

**SAINIK SCHOOL, AMARAVATHINAGAR**

XII

**HOLIDAY HOMEWORK – 2019 – 2020**

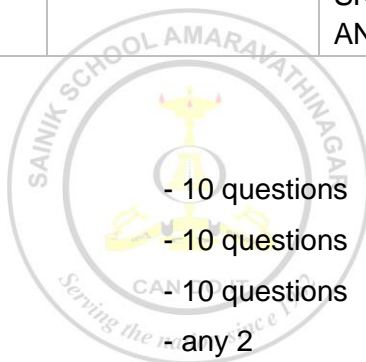
**Class: XII**

**Subject: BIOLOGY**

SL. NO	TOPICS	ACTIVITY	TIME REQUIREMENT	LEARNING OUT COMES	ANNEXURE
1	PRICIPLES OF INHERITANCE	READING AND WRITING	5Hrs	KNOWLEDGE, UNDERSTANDING	A
2	MOLECULAR GENETICS	READING AND WRITING	5Hrs	KNOWLEDGE, UNDERSTANDING	B
3	EVOLUTION	READING AND WRITING	5Hrs	KNOWLEDGE, UNDERSTANDING	C
4	PROJECT	LEARNING BY DOING	48 Hrs	KNOWLEDGE, UNDERSTANDING, APPLICATION, SKILL, EXPERIENCE AND EXPOSSURE.	D

**ANNEXURE :**

- A. PRICIPLES OF INHERITANCE
- B. MOLECULAR GENETICS
- C. EVOLUTION
- D. PROJECT



- 10 questions
- 10 questions
- 10 questions
- any 2

**TEACHER'S NAME:**

**SIGNATURE**

**Recommended By**

**Approved By**

**Vice Principal**

**Principal**

**PRICIPLES OF INHERTANCE****Read and write the followings:**

1. In a Mendelian monohybrid cross, the F<sub>2</sub> generation shows identical genotypic and phenotypic ratios. What does it tell us about the nature of alleles involved? Justify your answer.
2. Can a child have blood group O if his parents have blood group 'A' and 'B'. Explain.
3. What is Down's syndrome? Give its symptoms and cause. Why is it that the chances of having a child with Down's syndrome increases if the age of the mother exceeds forty years?
4. How was it concluded that genes are located on chromosomes?
5. A plant with red flowers was crossed with another plant with yellow flowers. If F<sub>1</sub> showed all flowers orange in colour, explain the inheritance.
6. What are the characteristic features of a true-breeding line?
7. In peas, tallness is dominant over dwarfness, and red colour of flowers is dominant over the white colour. When a tall plant bearing red flowers was pollinated with a dwarf plant bearing white flowers, the different phenotypic groups were obtained in the progeny in numbers mentioned against them:  
Tall, Red = 138      Tall, White = 132      Dwarf, Red = 136      Dwarf, White = 128  
Mention the genotypes of the two parents and of the four offspring types.
8. Why is the frequency of red-green colour blindness is many times higher in males than that in the females?
9. If a father and son are both defective in red-green colour vision, is it likely that the son inherited the trait from his father? Comment.
10. Discuss why *Drosophila* has been used extensively for genetically studies.

**MOLECULAR GENETICS**

Read and write the followings “

1. Define transformation in Griffith's experiment. Discuss how it helps in the identification of DNA as the genetic material.
2. Who revealed biochemical nature of the transforming principle?  
How was it done?
3. Discuss the significance of heavy isotope of nitrogen in the Meselson and Stahl's experiment.
4. Define a cistron. Giving examples differentiate between monocistronic and polyeistronic transcription unit.
5. Give any six features of the human genome.
6. During DNA replication, why is it that the entire molecule does not open in one go? Explain replication fork. What are the two functions that the monomers (d NTPs) play?
7. Retroviruses do not follow central Dogma. Comment.
8. In an experiment, DNA is treated with a compound which tends to place itself amongst the stacks of nitrogenous base pairs. As a result of this, the distance between two consecutive base increases. from 0.34nm to 0.44 nm calculate the length of DNA double helix (which has  $2 \times 10^9$  bp) in the presence of saturating amount of this compound
9. What would happen if histones were to be mutated and made rich in acidic amino acids such as aspartic acid and glutamic acid in place of basic amino acids such as lysine and arginine?
10. Recall the experiments done by Frederick Griffith, Avery, MacLeod and McCarty, where DNA was speculated to be the genetic material. If RNA, instead of DNA was the genetic material, would the heat killed strain of Pneumococcus have transformed the R-strain into virulent strain? Explain.

**EVOLUTION**

**Read and write the followings :**

1. What were the characteristics of life forms that had been fossilised?
2. Did aquatic life forms get fossilised? If, yes where do we come across such fossils?
3. What are we referring to? When we say 'simple organisms' or 'complex organisms'.
4. How do we compute the age of a living tree?
5. Give an example for convergent evolution and identify the features towards which they are converging.
6. How do we compute the age of a fossil?
7. What is the most important pre-condition for adaptive radiation?
8. How do we compute the age of a rock?
9. When we talk of functional macromolecules (e.g. proteins as enzymes, hormones, receptors, antibodies etc), towards what are they evolving?
10. In a certain population, the frequency of three genotypes is as follows:

**Genotypes:** BB Bb bb      **Frequency:** 22% 62% 16%

What is the likely frequency of B and b alleles?

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**PROJECTS**

**Choose any two from the following titles, submit a detailed report on your studies.**

**Microbes in Human Welfare :**

- ❖ Study On Gene Therapy
- ❖ Study Of Effects Of Antibiotics On Micro-Organisms
- ❖ Effects of Fertilisers, Manure and Polythene on the rate of elongation of the Hypocotyl
- ❖ Spermatogenesis
- ❖ Study on Enzymes
- ❖ Drug Addiction
- ❖ To Study of Drug Resistance In Bacteria Using Antibiotics
- ❖ To Study the Coaguable And Non-Coaguable Milk Proteins
- ❖ Mitosis in Onion Root Tip Cells
- ❖ Cellulitis
- ❖ Possible Effects of Maternal Behaviour on Foetal Development



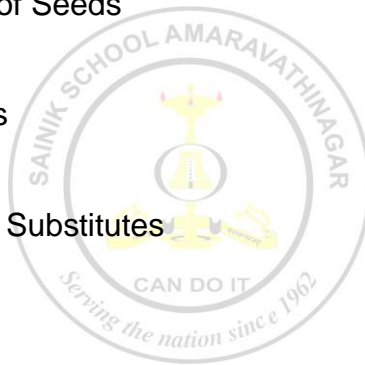
- ❖ Pollination
- ❖ Detailed Study on Infertility its Causes and Treatment
- ❖ Eye Diseases
- ❖ DNA Fingerprinting
- ❖ Recombinant DNA Technology In Todays Medicine
- ❖ How to See DNA with the Naked Eye
- ❖ Human Genome Project
- ❖ Dispersal of Seeds
- ❖ Turning to Motor Learning
- ❖ Eye Can See You
- ❖ Can Dog Drool Kill Germs
- ❖ Growing Yeast: Sugar Fermentation
- ❖ How Does Mold Grow
- ❖ How Does Microwave Radiation Affect Different Organisms
- ❖ What Music Does Bacteria Enjoy the Most
- ❖ How Does Light Affect Yeast
- ❖ Coffee Addiction



- ❖ Effect of Cannabis on the Human Body
- ❖ Eye Disorders in Children and Adolescents
- ❖ Human Cloning: Another You?
- ❖ Thigmotropism In Tendrils
- ❖ The Effect of Oil Spills on Oceans
- ❖ Harmful Effects of Mobile Radiation
- ❖ On Recent Diseases - Ebola
- ❖ Effects of Fertilisers, Manure and Polythene on the rate of elongation of the Hypocotyl
- ❖ Sickle Cell Anemia and its Prevention
- ❖ How Cigarettes Affect Your Health
- ❖ Study on Probiotics and their Preparation
- ❖ The Way Blood Works
- ❖ Testing the toxicity of Marine Pollutants using Daphnia
- ❖ Antibiotics Naturally
- ❖ Brush Away You Smile
- ❖ Ability of Curry and Cinnamon to Inhibit Bacterial Growth
- ❖ Which Cheese Grows Mold The Fastest



- ❖ Using Garden Mulch to Make a Bug Zoo
- ❖ What is the Best Way to Disinfect a Toothbrush
- ❖ Erasing and Implanting Human Memory
- ❖ Does Price and Vitamin C Affect How Fast Fruits Rot
- ❖ Strawberry DNA Extraction
- ❖ What Effect Does Glucose Have on the Longevity of Cut Flowers
- ❖ Diffusion VS Food Coloring
- ❖ Microwave and Germination of Seeds
- ❖ Heart Rate and Video Games
- ❖ Yeast Reproduction in Sugar Substitutes
- ❖ Angina Pectoris
- ❖ Pedigree Analysis
- ❖ Urinalysis
- ❖ Ozone Depletion
- ❖ Family Fingerprints
- ❖ To Chew or Not to Chew
- ❖ Does Blood Pressure Affect Heart Rate

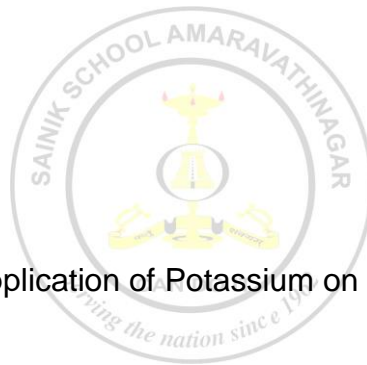




- ❖ Retinal Glare Recovery
- ❖ Whose Mouth Is Cleaner
- ❖ Measuring Human Horsepower
- ❖ Does a Mouse Rely More on His Spatial Memory or Vision
- ❖ Conserving Agricultural Irrigation Water by Controlling Transpiration Loss via Wind
- ❖ Effects of Ocean Water as an Irrigation Supplement on the Growth of Rice Seedlings
- ❖ How Does Music Affect Plant Growth
- ❖ Factors Affecting Nodule Formations in Legumes
- ❖ What Do Plants Need Most
- ❖ Compost or Fertilizer
- ❖ Effect of Sugar on Bean Plant Growth
- ❖ Does the Color of Light Affect Plant Growth
- ❖ Is Spinach Made in the Shade
- ❖ The Speed of Sprouting Seeds
- ❖ Investigating Seed Tolerance for Freezing Temperatures
- ❖ Fun with Phosphorus
- ❖ Comparing Varying Levels of Oxygen Aeration in Increasing Plant Production



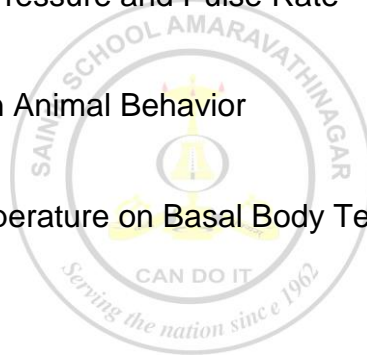
- ❖ Salt: Friend or Foe
- ❖ Cattails in the Water
- ❖ Cloning 101
- ❖ What Angle of Impact Has the Most Effect on Making a Bruise
- ❖ Ultraviolet Radiation
- ❖ Do Rats Learn Faster with Peer Pressure
- ❖ Can You Make the Grade
- ❖ Effects of Reading and Working on the Computer on Vision
- ❖ Blowing Off Carbon Dioxide
- ❖ Are Fingerprints Hereditary
- ❖ Effect of the Timing of the Application of Potassium on Antirrhinum
- ❖ Determining the Effects of Water Temperature and Exposure Terms on Seed Germination
- ❖ Effect of Color on Cherry Trees
- ❖ Hydroponics and Aeroponics
- ❖ Suck It Up
- ❖ Phytoremediation of Zinc
- ❖ Comparison of the Effectiveness of Organic Worm Castings
- ❖ Is It All Downhill from Here



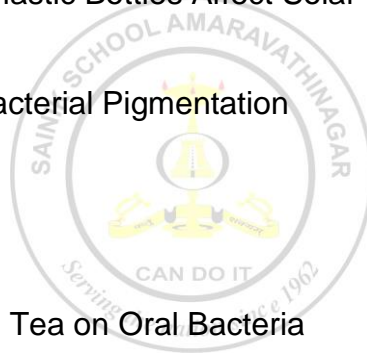
- ❖ Sunless Sunflowers
- ❖ Does Greater Leaf Diameter Increase Transpiration Rate of Rose Geranium
- ❖ Physiology of Plants in a Simulated Martian Atmosphere
- ❖ Death in a Water Bath
- ❖ Making of a Potpourri Fertilizer
- ❖ Does Beta Carotene Prevent Tumor Growth in Plants
- ❖ Growth Rate of *Poa pratensis* in Pure Humus
- ❖ Diabetes and Exercise
- ❖ The Power of Rat Senses
- ❖ Which Color is Dominant in Mice
- ❖ Does Varying Feed Affect the Milk of Lactating Caprines
- ❖ Are Mice Territorial
- ❖ Bioartificial Engineered Heart Tissue
- ❖ Effects on the Flow Rate, as a Representation of Stroke Volume
- ❖ Maintaining Correct Balance
- ❖ Effects of Diet on Blood Glucose
- ❖ Ammonia: The Passed Gas



- ❖ Do the Right and Left Ears Hear Notes Differently
- ❖ Got Stamina?
- ❖ Do You Hear What I Hear
- ❖ Blood Pressure
- ❖ Nail-Patella Syndrome Phenotype Expression
- ❖ Effect of Pupil Dilation on Peripheral Vision
- ❖ Now You See It, Now You Don't
- ❖ Effect of Exercise on Blood Pressure and Pulse Rate
- ❖ Effects of Various Aromas on Animal Behavior
- ❖ Effect of Ingested Fluid Temperature on Basal Body Temperature in Humans
- ❖ How Fibonacci Is Your Face
- ❖ Get a Head Start II
- ❖ Doggy Vision
- ❖ Does Oregano Oil Have an Antibiotic Effect?
- ❖ Do Different Diets in Ruminant Animals Affect the Microorganism Colony Growth?
- ❖ The Effect of Alkaline and Acids on Bacterial Growth
- ❖ Saving the World One Yard at a Time



- ❖ Ethyl Alcohol vs. E. coli
- ❖ Effectiveness of Various Spices in Promoting or Inhibiting the Spoilage Rate of Food
- ❖ There's a Germ Out There
- ❖ Effects of Different External Factors in Changing the Effectiveness of Various Antibiotics
- ❖ Demolishing Dental Bacteria
- ❖ Kimchi, Spicy Korean Culture
- ❖ Staph Aureus
- ❖ Does the Surface Clarity of Plastic Bottles Affect Solar Water Disinfection?
- ❖ Effects of Temperature on Bacterial Pigmentation
- ❖ Do Bacteria Like Gasses
- ❖ Study of the Effects of Green Tea on Oral Bacteria
- ❖ Mystery behind Bacteria Levels in Gym Equipment
- ❖ Fungus among Us
- ❖ Yeast past Its Code Date
- ❖ Meat That's Raw
- ❖ PH Tolerance of Microbes
- ❖ Which Ground Beef Has the Least Bacteria?



- ❖ Do Different Dilutions of Disinfectants Affect the Development of Bacterial Resistance?
- ❖ Isolation of Staphylococcus aureus from Raw and Pasteurized Milk
- ❖ Is Garlic Antibacterial
- ❖ How Much Bacteria Is on Your Retainer
- ❖ What Is the Best Way to Clean Your Toothbrush?
- ❖ Study of Bacteria Growth in Varying Acidic Environments
- ❖ Which Acne Medications Are Most Effective
- ❖ Beleaguered Beef
- ❖ Study of the Health Benefits of Spicy Cooking
- ❖ What Are the Effects of Ultraviolet Light on Bacteria Mortality?
- ❖ The Five Second Rule
- ❖ Bacteria Affected by Ultra-Violet Light

