Quadrant II – Notes

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Unit: The Science Teacher and Science Education in India

Module Name: Developing Scientific Attitude : Characteristics of a person with scientific attitude : Strategies to develop scientific attitude.

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Notes :

Meaning of Scientific Attitude -

The development of scientific discipline or attitudes is one of the primary goals of science education. Let us first define the meaning and concept of such discipline and attitudes before we can learn how to inculcate them.

According to NSSE;
"Scientific attitudes can be defined as open-mindness, a desire for accurate knowledge, confidence in procedures for seeking knowledge and the expectation that the solution of the problem will come through the use of verified knowledge."

According to another view, scientific attitudes include freedom from bias, prejudice and superstitions, open-mindedness, critical mindedness, intellectual honesty, beliefs when new evidence is available.

Characteristics of a person with scientific attitude -

In light of aforementioned definition characteristics of person having Scientific Attitude is as follows,

1. Open-mindedness,
2. Willingness to test & verify conclusions,
3. Faith in cause and effect relationship,
4. Curiosity,

5. Judgement based upon scientific facts alone,
6. Honest reporting of observation/experiment,
7. Rejection of the principle of authority, and
8. More faith in standard books by experts of the field.

These are only a handful of the main qualities that characterise the scientific attitude.

Strategies to develop scientific attitude. -

Tyler made the following recommendations for structuring learning experiences to instil scientific attitudes:
1. Improve the environment's degree of consistency.
2. Increase your chances of making satisfying changes to your attitude situations.
3. Allow for the investigation of an issue or scenario so that a student can comprehend and then mentally reset in the desired attitude.

In reality, the science teacher bears the primary responsibility for developing scientific attitudes in students. He has the ability to manage numerous scenarios in order to inculcate specific scientific attitudes in the students. Furthermore, by holding and practising various elements of these attitudes, he might set an example for others. This method of emulating the teacher will leave an indelible impact on the pupils' personalities.

The following points should be explored by the teacher in order to develop scientific attitudes:

1. Use of wide Reading

According to Curtis' research, students who engage in extensive science reading develop more scientific attitudes than those who study only one textbook. It suggests that students should be encouraged to study science literature from the library and other sources. It will only be possible if each school has a Science Corner in the school library, or better yet, a distinct Science Library, and if the science teacher enjoys extra reading. He should then instil in his students a love of reading as well as the capacity to use and comprehend reference books.

2. Study of Superstitions

Simply discussing superstitions and false ideas in class and labelling them as bad and out of date will have no impact on the students' minds. When teaching so many practical scientific classes, it is more successful if the science instructor encourages his students to research some prevalent superstitions and come to their own findings by actual survey and investigation.

One prevalent belief is that if a home has a shattered mirror, the family would not be able to live in peace and harmony. This can be investigated by keeping a broken mirror in the classroom or in the homes of certain pupils, while others should have unbroken mirrors. A comparative study can be quickly completed in a week or fortnight, and the students can draw their own conclusions.

Another prevalent belief in India is that if you see a cat when you first step out of your house in the morning, you are doomed, i.e., it is a bad day/omen. This idea can be examined and investigated in a similar way by presenting students with examples and allowing them to come up with their own conclusions.

3. Use of Planned Exercises

Some science periodicals provide exercises to help you adopt particular attitudes. The proper application of such exercises should be done on a regular basis. Newspaper cuttings can also be utilised for this purpose. Certain photographs and clippings may be put on the class bulletin board and used repeatedly for direct instruction. At the end of each chapter, good textbooks include exercises that help students develop scientific attitudes. Pupils must, for example, respond to questions in the format shown below.

'Some people believe that if a crow enters a house through an open door or window, death will follow.' Which of the statements below do you believe is the most appropriate?

i) The belief is a complete lie.

ii) It is nothing more than a superstition.

iii) It's possible that the assertion is completely false.

iv) It's possible to be correct in some cases.

4. Co-curricular Activities in Science

Science clubs, hobbies clubs, scientific society, chemical society, photographic society, scientific excursions, making scientific models, organizing science fairs and science exhibitions, improvising science apparatus, keeping aquariums, vivariums, and other activities should be well-organized, and students should be given enough freedom to plan their own activities. Students will indirectly inculcate certain positive attitudes..

5. Proper Use of Laboratory Period

The laboratory period can provide a lot of opportunity for learning certain scientific perspectives. It is the teacher's responsibility to ensure that such chances are taken advantage of. He should make sure that the experiment's problem is explained clearly. The solution hypotheses are offered, and correct procedures for testing the hypotheses are demonstrated. The results of the experiment should be discussed and understood thereafter. If there isn't enough proof, students should be taught to suspend judgement.

6. The Atmosphere of the Class

If the classroom is correctly set up and the room is furnished in a way that contributes to the establishment of a positive atmosphere, the pupils' thinking can be influenced to some extent toward the inculcation of certain attitudes. The role of the teacher in the classroom is equally critical in creating a positive learning environment. The teacher should foster a culture of constructive critique of techniques, data collecting, hypotheses, and outcomes. While in the classroom, he should make sure that the lessons are full with probing questions. Many teachers have been known to dismiss students who ask a lot of questions.

8. The Personal Example of the Teacher

The teacher's personal example is perhaps the most powerful influence for instilling scientific views. Psychology teaches us that children have a strong desire to imitate their teachers, to the point that it can be claimed that as the teacher is, so is the pupil. As a result, when engaging with students, the scientific teacher must be free of bias and prejudice. He must be open-minded, critical in thought and behaviour in his day-to-day interactions, free of superstitions and unfounded beliefs, objective and impartial, and truthful in his approach to everyday problems, believing in the cause-and-effect link.