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Department of Education
Region I
Schools Division Office I of Pangasinan
ENRICO T. PRADO NATIONAL HIGH SCHOOL
Lingayen

STRATEGIC INTERVENTION MATERIAL

SCI-MAT

Science

Grade 8

- *Task Analysis*
- *Guide Card*
- *Concept Micro*
- *Activities*
- *Assessment*
- *Enrichment*
- *Answer Key*

BELINDA M. SOCORIN

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Strategic Intervention Material
Grade 8

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PREFACE

Education is the cornerstone of scientific breakthroughs and innovation. In today's rapidly evolving world of science and technology, it is imperative to equip students with high-quality learning materials that address their unique needs and various learning styles. This Strategic Intervention Material (SIM) for Grade 8 Science is specifically crafted to close learning gaps and empower students to grasp Isaac Newton's Three Laws of Motion more profoundly. Navigating abstract scientific concepts can often be daunting for learners. To overcome this challenge, this intervention material offers captivating activities, clear explanations, real-life applications, and interactive assessments.

Our aim is to create a learning experience that is not only meaningful and enjoyable but also accessible to all students specially to all Grade8 who will use this SIM, thereby building a strong conceptual foundation in Newton's Laws of Motion.

The SIM is thoughtfully organized to include:

- *Task Analysis*
- *Guide Card*
- *Concept Micro*
- *Assessment*
- *Enrichment Activities*

By weaving together these essential components, this material is dedicated to helping students master vital scientific principles while nurturing their understanding and application of physics concepts. Together, let's inspire the next generation of thinkers and innovators!

-The Author

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I extend my heartfelt gratitude to the Department of Education, Region I, and the Schools Division Office of Pangasinan 1 for their unwavering support and guidance throughout the development of this Strategic Intervention Material (SIM).

To ENRICO T. PRADO NATIONAL HIGH SCHOOL, Lingayen, and its dedicated teachers, your encouragement and collaboration were instrumental in bringing this endeavor to life. Your passion for education and commitment to the growth of every learner have been truly inspiring.

I also express my sincere appreciation to the authors and researchers whose works served as valuable references. Your contributions have greatly enriched this material.

This SIM would not have been possible without your collective support. Thank you for empowering this initiative to help Grade 8 learners discover and appreciate the wonders of science.

Belinda M. Socorin
Author

Science

TASK-ANALYSIS

MAIN TASK/ LEARNING COMPETENCY:

Investigate the relationship between the amount of force applied and the mass of the object to the amount of change in the object's motion.

(S8FE-Ia-15)

SUB – TASKS:

1. Teach of Newton's Three Laws of Motion; (COGNITIVE)

2. Describe the relationship between the amount of force and the mass of the object to the amount of change in the object's motion; and
(PSYCHOMOTOR)

3. Appreciate the application of the Newton's Three Laws of Motion in a real - life situation; (AFFECTIVE)

Science

GUIDE CARD

INFO. OVERLOAD

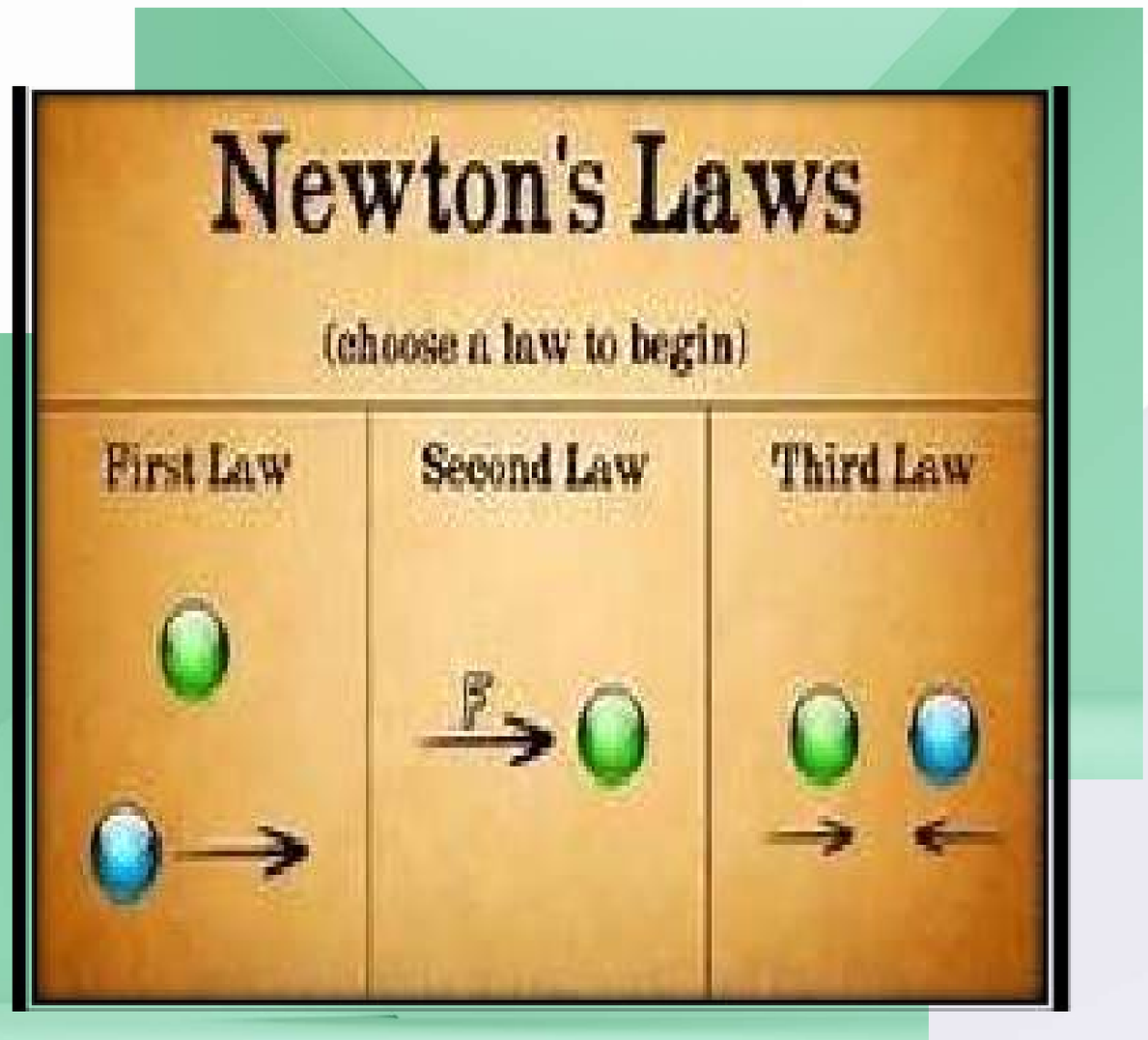
ISAAC NEWTON

was an English physicist, mathematician, astronomer, natural philosopher and a theologian. He postulated the Three Laws of Motion. His law of motion described the relationship between the forces acting on an object and its motion.

CONCEPT MICRO

Law of Inertia- an object at rest will stay at rest an object in motion will stay in motion unless acted upon by unbalanced forced.

Newton's first law states that every object will remain at rest or in uniform motion in a straight line unless compelled to change its state by the action of an external force. This is normally taken as the definition of inertia. The key point here is that if there is no net force acting on an object (if all the external forces cancel each other out) then the object will maintain a constant velocity. If that velocity is zero, then the object remains at rest. If an external force is applied, the velocity will change because of the force.



CONCEPT MICRO

Law of Acceleration- The acceleration of an object is directly proportional to its net force and inversely proportional to its mass.

The second law explains how the velocity of an object changes when it is subjected to an external force. The law defines a force to be equal to change in momentum (mass times velocity) per change in time. For an object with a constant mass m, the second law states that the force F is the product of an object's mass and its acceleration a:

$$F = m * a$$

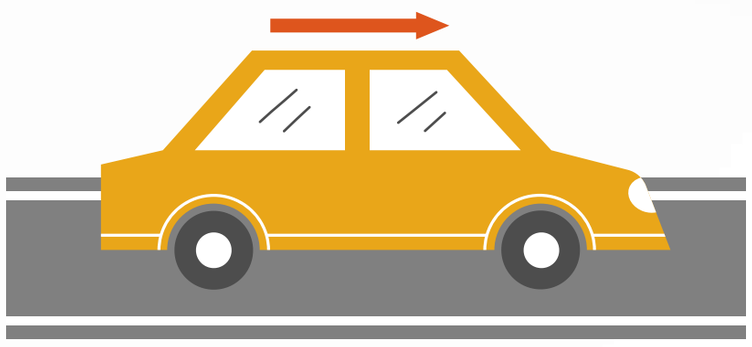
For an external applied force, the change in velocity depends on the mass of the object. A force will cause a change in velocity; and likewise, a change in velocity will generate a force. The equation works both ways.

CONCEPT MICRO

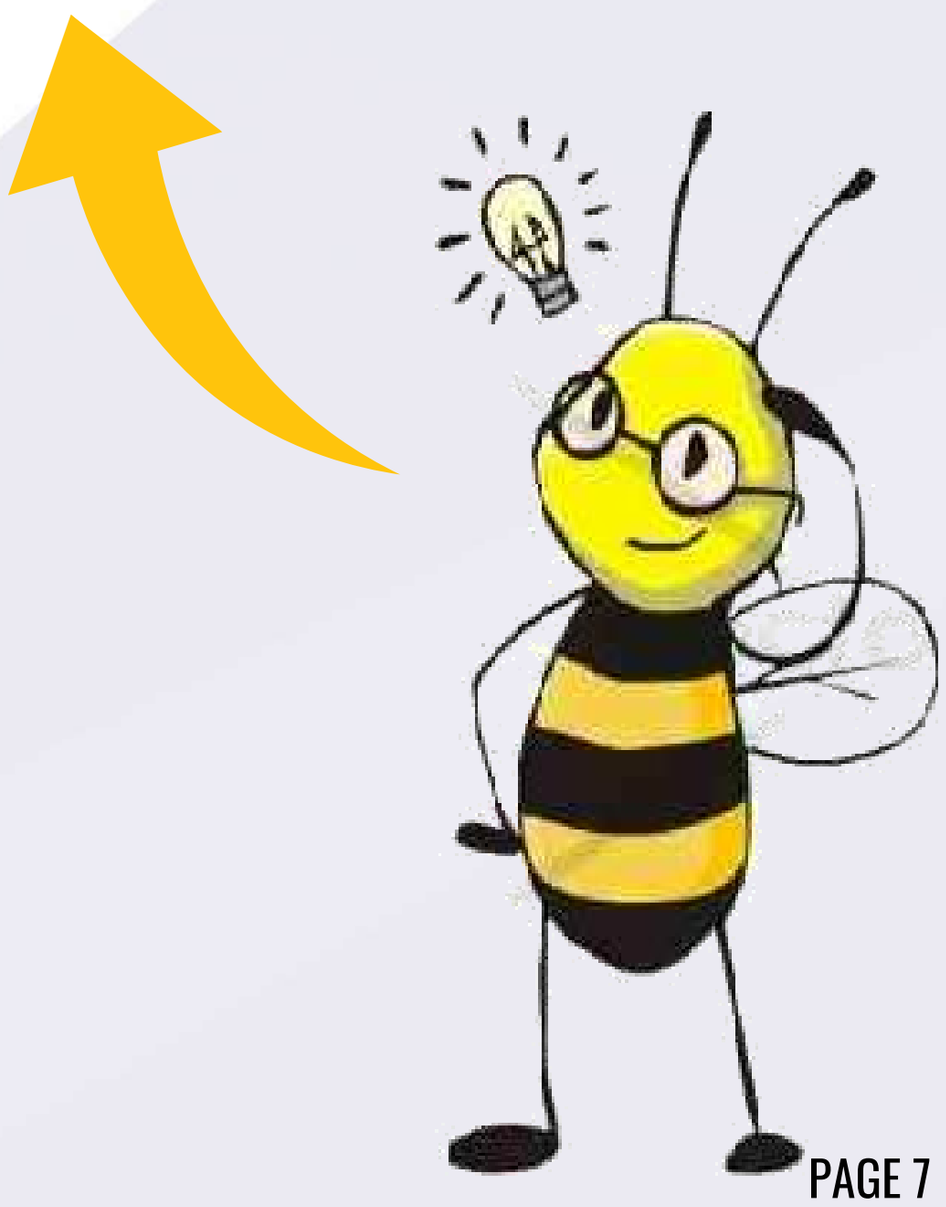
Law of Interaction- for every action there is an equal and opposite reaction.

The third law states that for every action (force) in nature there is an equal and opposite reaction. In other words, if object A exerts a force on object B, then object B also exerts an equal force on object A. Notice that the forces are exerted on different objects.

The third law can be used to explain the generation of lift by a wing and the production of thrust by a jet engine.



$$\vec{F} = m\vec{a}$$



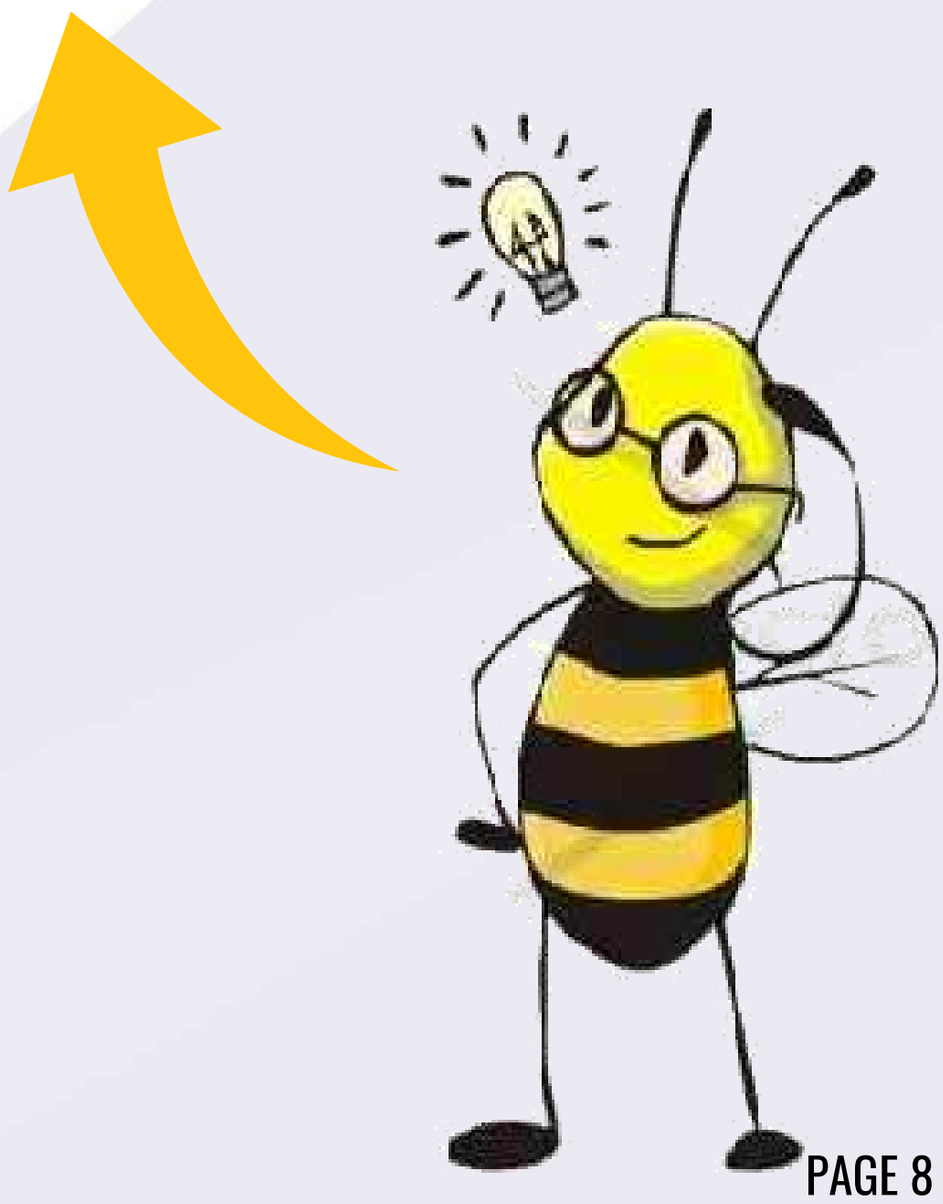
CONCEPT MICRO

Newton’s 1st Law of Motion:
The Law of Inertia

Statement: A body remains at rest, or moves in a straight line (at a constant velocity), unless acted upon by a net outside force.

Real life application – Shake up that bottle of ketchup! When you shake that bottle, you bring the bottom down, then suddenly you stop. This is inertia and it’s the inertia which causes the ketchup to come out of the bottle.

Taking a Look at Inertia Examples. One's body movement to the side when a car makes a sharp turn. Tightening of seat belts in a car when it stops quickly. A ball rolling down a hill will continue to roll unless friction or another force stops it.



CONCEPT MICRO

Newton’s 2nd Law of Motion:
The Law of Acceleration

Statement: The acceleration of an object is proportional to the force acting upon it.

Real life application – Your friend weighs less than you, but you both walk exerting the same amount of force. Your friend will go a good deal faster than you because the acceleration used by them would undoubtedly be higher.
One of the main reasons why people constantly try to reduce the mass of objects is to be able to increase its speed and acceleration. All of the factors have an effect on each other. If something has much more mass, then exerting more force will make it move faster.

CONCEPT MICRO

Newton’s 3rd Law:
The Law of Interaction (equal and opposite reaction)

Statement: For every action, there is an equal and opposite reaction. If one body exerts force on the second body then the second body exerts equal force on the first body.

Real life application – Hitting the Wall with Your Fist
There are two forces, your force and the other is an equal and opposite force applied by the wall on the fist. Hence, the harder you hit the wall the more force is exerted on your fist by the wall. This is why you get hurt more. So don’t hit the wall, you will get yourself hurt laddie!

Examples of Newton's third law of motion are ubiquitous in everyday life. For example, when you jump, your legs apply a force to the ground, and the ground applies and equal and opposite reaction force that propels you into the air. Engineers apply Newton's third law when designing rockets and other projectile devices

ACTIVITY CARD 1

Objective 1: State each of Newton's Three Laws of Motion. (COGNITIVE)

NEWTON'S THREE LAWS OF MOTION

Narrator: *One morning, three friends met at the canteen.*

Blossom: *Hello Friends, do you know the latest news?*

Bubbles: *News, About what?*

Buttercup: *So what's that news all about?*

Blossom: *Do you that there are Three Laws of Motion that was discovered by Sir Isaac Newton?*

The first law is the Law of Inertia- it states that an object at rest will stay at rest an object in motion will stay in motion unless acted upon by unbalanced forced.

DRAMATIZATION

I. Material: Activity Sheet
II. Procedure:

1. Read the script of the drama silently.
2. Then, Answer the questions below.
3. Record the answer on the answer sheet.

Buttercup: *Oh I see.. I Know the second one!*

"The Law of Acceleration- The acceleration of an object is directly proportional to its net force and inversely proportional to its mass."

Bubbles: *You got it right! And the third one is the Law of Interaction- it states that for every action there is an equal and opposite reaction.*

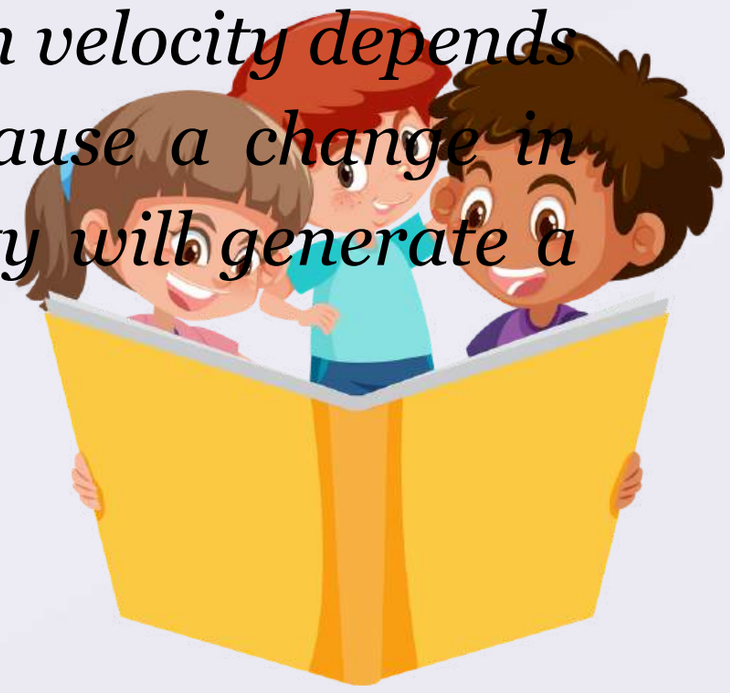
DRAMATIZATION

Blossom: *We are really good my dear friends! Hhhmmm... Latest chika:*

“Newton's first law states that every object will remain at rest or in uniform motion in a straight line unless compelled to change its state by the action of an external force. This is normally taken as the definition of inertia. The key point here is that if there is no net force acting on an object (if all the external forces cancel each other out) then the object will maintain a constant velocity. If that velocity is zero, then the object remains at rest. If an external force is applied, the velocity will change because of the force.”

Buttercup: *Akala mo ikaw lang may bagong chika ah.. Ako din meron!*

*“The second law explains how the velocity of an object changes when it is subjected to an external force. The law defines a force to be equal to change in momentum (mass times velocity) per change in time. For an object with a constant mass m, the second law states that the force F is the product of an object's mass and its acceleration a: F = m * a For an external applied force, the change in velocity depends on the mass of the object. A force will cause a change in velocity; and likewise, a change in velocity will generate a force. The equation works both ways.”*



DRAMATIZATION

Bubbles: And of course,

The third law states that for every action (force) in nature there is an equal and opposite reaction. In other words, if object A exerts a force on object B, then object B also exerts an equal force on object A. Notice that the forces are exerted on different objects. The third law can be used to explain the generation of lift by a wing and the production of thrust by a jet engine.

Oh d ba chika babes tayo with a purpose!

Narrator: *After their friendly discussion, they learned much about the Newton's Three Laws of Motion.*

QUESTIONS:

1. What are the Newton's Three Laws of Motion?
2. Describe each of the Newton's Three Laws of Motion.

ACTIVITY CARD 2

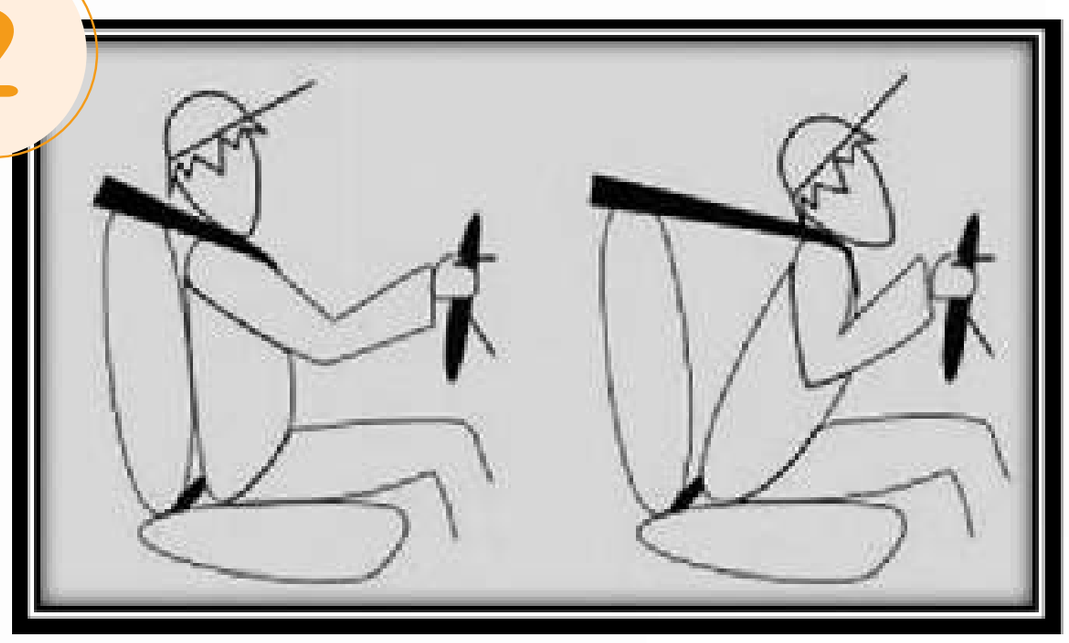
Objective 2:

Describe the relationship between the amount of force and the mass of the object to the amount of change in the object's motion. (PSYCHOMOTOR)

1

LAW OF INERTIA

2



LAW OF INTERACTION

3

LAW OF ACCELERATION

OOOPPS... CHECKPOINT

PICTURE STUDY

I. Materials:

Pictures depicting the *Three Laws of Motion*

II. Procedures:

1. Study the pictures carefully.
2. Then, answer the questions below.

ACTIVITY CARD 3

I. Material: Activity Sheets

II. Procedures:

1. Read the sentences given below.

2. If the sentence shows an appreciation in the application of the three laws of motion in real - life situation draw a happy face

If not, draw a sad face

SCIENCE CARES

_____1. Luggage is usually tied with a rope on the roof of a bus. When the bus stops suddenly.

_____2. A person swimming in a forward direction pushes the water in the backward direction with his/her hands.

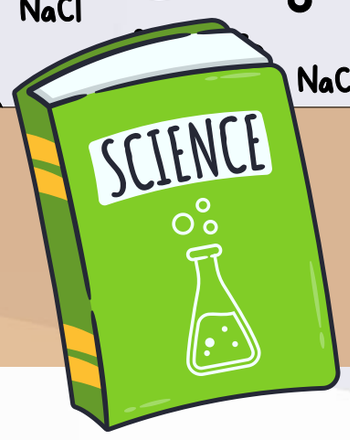
_____3. Pushing an empty shopping cart is easier than pushing a loaded shopping cart.

_____4. A book falls off a table and free falls to the ground.

_____5. If you jump from a car or bus that is moving, your body is still moving in the direction of the vehicle.

III. Question:

1. How do you appreciate the application of the three laws of motion in real life situation?.



ASSESSMENT CARD 1

DIRECTION:
Complete the sentences about the Three Laws of Motion. Select the answer from the words listed in the box.

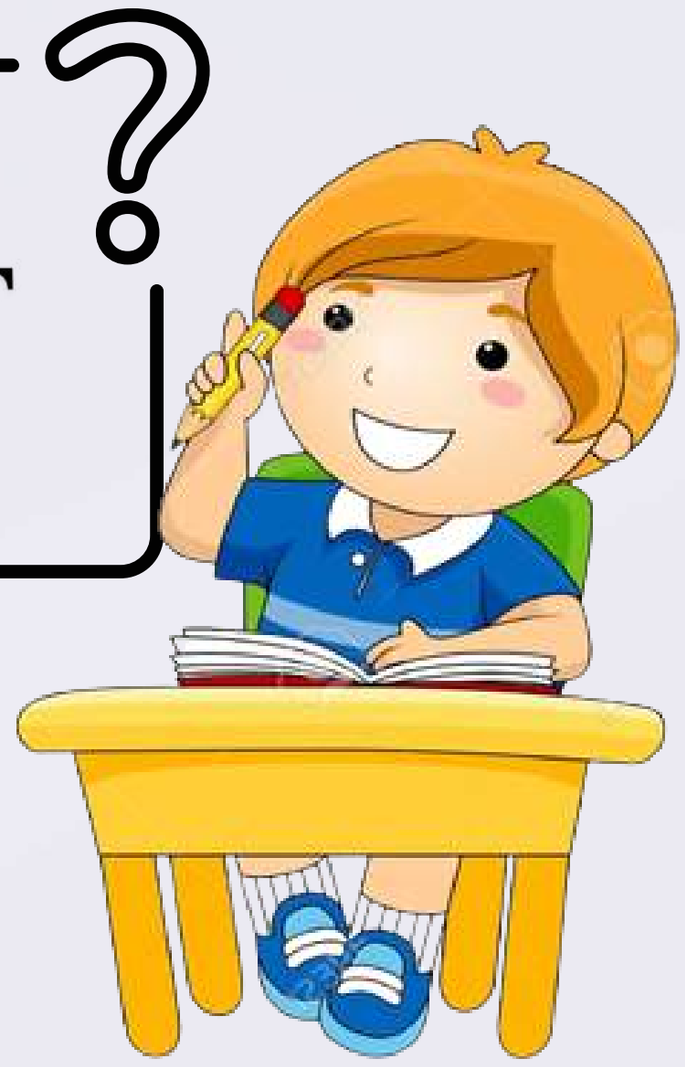
Action
Rest
acceleration
Reaction
Velocity
Unbalanced
Force
Mass
Proportional
Net force

A. A body will remain at
(1)_____or move at constant
(2)_____unless acted by an (3)_____
(4)_____.

B. The (5)_____of an object is directly
(6)_____ to the magnitude of the
(7)_____ acting on it and is inversely proportional to its (8)_____.

C. For every (9)_____there is an equal and opposite (10)_____.

GUESS IT

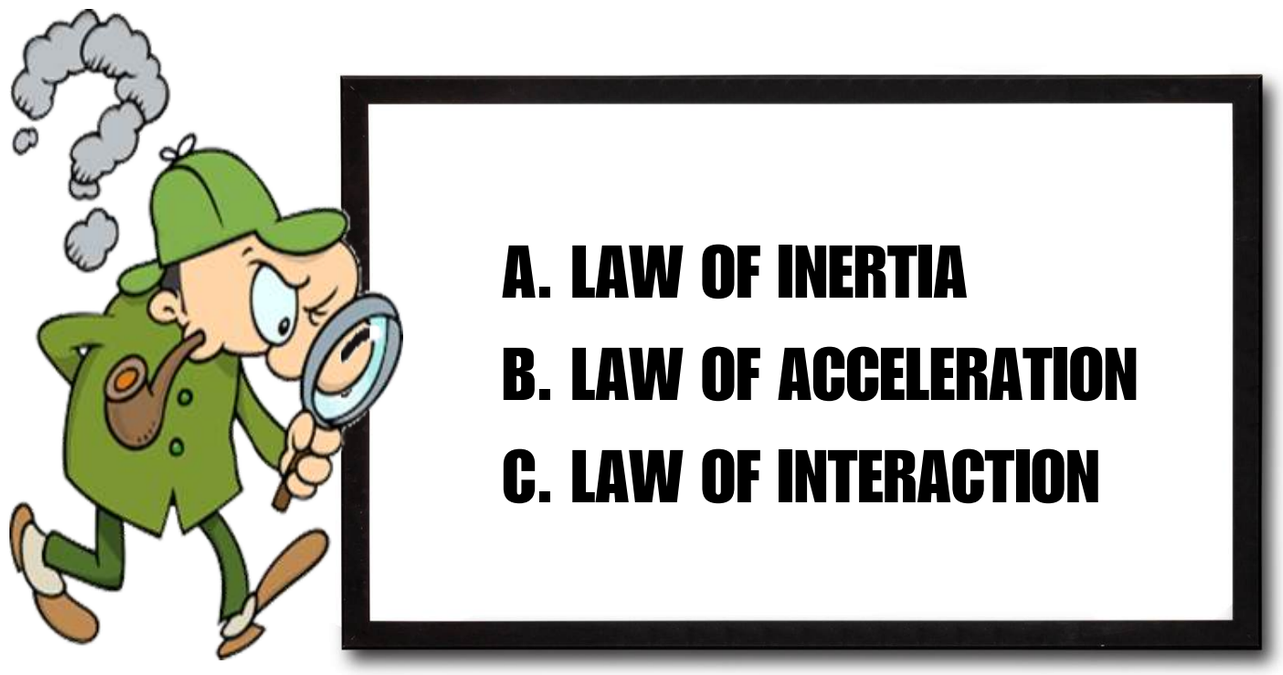


ASSESSMENT CARD 2

DIRECTION:

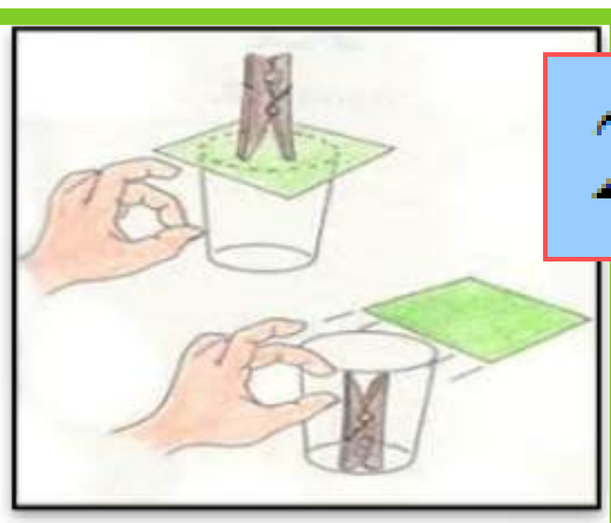
Look carefully at the pictures and identify what law of motion is being demonstrated/applied.

Get the ans of the correct answer.



1

2



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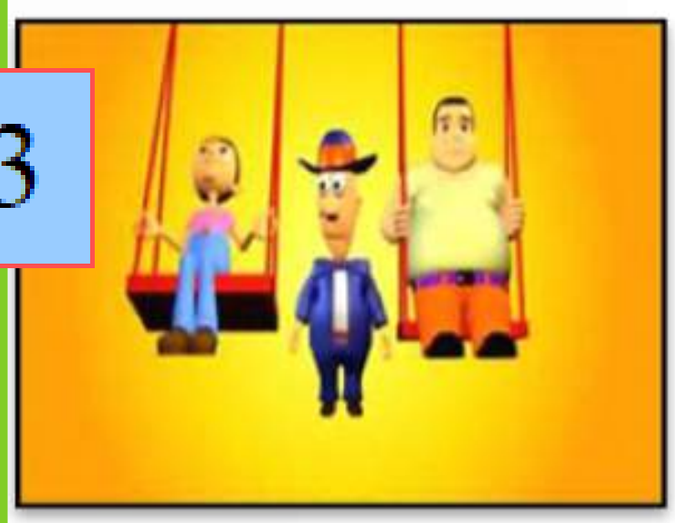

4

5

ASSESSMENT CARD 3

DIRECTION:

1. Read the sentences given below.
2. If the sentence shows an appreciation in the application of the three laws of motion in real life situation draw a THUMBS UP 👍

If not, draw a THUMBS DOWN 👎

_____1. When you stir coffee or tea and stop, the swirling motion continues.

_____2. A teacher applies a force to a wall and becomes exhausted.

_____3. A karate player makes use of motion to perform the task of breaking a slab of bricks.

_____4. When a person sitting on a chair pushes the wall with his feet, the chair moves backward.

_____5. A ball develops a certain amount of acceleration after being hit.

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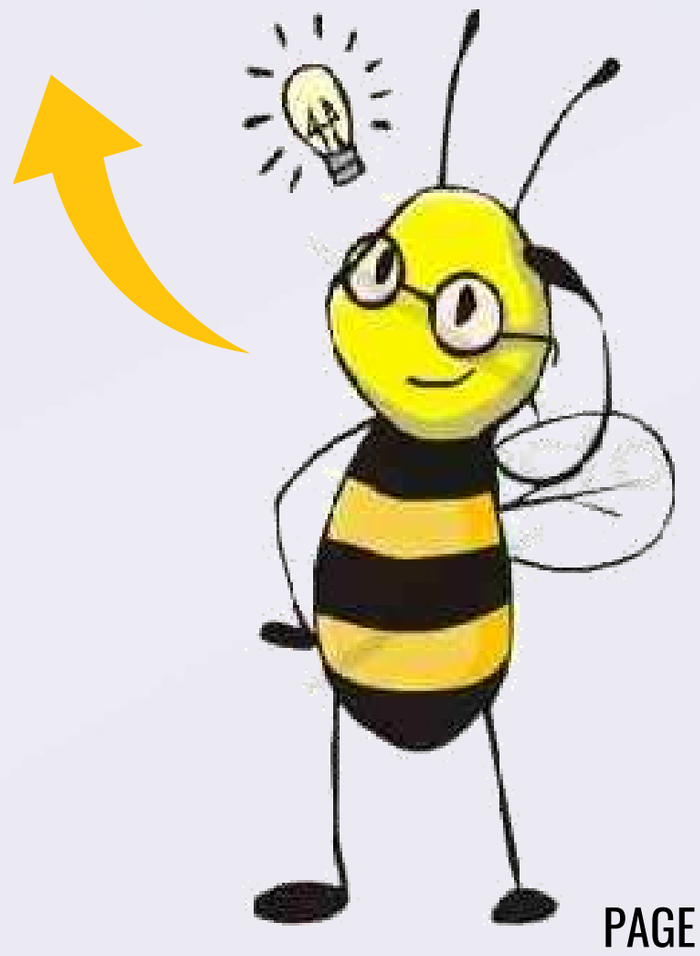


ENRICHMENT CARD 1

DIRECTION:

Loop aword from the puzzle to form words related to the Newton's Three Laws of Motion.

WORD UP!

I	M	A	C	C	E	I	C	S	I	N	W
N	A	A	I	I	O	F	O	R	C	E	N
E	P	M	A	S	S	I	T	E	I	R	E
R	P	R	O	W	E	I	G	H	T	U	W
T	E	A	L	R	O	E	H	A	R	S	T
I	M	P	O	L	R	T	A	S	A	B	O
A	R	T	S	F	R	I	C	T	I	O	N
I	N	T	E	R	A	C	T	I	O	N	R
A	C	C	E	L	E	R	A	T	I	O	N
K	I	L	O	G	R	A	M	K	I	D	S
S	U	N	B	A	L	A	N	C	E	D	E

ENRICHMENT CARD 2

DIRECTION:

Answer the Crossword puzzle about the Newton's Three Laws of Motion. Get the answer from the box below the puzzle. Write the correct answer.

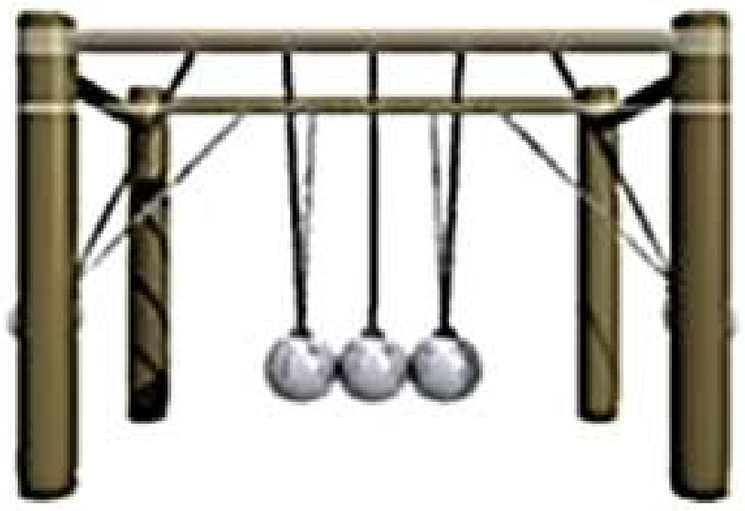
PUZZLE!

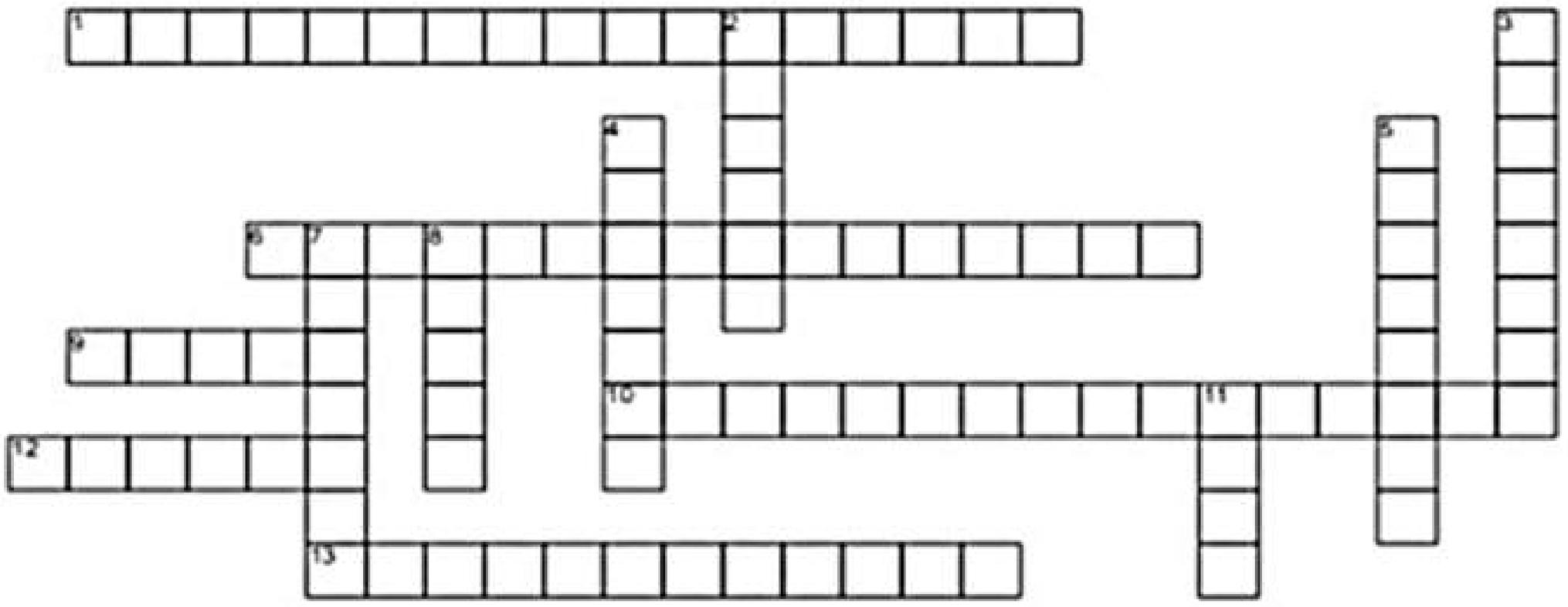
Name:

Date:

Newton's Laws of Motion Crossword

Complete the activity.





ACROSS

1. Force is equal to the change in monentum (mV) per change in time. For a constant mass, force equals mass times acceleration. F=m a
6. Every object persists in its state of rest or uniform motion in a straight line unless it is compelled to change that state by forces impressed on it.
9. Push or pull
10. For every action, there is an equal and opposit reaction
12. Measure of gravitational attraction or force or gravity pulling one object toward the center of another object
13. The rate velocity changes with time

DOWN

2. The result of unbalanced forces
3. Force that opposes motion between two surfaces
4. The force that pulls on objects and causes acceleration if the objects are not balanced by an opposing force
5. Speed of an object, but in a specific direction
7. Resistance to change
8. Distance traveled per unit time
11. Amount of matter in an object or a measure or the inertia of an object

Motion	Acceleration	Speed	Third Law of Motion
Inertia	Weight	Velocity	
Force	Friction	First Law of Motion	
Mass	Gravity	Second Law of Motion	

ANSWER KEY

Activity Card 1

1. Law of inertia Law of Inertia- an object at rest will stay at rest an object in motion will stay in motion unless acted upon by unbalanced forced.
2. Law of Acceleration- The acceleration of an object is directly proportional to its net force and inversely proportional to its mass.
3. Law of interaction Law of Interaction- for every action there is an equal and opposite reaction.

Activity Card 2

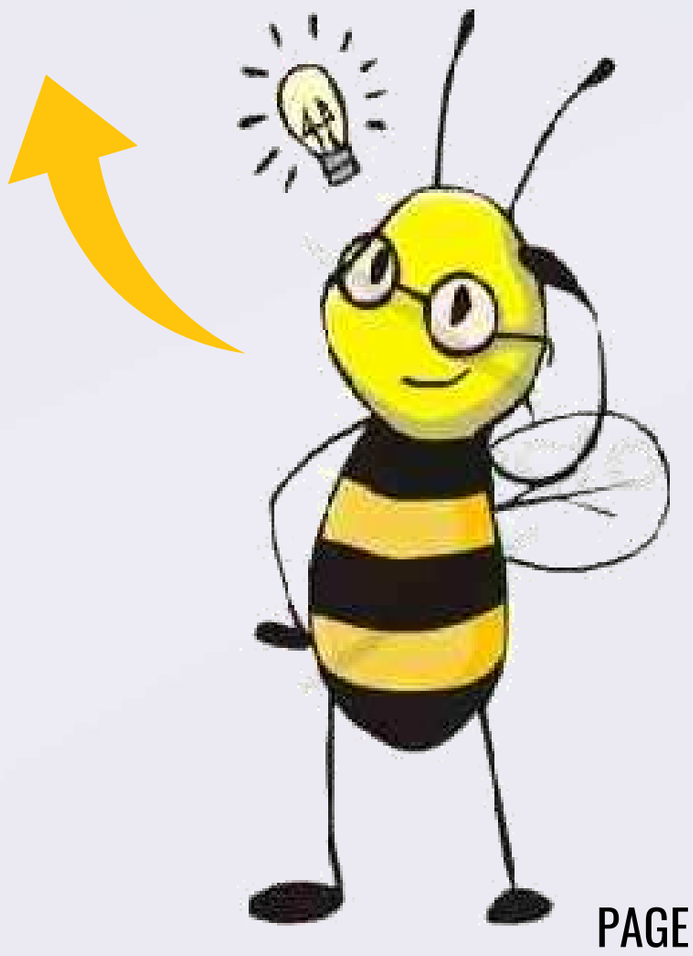
1. The Law of Inertia A body remains at rest, or moves in a straight line (at a constant velocity), unless acted upon by a net outside force.
2. The Law of Acceleration The acceleration of an object is proportional to the force acting upon it.
3. The Law of Interaction (Equal and opposite reaction) For every action, there is an equal and opposite reaction. If one body exerts force on the second body then the second body exerts equal force on the first body.

Activity Card 3

1. ☹
2. ☺
3. ☺
4. ☺
5. ☺

Assessment Card 1

1. Rest
2. Velocity
3. Unbalanced
4. Force
5. Acceleration
6. Proportional
7. Net force
8. Mass
9. Action
10. Reaction



ANSWER KEY

Assessment Card 2

1. Law of Interaction
2. Law of Inertia
3. Law of Acceleration
4. Law of Interaction
5. Law of Inertia

Assessment Card 3

1. 👍
2. 👎
3. 👍
4. 👍
5. 👍

Enrichment Card 1

1. Inertia
2. Mass
3. Acceleration
4. Force
5. Weight
6. Newton
7. Interaction
8. Friction
9. Kilogram
10. Unbalanced

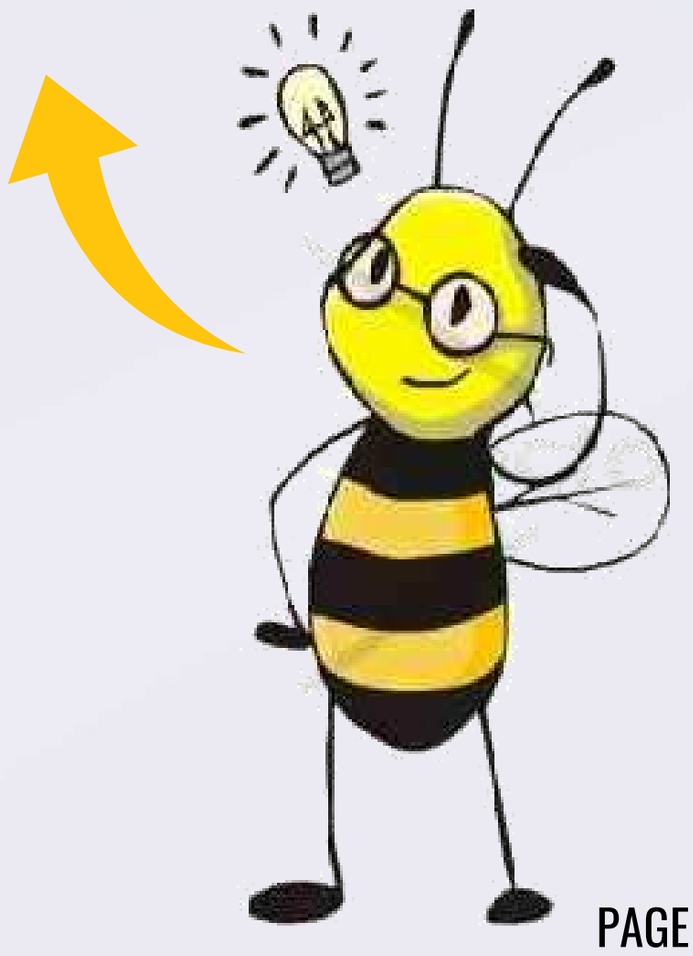
Enrichment Card 2

ACROSS

1. Second Law of Motion
6. First law of Motion
9. Force
10. Third law of Motion
12. Weight
13. Acceleration

DOWN

2. Motion
3. Friction
4. Gravity
5. Velocity
7. Inertia
8. Speed
11. Mass



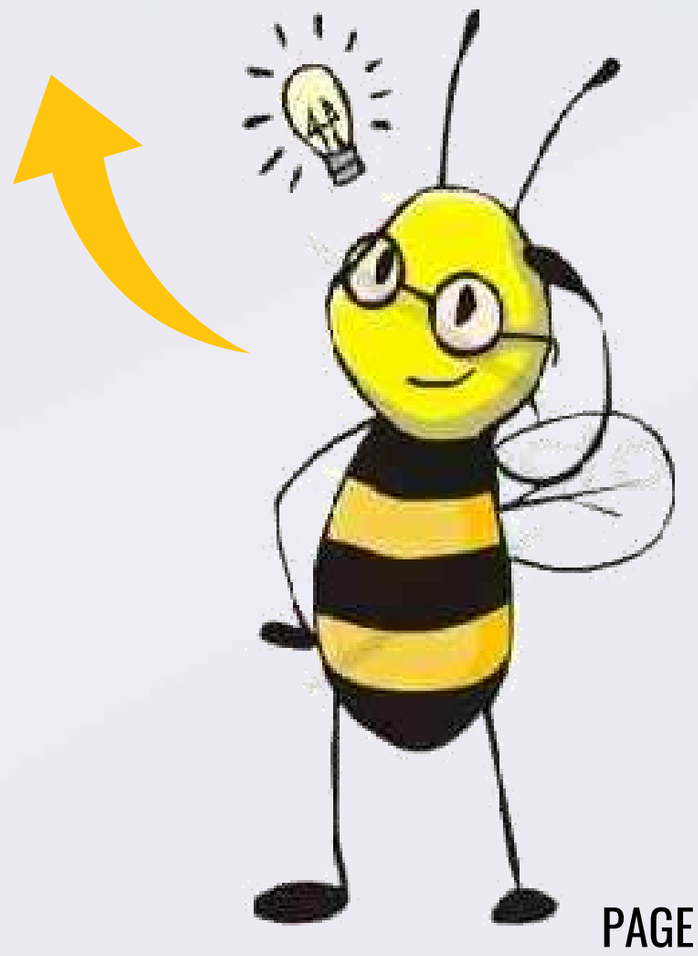
REFERENCE

A. Books

- Science Links, Worktext for Scientific and Technological Literacy p. 15-24
- Science 8, Learners Module p.10-20

B. Electronic Sources

- https://www.thoughtco.com/newtons-laws-of motion
- https://www.britannica.com/science/Newtons-laws-of-motion
- https://www.youtube.com/watch?v=5oi5j11FkQg
- Helmenstine, Anne Marie, Ph.D. (2024, July 16). What Are Newton's Laws of Motion? Retrieved from https://www.thoughtco.com/what-are-newtons-laws-of-motion-608324
- Getty Images / Dmitrii Guzhanin
- https://eduinput.com/examples-of-newtons-second-law/
- https://fierstvijlessonmedia.z14.web.core.windows.net/newtons-first-law-of-motion-pdf.html



END OF THE LESSON

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SCI-KICK

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