure. **Pulleys;**  A pulley is a wheel that carries a flexible rope, cord, cable, chain, or belt on its rim. Pulleys are used singly or in combination to transmit energy and motion. **Types of Pulley;** ✓ Fixed ✓ Movable ✓ compound. **Some uses of pulley are listed below.** • Use of pulley to lift water from the well. • Elevator. • Lifting cargos. • Window curtains. • Fans with chains. • Cranes. • Extended ladders. • Gym equipment.	Learners in small groups to discuss and report to the class on examples of common devices and systems that incorporate pulleys and/or gear. **Exercise;** 1. What are Pulleys? 2. State 3 types of Pulleys. 3. Explain 3 uses of Pulleys.

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