

## **Department of chemistry and Biochemistry.**

The college has well equipped labs in order to provide the study centered environment and to emphasize the fundamental understanding in chemical, physical and biological principles, effective application of scientific method, critical thinking, quantitative analysis and intensive experimental learning activities.

The goal is nurturing the young brain with in-depth and advanced scientific knowledge and capable of rational thinking. Chemistry department has five well equipped labs among which three are utilized for Undergraduate course (B.Sc.) and two are utilized for Post graduate course (M.Sc.), for both chemistry and biochemistry streams. The labs are having all the chemicals, glassware and instruments required for the experiments and their dissertation work. The entire lab in charge and lab attender will be trained always regarding how to handle hazardous chemicals. Stock of chemicals and glass wares is well maintained and audited from time to time.

When one chooses to study chemistry, it is not just important by necessary to attain the practical skills also. We make our students to do practical regularly through proper guidance and follow systematic protocols. The practical classes in our college is meant to teach you not only the practical skills that you may need to be a scientist but also other skills such as problem-solving, time management, organization. We believe that the practical knowledge gained during undergraduate level should also teach them how to work safely in a chemistry laboratory and with

chemicals as they will learn how to assess the potential dangers associated with every chemical they use.

We keep doing to give instructions to the students before starting the experiments for the particular semester curriculum. The students are not permitted in lab without wearing the safety measures especially the lab coat. Three of our chemistry labs are exclusively given for carrying out the undergraduate practical under both Chemistry and Biochemistry streams. The teachers always put interest to monitor students' progress in handling their lab from first to last year.

By the end of third year of their degree, the students are expected to have learned;

- Basic experimental skills such as titrations, synthesis and purification of organic and inorganic compounds.
- The safe and confident use of chemical apparatus and chemicals.
- How to obtain accurate results.
- To make careful observation of chemical reactions and correlate the experiments they do in labs with the theory classes.
- To analyze and interpret the experimental data.

These skills thus acquired by the students make them to work confidently in industries and other laboratories after their degree.

### **Lab-01:**

This lab is allotted for Organic chemistry experiments. 3<sup>rd</sup> semester B.Sc. students carry out the experiments like preparation of organic compounds, determination of Physical constants like Melting point for different organic solids and Boiling point of different organic liquids. This lab is equipped with electric water bath (thermostat), Boiling point apparatus (condensation unit) and melting point apparatus (Thiel's tube) and other apparatus required to conduct organic chemistry experiments. This lab includes instrumentation room for the storage of instruments, store room for the storage of chemicals and apparatus issue room, from where the

instruments will be issued to the students whenever they require apparatus and to collect it back. Each practical is of 3 hours duration. In the end of each semester students must undergo practical model exams before they go for final university exam.



## Lab-02:

This lab is allotted for Inorganic as well as Physical chemistry experiments. 1<sup>st</sup> semester B.Sc. students learn Inorganic chemistry experiments like titrations and estimations of inorganic compounds, in 2<sup>nd</sup> semester they learn the Physical chemistry experiments like determination of physical constants like Viscosity, Surface tension, Distribution Coefficient of binary liquids, Molar Mass of electrolytes and non-electrolytes, transition temperature of a salt hydrate and degree of dissociation of electrolytes, etc. In 6<sup>th</sup> semester they perform the physical chemistry experiments including Potentiometric, Colorimetric and Conductometric titrations for the estimation of compounds.

This lab is equipped with electric water bath (thermostat), hot air oven, Distillation unit, fume exhaust hood's, Viscometer, stalagmometer, Colorimeter, PH meter, potentiometer, electrodes, Cooling Centrifuges, Electrophoretic units, reflex condenser, magnetic stirrer, etc. This lab also has an apparatus issue room, from where the instruments are issued to the students.





### Lab-03:

This lab is allotted for inorganic chemistry experiments like systematic semi-micro qualitative analysis of inorganic salt mixture and estimation of inorganic compounds.

It is equipped with Muffle furnace, centrifuge machines, electric water bath and instruments required for inorganic chemistry experiments. This lab also includes Instrumentation room and Apparatus issue room.



## **Lab 4 (Biochemistry PG)**

We have Biochemistry Lab is well equipped with Basic instruments, Chemicals, Glassware, Immunological kits and Molecular Biology Kits. Our Biochemistry lab met the required facilities, instruments for M.Sc experiments and project work as per University designed experiments.

Biochemistry lab is equipped with Colorimeter, PH meter, Cooling Centrifuges, Refrigerator with Freezer, Incubator, Hot Plates, Water bath, Burette stands, Electronic weigh balance, Bunsen burner, Micropipette (0.5  $\mu$ l – 10  $\mu$ l, 2 – 20 $\mu$ l, 20 – 200 $\mu$ l and 200 – 1000 $\mu$ l), Trans Illuminator (UV), Basic Microscope, Electrophoretic units both horizontal and vertical, etc.

Clearly, we have displayed an information about laboratory Do's and Don'ts in entry of our lab.

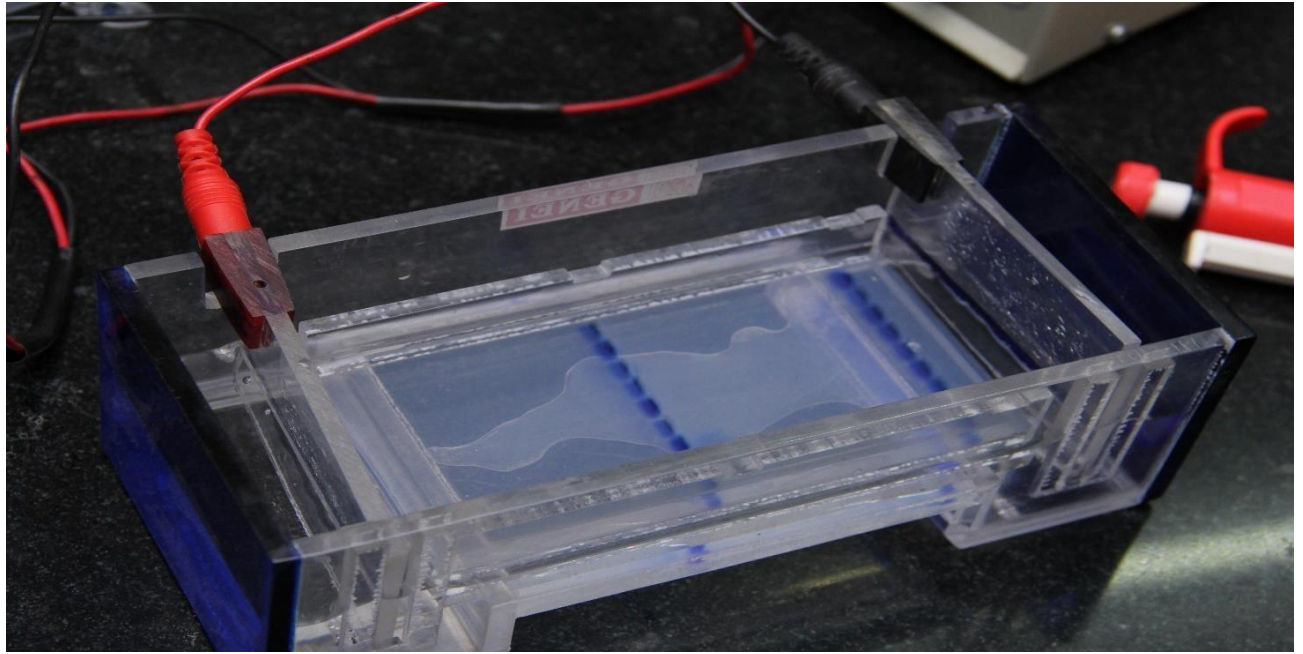
Stock will be taken care every year. Lab-in charge and Attenders are trained with basics of chemistry. Lab-in charge is taught to take care of hazardous chemicals. Laboratory is always maintained. It is pre-prepared before starting any lab class or practical.

The first semester of the new curriculum is dedicated to instruction in modern biochemical concepts and methods, including amino acid, protein and nucleic acid estimations. Estimations of Vitamin, Hydrolysis and Chromatography (Thin layer, Paper, Ion Exchange), while the second semester focuses on. Double immune diffusion and radial immune diffusion ELISA, immune-blotting techniques, Rocket electrophoresis. Basic python programming, ANOVA using R and Data mining using R Students also taught through computational biology. Biochemical enzyme kinetics  $K_m$ ,  $V_{max}$ , Inhibition studies, PH and temperature optimization also learned from second semester.

Third semester mainly focused on clinical Biochemistry and molecular biology. Estimations of glucose, urea, Hb, Cholesterol, calcium, Creatinine, Bilirubin, SGOT and SGPT. Isolation, quantification and characterization of genomic and plasmid DNA, from plant and Bacteria. Concepts of PCR, RT-PCR, South blotting also learned through demonstration program through external laboratory experts in our lab.

Fourth semester focus on genetic engineering and protein chemistry. Extraction and isolation of enzymes (phosphatases / esterases / amylases) from Insect / Microbial / Plant sources. Preparation of Competent cells and Synthesis of cDNA. Isolation and characterization of gene fragments for cloning and Restriction digestion of isolated plasmid DNA are done in our lab.

Students have to do project for final semester as per their curriculum. They have to submit their dissertation record in university. Students generally do their project work in our Biochemistry lab under the guidance of some teacher. We have equipment for phytochemical extraction units like Soxhlet extractor apparatus. Students apply the methods and concepts from the first, second and third semester knowledge to design and execute a project work in their fourth semester. The year-long course concludes with groups of students preparing a manuscript (scientific paper) through lab PC and orally presenting a scientific poster that details their findings.





#### **Lab 4 (Chemistry. PG).**

Laboratory work is an established part of courses in chemistry in higher education. The original reasons for its development lay in the need to produce skilled technicians for industry and highly competent workers for research laboratories and 'hands-on' laboratory time is part of wider process of learning. In consideration of this, our college provides separate well-equipped laboratory for post graduate students.

The practical experimentation reinforces the material which have learned in class and it gives students a chance to apply their knowledge. As per the curriculum Inorganic/ Physical chemistry experiments and Organic chemistry experiments were carried out by I year and II year M.Sc., students respectively. The lab equipped with chemicals, glassware's, instruments, working tables, and can accommodate 25 students per session. To perform the experiments lab equipped with instruments like PH meter, calorimeter, conductometer, potentiometer, magnetic stirrer etc. It also has fume hood, fire extinguisher, waste disposal unit and exhaust fans. The lab in-charge and lab attenders trained regarding handling and storage of chemicals, reagent preparation, glassware cleaning, instruments calibration and stock maintenance.

In Inorganic practical's students learn inorganic salt analysis, Inorganic complex preparations, gravimetric and volumetric analysis of salts. In Physical chemistry, they always learn chemical kinetic studies, thermodynamic related experiment, colorimetric, potentiometric, conductometric experiments. In organic chemistry students learn about analysis of organic compounds and synthesis of various organic compounds via single or multi step reactions, separation and analysis of binary mixture of organic compound. Along with it they also perform isolation and estimation experiments.



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## Department of Mathematics

The Mathematics Lab is equipped with 15 computers that have internet access and an LCD projector. It offers students the opportunity to discover mathematics hands-on. The lab enables students to tackle mathematical problems using various software tools like Scilab, Maxima, and Python, allowing for graphical visualizations that enhance conceptual understanding. This space encourages informal exploration of mathematics, fostering creativity and the design of new activities. Ultimately, the Mathematics Lab serves as a dynamic environment where anyone can experiment with patterns and ideas.



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## **Department of Bio Technology**

The learning process is made more engaging by the use of experimental learning, participatory learning, and problem-solving techniques. Bangalore Central University has included provisions for experimental and participatory learning in the design of all of its curricula. The students are encouraged to join any industry, advanced laboratory, MNC, etc. or can design the experiments in accordance with the Bangalore Central University syllabus, either for internships or projects in the fourth semester, while the professors are encouraged to embrace problem-solving approaches. A key component of CIA in all programmes is the use of student-centered approaches by departments to provide project work, assignments, quizzes, presentations, etc.

Every semester, the curriculum is planned in a comprehensive way that gives both theory and practice equal weight. The department has frequent meetings to discuss academic, curriculum, co-curricular, and extracurricular activities. Departmental minutes are taken during these meetings. Each separate faculty with a specific specialization is given a schedule and task.

Practical exercises are carried out and developed to the level of research projects. Depending on the overall number of students in each part (both UG and PG), students are divided between 2–5 batches. Every student is encouraged to complete practical's both alone and in groups. To determine the significances and effects of the experiments, the practical results are combined. The initiatives are created and carried out as "in house projects" at the PG levels. The department has seven labs available, including two for undergraduate biotechnology students, two for genetics students, one for graduate students, and the other two for plant tissue culture and animal tissue culture. The experimental/laboratory technique is utilized to personally introduce the pupils to the facts through hands-on experience. Students perform the necessary research to confirm the relevant facts and procedures.

The activity-centered technique and the student-centered method are more reliable and successful in delivering educational experiences. Students show interest in and gain knowledge through activities such as creating charts, creating experimental models that are similar to or functional, utilizing materials and equipment that are affordable, durable, and useful, and giving learning experiences. Teachers utilize the



inductive-deductive technique in laboratories in addition to giving lectures to help students acquire a scientific mindset. During lab instruction, faculty personnel employ ICT through power point presentations and e-contents.

Professors of the department are very active in encouraging students to participate in agricultural extension activities.

Industrial tours/training at institutions like Biocon, Biozeen, IIHR, ICAR, CSIR etc. , extension activities are a part of experiential and participatory learning as they help student'sstudents become familiar with modern research techniques quite early in their courses.

Agricultural extension activities, specifically field visits/educational excursions/study tours and the organization of camps conducted by students for development, in the program "From school to community".

Visiting horticulture, floriculture and agriculture fields helps students work cooperatively, interact with each other, take responsibility and develop confidence. It stimulates students' interest and creates opportunities for freedom of thought and the free exchange of different views.







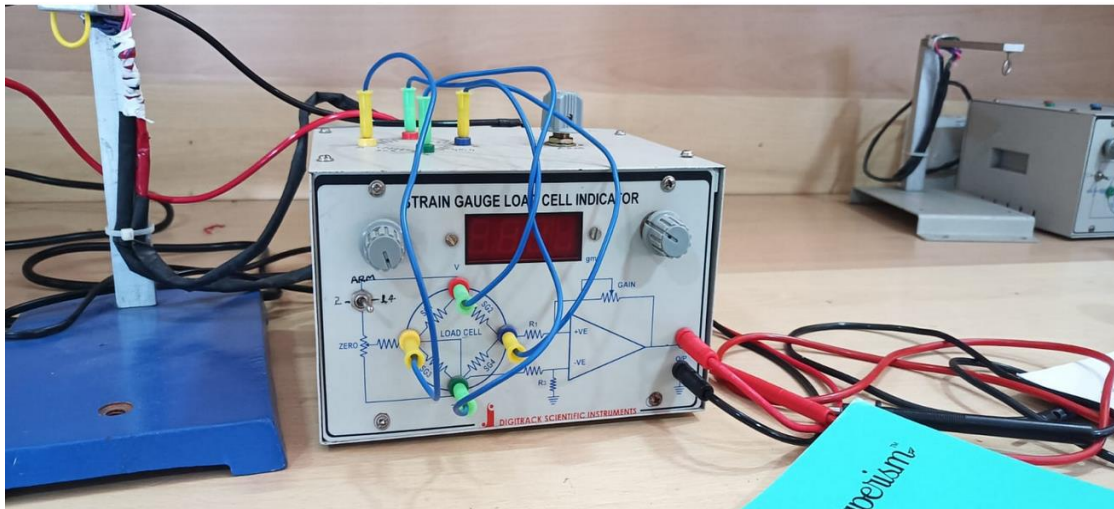
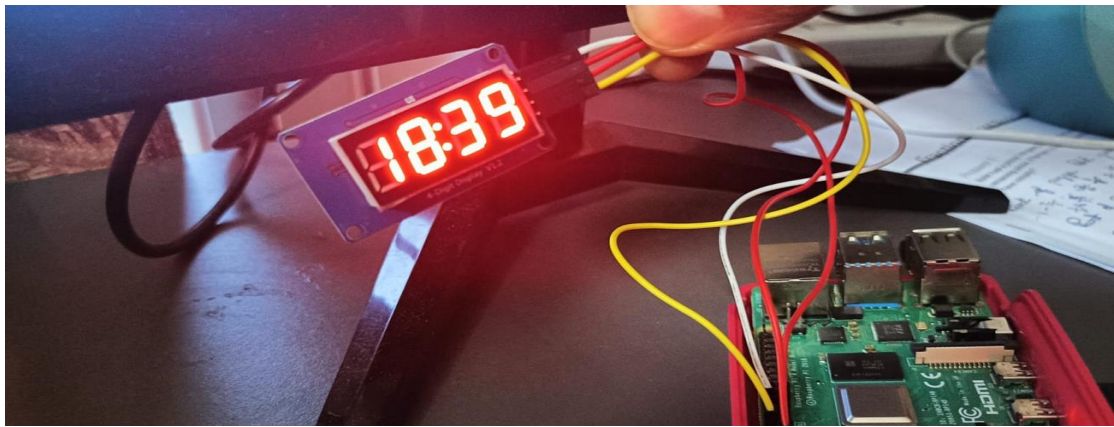
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## DEPARTMENT OF ELECTRONICS

### OBJECTIVE OF ELECTRONICS LAB

- Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fields of electronics both in industries and research.
- To acquire experimental skills, analysing the results and interpret data. Ability to design develop / manage / operation and maintenance of sophisticated electronic gadgets / systems / processes that conforms to a given specification within ethical and economic constraints.
- Capacity to identify and implementation of the formulate to solve the electronic related issues and analyse the problems in various sub disciplines of electronics.
- Gain the knowledge of programming the system using C programming language.
- The ability to code and simulate any digital function in Verilog HDL.
- Hands on training in Internet of things(IOT) experiments using Raspberry Pi and Instrumentation.
- Learn advanced coding techniques required for current industrial practices





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## Department of Computer Science

The computer lab plays a vital role in supporting various academic activities for our students, and it is essential to ensure its efficient operation and maintenance to meet industry standards. Located on Levels 4 and 5 of the campus, the lab is equipped with computers that are regularly updated to meet the specifications required for modern software and applications. Each lab accommodates up to 60 students and staff members during regular hours. The computers are well-maintained, with routine hardware checks conducted to ensure optimal performance. However, it is advisable to develop a hardware upgrade plan to keep pace with technological advancements and evolving academic needs. The lab features a wide range of software applications essential for academic purposes, including the Microsoft Office Suite, programming environments, statistical analysis tools, and internet browsers. Regular software updates are carried out to maintain system security and functionality. The lab is also connected to the institution's high-speed internet, providing fast and reliable access for students and staff.





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## DEPARTMENT OF PSYCHOLOGY

A Psychology Lab is a controlled environment where psychological research and experiments are conducted to study behavior, cognition, emotions, and mental processes. It is an essential component of both academic and applied psychology, providing the necessary space for experimentation, data collection, and analysis.



### Purpose of Psychology Lab

- **Conduct Controlled Experiments:** To test hypotheses and theories about human behavior and mental processes in a controlled environment.
- **Empirical Data Collection:** To gather quantitative and qualitative data that can be analyzed to draw conclusions about psychological phenomena.
- **Training and Skill Development:** To train students and researchers in research methodologies, experimental design, data analysis, and scientific writing.
- **Explore Psychological Theories:** To test, refine, and develop psychological theories through practical experimentation and observation.
- **Improve Real-World Applications:** To translate laboratory findings into practical solutions for issues like mental health, education, workplace behavior, and consumer psychology.

- **Promote Scientific Inquiry:** To foster critical thinking, skepticism, and evidence-based reasoning in the study of psychology.
- **Foster Innovation:** To create new tools, techniques, or interventions for use in clinical, educational, or organizational settings.
- **Simulate Real-World Conditions:** To replicate or simulate specific real-world scenarios in a controlled setting to study complex psychological phenomena.
- **Ethical Research Practice:** To ensure that psychological research adheres to ethical standards, including informed consent and participant welfare.



### Importance of Psychology Lab

- **Advances Psychological Knowledge:** Provides a space for empirical research that deepens understanding of human behavior, cognition, and emotion.
- **Promotes Scientific Rigor:** Ensures research follows systematic, controlled methodologies, enhancing the reliability and validity of findings.
- **Facilitates Learning and Education:** Offers students hands-on experience with research tools, experimental design, and data collection, reinforcing theoretical knowledge.
- **Encourages Critical Thinking:** Challenges students and researchers to question assumptions, evaluate evidence, and apply critical analysis in studying psychological phenomena.

- **Supports Evidence-Based Practices:** Facilitates the development of interventions and therapeutic techniques grounded in scientifically-tested principles.
- **Enables Replication of Studies:** Promotes the ability to replicate studies, an essential process in validating results and strengthening psychological theories.
- **Fosters Collaboration:** Brings together researchers, students, and professionals from various psychology subfields to share ideas and expertise.
- **Enhances Ethical Standards:** Provides a framework for conducting ethical research, ensuring participant welfare, informed consent, and confidentiality.
- **Contributes to Real-World Solutions:** Helps apply research findings to address practical issues in mental health, education, business, and social policy.
- **Stimulates Innovation:** Serves as a breeding ground for new research tools, techniques, and methodologies that can advance the field.



### **Outcome of Psychology Lab**

- **New Insights into Human Behavior:** Provides empirical data that enhances understanding of psychological processes such as cognition, emotion, and motivation.
- **Tested Hypotheses and Theories:** Confirms, refines, or challenges existing psychological theories based on experimental findings.



- **Development of Psychological Interventions:** Leads to the creation of evidence-based therapies, treatments, and tools for addressing mental health and behavioral issues.
- **Data for Evidence-Based Decision Making:** Provides objective, data-driven results that can inform policies, educational practices, and workplace strategies.
- **Improved Research Methods:** Advances experimental techniques, measurement tools, and data analysis methods that contribute to the overall quality of psychological research.
- **Contribution to Ethical Guidelines:** Helps develop and reinforce ethical standards in psychological research, ensuring that studies are conducted responsibly.
- **Increased Research Collaboration:** Fosters interdisciplinary and collaborative work, enriching the field by integrating ideas from other scientific domains.
- **Training of Future Psychologists:** Equips students with the practical skills needed to conduct research, analyze data, and apply psychological principles in real-world contexts.
- **Identification of New Psychological Phenomena:** Leads to the discovery of previously unstudied or underexplored aspects of human behavior.
- **Practical Applications:** Findings can be used to improve mental health care, educational strategies, workplace dynamics, and more.

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## Department of Microbiology

### Experimental learning

In the department of microbiology, there are two laboratories for UG and one laboratory for PG is available. These laboratories are equipped with basic instruments required for conducting the experiments prescribed by the Bangalore City University, Bengaluru. For each practical course, two faculties are assigned to conduct the experiments and the students are provided with hands on training of each experiment. The experimental observations are monitored and verified by the faculty in charge. The objective, principle, protocols, observations, results, and discussions of each experiment conducted are systematically recorded and documented.

Sixth semester UG students under NEP curriculum perform their one-month internship at various industries, private labs, hospitals, and research institutions across the country. Internships provide the students practical hands-on experience in a specific field, make them to develop technical and soft skills, help the students to explore career paths, build a professional network, and enhance their resume.

In addition to the regular practical courses of UG and PG programmes, “in house dissertation” was carried out for the IV semester M. Sc. students. Mostly, the dissertation is done for the students in a group of 3 to 4. At the end of the semester, the dissertation is submitted to the University and presentation along with *viva-voce* for each student is conducted to evaluate the work. The aim of the dissertation work is to introduce PG students to research planning, execution, and documentation. The students were trained to write the research paper on their dissertation and the same will be published in a research journal.

Teachers of the department are very active in encouraging students to participate in different extension activities. As a part of curriculum, industrial tours or trainings were given to students at institutions of ICAR, and CSIR and private companies like Biocon, Biozeen, etc. allow students to familiarize with modern research techniques quite early in their academics.

Agricultural extension activities, educational excursions/study tours, and the organization of camps by students as a part of curricular and co-curricular activities helps students work cooperatively, interact with each other, take responsibility and develop confidence. It stimulates students' interest and creates opportunities for freedom of thought and the free exchange of different views.





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