GENERAL GUIDELINES

I. INTRODUCTION

Students with visual impairments learn new concepts just like the sighted would, the only difference is that they would primarily use their other senses (residual vision, touch, sound, smell, taste, movements) to experience and understand the world as we know it. The teaching and learning processes are fundamentally the same for both – students with and without sight; therefore, the teaching techniques need not be altered significantly.

Further, blind and low vision students follow the regular curriculum with adapted resources (e.g. Braille or computers) to access their study material.

II. GENERAL TEACHING PRINCIPLES

Teaching blind and low vision students can be very easy and straightforward if certain key principles are kept in mind. The general teaching principles as listed below cut through all topics being taught.

1. Accept Individual Differences & Consider Sensory Substitution.
Teaching materials and methods must be planned in such a manner that they encourage the use of the remaining / alternate senses to substitute blindness or low vision. This is known as Sensory Substitution.
Environmental modifications (lighting, workspace etc.) may need to be considered to accommodate individual differences.

- Get to know the child's eye condition so that you can make necessary accommodations to the tools and techniques accordingly.
- Spend time observing and understanding the student's learning preferences, and identify which modes and methods have more impact.
- Be open to allowing different ways of doing things – oral, Braille, computers, activities etc.
- Use multiple teaching approaches for the same concepts, thus allowing students to comprehend better.
- Describe objects and processes, whenever it is not possible for the child to perceive them by touch.

2. Use A Multi-Sensory Approach & Provide Experiences.
A variety of activities should be planned involving a combination of two or more senses at the same time to comprehend a particular concept.

- Allow the student to touch, hear, smell, and even taste the object, where applicable. Encourage low vision students to use their residual vision to explore the Teaching Learning Aids (TLAs), whenever possible.
- Use TLAs and activities that promote understanding of concepts through more than one sense.

For example,
3D models with audio feedback.

Incidental learning that occurs by noticing and experiencing one's surroundings through sight needs to be presented to blind and low vision students in ways that they can comprehend.

- As far as possible, plan real experiences, activities and exercises to depict new words and concepts.
- Use Teaching Learning Aids (TLAs) effectively.
- Bring real objects to the classroom, where possible.
- Include blind and low vision students in art and craft, laboratory work, field trips, picnics, outings etc.

Even when the visually impaired child may not be directly involved in an activity, it helps her/him to know what is going on within her/his surroundings. So, describe the surroundings and occurrences, as far as possible.

3. Encourage Learning by Doing.

This principle of 'learning by doing' enhances educational experiences of all students, whether visually impaired or not.

- Use practical or activity-based methods for effective teaching.
- For the child to learn how something must be done there's no better way than to let her/him do it.
- Allow the student to learn from experience, and to practise what she/he learns by doing it again.

For example,

- At the elementary level, use a doll house to teach the spatial concept of inside and outside, involving the student in her/his entirety by going in and out of the doll house.
- At a higher level, get the students to blow a balloon to explain how air occupies space.

4. Provide Equal Opportunities.

Failure to recognise the principle of equality may lead to pity / sympathy and discrimination.

- Promote a positive environment for acceptance of the blind or low vision child by not treating her/him differently. They are not special.
- Empathise and try to understand what a child with a visual impairment might need from you; but be careful not to sympathize or feel bad for the child, else your emotions may adversely affect your ability to help the child learn and grow.
- To maximise learning, the opportunities provided to sighted students must be adapted, where necessary, and made available to visually challenged students.
- The materials and methods may need to be altered to help provide similar knowledge and understanding (Braille, computers etc.)
- Adapt and provide all learning matter that is applicable to the student, such as textbooks, workbooks, worksheets, charts, smart board content etc.
- Have equal expectations of class work, homework, practice work, examination from blind and low vision students as you would with sighted students.
- Visual aspects like images denoted in learning materials for the sighted would need to be represented keeping in mind the principles of sensory substitution, experiential learning by doing etc.

- Just as you would with a sighted child, it is always advisable to check if what is taught is understood. This is especially true of visual concepts.
- Include blind and low vision students in all areas of education – even sports, art and craft, physical education, etc. Find out how to make these classes accessible for all students.
- Don't reserve communication only for teaching time. Just as you would interact with sighted students, engage in conversation with the visually challenged child even while not teaching.
- Have the child learn skills that would be needed outside the "normal" teaching-learning process. Hygiene, self-grooming, packing one's bag etc. are functional skills that should be expected of a visually impaired child, just as it would be expected of her/his peers.
- Do not shy away from assigning tasks to a visually impaired child. Give her/him responsibilities as you would give a sighted child. This shows your confidence in them, thereby, improving their self-esteem and confirms their capabilities to the sighted.
- Impairment does not give the child the right to behave badly. The consequences of indiscipline should be clear and consistent.

5. Do Not Assume the Presence of Any Sixth Sense / Special Abilities / Special or Defective Cognition.

Contrary to common misconceptions, blind and low vision students do not have any sixth sense/special abilities / special cognition. The student may acquire skills to compensate her/his lack of vision.

- Do not have raised or low expectations from them.
- Meaningfully adapt materials that are easily differentiable tactually, auditorily etc.
- Unless ambient sounds are an issue, there is no need to speak loudly to them.

6. Avoid Clutter: Clutter Confuses

Although it becomes essential for a teacher to enhance the learning of the visually impaired child by giving as much information as is necessary, it is just important that the teacher does not overload the child. To make things accessible, it is better to lay out things one at a time. Giving facts and figures that are not required may not be helpful in the teaching-learning process, and could, in fact, end up crowding the child's mind thereby defeating the learning purpose.

- Provide only as much information / knowledge as is required for the child to perform the task at hand.
- Avoid visual information overload by keeping away data that may not add value to the child's understanding and comprehension of a particular concept or if it may cause confusion to the child.

For example,

- While describing an image of "The Water Cycle", apart from the process involved, one could talk about the various features (oceans, mountains, clouds etc.) … not about how many trees are shown in the picture.

- If several aspects are found to be vital to a topic, consider separating the data into relative chunks of information based on the various sub-topics.

For example,

- When multiple aspects need to be demonstrated in a diagram, consider splitting the information into separate tactile diagrams.

7. Apply The Universal Design Principle To Make The Environment Usable By All.

An environment that is accessible for students with disabilities also becomes more usable, safer and enriched for all.

- *A place for everything, and everything in its place:*

Materials should have their assigned places, and there should be no change in where they are kept / stored. In case a change is necessitated, the child should be informed of where the item is now placed, and what is there in its earlier location.

- *Clear pathways and storage:*

Keep a clear path from the door into the room, the passages, aisles etc. Encourage others to keep personal items out of pathways.
Provide sufficient space for the child to store and/or use her/his assistive equipment.

- *Doors and Windows –Fully opened or closed:*

A door ajar can be confusing and hazardous, especially to a child with blindness or low vision. Follow the same rule in case of windows that open out into passages where the child may walk. Sliding doors / windows could be recommended to the authorities.

- *Identification of Spaces – Audio / Tactile markings*

For steps, ramps or any change in surface, use high-contrast yellow tape to distinguish each step to aid students with low vision. For children with no vision, some other sensory marking (tactile and/or auditory) may be utilised.
Braille and audio labels may be used for various locations as well as objects within the child's reach or those that the child would need to access.

- *Lighting: Bright and Clear*

Make sure the classroom / resource room / study room has adequate and conducive lighting as required by the student with low vision. The student should not have to look towards the light source during a session; the window should be behind the student (as against behind where the teacher stands).Take care to reduce glare.

8. Ensure Clear and Verbal Communication.

- Identify yourself, especially when entering a room. Avoid saying, "Do you know who this is?" Don't give the child a chance to feel uncomfortable about not knowing who is speaking to her/him.
- Encourage others to introduce themselves to the visually impaired child.
- Use clear verbal cues to begin and end a conversation. Especially inform the blind or low vision child when you are leaving so that they do not continue talking after you have left.
- To address the child, use her/his name or touch her/him on the arm. This informs the child that you are speaking to her/him and not someone else in the room.
- Apart from the visually impaired child, also refer to others in the room by name. So that the child is clear about who is being spoken to.
- Don't be afraid to use words like "blind" or "see" or "look". Their eyes may not work and in some cases, they may not have eyes, but they "see" through their other senses. Hence, it is OK to say things like "Did you watch TV last night?" rather than saying, "Did you listen to TV last night?"
- During activities, give clear instructions. Avoid saying only 'this', 'that', 'here', 'there'. Be specific while giving directions. Say "The table is five feet to your right" as opposed to "The table is over there." Avoid pointing and saying, "Go that way" or "It's over there". Use distinct terms such as "Straight ahead", "Turn left", "On your right" instead.
- Check with the student if she/he would prefer that the information be provided in other ways.

For example, an alternative for “five feet” could be “six steps”.

- Give a clear description to an individual without sight. Include details such as colour, texture, shape, size, landmarks, uses etc.
- Provide as much information as possible in a clear and concise manner.

9. Provide Orientation & Mobility Based On Facts, Not Myths.

Blind persons and students can, and do move around independently.

- Learn and make use of the sighted guide technique[1], whenever walking with a visually challenged child. Encourage others to do the same.
- Never leave a visually challenged child in an open space. If you must leave the child alone for a moment, leave her/him in contact with some stationary object such as a wall or table whose location they may be familiar with. This helps maintain their environmental orientation.
- It should be compulsory for blind students to become independent in their movement around school (washroom, cafeteria, ground, labs, libraries etc.) within accepted timeframes.
- Check if the visually impaired child requires a repetition of instructions and orientation in case they cannot recall the layout.

III. SPECIFIC TEACHING ASPECTS

The first step in the teaching process should involve clearly defining the teaching purpose and the extent of support required to address a given situation. In order to make learning more meaningful and effective for a visually impaired student, consider the various aspects as mentioned below.

1. <u>Determining the Teaching Purpose</u>

- The teacher should always clarify the purpose of the topic to be taught.

For example,

- In the lab, if it is not necessary that the student learn how to light a burner or to spot a colour change, those aspects of the experiment could simply be done by a lab partner.

- Questions and exercises that are perhaps not accessible would have to be edited based on the capabilities of the visually challenged student.

For example,

- Where the student has to “Circle the correct answer”, if the objective is not to test the artistic skills of the student, but simply to have her/him give the right answer, the teacher could modify the question and ask the student to “Write the correct answer”.

- How the matter could be adapted is something that the teacher could discuss with the special educator or support organisation.

For example,

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[1] The sighted guide technique allows a person with sight to appropriately guide a blind or low vision person such that they can both walk together safely and efficiently.

- Instead of drawing images of oranges on to the blackboard for the students to calculate the sum of all, the teacher could bring oranges to the classroom for the students to count, either individually or in groups.

▪ Finally, the teacher would need to locate the materials needed for the subject matter or seek help in creating them.

2. Understanding Accessible Formats for Text Material

A brief explanation of the various format options available for visually challenged students to read and write literary and mathematical text matter is given below.

For Literary Content—

2.1 Audio Recorded Materials

▪ Be open to the use of recorders by visually impaired students in the classroom. This is especially true of those who have not yet learnt or are not comfortable using other modes of note-taking such as Braille, use of computers etc. The recordings allow the student to revise what has been done in class.

▪ The student should be allowed to record their homework and other assignments which they can playback for the teacher to check.

▪ If the student prefers the audio mode of learning, the teacher can facilitate the procurement of DAISY audio books (see point 2.5). This would enable her/him to locate specific sections within an audio book. In the absence of this, the student would be at a loss when it comes to locating and reading particular portions of the lesson with precision in a plain audio recording.

2.2 Braille – Paper and Paperless

Braille is a script, not a language, used by the blind to read and write. It is written within a six-dot unit called a Braille cell. Combinations of these dots make up the Braille alphabet. It also includes symbols to represent punctuation, mathematics and scientific characters, music, computer notation and foreign languages. Either of the two levels of Braille (Grade 1 or Grade 2) can be utilized with or without the use of paper.

▪ Just as sighted students would be required to refer to the sighted print text materials, visually impaired Braille users should be reading and writing with all required materials, including textbooks, workbooks, worksheets, whatever the teacher writes on the board etc.

▪ Within the classroom, it is important for the teacher to become aware of certain basics of Braille usage as given below.

- To read Braille, the child should place the forefingers of both hands side-by-side to read the Braille characters. The fingers gently glide from left to right over the paper that has been embossed.
- When moving to the next line, the reader moves only the left hand to locate the new line so as not to lose her/his last reading position.
- If the teacher notices inconsistency or errors in the method of reading Braille, it must be brought to the attention of the special educator and the parent.

- For the same reason, while note-taking using the Braille slate and stylus, this technique of keeping one hand (in this case, the left hand) steady while locating the next line with the other (right hand) is recommended.

- It is to be noted that due to the need for mirror image writing while using the Braille slate and stylus, sometimes, errors may be found in the students' Braille work. This must be informed to the special educator and the parents since it can only be corrected through frequent practice.
- Whether making use of the Brailler or the slate and stylus, the visually impaired students should be encouraged to locate the left side of the paper based on the punched holes, and to manage the placement of the paper into the appliance by themselves.
- Just as the teacher expects all students to write the Date, Topic etc. before beginning the day's work, visually impaired students should also organise their notes in a similar manner. However, since Braille papers are loose sheets, the child may also need to mention extra information like the Subject and Sheet Number which would be useful when the notes are to be filed together.
- The special educator or support organisation could assist in transcribing the notes, but it is for the class teacher to correct and give marks for the work done.
- Braille story books being used in the library could be transcribed by the special educator or support organisation. This would help to promote paired reading where both the sighted and the non-sighted may enjoy the same book simultaneously.
- If the visually impaired student opts for an electronic Refreshable Braille Display that works with a computer or is a standalone machine, all text material would be needed in softcopy. The student could also present her/his work as a Word document which the teacher could read directly, without the use of transcription that is required in hardcopy Braille.

2.3 Low Vision Aids

- Students with low vision should be allowed to use dark pens or markers and write in large font. This means they would need an extra number of supplements during a test, or more pages within a notebook.
- They may use a regular book or a sheet of paper that is either blank, or lined. Some students may require the lines to be darkened with the help of black markers so that they may be able to locate them. This would need to be done by a sighted person (parent / teacher / peer).
- Some visually impaired students may even need to use various optical aids or electronic magnification tools available, both as handheld devices as well as fixed units. When it comes to electronic video magnifiers, the teachers may sometimes need to assist the visually impaired student if they cannot get the device to start, or if and when they need to plug in the device for charging.
- Although all students should be encouraged to be independent and this includes a low vision child locating the plug point, and managing to put the devices to charge by herself/himself, the teacher's help may be sought due to safety purposes.
- Students with low vision may need to be seated as per already existing light arrangements in the class; or perhaps, further adjustments in illumination may be required.

2.4 Computers

With screen magnification and screen reading softwares, all functions of the computer can be performed by visually impaired students independently. Large font keyboards are also available for those with functional vision.

- Once trained well, visually impaired students could independently operate computers either with screen reading software or screen magnifying software or both, as per their needs.
- With the use of laptops in the classroom, no transcription is needed for the teacher to be able to understand what the student is reading or writing.
- Whatever the teacher wants to present to the blind or low vision child can be submitted in softcopy, and since the student would be doing her/his work on the computer, the teacher could check on the child's work in softcopy just as she/he would examine the work of the sighted students in hardcopy i.e. during class hours.
- The teacher may need to help any student who would require to put their electronic devices to charge. Such assistance may be necessary until the teacher is satisfied that the student can do so safely.

2.5 Digital Accessible Information System (DAISY)

Digital Accessible Information System (DAISY) is a standard format to produce accessible books. The reason DAISY is preferred over text documents or audio recordings is that every DAISY softcopy book matches the sighted hardcopy page by page. This system allows the user to jump to page, heading level, bookmark, phrase etc. just as in any sighted print book. Thus, this format allows a print-disabled person to be on par with those who access regular printed materials. DAISY books may be created either as full text, or full audio, or full text – full audio files.
DAISY books may be read on computers, mobile phones or other special DAISY players. Various magnification and speech options are available.

For Mathematical Content—

Apart from Audio Recorded Materials, Low Vision Aids etc., some specifics ways to access Maths are:

2.6 Nemeth Braille on a Brailler

For writing Mathematics in Braille, the Nemeth Code is considered most exhaustive. An Indian version of the code is published under the name of Braille Mathematics Code for India. In addition to these, there is a new development in this field under the Unified English Braille Code for technical material.

2.7 LaTeX and MathML on a Computer

Mathematical Markup Language (MathML) is an application for describing mathematical notations and capturing both its structure and content. One way to create such a file is to use LaTeX with a screen reader to type content in a word processor. In order to do so, the student will have to learn the LaTeX code. Once LaTeX is keyed in, softwares can convert it into the spatial mathematical format (as seen by a sighted person). This in turn can be published as a MathML book that is accessible to a screen reader with the use of a math reader add-in to the web browser.

NOTE:
Both above mentioned methods of writing Maths – Nemeth Braille and LaTeX can be made accessible to the classroom teacher and presented for evaluation in a way where the teacher will not have to learn the code.
Nemeth Braille written on paper by the student can be transcribed by the Special Educator.

LaTeX typed out on the computer can be converted to sighted print Maths.

2.8 MathDaisy™

This enables teachers and others to save documents in the DAISY Digital Talking Book format. Students can use MathPlayer™ - enabled DAISY player software to read classroom materials in the manner that suits their abilities and preferences best.

2.9 Others

Tools and technologies like the Taylor Frame, Abacus, VP Arithmetic, VP Algebra, Marvel Math, Place Value Kit, Talking Calculators etc. are useful, and to be used as Teaching Learning Aids, but not as the sole or primary method for practice work in Maths.

3. Selection of Accessible Formats for Text Material

3.1 It is of utmost importance that the child and what's best for her/him be placed at the centre of the decision-making process when selecting the formats. It is also imperative to have a thorough understanding of the pros and cons of each format option, prior to making the choice. Seeking this information from support organisations is encouraged.

3.2 It is generally ideal to let the child make the choice of the format he/she wishes to use. But in the case of the child being too young to make the choice, this decision could be collectively taken by the parent, special educator and school together. One must keep in mind that the format to be selected must depend on what the student (and her/his family) can afford, and what the student prefers after sufficient practice.

3.3 Some questions you could ask yourself that will help to make the choice of formats:

- *Am I choosing an option solely because it will be easier for me as the parent / teacher to read the child's work and teach her/him?*

It is imperative to ensure that the parent or school do not just look for the more convenient options for themselves; or perhaps rely on their own understanding of what's best for the child. It is always better to discuss this with other stakeholders.

- *Does the child enjoy the format that is chosen?*

For example, if a child lacks finger sensitivity, she/he may not be comfortable learning Braille. This format (which involves the tactile sense) may even be impossible in such a case; and auditory modes of accessing would need to be considered.
The student should have enough practice with at least one, but preferably two of the modes in order to be comfortable to use them independently.

- *Will the child have to learn additional skills in order to be able to access content effectively using the format chosen?*

For example, if the student is already doing their literary subjects in Braille (more so Contracted Braille) then, the transition to Nemeth Braille for Maths may be smoother.

- *Will a particular format give the child a thorough exposure to perform all class work, homework, extra practice etc. in line with her/his sighted peers?*

Ideally, the format selected should aid the student to become independent in reading, writing and accessing all educational matter.

- *Will he be able to present his work for evaluation in the chosen format?*

Whether worksheets or activities, establish why the visually impaired child cannot do it in its original form.
For example, if the worksheet is in hardcopy, does the student need a Braille print or an e-copy?

3.4 Once the format is decided based on the eye conditions, certain requirements would need to be taken care of.

- Whenever possible, give the child her/his own copy of any book, or reference matter.
- Since visually impaired computer users would be making use of the keyboard for all the topics taught in the Computer lab, the teacher-in-charge could ask the special educator or support organization for a list of computer keystrokes and tactile representations of the different screens that would be needed for the student based on the topics to be taught.
- To be able to keep a track of the student's work, the teacher would need to be aware of whether or not all the rules of Braille (Literary & Nemeth) are followed by students who use them.

4. Understanding & Selection of Accessible Graphics

4.1 For Guidelines and Standards for Tactile Graphics, refer to the Braille Authority of North America (BANA) link:
http://www.brailleauthority.org/tg/

Apart from the more advanced technology-based graphics, created using capsule paper (with machines like the PIAF), and the thermoforming process, various handmade options exist to create tactile representations of simple shapes as also detailed diagrams. A few options are listed below.

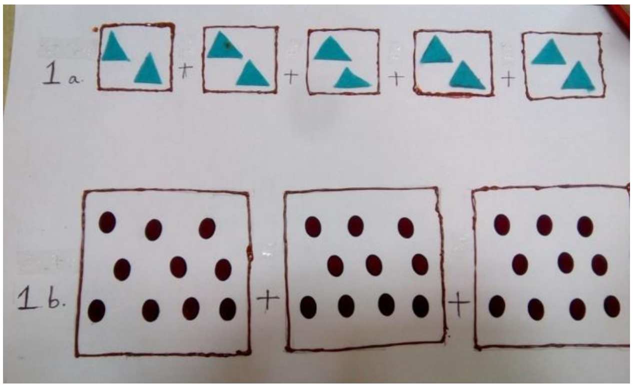
4.2 Household Items

(Thread, String, Rope, Straw, Cardboard, Foam, Thermocol, Beads, *Bindis*, different textured papers and any other material available at hand… and Fevicol or any other strong enough glue)

The teacher / organization should use their discretion to decide which images can be replicated using household items such that they are able to convey the appropriate message to the student.

How to Use Household Items

1. Free-hand tactile diagrams can be created directly with the use of household items.
2. If an image is already available and needs to be made accessible, one can print or photocopy the diagram to reproduce it in A4 or A3 size. Appropriate household items can then be stuck to represent different parts of the image.
3. Since this is a manual way of creating tactile images, one can choose to demonstrate different parts of the image with a range of textures.



4.3 3D Liner

Fevicryl Hobby Ideas 3D cone outliners come with a long nozzle that allows one to trace out a variety of patterns. One can use this outliner to define the boundaries of designs and later fill them up with colour, if required. It can be used on glass, wood or paper.

How to Use the 3D Liner

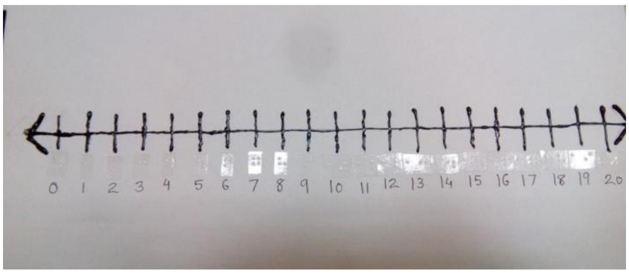
1. Free-hand tactile diagrams can be created directly with the use of 3D liners onto paper, glass, wood etc.
2. If an image is already available and needs to be made accessible, one can print or photocopy the diagram to reproduce it in A4 or A3 size. A 3D liner can then be used to trace along the borders of the illustration.
3. Since this is a manual way of creating tactile images, one can choose to demonstrate different parts of the image with a range of textures by creating fine dots, hollow circles, solid lines, dashed lines etc. which when placed differently can be used to distinguish between parts of an image.

Available at

Most stationery stores

Price

Approximately Rs. 25 per tube of colour



There are various options available for blind and low vision students to represent images tactually. Some of these options are mentioned below.

4.4 Velcro Board

The Velcro Board refers to a flat board which has one portion of the fabric attached to the board while the other part (which hooks on to it when pressed) remains independent to allow the designing of various graphs on the board.

How to Create a Velcro Board

Making your own Velcro board is easy and relatively cheap.

- Find a sturdy board (such as a white board, or an appropriately big plank of wood etc.) to use as the base for attaching the Velcro sheet.
- Use a strong glue or tape to hook one part of the Velcro sheet on to the board such that the usable side of the Velcro is facing you. Strips of Velcro (with equal breadth) may be used to cover the entire board.

(Once fixed as the base, these strips may be used to denote units of measurement while reading a graph.)

- The other part of the Velcro sheet may be used to represent the various features.

How to Use the Velcro Board

The Velcro board may be used by the teacher / sighted peer / student with blindness or low vision to demonstrate the graphs that are being displayed visually in class, or while explaining a certain topic out of the classroom.

1. Begin by placing one strip each for the main aspects of a graph i.e. the X-axis to be arranged horizontally near the bottom of the board and the Y-axis to be arranged vertically near the left side of the board such that the Y-axis is perpendicular to the X-axis, and the origin (where the two axes meet) is near the bottom left side of the board.
2. Next arrange more strips appropriately to denote straight lines, curves etc. as per the related graph.
3. To exhibit her / his understanding of a graph, he too can feel the board, take one loose strip at a time and attach it to the board to represent the appropriate graph.

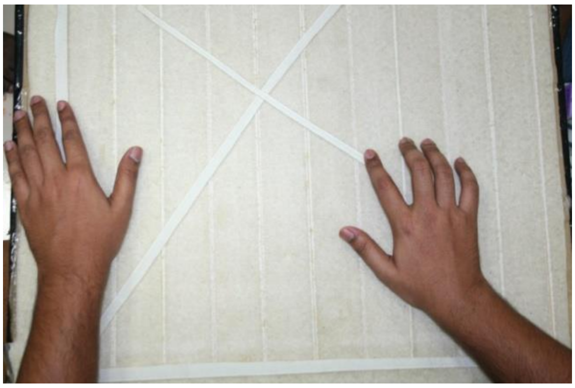
Available at

This could be made from scratch based on the details given above.

Resources

- *DIY Velcro Board*

http://teachinglearnerswithmultipleneeds.blogspot.in/2013/01/diy-velcro-board.html



4.5 Wikki Stix

Wikki Stix is made of wax and yarn and is soft and easy-to-shape. The wax enables them to stick to all smooth surfaces, and they can be peeled off without leaving a mark.

How to Use Wikki Stix

1. If using the board available with the pack, place the board on a flat surface.
2. Pick a wax strip and stick it onto the surface of the board or directly onto the bench or even on a sheet of paper, as desired.
3. Press the wax strip firmly down.
4. Continue to use more strips of wax as required to represent the diagram at hand.

These strips could be positioned straight, curved, folded, and even placed one over the other to display a variation in levels.

Available at

- *Wikki Stix*

Omnicor, Inc., 11034 N. 23rd Drive #103, Phoenix, AZ 85029, USA
Tel.: 800-869-4554, 602-870-9937 | Fax: 602-870-9877
E-mail: info@wikkistix.com, wendy@wikkistix.com

- *Amazon*

http://www.amazon.com/WikkiStix-701-0-Wikki-Stix-Rainbow/dp/B00O2TGG6W
http://www.amazon.com/Wikki-Stix-Big-Count-Box/dp/B000PEN8U0

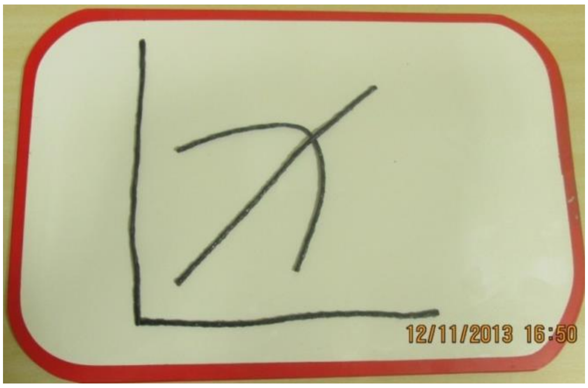
Price

Packs approximately range from Rs. 150 to Rs. 14000

Resources

- *Wikki Stix*

www.wikkistix.com



4.6 Sewell Line Kit

The Sewell Line Kit includes
-a regular clipboard to hold the drawing sheet firm,
-a rubber mat
-a special plastic sheet (parchment paper) which enables the drawings to get raised on the same side (as opposed to a mirror image on the bottom side of the sheet)
To use the kit, a sharp object such as a stylus or a ball pen is needed.

How to Use the Sewell Line Kit

1. Place the clipboard from the wooden Braille kit on the table.
2. Put the rubber mat on the board and align it along the clip of the board since the rubber mat will not fit under the clip due to it thickness.
3. Position the special plastic sheet (parchment paper) on top of the rubber mat. See that at least two sides of the sheet and the rubber mat are aligned.
4. Slide about 1cm of the sheet under the clip and fasten the sheet and the rubber mat.
5. After securing the top of the sheet under the clip, place one hand flat on the upper part of the sheet and begin gliding downwards to ensure that there are no lumps in the paper and it is not sticking out anywhere.
6. Using one binder clip on each of the other three sides will help to steady the entire sheet (not just the top of it).

OR

In order to stabilise the kit, two metal strips (from two wooden Braille kits) are used to hold the material secure. One metal strip should be attached to the second pair of holes from the top of the wooden Braille slate while the other is to be set at the lowest or second lowest pair of holes in the slate. These metal strips need to have a rubber band wound on the side that opens, so as to lock in the sheet and the rubber mat.

NOTE: This initial process may take some practice on the part of the child.

7. Once the student is comfortable using the board, he/she would need to learn how to use the various instruments to create diagrams on the kit.
8. She / He can use a sharp object (such as a stylus or a ball pen) to begin drawing freehand.

Stencils can be used to create multiple shapes.

Available at

- *Amazon - Sewell E-Z Write N Draw Raise Line Drawing Kit with Clip*

http://www.amazon.com/Sewell-Write-Draw-Raise-Drawing/dp/B000YL5O74

- *Maxi Aids - Sewell E-Z Write N Draw Raise Line Drawing Kit with Clip*

http://www.maxiaids.com/sewell-e-z-write-n-draw-raise-line-drawing-kit-with-clip

- *All India Plastics - Parchment paper*

20/22 Mirza Street, Off Abdul Rehman Street, Mumbai 400003
Contact: Bharat Gada
Tel.: 23428096, 23429540, 23437750 | Fax 23448151 | E-mail: kompak@bom8.vsnl.net.in

- *National Association for the Blind (India) - Rubber Mat & Wooden Braille Set*

11/12, Khan Abdul Gaffar Khan Road, Worli Seaface, Mumbai – 400 030
Fax: 6683 8659 | E-mail: contactus@nabindia.info

- *Worth Trust - Tactile Geometry Kit*

48, New Tirumala Road, Katpadi - 632007, Tamil Nadu
Tel .: 91-416-2242739, 2243939 | E-mail: worth@md3.vsnl.net.in
http://www.worthtrust.org.in/

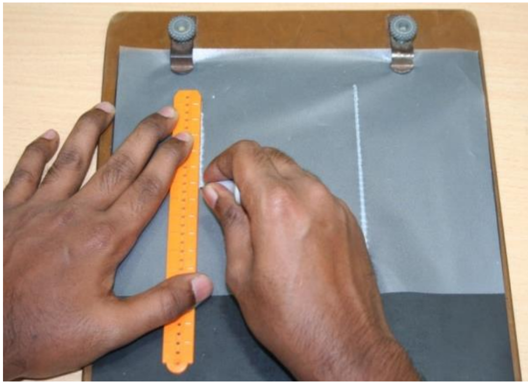
Price

- Approximately Rs. 2000 for the Sewell E-Z Write N Draw Raise Line Drawing Kit with Clip available under this name at *Amazon.com*
- Approximately Rs. 5 per sheet of parchment paper from Mumbai (Rs. 250 for a pack of 100 sheets)

- Approximately Rs. 25 for the rubber mat from NAB
- Approximately Rs. 250 for the Wooden Braille Set from NAB
- Approximately Rs. 90 for the Tactile Geometry Kit from NAB

Resources

- *Amazon - Sewell E-Z Write N Draw Raise Line Drawing Kit with Clip*
http://www.amazon.com/Sewell-Write-Draw-Raise-Drawing/dp/B000YL5O74
- *Maxi Aids - Sewell E-Z Write N Draw Raise Line Drawing Kit with Clip*
http://www.maxiaids.com/sewell-e-z-write-n-draw-raise-line-drawing-kit-with-clip
- *National Association for the Blind (India)*
http://www.nabindia.org/
- *Worth Trust - Tactile Geometry Kit*
http://www.worthtrust.org.in/



4.7 How to Label a Diagram created using a Sewell Line Kit

Since diagrams created using a Sewell Line Kit can be stored for future reference, the student would need to name the image and / or label its components after the required diagram is constructed.
While a low vision student may label the diagram in large font, the totally blind student may choose any of the following ways to do so.

A. Braille Labels Typed Directly:

The parchment paper can be taken off from the Sewell Line Kit and inserted into a Brailler. The student can scroll down to the appropriate portion on the page and adjust the cursor at the proper position before typing out the required title, labels etc. directly onto the parchment paper.

B. Braille Labels Stuck:

If the student is not comfortable or chooses not to follow option A, they may use an external substitute for Braille labelling. However this involves, some amount of cutting of the sticker which not everyone may be comfortable with.
Transparent sticker sheets are available in sizes similar to a cardboard sheet. When these are cut into A4 or other easily usable sizes, they can be inserted in a Brailler (Braille typewriter) to create labels in Braille that can be stuck on to various tactile graphs for naming, labelling and any other information that is needed together with the image.

How to Use Transparent Sticker Sheets

1. Take an A4 size sheet of the transparent sticker paper.
2. Insert it into the Brailler (Braille typewriter) similar to how one would insert a Braille paper.
3. Once the sheet is fixed, use the 6-key entry to type out the required labels in Braille.
4. After typing the labels, take out the sticker sheet from the Brailler.
5. Cut the sheet into small chits as per the size of the labels typed out.
6. Peel off the sticker and stick them at appropriate places on the required diagrams ensuring that the dots are placed correctly.

These sheets are available at most stationery stores at approximately Rs. 11 per cardboard sized sheet.

C. Audio Labels (Audio labeller & reusable labels) Stuck:

If the blind or low vision students are not Braille users, they have the option of labelling their diagrams with sound.

The Sonic Labeler is a digital voice-labelling device that helps people to record voice messages on labels.

How to Use the Sonic Labeler

NOTE: Make sure to do all the recordings in a quiet space to avoid any unnecessary ambient sounds getting recorded such as those of the fan, air-conditioner, people talking etc.

1. Peel a label from the label booklet and stick it at the appropriate place on the tactile diagram.
2. Press and hold the second of the three round buttons on the labeller.

The labeller speaks, “Select a label to record on.”

Do not release the button until the end.

3. While the button is still pressed, touch the tip (sensor) of the audio labeller to the label.

The labeller speaks, “Recording Start.”

4. With the button still pressed, lift up the audio labeller and hold it about 2 inches away from the mouth so that the recording is clear.
5. Release the button.

The labeller speaks, “Recording Stop.”

6. The next time the sensor of the Sonic Labeler device is touched to that label, it will read aloud the information associated with it.

This Sonic labeller is available at Go Discover (www.godiscover.in) or through Saksham Trust (www.saksham.org).

The device with the first 100 labels costs approximately Rs. 2600.

NOTE:

Care needs to be taken while using labels so that chances of them peeling off are reduced.

4.8 Concept-Based Diagram Recommendations

Since there are a range of options available in terms of accessible images / tactile diagrams, here are suggestions considering the specific use based on the various visual aspects in education.

Sr. No.	Concepts	Recommended Use of Accessible Images
1	Free-hand drawings Basic Mathematical shapes including <u>unmeasured</u> / <u>measured</u> lines, angles, triangles, polygons, line graphs, bar graphs etc. Scientific diagrams including internal organs, chemical combinations, simple processes etc.	3D Liners HOUSEHOLD ITEMS (Thread, String, Rope, Straw, Cardboard, Foam, Thermocol, Beads, *Bindis*, different textured papers and any other material available at hand… and Fevicol or any other strong enough glue)
2	Temporary diagrams <u>Unmeasured</u> geometric concepts-lines, angles, triangles, polygons, line graphs, bar graphs etc. for Mathematics, Economics etc.	Velcro Board & Wikki Stix
3	Temporary representations Spatial relationships, shapes, series, patterns, angles, triangles, graphs etc. for Mathematics, Economics etc.	String Along Lacing Kit
4	Temporary/ Single Use Underlining / highlighting on notes, Representing sighted alphabets, numbers, mathematical symbols, series, patterns, <u>Unmeasured</u> geometric concepts – lines, angles, triangles, polygons, charts and graphs etc. Representation of fractions, Science diagrams-chemical combinations, cross-sections of flowers, simple processes etc. for Mathematics, Economics, Science etc.	Wikki Stix
5	<u>Relatively permanent possibilities of representing simple graphics</u> sighted alphabets, numbers, mathematical symbols, series, patterns, spatial relationships; <u>unmeasured</u> / <u>measured</u> geometric concepts- lines, angles, triangles, polygons, representation of fractions; charts and graphs; Science diagrams-chemical combinations, cross-sections of flowers, simple processes etc. for Mathematics, Economics, Science etc.	Sewell Line Kit
6	**Permanent representations with various textures**	PIAF,

	Sighted alphabets, numbers, mathematical symbols, series, patterns, spatial relationships, maps; Geometric concepts- lines, angles, triangles, polygons, fractions; Charts and graphs; Science diagrams-chemical combinations, parts of a flower, cross-sections of flowers, internal organs, water cycle and other procedures etc. for Mathematics, Economics, Science, Geography etc.	Thermoforming, Digital Printing

5. **Creation & Use of Accessible Graphics**

5.1 Guidelines and Standards for Tactile Graphics

▪ Refer to the following link from Braille Authority of North America (BANA): http://www.brailleauthority.org/tg/

5.2 Tips When Creating Accessible Graphics

▪ There are quite a few points to be considered when accessible images are created either by the student or by the teacher / organization.

▪ Before beginning the creation of tactile graphics, first decide which format to use.
(Students may seek the help of a teacher / support organization for advice / suggestions in advance.)

▪ Make sure that all the required materials are nearby, preferably in an enclosed space such as a tray with high enough borders to avoid things from falling off. This is done to avoid having to leave one's place in the middle of an activity.

▪ While creating diagrams, maintain appropriately corresponding textures.
For example,
- If a tactile image of a strawberry is to be shown, take care to present its surface with a dotted texture and not lines.

▪ Pay attention to the size and check to see if the required aspects of the diagram would be identifiable. If the graphic is too small, the student may not be able to tactually differentiate the various parts and textures. On the other hand, if it is too large, the student may not be able to access all the information comfortably. Hence, the abilities of each student should be considered individually.

▪ Keep all graphics aesthetically pleasing for the enjoyment of sighted and low vision learners as well.

▪ Maintain colours accurately when creating tactile graphics.

For example,

- An image representing the sun should be yellow.
- A graphic of a mountain should be brown and/or green; alternatively, it could be white to represent snow-capped mountains.

▪ Labels in large font (for the low vision), Braille (for Braille readers) or audio (for those who do not use Braille) could be used to describe an overview of the figure. The title of pictures, different parts of diagrams, page numbers etc. could be labelled.

- Dark, black permanent fine-tip markers may be used for labelling diagrams for the low vision. A minimum of 20 point font size may be used. But for the labelling to be beneficial, it is important that the text is presented at a font size comfortable to the student.
- For Braille readers, transparent sticker sheets may be used to type out Braille signage and labels using a manual Brailler (such as the Perkins Brailler). The transparency allows the sticker cut-outs to be placed over the sighted print, thus making paired reading possible.

***The sheets must be tested for quality so that they don't peel off easily from diagrams.*

- For those visually impaired students who do not read sighted print or Braille, the option of audio labelling exists. The audio labels may be placed at the appropriate positions, and the recordings done using the corresponding audio labeller.

***If using sound labels, make sure to do all the recordings in a quiet space to avoid any unnecessary ambient sounds getting recorded such as those of the fan, air-conditioner, people talking etc..*

5.3 Tips for Using Accessible Graphics

Some essential points to remember while making use of such accessible images are listed below.

▪ Come prepared with back up tactile graphics.

▪ Give the student her/his own copy of the visuals that are displayed on the white board.

▪ Always present the tactile image to the student in the correct orientation (with the top, bottom, right & left as per the child's position).

▪ Teach the student to identify markers such as the diagram name, arrow pointing North etc. on the tactile diagrams which would guide them to hold the sheet correctly even when the teacher is not immediately available.

**In the case of the Velcro Board, Wikki Stix etc. to show graphs, the teacher may bring the student's notice to the origin where the axes meet.

▪ Teach them how to explore graphics beginning from the top left, moving towards the right while going downwards. In some cases they may need to follow the tactile borders to understand the graphic better.

▪ The teacher must first orient the student to the basic features represented on the graph, such as the axes, the origin, the scales etc.

**Further individual graph-specific explanation should begin only after the child has understood the above. This should be followed for all types of diagrams.

- Hand-over-hand guided exploration of the raised picture may need to be practised at least when first introducing an image.

- Familiarize them on how to use the key to the diagrams and other Braille and audio labelling in the images.

- Inform the student where the labels are located. The labels would be rendered useless if the child is not made aware of its existence and position.
**For audio labels, make sure the corresponding labeller device is handy; else the audio labels will not be readable.

- Encourage independent exploration of the tactile diagrams as much as possible, with more verbal instructions.
**Orient the student to explore the tactile graphic such that they cover all areas of the diagram.

- *Drawing of diagrams involves much more than what exploration of a tactile image entails. For construction of geometric and other diagrams, some additional points need to be kept in mind.*

➢ The student should first go through the entire diagram construction in his/her mind, so that he/she has an idea of the steps to be followed, and the materials required, and the activity flows smoothly.

➢ While constructing diagrams, the student should sit in a way that they are looking straight down at the measuring devices. Otherwise they will get an incorrect value in case the instruments move and the student doesn't realize it.

➢ Teachers would have to allow blind and low vision students to round up all measurements to a '.0' or '.5', since more specific dimensions may not be practically possible.

➢ If the child needs to record labels as part of diagram constructions during school hours, the teacher would need to get the class to quieten down so that the visually impaired child may have clear recorded labels.

6. <u>Orientation to & Appropriate Selection of Teaching Learning Aids (TLAs)</u>

Teaching Learning Aids (TLAs) etc. should be planned depending on the learning objective.
A Teaching Learning Aid used for blind and low vision students could be:

A. A real object (e.g. a dog, a plant, a creeper, an apple)

B. 3-Dimensional models (e.g. 3D model of a building, railway station etc.; stuffed toys of animals, plastic or wooden replicas of vehicles, human anatomy models; solid shapes etc.)

C. 2-Dimensional tactile graphics (e.g. tactile diagrams of the human digestive system, tactile geometrical figures on paper etc.)

D. An activity to aid learning (e.g. soaking a seed in water and observing it daily to watch it sprout, adding and subtracting by walking up and down stairs to reinforce mental math etc.)

6.1 To depict new words and concepts, give first preference to real objects or experiences & activities, followed by 3D models and then 2D representations.

Interaction with a model or an image is not the same as dealing with a real object, particularly if the student has not previously had direct contact and interaction with the real thing. This is true for all students, but especially for blind and low vision students.
For example,

- Playing with a plastic 3D model of a dog has no meaning to the student who has not touched, heard, smelled and interacted with a real dog.
- Showing an artificial apple to the student who has not touched, smelled and tasted a real apple will leave the concept of an apple incomplete. Further, a blind and low vision student, who eats a cut apple in his lunch box daily, may never actually have come across a whole apple and hence, will not be able to associate the two.

While introducing the child to an apple, the lesson planned should ideally involve activities to let the child experience an apple through touch, smell and taste etc. and in various forms.

6.2 Introduce the spelling and pronunciation of the names, and other words in relation to the concept as well as the parts of the TLA.

6.3 Procure models with textures similar to the real object, as far as possible.
For example,

- Rather than a plastic model, a soft toy of a lion would enable the student to have a better idea about the feel of the lion's skin and fur, specifically the mane and the furry end of the tail.

6.4 When selecting TLAs, pay attention to the size and check to see if the required aspects of the model or diagram would be identifiable. If the 3D model or 2D graphic is too small, the student may not be able to tactually differentiate the various parts. On the other hand, if it is too large, the student may not be able to access all the information comfortably. Hence, the abilities of each student should be considered individually.

6.5 Keep all TLAs aesthetically pleasing for the enjoyment of sighted and low vision learners as well.
Maintain colours accurately when creating 3D or 2D TLAs. Appropriate colours should be considered when procuring readymade models and graphics as well.
For example,

- A TLA representing the sun should be yellow;
- A TLA representing a mountain should be brown and/or green; alternatively, it could be white to represent snow-capped mountains.

6.6 Create opportunities for paired reading by ensuring that audio and Braille labels on TLAs are accompanied by large font text. This not only makes it accessible to blind and low vision students but also to sighted learners.

6.7 Make it a point not to focus only on one particular sense (especially auditory) when teaching the blind. A variety of activities should be planned to provide a multisensory approach. Even in the case of those with low vision, alternate visual tasks with non-visual tasks to avoid eye fatigue.

7. Use of Teaching Learning Aids (TLAs)

7.1 Define the workspace area by making use of trays, place mats etc., so that the student does not misplace the objects he is working with. It also reduces the chances of dropping the objects.

7.2 Come prepared with trays, tissues, back up aids etc. and other pre-supposed things for a lesson.

7.3 In the case of the blind or low vision student being part of an inclusive classroom, use the TLAs while teaching the full class. Call the student to the front of the classroom to feel the TLA while showing it to the rest of the class.

7.4 When real animals are available, encourage the student to touch them. However, do not force her/him.

7.5 It is important to provide interaction with actual objects first and then determine if the student can transfer that understanding to a model or a raised line drawing. Do not assume that a student has had experiences even with seemingly common items.
Specifically in early education, it is important to introduce the student to 3D models before 2D diagrammatic representations of those objects, so that students have a clear understanding.
For example,

- Showing a 3D model of the human heart before a tactile diagram of the same is preferred.

7.6 Always present the TLA to the student in the correct orientation (with the top, bottom, right & left as per the child's position).

7.7 When objects need to be explored by a child with a visual impairment, ask her/him to use both hands and see the item. It is often impossible to acquire information by using only a couple of fingers or a single hand.

7.8 Properly employ the hand-over-hand or hand-under-hand techniques, where necessary. However, avoid doing the activity for the student.

7.9 After handing over the aid to the student, orient the student to it first – the top, the sides, the bottom, various parts etc.

7.10 Bring the student's attention to the key distinguishing features of the model.
For example,

- Guide the student to notice the elephant's trunk, tusks, ears etc. on the TLA.

7.11 Do not rush with showing the TLA. Leave the aid with the student to explore.

7.12 Allow for repetition of seeing the aid. Remember that the student may not get a chance to observe this repeatedly in his surroundings.

7.13 When presenting models, talk about the textures, sounds, smells, movements (if applicable), colour (if applicable). Allow the student to smell, touch, taste, hear the aid where applicable. Encourage low vision students to use their residual vision to explore the aid, whenever possible.

7.14 As a general practice, the size of the chart or handout should not be more than A3 (or A4 depending on the comfort of the student), else it would be too large an area for the student to explore and make sense of easily.

7.15 Inform the student where the labels are located. The labels would be rendered useless if the child is not made aware of its existence and position.

▪ For audio labels, make sure the corresponding labeller device is handy; else the audio labels will not be readable. If using audio labels, the person recording them should make sure to do so in a quiet space to avoid any unnecessary ambient sounds getting recorded, such as those of the fan, air-conditioner, people talking etc.

7.16 Appropriately flag off variations in a single category over generalization of a type. Notify the student that even things belonging to the same category may have multiple differences.

For example,

- A wide variety of tables exist

--Different formats (round, rectangular etc.),

--Various sizes (table for 2, table for 6 etc.),

--Diverse materials (wooden, glass etc.) and so on.

7.17 Discuss Size and Scale.

▪ Explain to the student the size & scale when demonstrating models representing real objects.

For example,

- Inform the student that the elephant is a large animal taller than you and the student and the TLA is just a miniature version of it.

▪ Use comparisons to indicate size and scale.

For example,

- A cave would be as big as this room.

- A coconut tree can grow tall enough that it would reach the 1st or 2nd floor of the school building.

▪ When using small toys, explain to students the relative sizes. Try to have the accurate scale but a rough estimate should also be fine.

For example,

- A lion is 15-20 times larger than a mouse.

7.18 During activities, give clear instructions. Avoid saying only ‘this’, ‘that’, ‘here’, ‘there’.

7.19 Verbalize all relevant actions being performed by you or by other students during the activity.

For example,

- When you ask, “Who all have understood what needs to be done?” and some students in the classroom lift up their hands, announce, “3 people have raised their hand.”

8. Working in the Laboratory

- With proper instructions, presenting the experiment in an organized manner, sufficient time for students to practise working with the apparatus before beginning experiments, and encouraging the student to check the status before taking the next step, the student should be sufficiently equipped to work safely.

- While the special educator may be responsible for orienting the visually impaired student to her/his typical routes, the school teachers should make the child aware of their surroundings within the classroom and other environments including the science laboratory. Seek advice from the special educator on how to orient the child to new environments.

- Within each of the settings mentioned above, the teacher would need to inform the student about where things are kept, the shelves, the seating arrangement, walkways, safe areas etc. If this is done well, the student would not always need a sighted assistant accompanying her/him.

- Define the workspace by making use of trays, place mats etc. with appropriate boundaries, so that the student does not misplace the objects she/he is working with. It also reduces the chances of dropping the objects being used.

- Come prepared with trays, tissue, back up aids etc. and other objects based on the lesson plans.

- Although this rule applies in all situations, it is especially crucial in a lab environment – verbal instructions need to be given when placing, moving or taking away objects from the student's work area. When changing the position of the apparatus, the blind or low vision student needs to be informed about such changes. Overall, the teacher and the peers need to be clear, and speak out every action. This helps to be organised and ensure safety.
For example,
- Do not merely place or take out objects from the trays without informing the student. The best thing to do is to have the student place the object in the tray after handing it over to her/him.

- There are readily accessible tools as well as easily alterable equipment for blind and low vision students to use.
- Teachers should permit the use of accessible aids and appliances like the Talking Lab Quest, Talking Blood Pressure Machines, Talking Physiotherapy Machines, Talking Weighing Scales, Liquid Level Indicators etc.
- Simple adaptations and replacements can be made to other apparatus.
For example,
- Using droppers or syringes to pour solutions from one test tube to another can avoid spillage.
- A cello tape can be appropriately stuck on a red wire to tactually differentiate it from a black wire.
- Markings / grooves can be made on syringes to indicate the amount of liquid being pulled in. This could replace the need to measure liquids using pipettes / droppers. The same can be done with other weighing scales.

- All lab apparatus (test tubes, beakers, chemical containers etc.) should have labels in large font, Braille and/or audio, as far as possible; especially those that have existing print labels on them.

- Handling of all necessary tools, as well as the techniques and processes of the experiments need to be well understood by the student prior to beginning any activity.

For example,

- Certain skills like measuring substances etc., if required, may need to be learned before beginning experiments. It is advisable that the student becomes familiar with the apparatus outside class hours.
- If learning the skill of measuring 100 grams of a chemical, or pouring a liquid needs to be grasped for future lab work, the student could be taught these skills prior to the experiment with the help of modified/adapted lab equipment. However, if this skill is not crucial at the current level, the student could simply be provided with the desired quantities of chemicals required for the experiment.

- Allow the student to seek visual information from sighted assistants, wherever required.

Lab partners may be assigned to the visually impaired student for identification of colour changes and other visual observations in an experiment, and also in case the student is not comfortable or confident in the use of materials within a laboratory.

Experiments are not all about physical activity but about understanding reactions.

As long as the student applies her/his mind, and instructs the sighted assistant during the activity and is able to draw conclusions, the experiment is considered done by the student. Taking sighted assistance in certain scenarios to note the changes does not affect the student's understanding of the observations. If the student is able to make appropriate conclusions from conducting experiments, it shouldn't matter if the observations were made by the student's eyes or an assistant's.

For example,

- *While performing the Litmus test experiment, one visually impaired student may decide to have the sighted partner do as she/he instructs, while another visually impaired student may want to only be informed about the change in colour after she/he dips the litmus paper into the solution themselves.*

- Everything is not purely visual but can also be accessed using the multisensory approach.

For example,

- The visually impaired student may not be able to observe a change in colour caused due to chemical reactions but she/he can note other changes that have occurred like the test tube turning warm, the presence or change in odours etc., where applicable.

The teacher would have to pre-plan and make a note of such observations so that she/he can point out these multisensory factors of the experiment to the child, where applicable.

- The student should first go through the entire process of the experiment in her/his mind; such that she/he has an idea of the steps to be followed, and the materials required, thereby, enabling the activity to flow smoothly.

9. Working with Charts or Tables for Classifications

Often tables or charts in textbooks or on smart boards/blackboards/overhead projectors are used to depict classifications when teaching.
For example,

- Living Things & Non-living Things
- Natural & Man-made

▪ Verbalize the table listing the examples while you are demonstrating it on the black board.
For example,

- "On the left of the board, we have 'Living Things' and to the right we have 'Non-living things'. Now can you name things from our surroundings? … Someone just said 'cat'. So is a cat a living or non-living thing? … Good… So I will now write 'cat' under the heading 'Living Things'."

▪ While verbalizing maybe better for older students who already have had sufficient experience seeing and visualizing tables, a better option for students in lower grades would be to provide a tactile graphic. Therefore, the student will be able to tactually see the rows and columns with the headings 'Living' and 'Non-living' in Braille and large font.
If the graphic is sufficiently large, the student could be given small magnetic or sticker place cards with the examples (such as cat, table, rat, spider, tree, car, bridge etc.) written in Braille & large font that can be placed under the corresponding column in the table; thus, making the classification a concrete experience / activity.

▪ Another option would be classifying 'objects' (like toy animals, pencils etc.) in two boxes or trays that have been labeled as 'Living Things' and 'Non-living Things'.

10. Teaching New Vocabulary & Visual Concepts

10.1 Teaching New Vocabulary

▪ Generally new vocabulary, examples etc. are provided in textbooks with multiple pictures for better understanding. Use real objects, models, activities as much as possible for these pictures or new vocabulary mentioned as part of the text.
For example,

- In a poem about a garden, the image in the text may have a honeybee on a flower.

Here, a sufficiently large 3D model of a honeybee, the sound that a honeybee makes while fluttering around etc. should be introduced to the student since she/he may never have experienced an actual honeybee.

▪ It is just as important to introduce the spelling and pronunciation of the words in relation to the concept as well as the parts of the TLA.

▪ When discussing plants with sighted students, the discussion would not be void of images of the different plants. Similarly, demonstrating an assortment of real plants as well as artificial 3D models helps all students to clearly understand and even enjoy the topic. Also, keep in mind that

while sighted children are daily exposed to the vast variety of plants all around – different shapes, sizes, shades and colors, the sighted child may not have these experiences.
For example,
- Pictures of trees, spiders, a swing, snails, dogs etc. when discussing Living & Non Living things.

NOTE:
The teacher could share this list with the special educator / parent for them to take this up with the child.

10.2 Teaching Specific Visual Concepts

▪ Lessons should be planned in a manner that they encourage the use of the remaining senses to substitute blindness and low vision.
- If it can be done or experienced, make the students do it. Use the kinesthetic sense.
- If it can be touched, encourage tactual exploration. Use the sense of touch.
- Encourage the use of smell and taste while exploring, wherever possible.

There may be concepts which seem entirely visual, but which also involve other senses.
For example,
- A shadow is not only darker but also cooler; this could be brought to the student's attention.

Hence, if a concept can be experienced by more than one sense, this should be encouraged.

▪ The relation of abstract concepts to tangible realities aids learning, hence relate concepts to real life situations.
For example,
- Comparing the computer desktop to a table top
- Comparing folders and sub folders on the computer to rooms and cupboards
- Relating the concept of adding and subtracting negative numbers to borrowing and lending of money.

▪ Visually impaired students may never have full awareness of these concepts (based on their varying levels of blindness) but can have 'information about them' and learn about them through associations. A totally blind student without any light perception may be asked to imagine purely visual concepts. They must be taught such visual concepts, in the same way and for the same reasons that you would teach the sighted students. Light, Colour etc. are a part of the world and cannot be ignored while teaching.

▪ Don't forget that we teach internal organs without seeing them, something we teach internal respiration.

➢ **Colours**

▪ Inform the student that colour is one of the many ways of differentiating one thing from another that leads to an easy and faster identification. There can be multiple units of the same object and the colour difference helps differentiate.

▪ One can explain a colour with its universally accepted association.
For example,

- The sky is always associated with the colour blue, leaves of the trees are green, the bark of the tree is brown, snow is white etc.

▪ Students with low vision who can perceive a few colours may be asked to imagine a combination or variations of what they can see.

For example,

- Red and yellow become orange
- Adding white to black makes it grey, and the more white you add, the lighter the shade of grey.

Some colours are described as being warm or cold and it is useful for the students to understand which colours describe these ideas.

▪ Moreover, it would be helpful for the student to learn which colour her/his belongings are so that she/he can try to keep track of them.

▪ Colour detectors may be used for the student to be able to identify colours themselves.

➢ **Light & Shine**

▪ Know the students eye condition. Based on their experiences, explain the concept of light.

▪ A number of students with total blindness may be able to perceive light even when they can’t see anything else. Helping students develop the concept of light is useful and of value for different subjects as well as for a better understanding of the visual world on a day-to-day basis.

▪ Teach the student that light can be both natural and artificial; the Sun is the greatest known source of the natural source of light; tube lights, bulbs, car lights etc. are some examples of artificial source of lights.

▪ Explain that shining is the quality of brightness produced when light is reflected on something. It means giving out or reflecting bright light.

▪ Discuss summers; how the extreme brightness makes it difficult for a person to look directly at the Sun that shines brightly in the sky, which is the source of that light. One also feels warm / hot when light falls on her/him. The closer you are to the source, the hotter it feels.

▪ Explain that light helps one see more clearly as it brightens up the area. Describe the way that we use light to alter the mood of a stage set for different scenes, by using the stage lamps to demonstrate the changes.

▪ Conduct light experiments.

For example,

- Ask the student to place both hands flat on a table with their palms facing upwards. Shine a light on one palm close enough so that she/he can feel some heat. Enquire if they can feel anything; let them describe the sensation. If they find it difficult to explain, question them specifically about heat, weight etc.

Repeat this process with something cold to demonstrate the difference. This can be connected to what the person already experiences in daily life thus making the connection between darkness and cold heat and light.

- Explain to the student that the absence of light is what is referred to as darkness. The lack of light would thereby reduce heat.

- Nowadays, accessible light indicators are available for students to identify whether or not a room is dark or light, and even locate the direction or source of the light.

➢ **Blinking**

- The student would learn that the shutting and opening of eyes quickly is called blinking.

- When learning about digital clocks, computer cursors etc., the student may be taught that the flashing on and off is also known as blinking. The object essentially appears and disappears in a regular or intermittent way.

Sighted children receive a lot of information from their surroundings outside any formal curriculum in no particular structure or format but just by the visual exposure they get. A blind and low vision child lacks such incidental learning.
For example,
- If a blind and low vision child is not exposed to or tactually shown things as common as a leaf, a tree, a plant etc., he may grow up without ever having a clear concept of these words, and maybe without ever experiencing them.

Also watch for situations for which the student may have had no prior experience.
For example,
- Foods in different forms: corn-on-the cob, cooked corn, popcorn, dried corn;
- Matter in altered form: water, steam, ice, dew

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11. <u>Teachers Corner – Teaching Instructions</u>

- *<u>Content</u>*
- Content teaching needs to be in-line with the lesson objectives, to make sure the student meets each one of them before proceeding to the other.
- After every section the activities that are planned will help to gauge if learning has taken place and whether the objective has been met or not.
- Activities need to be planned and scheduled after every section in the lesson for recapitulation.

- *<u>Peer/Buddy System</u>*
- For any lesson where peer support is required, the teacher needs to make sure to select a classmate/peer who is willingly helping the student and is articulative. (Has comfortable

rapport with the student and who understands the requirements to explain detailed information to student with visual impairment).

- The sighted student needs to be trained in order to help the student with visual impairment.

- *Assessment and Evaluation*
- Plan a summative evaluation assessment to test student learning after teaching the lesson. The evaluation sheet will consist of various types of questions ranging from objective type to essay type questions; making sure we move use the maxim of teaching from simple to complex. (fill in the blanks, multiple choice questions, match the columns, answer in one word, short notes, answer in detail and lastly essay type questions)
- The reason to use the maxim of teaching from simple to complex is to help the student to be confident and encourage her/him to solve the test).
- Plan the evaluation based on the need of the student.

IV. AVAILABILITY OF CRAFT MATERIALS AND OTHER USABLE PRODUCTS (IN MUMBAI)

General Stationery Items

Blu-tac (Tack It - Faber-Castell)	Faber-Castell Mumbai Corporate Office 801, Kamla Executive Park, Near Vazir Glass works, Off Andheri-Kurla Road, J. B. Nagar, Andheri East, Mumbai – 400059 info@faber-castell.in
Braille Sticker Paper	Orion Enterprises 48, Sutar Chawl, Ground Floor, Zaveri Bazaar, Mumbai – 400002 orionenterprises1027@gmail.com
Parchment Paper	All India Plastics 20/22, Off Abdul Rehman Street, Mirza Ln, Chippi Chawl, Kalbadevi, Mumbai, Maharashtra 400003 kompak@bom8.vsnl.net.in
Rubber Mat	NATIONAL ASSOCIATION FOR THE BLIND (INDIA) 11/12, Khan Abdul Gaffar Khan Road, Worli Seaface, Mumbai – 400030 66838650 66838651 contactus@nabindia.info
3D – Liners	Stationery stores
Twine	Stationery stores
Paper Thread	Stationery stores
Ice cream sticks	Stationery stores
Sequins	Stationery stores
Cardboard	Stationery stores
Mount board	Stationery stores

Different Textured Paper Options

Foam	Stationery stores
Craft Paper	Itsy Bitsy Phoenix Marketcity F-68, Lal Bahadur Shastri Marg, Kurla West, Kurla, Mumbai, Maharashtra 400070 +91 9967170020 +91 8049626544 / 9741064499 / 9741013355 / 26266544 info@itsybitsy.in
Corrugated Paper	Stationery stores
Velvet / Crape Paper	Stationery stores
Sand Paper	Stationery stores
Card Paper	Stationery stores

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