SKILL OF PROBING QUESTIONING

(Applied after Bimla Passi, 1976; modified to suit teaching of biology)

INTRODUCTION

You are all aware that when you put a question in the class, you get various types of responses from the pupils. Some may give no response or say 'I don't know'. Some other pupils may give incorrect responses or partially correct or completely correct responses. How to handle such responses of the pupils? In case of all such situations except completely correct responses, you will have to lead the pupils to the correct response without resorting to punishment, if you want to be an effective teacher. That is, you will have to go deep or probe into the pupil responses by asking a number of questions about what they already know and to lead them to the correct response or to remove any ambiguity or hindrance in their understanding which has led to such responses. Even if the response is correct you may help the pupils to view it from a broader perspective. In all such cases, you are said to resort to probing by asking a number of questions about the response given to the first question. Such techniques that deal with the pupil responses to your question are included in the 'skill of probing questioning'.

This skill involves going deep into a pupil's response by asking a series of subsequent questions. In order to understand what the skill is about, the study of the following classroom episodes will be helpful.
Episode 1:

Teacher : What do you mean by mutations? Reema?
Reema : (No response)

Teacher : (The teacher deals with a no response situation)
Alright, what is the smallest functional unit of human body?

Reema : Cell

Teacher : Which component of the cell controls its various activities?

Reema : Nucleus. (The teacher gives hints which help Reema to respond)

Teacher : Will you describe the structure of nucleus?

Reema : Nucleus is a spherical body bounded by Nuclear membrane containing Nucleoplasm in which net work of filaments called nuclear reticulum or chromosomes is present.

Teacher : Very good. What is the chemical composition of chromosomes? Ritu?

Ritu : Chromosomes are mainly composed of DNA, RNA and small amount of protein.

Teacher : What is the full name of DNA and RNA?

Ritu : DNA is De-oxyribonucleic acid and RNA is Ribonucleic acid.
What are the various functions of DNA?

(i) It carries hereditary characters from generation to generation.

(ii) It enables the cell to grow by the formation of protein.

(iii) It controls metabolism by directing the synthesis of enzymatic protein.

(iv) It contributes to evolution.

How DNA contributes to evolution?

Through sudden changes in the genes and through recombination of genes, and through changes in the chromosomes. All these changes are mutations.

How will you define mutations?

Mutations are defined as sudden, stable and inheritable changes in the Genetic material (DNA) of a cell.

What are the various types of Mutations, Nitu?

Gene Mutations and Chromosomal Mutations.
Episode 2

Teacher : What are mutations?

Pupils : (No response)

Teacher : Okay, I will teach you what are mutations. Mutations are sudden, stable and inheritable changes in the genetic material of a cell. The genetic material consists of DNA. What is DNA?

Pupil : Deoxyribose (incomplete answer)

Teacher : Where is DNA?

Pupil : (No response)

Teacher : It is in the nucleus.
DESCRIPTION OF THE SKILL OF PROBING QUESTIONING

(i) Prompting Technique: This involves the teacher to give clues or hints to the pupil and ask leading questions. Here, the teacher neither supplies answer to the pupil nor does he redirects the question to some other pupils, but helps the pupil to answer the question himself. This technique allows the teacher to probe by prompting the pupil, even though at first instance it appears that the pupil cannot answer the question.

Prompting technique can be used by a teacher when the pupil gives (a) 'I do not know' or 'I am not sure' response, and (b) very weak or wrong response. Sometimes, it can also be used when the response is partially correct or incomplete.

Let us begin with the situation when a pupil fails to respond or gives 'I do not know' response. Before putting prompting questions, make sure that your question is clear to the pupils. If need be, you may rephrase the question. Prompting questions consist of a series of questions which help the pupil to develop his answer. Usually, the teacher begins by asking questions about what the pupil knows and then proceeds to developing the criterion response.

While using this technique, a teacher keeps the following two things in mind. Firstly, the teacher does not discourage the pupil for his no or wrong response. Secondly, the teacher helps the pupil to arrive at the criterion response by means of systemati
and step-by-step questioning process.

Example 1

Teacher : Name plants without chlorophyll.
Pupils : (No response)
Teacher : What is colour of chlorophyll?
Pupil : Green
Teacher : Guess the colour of plant without chlorophyll
Pupil : White, blue or yellow.
Teacher : Have you seen yellow plant like long wires on the tree?
Pupil : Cuscuta.
Teacher : Name plants without chlorophyll
Pupil : Cuscuta.

If the initial response is partially correct or incomplete you should reinforce the correct part before modifying the incorrect or incomplete part of the response. This would give another chance to the pupil to think over the question.

(ii) Seeking Further Information Technique: If the initial response of a pupil is either incomplete or partially correct, then the teacher helps the pupil to clarify, elaborate, or explain his initial response. Here, the teacher elicits more information and meaning or seeks further clarification from the pupil by asking questions like:
Example 2

1. What are Bryophytes?
2. What are salient features of Bryophytes?
3. Why are these called amphibians of the plant world?

In this way, seeking further information consists of asking the pupil to supply the additional information to bring initial response to the criterion level or the expected level.

Let us begin by assuming that there is a pupil who gives a poorly organized and incomplete response. The pupil is not wrong, but the answer does not match with the criterion response. In this instance the teacher asks the pupil to complete his response by asking questions like:

(a) What else can you add to your response?
(b) Is there any other answer also to the problem?
(c) Please state it in other words.
(d) How can you make your answer clearer?

It is clear from the examples given above, that all these questions call for additional information from the pupil.

The teacher may ask for more information when he suspects that the pupil has guessed and does not know the answer. He can ask the pupil to give rationale for his answer by asking him to give reasons for his answer, or by asking him even to restate the answer in different words. If the pupil is answering by guessing,
he will not be able to respond to the teacher's subsequent questions about the response. This technique helps to remove any faulty assumptions underlying the pupil's answer. Examples for such questions used for justification include:

(a) Will you tell me why do you think that you are right?
(b) Will you please elaborate your answer?
(c) Will you give an example to support your view?

When a pupil is asked to justify his response, the teacher should monitor closely the underlying rationale of the pupil response and correct him if there are any faulty assumptions. The example below illustrates the point.

Example 3

Teacher : How can we say that the food habits of man are largely controlled by the climate of the particular region where he dwells?

Pupil : Man accepts those items for his diet which are easily available or found in abundance.

Teacher : Can you make your answer clearer by giving an example?

Pupil : Yes, for example the Eskimos consume fish and meat because they are easily available for them.
(iii) Refocusing Technique: This technique is generally used when the pupil gives a correct response. The teacher relates the present answer with the topic already covered in the class. Let us think of a situation in the classroom where there is a pupil who gives a correct response or who has given a high quality response. Then the teacher refocuses his or her class attention to a related issue. This technique consists of enabling the pupil to view his response in relation to other similar situations.

This technique requires the pupils to relate a completely acceptable answer to other topics already studied by him. Here, the teacher wants that the pupil should consider the implications of a given response in more complex and novel situations. Some sample questions for refocusing are given below:

(a) In what way is this different from ... ?
(b) How does it relate to ... ?
(c) In what way is it similar to ... ?
(d) If you examine it from the view point of ... ?

Such questions stimulate pupils to view the response in a broader perspective. An example of refocusing technique is given below:
Example 4

Teacher : What are Bryophytes?

Pupil : Bryophytes are the simplest land plants growing in moist habitats, rocks and trees. *Marchantia* and *Funaria* are the examples.

Teacher : How do bryophytes differ from thallophytes?

In the above examples, the second question put by the teacher is for the purpose of refocusing pupil response.

(iv) Redirection Technique: Redirection technique involves putting or directing the same question to several pupils for response. This can be used for many purposes. The most important among them are for the purposes of probing and for increasing pupil participation.

You have learnt about the techniques of probing, namely, prompting and seeking further information which are used when there is a wrong/no response, incomplete response or incorrect response. In such situations, it is not necessary for the same pupil to be involved while using the above techniques, especially the technique of seeking further information. You may involve many pupils by putting them probing questions in order to elicit the expected response. Even in this case you are said to be using redirected questions (it is the same question as far as main question is concerned). Even after using prompting technique
when there is a 'no response' you may redirect the same question to other pupils. The following example illustrates the above points.

Example 5

Teacher : What are the characteristics of living things?
Rani :  (No response)
Teacher : Sunita? (Redirection)
Sunita : They reproduce.
Teacher : Yes, Anyother? Rama? (Seeking further information and Redirection)
Rama : They move.
Teacher : Anyother? Radha? (Seeking further information and redirection)
Radha : (No response)
Teacher : Is there anything regarding their growth? (Prompting question)
Radha : (No response)
Teacher : Sudha? (Redirection)
Sudha : They grow.

In the above example, redirection of the same question is done in the beginning. The question is also redirected in the form of probing questions either seeking further information or while prompting.

(v) Increasing Critical Awareness Technique: This technique mainly involves asking 'how' and 'why' of a completely correct
The purpose is to seek increased critical awareness in the pupil. The teacher asks the pupil to justify his response rationally. Therefore, this technique elicits a rationale for his initial response. Some examples of the questions for increasing pupil's critical awareness are as follows.

(a) How do you say so?
(b) What are you assuming here?
(c) How would someone who take the opposite viewpoint respond to this?

When questions as above are asked above a completely correct response, just elicited, such questions increase critical awareness in the pupils about the response. An example is given below where a biology teacher is teaching a lesson on 'arteries'. He increases pupil's critical awareness by asking questions while probing into pupil's response.

Example 5

Teacher : Whether arteries contain pure blood or impure?

Pupil : Pure except in pulmonary artery which contains impure blood?

Teacher : Why does this contain impure blood?
Teacher: What are the various characteristics of living bodies?

Pupils: (No response)

Teacher: Of which material living bodies are made up of? (Prompting) Anita!

Anita: Living things are made up of cells.

Teacher: So, this is the first characteristic of living things. What is inside a cell? (Seeking further information) Suhita!

Sunita: (No response)

Teacher: You, Kavita (Redirection)

Kavita: Protoplasm.

Teacher: What difference you notice in non-living bodies and living bodies if you observe them again after two months? (Prompting)

Suresh: Living things increase, they grow but non-living things do not grow.
Teacher : Why do living things grow?
      (Increasing critical awareness) Naresh.

Naresh : (No response)

Teacher : Sumedha (Redirection)
Sumedha : They take food, while non-living things do not.

Teacher : How food causes growth?
      (Increasing critical awareness)

Sumedha : Digested food increases the size of cells and
         forms new cells. Thus the living body grows in size.

Teacher : Where goes the undigested food? (Refocusing)
Anil : It is thrown out of the body of living things.

Teacher : What is this process called?
Anil : (No response)

Teacher : Yes, Veena (Redirection)
Veena : (No response)

Teacher : Can you use another word for 'thrown out of body'.
         (Refocusing)
Veena : excreted.

Teacher : Why do living bodies take food?
         (Seeking further information)

Veena : For growth

Teacher : and for what else?
         (Refocusing and seeking further information)
Haj : For doing activities.

Teacher : Now enlist these characteristics of living bodies
         on your notebooks.
OBSERVATION SCHEDULE FOR THE SKILL OF PROBING QUESTIONING

Name of the student teacher________________ Roll No._______
Topic __________________________ Class_________
Name of the supervisor________________________
Date___________ Time duration__________ Teach/Reteach

The glossary for each type of probing questions is given below:

Prompting Questions: Questions where there is a hint for the pupil/s which helps in reaching expected response.

Seeking Further Information Questions: Questions where more information is sought, asking 'how' and 'why' of correct or wrong part of the partially correct answer.

Refocusing Questions: Questions which seek the pupil to compare the phenomenon in his response with other phenomena either for the similarity or contrast or for any other relationship.

Redirected Questions: Questions which are directed to more than one pupil for response.

Increasing Critical Awareness Questions: Questions which seek 'how' and 'why' of a completely correct or expected response.
Instructions: Mark tallies for each of the probing question in appropriate cells as they occur during the lesson.

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<th>Components</th>
<th>Tallies</th>
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<tr>
<td>Prompting</td>
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Comments (if any):
OBSERVATION SCHEDULE FOR THE SKILL OF PROBING QUESTIONING

Name of the student teacher ___________________ Roll No. ____________
Topic _____________________________________________ Class ____________
Name of the supervisor _____________________________
Date ____________ Time duration ____________ Teach/Reteach

Instructions: This proforma is meant to ascertain the extent to which the student teacher exhibits or uses the skill of probing questioning. Judgments have to be given on a seven-point scale for various aspects of the skill. Indicate the extent of acquisition of the various aspects of the skill by crossing (X) the appropriate number you deem fit. The scale value '1' indicates that student teacher did not use the concerned aspect(s) of the skill at all, whereas the scale value '7' means that the student teacher used/practised the skill aspect(s) very much. Keeping these two extremes in view, examine carefully the teacher behaviour related to the various given aspects of the skill and cross (X) the appropriate scale value ranging from one to seven.
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<tr>
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<th>Not at all</th>
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<td>The teacher used prompting questions to lead the pupils to the expected response.</td>
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<td>The teacher used questions for seeking further information of the pupil responses.</td>
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<td>The teacher used questions to refocus the pupil responses</td>
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<td>The teacher redirected questions to the pupils.</td>
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<td>The teacher used questions to increase critical awareness of the pupils about their responses</td>
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Comments (if any):