

LESSON PLAN 1 [2019 - 2020]



DLF Public School

THE LEARNING ACADEMY

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	August 2019	Gravitation	Force of gravitation & force of gravity
Expected Learning Outcome: Students will be able to ⇒ Describe and understand the difference between force of gravitation & gravity ⇒ State Newton's law of gravitation. ⇒ Differentiate between G & g. (universal gravitation constant & acceleration due to gravity)						
Expected skill development: Comprehension, comparison, Critical, analytical thinking.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION 5 min

Student will review their previous knowledge by answering the following questions:

- ⇒ What is the force?
- ⇒ What is Newton 3rd law of motion?
- ⇒ What is the basic formula of force?

CONTENT (Discussion method)

(20 min)

- ⇒ Define force of gravitation
- ⇒ Statement of newton's law of gravitation.
 $F \propto m_1 m_2$ -----(1) $F \propto 1/r^2$ ------(2)
Combining (1) & (2)
 $F \propto m_1 m_2 / r^2 \Rightarrow f = G m_1 m_2 / r^2$
- ⇒ Basic introduction to g: its nature, value, SI unit and universal constancy.
- ⇒ Define force of gravity
- ⇒ Expression $F = ma$ but here $a = g$ therefore $F = mg$.
- ⇒ Basic introduction to g: its nature, value, SI unit and changing value at height & depth.

THINK-LINE: Gravitational force acts on all objects in proportion to their masses. Why then, a heavy object does not fall faster than a light object?

CLOSURE:

(5min)

Students were made to write 3 differences between force of gravity & gravitation as well as G & g on the basis of -

(a) Basic definition

- (b) Nature
- (c) Direction
- (d) SI units.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ State Newton's law of gravitation? ➤ Write three differences between G and g? ➤ Write three differences between force of gravity and gravitation? ➤ Why Newton's law of gravitation called the universal law? ➤ List three phenomenon which can be explained by applying universal law of gravitation?
Evaluation/Assessment: Written Questionnaire State Newton's laws of gravitation. Difference between G and g?
DIFFERENTIATED CLASSROOM

Learners on the way ➤ Why Newton's law of gravitation called the universal law?	Advanced Learners ➤ List three phenomenon which can be explained by applying universal law of gravitation
Materials needed/Resources: Chalk, duster, NCERT, pencil bag, daily life examples	
Common Misconceptions: Force of gravitation & force of gravity is exactly the same thing.	Addressing the misconceptions: By describing 3 basic differences between the gravitation & force of gravity and making them aware of this fact that gravitation can be force between any 2 objects & gravity is always between earth.

(5 min)

Home assignments:

- What is the magnitude of the gravitational force between the earth and a 1Kg object on its surface?

2. The earth and the moon are attracted to each other by gravitational force. Does the Earth attract the Moon with a force that is greater or smaller or the same as the force with which the Moon attracts the Earth? Why?
3. If the Moon attracts the Earth, why does the Earth not move towards the Moon?

**LESSON PLAN 2 [2019- 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	August 2019	Gravitation	Relation both g & G

Expected Learning Outcome:

Students will be able to

- ⇒ Relate g & G
- ⇒ Describe the dependence of g on shape of earth
- ⇒ Derive the value of g on the surface of moon.

Expected skill development:

Derivation, Critical thinking, analysis, Application.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION 5 min

Will review the previous knowledge with the following questions:

- ⇒ What is g and what is its value?
- ⇒ What is G and what is its value?

CONTENT (Discussion method)

(20 min)

Derivation of relation both G & g

Force of gravitation, $F = GMm/R^2$ ------(1)

Force of gravity, $F = mg$ ------(2)

Equating (1) & (2), $GMm/R^2 = mg \Rightarrow GM/R^2 = g$.

Dependence of g on shape of earth.

Since $g \propto 1/R^2$ & $R_e > R_p \Rightarrow g_p > g_e$

Value of g on the surface of earth.

$R_e = 4R_m$ & $M_e = 100M_m$

$g_m/g_e = 16/100 = 1/6$ $g_m = 1/6 g_e$

THINK-LINE:

Why will a sheet of paper fall slower than one that is crumpled into a ball?

CLOSURE: What do we call the gravitational force between the Earth and an object?

(5min)

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- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What is g and what is its value? ➤ What is G and what is its value? ➤ What is the relation between g and G? ➤ Buy a bag of sugar of weight W at a place on equator. Take this Antarctica. Would its weight be same? Give reasons. ➤ The value of g at moon surface is 16.7m/s^2.if the radius of moon is $1.74 \times 10^6\text{m}$,calculate the mass of the moon?
➤ Evaluation/Assessment: Written questionnaire What is the relation between g and G?
DIFFERENTIATED CLASSROOM

Learners on the way ➤ What is the relation of G and g?	Advanced Learners ➤ Suppose gravity of earth suddenly becomes Zero, then in which direction will the moon begins to move if no other celestial body affects it?
Materials needed/Resources: Chalk, duster, ncert, daily life examples	
Common Misconceptions: Students generally get confused that how the value of g has been calculated?	Addressing the misconceptions: By putting the values of mass of earth, radius of earth in $g=GM/R^2$,it is done .Then it is verified by using experiment

Home assignments:

(5 min)

- Amit bought few grams of gold at the poles as per the instruction of one of his friends. He hands over the same when he meets him at the equator. Will the friend agree with the weight of gold bought? If not, why?
- Calculate the force of gravitation between the earth and the sun, given that the mass of the earth= 6×10^{24} Kg and mass of the sun= 2×10^{30} Kg. The average distance between the two is $1.5 \times 10^{11}\text{m}$.

**LESSON PLAN 3 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	August 2019	Gravitation	Concept of free fall and its equation of motion & differences between mass and weight.
Expected Learning Outcome: Students will be able to ⇒ Understand and describe the concept of free fall & frame the equation of motion according to it. ⇒ Evaluate the differences between mass & weight						
Expected skill development: Computational, comprehension, visual thinking, .						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Student will review their previous knowledge by answering the following questions:

(5 min)

- ⇒ What are the factors on which the value of g depends?
- ⇒ Do you think dropping & throwing of an object is exactly the same thing?
- ⇒ What are the 3 equations of motion for a moving body?

CONTENT (Discussion method)

(20 min)

- ⇒ Define free fall

$$u=0 ; a=g$$

- ⇒ Equation of motion for freely falling objects

$$V=u+at \Rightarrow v=u+gt$$

$$S=ut+\frac{1}{2}at^2 \Rightarrow v=ut+\frac{1}{2}gt^2$$

$$V^2=u^2+2as \Rightarrow v=u^2+2gs$$

In case of downward motion of object $\Rightarrow g=+ve$

In case of upward motion of object $\Rightarrow g=-ve$

Difference in mass and weight($w=mg$)

Solve the following question:-

A stone is dropped from the edge of the roof: find

- (i) How long does it take to fall 4.9m?
- (ii) How fast does it move at the end of that fall?
- (iii) How fast does it move at the end of 7.9m?
- (iv) What is its acceleration after 1s and after 2s?

THINK-LINE: A stone falling towards Earth also attracts the Earth with the same force. Is it true?

CLOSURE:

(5min)

Which force holds the atmosphere around earth?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ What are the factors on which the value of g depends? ⇒ Do you think dropping & throwing of an object is exactly the same thing? ⇒ What are the 3 equations of motion for a moving body? ⇒ Write 3 differences between mass and weight? ⇒ Define free fall. - Evaluation/Assessment: Written questionnaire Define free fall, acceleration due to gravity, mass and weight.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
➤ A stone is released from the top of a tower of 19.6m. Calculate its final velocity just before touching ground.	A coconut is hanging on a tree at a height of 15m from the ground. A boy launches a projectile vertically upwards with a velocity of After what time will the projectile pass by the coconut?
Materials needed/Resources: Chalk, duster, NCERT, daily life examples	
Common Misconceptions: Student generally takes the concept of mass and weight	Addressing the misconceptions: By making them realize this fact that mass is the total matter contained in an object & weight is the force which that object is attracted towards the earth

Home assignments:

(5 min)

- Gravitational force on the surface of the moon is only $1/6$ as strong as gravitational force on the Earth. What is the weight in newtons of a 10Kg object on the Moon and on the Earth?

LESSON PLAN 4 [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	August 2019	Gravitation	NCERT numerical on Newton's law of gravitation and free fall

Expected Learning Outcome:

Students will be able to

- ⇒ Comprehend and solve step by step each numerical related to Newton's law of gravitation and free fall in back question of NCERT.

Expected skill development:

Comprehension, computation.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

(5 min)

Will review the previous knowledge with the following question.

- ⇒ State Newton's law of gravitation?
- ⇒ What is the value of G ?
- ⇒ What do you mean by free fall?
- ⇒ How the equations of motion change when the body is under free fall?

CONTENT (Discussion method)

(20 min)

The following numerical will be solved one by one on the blackboard by the students:

- ⇒ What happens to the force between two objects, if
 - (i) The mass of one object is doubled?
 - (ii) The distance between the objects is doubled and tripled?
- ⇒ A ball is thrown vertically upwards with a velocity of 49 m/s. Calculate
 - (i) the maximum height to which it rises,
 - (ii) The total time it takes to return to the surface of the earth.

THINK-LINE: In free fall, will heavier objects accelerate more than light ones?

CLOSURE:

(5min)

A stone is allowed to fall from the top of a tower 100m high and at the same time another stone is projected vertically upwards from the ground with a velocity of

25m/s. Calculate when and where the two stones will meet.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ State Newton's law of gravitation? ⇒ What is the value of G? ⇒ What do you mean by free fall? ⇒ How the equations of motion change when the body is under free fall?
Evaluation/Assessment: Oral Questionnaire
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
➤ A stone is released from the top of a tower of height 19.6 m. Calculate its final velocity.	➤ A stone is allowed to fall from the top of a tower 100 m high and at the same time another stone is projected vertically upwards from the ground with a velocity of 25 m/s. Calculate when and where the two stones will meet.
Materials needed/Resources: Chalk, duster, NCERT book	
Common Misconceptions: Students get confused which equation has to be used in which situation.	Addressing the misconceptions: By giving them numerical of each type to practice.

Home assignment: 5 min

Calculate the force of gravitation between the earth and the Sun, given that the mass of the earth = 6×10^{24} kg and of the Sun = 2×10^{30} kg. The average distance between the two is 1.5×10^{11} m.

LESSON PLAN 5 [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Sept 2019	Gravitation	Mass and weight and relation between g and G.
Expected Learning Outcome: Students will be able to ⇒ Comprehend and solve step by step each numerical related to mass and weight and relation between g and G of NCERT book.						
Expected skill development: Comprehension, computation, critical thinking and problem solving.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Will review the previous knowledge with the following question. (5 min)

- ⇒ What is the relation between g and G?
- ⇒ What are the differences between mass and weight?
- ⇒ What is the relation between mass and weight?

Group activity (Collaborative, leadership and communicative skill)

CONTENT (20 min)

The following numerical will be solved one by one on the blackboard by the students:

- ⇒ A ball thrown up vertically returns to the thrower after 6 s. Find
 - (a) the velocity with which it was thrown up,
 - (b) the maximum height it reaches, and
 - (c) its position after 4 s.
- ⇒ Gravitational force on the surface of the moon is only $1/6^{\text{th}}$ as strong as gravitational force on the earth. What is the weight in newton of a 10 kg object on the moon and on the earth?(Deep thinking)

CLOSURE: (5min)

Recapitulation of the concept taught by writing the 3 equation again.
Relation between G and g? (Critical thinking)

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| • Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones |

given as class-work in the notebook) ⇒ What is the relation between g and G? ⇒ What are the differences between mass and weight? ⇒ What is the relation between mass and weight?
Evaluation/Assessment: Written questionnaire Derivation of the equation Differentiate between mass and weight.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
⇒ Amit buys few grams of gold at the poles as per the instruction of one of his friends. He hands over the same when he meets him at the equator. Will the friend agree with the weight of gold bought? If not, why?	⇒ An object weighs 10 N when measured on the surface of the earth. What would be its weight when measured on the surface of the moon?
Materials needed/Resources: Chalk, duster, NCERT book	
Common Misconceptions: Students get confused which equation will be used in which situation	Addressing the misconceptions: By giving them numerical of each of the 3 types to comprehend & solve themselves.
Home assignment:	5 min

A car falls off a ledge and drops to the ground in 0.5 s. Let $g = 10 \text{ m s}^{-2}$.

(i) What is its speed on striking the ground?

(ii) What is its average speed during the 0.5 s?

(iii) How high is the ledge from the ground? (Problem solving)

**LESSON PLAN 6 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	SEPT 2019	Gravitation	Determination of density of given body.
Expected Learning Outcome: Students will be able to- Calculate the density of given object by a lab activity.						
Expected skill development: Observation, team work, calculations, Critical, communicative and leadership skills.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

GROUP ACTIVITY (Critical, collaborative and communication skills)

(5 min)

WARM UP AND INTRODUCTION

Previous knowledge of the students will be reviewed by the following question: (5 min)

- ⇒ What is the formula for density of a substance?
- ⇒ What is its SI unit?
- ⇒ What is the nature of density-scalar or vector?

CONTENT (Discussion method)

(20 min)

Students will be taken to the lab & will be divided into 4 groups.

- ⇒ All the student will be instructed to write the aim, apparatus. & obs. table of the experiment in their notebook.
- ⇒ Students will be introduced with the apparatus measuring cylinder, spring balance ,beaker
- ⇒ A common demonstration of the entire experiment will be given step by step and single observation for all the columns of the observation table is taken to show the calculations.
- ⇒ Now all the students were instructed to perform the experiment in their respective groups.
- ⇒ All the readings and calculation of the groups is recorded in their notebooks.

CLOSURE:

(5min)

Students will be asked to share the result with every other group as same type of

object is given to every group.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ What is the formula for density of a substance? (Derivative Method) ⇒ What is its SI unit? ⇒ What is the nature of density-scalar or vector? ⇒ What is the range of measuring cylinder & spring balance ⇒ What is the least count of spring balance? ⇒ Till what depth the object given should be dipped in water (a) Touching the bottom? (b) Half dipped? (c) Completely dipped?	
Evaluation/Assessment: Oral questionnaire	
DIFFERENTIATED CLASSROOM	

Learners on the way ➤ What is the range of measuring cylinder & spring balance? ➤ What is the least count of spring balance?	Advanced Learners Till what depth the object given should be dipped in water (d) Touching the bottom? (e) Half dipped? (f) Completely dipped?(Critical thinking)
Materials needed/Resources: Measuring cylinder , beaker, thread, spring balance, object	
Common Misconceptions: While taking readings, student generally observe the reading of measuring cylinder through an upward level	Addressing the misconceptions: They should be informed all the reading should be taken in the line of action or same level

Home assignments:

(5 min)

Record the activity performed in the lab manual as instructed.



LESSON PLAN 5-6 [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	70 min	SEPT 2019	Gravitation	Verification of Archimedes principle
Expected Learning Outcome: Students will be able to ⇒ Observe and calculate the weight loss of the object when kept in different liquids through lab activity.						
Expected skill development: Observation, understanding, team work, calculation, critical, collaborative and communicative skills.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION (GROUP ACTIVITY IN THE LAB)

Discussion of homework questions given in the last class
(5 min)

Will review the previous knowledge with the following questions: (10 min)

- What was the observation of the activity done in class VIII in which various vegetables are put in water?
- What do you think was the reason for that?
- What do you think about the result if in that experiment, water is replaced by some other liquid?

CONTENT (40 min)

- ⇒ All the students will be taken to the lab and will be divided into 4 groups.
- ⇒ All the students will be instructed to write the aim, apparatus and observation table of the experiment in their notebook.
- ⇒ Students will be introduced with the apparatus –measuring cylinder, spring balance, beaker, overflow cylinder.
- ⇒ A common demonstration of the entire experiment will be given step by step and single observation for all the columns of the observation table is taken to show the calculations to be done.
- ⇒ Now all the students will perform the experiment in their respective groups.
- ⇒ All the readings and calculations of the groups are recorded in their notebooks.

CLOSURE:

(10 min)

1. Students will be asked to share and compare the result with every other group (as same type of object is given to every group)
2. Students will be asked to infer a few things by answering the following questions:-
 - ⇒ Do you think the weight of the object changes when it is kept inside the liquid
 - ⇒ How the change in weight varies with tap water and glycerine? (Conceptual thinking)
 - ⇒ Does the loss in weight have any relation with amount of liquid displaced? (Critical and analytical thinking)

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) • What was the observation of the activity done in class VIII in which various vegetables are put in water? • What do you think was the reason for that? ➤ What do you think about the result if in that experiment, water is replaced by some other liquid? ➤ What is the range of measuring cylinder? ➤ What is the range of spring balance? ➤ What is the least count of measuring cylinder? ➤ What is the least count of spring balance? ➤ What is an overflow cylinder?
• Evaluation/Assessment: Identifying different scientific apparatus in the lab and finding the least count of each
DIFFERENTIATED CLASSROOM

Learners on the way ➤ What is the least count of measuring cylinder? ➤ What is the least count of spring balance?	Advanced Learners What do you think in which case the weight loss is greater-tap water or glycerine? Why?
Materials needed/Resources: Chalk, duster, NCERT, measuring cylinder, spring balance, water, object, thread, glycerine, over flow cylinder	
Common Misconceptions: Students get confused between the over flow cylinder and measuring cylinder.	Addressing the misconceptions: Confusion is cleared by showing the different functioning of the 2 cylinders.

Home assignments:

Record the activity performed in the lab manual as instructed.

**LESSON PLAN 7 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	October 2019	Gravitation	Concept of buoyancy and Archimedes principle
Expected Learning Outcome: Students will be able to ⇒ Define buoyancy and buoyant force. ⇒ Understand and evaluate factors on which buoyant force depends. ⇒ Understand and state Archimedes principle.						
Expected skill development: Comprehension, understanding, problem solving.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of homework questions given in the last class
(2 min)

Will review the previous knowledge with the following questions: (5 min)

- Have you noticed any weight change of the solid when it was dipped in water?
- In which case, the weight loss is greater-water or glycerin?
- What is the reason of the weight change?

CONTENT (Discussion method and demonstration by teacher) (20 min)

- ⇒ Define buoyant force or up thrust.
- ⇒ Define buoyancy.
- ⇒ Factors on which the value of buoyant force depends: -
 - a) Density of liquid.
 - b) Volume of liquid displaced.
- ⇒ State Archimedes principle
 - a) What is the basic principle?
 - b) What is the reason for the loss in weight of object?
 - c) What is the buoyant force equivalent to?
- ⇒ The following numerical will be solved in the class:-

A cube of side 5cm is immersed in water and then in saturated salt solution. In which case will it experience a greater buoyant force?

If each side of the cube is reduced to 4cm and then immersed in water, compare

the force experienced by the cube as compared to the first case?

THINK-LINE: You find your mass to be 42Kg on a weighing machine. Is your mass or less than 42Kg.

CLOSURE:

(5min)

Recapitulation of the concept by asking the following questions

- Define buoyant force?
- What are the 2 factors on which buoyancy depends? (Critical thinking)
- Define buoyancy?
- State Archimedes principle?

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ Define buoyant force? ➤ What are the 2 factors on which buoyancy depends? ➤ Define buoyancy? ➤ State Archimedes principle? ➤ What is the buoyant force equivalent to?
• Evaluation/Assessment: Written questionnaire ➤ Define buoyancy? ➤ State Archimedes principle?
DIFFERENTIATED CLASSROOM

Learners on the way ➤ Do all bodies immerse in a given fluid experience the same buoyant force?	Advanced Learners When an object is suspended with a string, it gets stretched but when the object is completely immersed in water, the extension of the thread decreases. explain?
Materials needed/Resources: Chalk, duster, NCERT.	
Common Misconceptions: Students get confused in understanding the concept of weight of liquid displaced.	Addressing the misconceptions: It is resolved by telling them that $F = mg$ $= (\text{mass of liquid displaced})g.$

Home assignments:

(3 min)

You have a bag of cotton and iron bar, each indicating a mass of 100Kg when measured on a weighing machine. In reality, one is heavier than the other. Can you say which one is heavier and why?

LESSON PLAN 8 [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	October 2019	Gravitation	Law of floatation in terms of buoyant force and weight.
Expected Learning Outcome: Students will be able to ⇒ Understand and state the law of floatation in terms of weight and buoyant force. ⇒ Also understand the working of submarines.						
Expected skill development: Comprehension, analysis, Collaborative and communicative skills.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Students will review their previous knowledge by the following question. (5 min)

- ⇒ Can you name few objects which will sink when kept in water?
- ⇒ Can you name few objects which will float in the same case?

CONTENT (Discussion method and Demonstration by teacher)

(20 min)

- ⇒ The two factors acting on the bodies immersed inside a liquid:
 - (a) Weight of the body acting downwards.
 - (b) Buoyant force acting upwards.So the body will go in that direction, in which the force acting is greater.
Working of submarines:
 - (a) Take water inside => become heavy=> buoyant force < weight => sink.
 - (b) Pumps out water become light => B.F > weight => sink. (Critical thinking)

CLOSURE:

Students will note down the observation about objects which float and sink and state the law of floatation and its application for the examples demonstrated (5 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

⇒ Can you name few objects which will sink when kept in water? ⇒ Can you name few objects which will float in the same case? ⇒ Why the icebergs are 70% inside water & 30 % above water? ⇒ State the conditions in which a body floats when immersed in a liquid?
⇒ Evaluation/Assessment: Oral questionnaire State the conditions in which a body floats when immersed in a liquid?
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
➤ State the conditions in which a body floats when immersed in a liquid?	Why the icebergs are 70% inside the water & 30 % outside?
Materials needed/Resources:	
Chalk, duster, NCERT, daily life examples	
Common Misconceptions: It becomes difficult for the students to understand the condition when the body immersed float at same portion.	Addressing the misconceptions: By making the students understand that at that position their weight becomes nearly equal to buoyant force acting.

(5 min)

Home assignments:

1. In which direction does the buoyant force on an object immersed in a liquid act?
2. State the law of floatation

LESSON PLAN 9 [2019 - 2020]



DLF Public School

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	October 2019	Gravitation	Applications of buoyancy and Archimedes principle
Expected Learning Outcome: Students will be able to ⇒ Understand and analyze the various day-to-day life applications of buoyancy and buoyant force. ⇒ State the applications of Archimedes principle.						
Expected skill development: Comprehension, understanding, critical thinking, Analysis and brainstorming.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of homework questions given in the last class

Will review the previous knowledge with the following questions: (3 min)

- State Archimedes principle?
- What are the 2 factors on which buoyancy depends?

CONTENT (GROUP ACTIVITY) Group will be divide with topic given to students) (20 min)

- ⇒ The following applications of buoyant force in our daily life will analyzed one by one:-
 - a) A block of plastic released under water come up to the surface of water.
 - b) While drawing water from a well, the bucket of water appears to be heavier as it comes out of water.
 - c) Iron nail in water sink but the ship made up of tones of same iron float.
- ⇒ Three applications of Archimedes principle will be discussed in brief: -
 - a) Lactometers
 - b) Hydrometers
 - c) Designing of ships and submarines (Creativity and critical thinking)

CLOSURE: (5min)

Recapitulation of the concept by asking the following questions

- What are the 2 factors on which buoyancy depends?
- State Archimedes principle?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ State Archimedes principle? ➤ What are the 2 factors on which buoyancy depends? ➤ Do all bodies immerse in a given fluid experience the same buoyant force? ➤ When an object is suspended with a string, it gets stretched but when the object is completely immersed in water, the extension of the thread decreases. Explain?	
- Evaluation/Assessment: ➤ What are the 2 factors on which buoyancy depends? ➤ Do all bodies immerse in a given fluid experience the same buoyant force?	
DIFFERENTIATED CLASSROOM	

Learners on the way	Advanced Learners
➤ Do all bodies immerse in a given fluid experience the same buoyant force?	When an object is suspended with a string, it gets stretched but when the object is completely immersed in water, the extension of the thread decreases. Explain?
Materials needed/Resources: Chalk, duster, NCERT	
Common Misconceptions: Students get confused in understanding the concept of weight of liquid displaced.	Addressing the misconceptions: It is resolved by telling them that $F = mg$ $= (\text{mass of liquid displaced})g$.

Home assignments:

(2 min)

Why does a plastic block released under water come up to the surface of water?

**LESSON PLAN 10 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	October 2019	Gravitation	Concept of density & relative density.
Expected Learning Outcome: Students will be able to ⇒ Define density & relative density along with their SI unit. ⇒ Understanding & state law of floatation and terms of relative density. ⇒ Comprehend the concept by doing numerical related to it.						
Expected skill development: (PMI) Comprehension, numerical ability, analysis and problem solving.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Students will review their previous knowledge by the following question. (5 min)

- ⇒ State law of floatation?
- ⇒ What is the SI unit of mass and volume?

CONTENT (discussion method and demonstration by teacher)**(20 min)**

- ⇒ Define density, write its SI unit and the nature of physical quantity.
Density= mass of substance/volume of substance
 - ⇒ Law of floatation in terms of relative density.
 - (a)relative density >1=> body sink
 - (b)relative density ≤ => body float
- => students will do following numerical on the board one by one:

(PROBLEM SOLVING) BY THINK PAIR SHARE.

- 1) Density of gold is 19300 kg/m^3 . what will be the mass of gold brick with dimension of $5\text{cm} \times 10\text{cm} \times 20\text{cm}$?
- 2) The volume of 30 kg of a solid is 20cm^3 . Will it float or sink?
- 3) The dimensions of wooden block are $2\text{m} \times 0.25\text{m} \times 0.10 \text{ m}$ if relative density of wood is 0.6, calculate the mass of block in kg.

CLOSURE:**(5 min)**

Students will recapitulate the formula of density & relative density by writing them again.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ Define density of a substance? ⇒ State law of floatation? ⇒ Define relative density? ⇒ What is the SI unit of mass and volume? ⇒ Arrange the following in increasing order of their relative density: air, iron, water.
Evaluation/Assessment: Oral questionnaire Arrange the following in increasing order of their relative density: air, iron, water
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
➤ Arrange the following in increasing order of their relative density: air, iron, water.	The dimension of wooden block are 2m x 0.25m x 0.10 m. if relative density of wood is 0.6.calculate mass of the block in kg.
Materials needed/Resources: Chalk, duster, NCERT	
Common Misconceptions: Students get confused when to use the density of water in g/cm^3 and when in kg/cm^3?	Addressing the misconceptions: By telling them this fact that anything can be used. ⇒ If g/cm^3 is used $\Rightarrow$ mass will be calculated in g ⇒ If kg/cm^3 is used $\Rightarrow$ mass will be calculated in kg

Home assignments:

(5 min)

- The dimension of wooden block is 2m x 0.25m x 0.10 m. if relative density of wood is 0.6. Calculate mass of the block in kg. (Problem solving)
- The volume of 500g sealed packet is 350cm^3 . Will the packet float or sink if the density of water is 1g/cm^3 ? What will be the mass of the water displaced by this packet?
- The volume of 50g of a substance is 20cm^3 . If the density of water is 1g/cm^3 , will the substance float or sink?