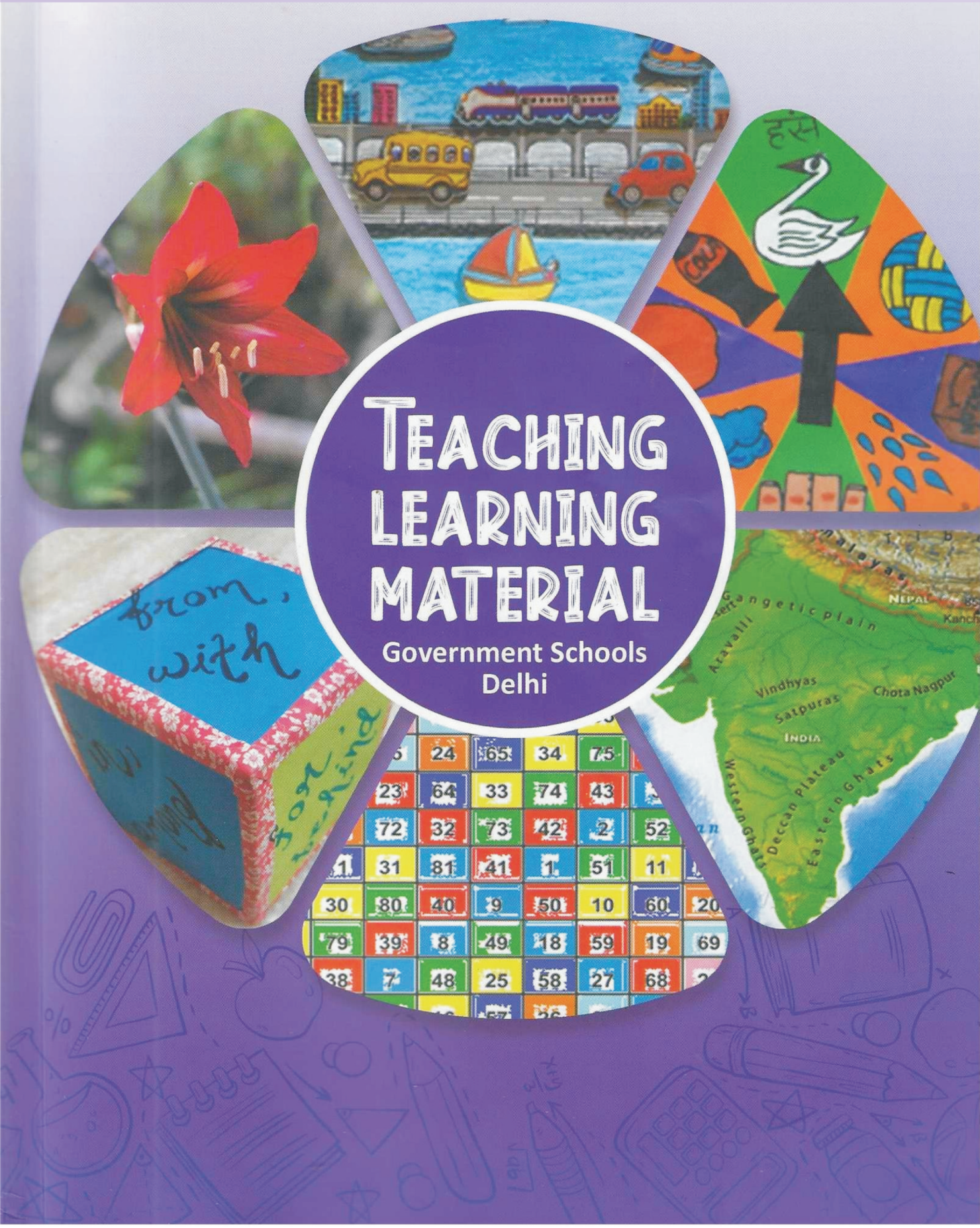
B.N.SAHA
D.A.V TEACHERS TRAINING COLLEGE

(Affiliated to Vinova Bhave Vni. hazaribagh & Reccognized by NCTE Dwarika, New Delhi), Giridih 815312 (Jharkhand)



CONTENT-: TLM SERIES...

The list mentioned above includes some awarded and non-awarded TLMs under the ERA category (formerly called SBERA awards). The awarded TLMs have been marked with ERA medal, while gold and silver star have been provided by Bharti Foundation for encouraging teachers' efforts.

Disclaimer: Few digital TLMs come with a weblink, these weblinks have been created by the respective mentor teachers and may or may not working as of now. Bharti Foundation is not responsible for the working/non working condition of these links.

Means of Transport

TLM 1

Created by Teacher: Jyoti Lakra

School: SKV Mundka, West B Zone 17, Delhi

TLM for Classes PP to 2
Subject : Language and GK
Topic : Means of transport

Brief description: This TLM can be used as a game to develop the vocabulary, critical thinking and problem-solving skills of the primary school students. It can be used for pre-primary students to identify the objects, class 1 students to learn the spellings of the objects and class 2 students to learn the modes of transport.

Other concepts that can be taught using this TLM: Vocabulary, concepts of air, water and noise pollution, concept of colours, identify and differentiate between birds, land animals and aquatic animals.

Materials used: Cardboard of used cartons or cake bases, colours, Velcro of old shoes or bags, Fevicol

Cost of the material used for making TLM (approx.): ₹20

How to make:

1. Take a cardboard of any shape (square, rectangle or circle) as shown in the the figure.
2. Draw a picture showing all the three segments, namely, air, water and land as shown in the given figure.
3. Colour the picture with symbolic colours for air, land and water.
4. Repeat the same procedure on the back side also.
5. On both sides, paste the Velcro to stick the objects and only on one side draw the shape of objects.

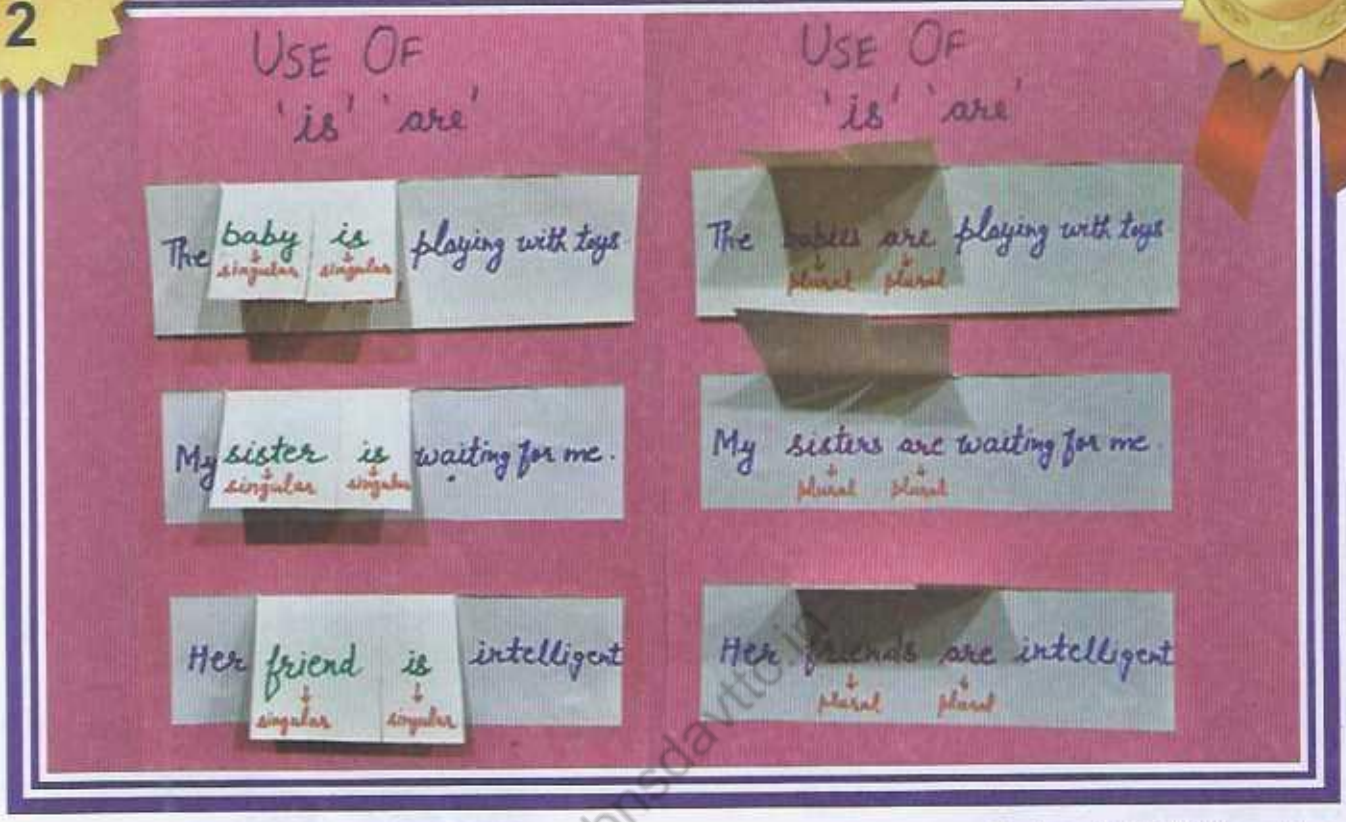
How to use:

- Show the TLM to the students and ask them to identify the objects.
- Ask them about names of the objects and places where they can be found.
- Let them figure out and stick the objects at their appropriate place where they are found like:
    a. Air: aeroplane, helicopter, crow, pigeon, etc.
    b. Land: train, car, bus, cow, dog, monkey, horse, etc.
    c. Water: boat, ship, fish, tortoise, etc.
- Ask them to change the side and stick the objects at their proper place by resembling the shape of the object if the kids are in pre-primary school.
- If the student is in class 1, extend the activity by reading and writing spellings, and in class 2. further discuss the modes of transport, types of pollution, etc.

[NOTE: This TLM can be used as an individual activity, in pairs or as a group activity.]

Use of 'is' and 'are'

TLM 2



Created by Teacher: Priyanka Vohra

School: SKV, Samalka, South West B1, Delhi

TLM for Class 3

Subject : English (Grammar)

Topic : Use of 'is' and 'are'

Brief description: The TLM was helpful in making the students understand grammatical concepts such as singular and plural through the use of verbs 'is' and 'are'.

Other concepts that can be taught using this TLM: Verb agreement, adjectives, pronouns, tenses and vocabulary

Materials used: Coloured A4 size sheets, sketch pens, pair of scissors and glue

Cost of the material used for making TLM (approx.): ₹30

How to make:

1. Take an A4 size sheet. Cut it into 3 to 4 strips of approximately 3 inches wide.
2. Fold the strips into half.
3. Paste these strips on another A4 sheet (in such a way that the crease is on the top and the opening is at the bottom).
4. Flip open the strip.
5. Write a plural sentence on the inside of the strip. (*For example: The babies are playing with the toys.*)
6. Write the same sentence using a singular noun and verb form on the top of the flap. (*The baby is playing with the toys.*)
7. Using the scissors, cut out and remove the first and the last part of the sentence written on the top of the flap. (*The baby is playing with the toys.*)
8. On the top of the flap, you will be left with the singular noun and singular verb (*baby is*). Using the scissors, make a slit between the singular noun and singular verb.
9. Flip the folds to read the sentences.

How to use:

- Flip the folds back and forth to read the sentences.
- When the fold is closed, learners will be able to look at the sentence using 'is'. On opening the fold, learners will be able to look at the same sentence using 'are'.
- Students can also experiment with mixing up plural nouns (*babies*) with singular verb (*is*).
- This will help them understand the rule of using singular nouns with singular verbs and plural nouns with plural verbs.
- Ask students to think of more singular and plural nouns.
- Encourage them to make appropriate sentences using 'is' and 'are'.

Noun

TLM 3

Created by Teacher: Archana Verma

School: Govt Co-ed Sr. Sec. School, E Block, West Vinod Nagar, East Delhi

TLM for Classes 3 to 8

Subject : English

Topic : Noun (Common noun and proper noun)

Brief description: Students will be able to understand nouns and easily differentiate between common nouns and proper nouns.

Other concepts that can be taught using this TLM: Nouns and types of nouns

Materials used: Old calendar or any plain blank thick paper, old newspaper, A4 size sheet, board marker, a pair of scissors, 2 to 4 wall pins, glue and broom sticks (or any stick to be able to hold paper picture)

Cost of the material used for making TLM (approx.): ₹40

How to make:

1. Take the calendar paper. Write the definitions of common noun and proper noun on the plain side of the calendar as shown in the picture.
2. Stick the calendar over wall by using wall pins.
3. Now, take the newspaper. Cut different pictures from it. Using glue, paste each picture on the A4 size sheet of paper.
4. Cut the A4 sheet of paper to the shape of the picture glued on it.
5. Using glue and tape, fix a stick to every picture.
6. Once made, each picture with a stick fixed to it can be used many times to explain the concepts of common and proper nouns. It is easy to keep and store them too.

How to use:

- Pick up any picture with the help of the stick attached to it and show it to the class.
- Ask the students whether the picture is an example of a common noun or a proper noun.
- With the help of pictures let the students clearly understand and differentiate common and proper nouns.
- Explain why proper nouns are always written in capital letters.
- This TLM makes it easy to use the teaching strategy of 'known to unknown'.
- Students will visualise and think critically to develop their understanding of nouns and different types of nouns, particularly common nouns and proper nouns.

विशेषण

TLM 4

Created by Teacher: Manohar Lal **School: SV, Kakrola– 78, South West B, Delhi**

TLM for Classes 3 and 4

Subject : Hindi

Topic : विशेषण

Brief description: The students will rotate the wheel, and whichever picture is pointed at by the arrow, they have to say the things they notice in the picture. This TLM helps students understand Hindi grammar topic (विशेषण) more clearly. With the help of pictures, they could easily identify what they are actually studying.

Other concepts that can be taught using this TLM: Reading and writing names of different things or objects

Materials used: Circular cardboard, a pair of scissors, glue, colourful sheets, colour pens, other stationary items

Cost of the material used for making TLM (approx.): ₹50

How to make:

1. Take cardboard and cut it into a circle.
2. Take one colourful sheet and cut a circle the same size as the circular cardboard. Paste the sheet on the cardboard.
3. Now, take sheets of different colours and cut them into triangles (as shown in the picture). Paste these triangles on the circular cardboard.
4. For the next step, either draw the picture of the objects or print them and paste them on triangular areas on the board.
5. After completing the wheel, the last step is to rotate the wheel. To do that, make a hole in the centre of the cardboard and pass a small stick through it.
6. Attach an arrow to the stick (as shown in the TLM picture).

How to use:

- Show the TLM to the students and let them first guess and identify the objects.
- Ask the students to remember the places where they have seen all these things.
- Ask students to come one by one and rotate the wheel. Ask them to list out everything that they notice in the picture that the arrow is pointing at.
- After they have listed out all the things, tell them the definition of विशेषण. Now, ask them to rotate the wheel again, and this time they will write down all the things they have noticed in their notebooks.

Making Words from Alphabets

TLM 5

Created by Teacher: Manju Bhandari

School: GGSSS Jhilmil Colony, East Delhi

TLM for Classes 3 to 5

Subject : Hindi

Topic : Making words from alphabets

Brief description: The TLM comprises of some Hindi letters, the teacher is expected to share these letters with the students and make as many words as are possible by using these letters. Students will be able to enhance their vocabulary using this TLM.

Other concepts that can be taught using this TLM: Learning Hindi and English languages, vocabulary enhancement and verbal communication

Materials used: Chart paper, colours, and number chart

Cost of the material used for making TLM (approx.): ₹10

How to make:

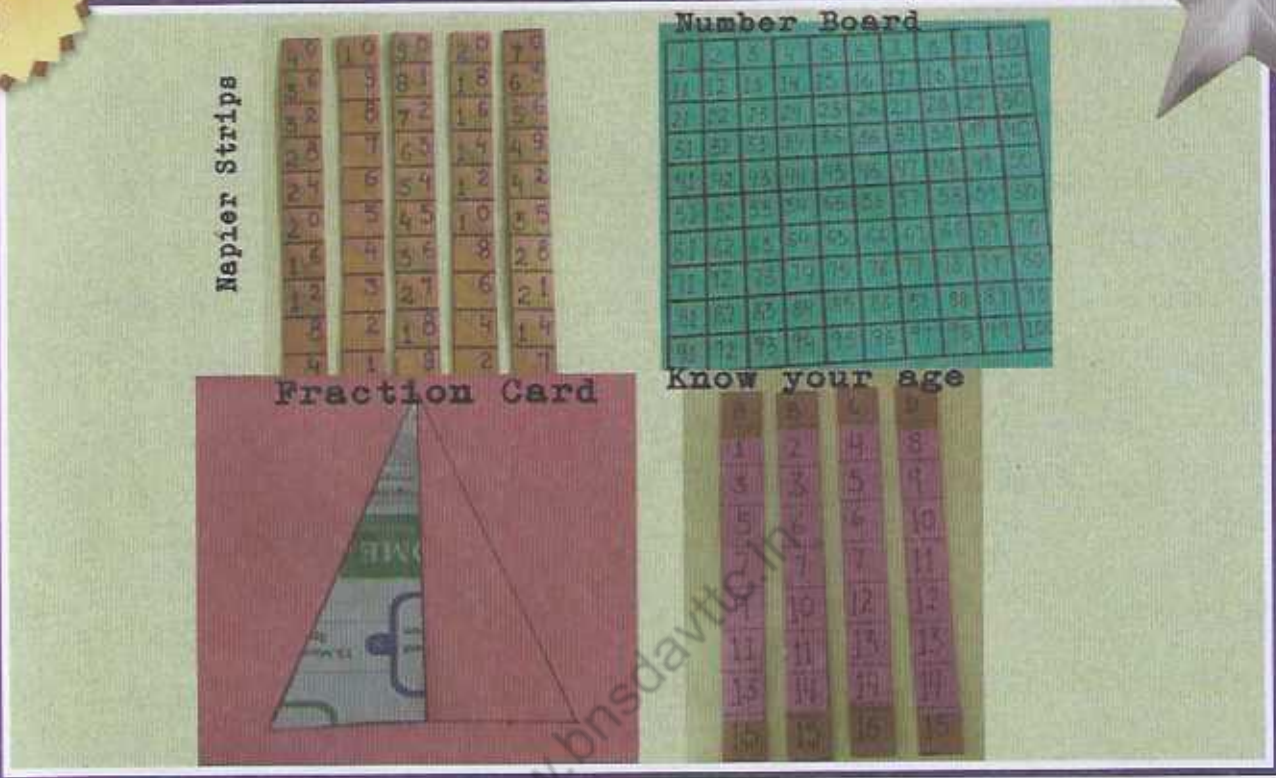
1. Take the chart paper.
2. Cut the chart paper into small square pieces. The chart paper can be cut into any shape. It is not necessary to cut paper pieces only in square shape.
3. Now, write Hindi alphabets on each of the square paper pieces, one alphabet per piece as shown in the picture.
4. Also, write any number on the right side of each square piece.
5. Make 2 to 3 sets of such pieces.

How to use:

- Create 5 to 6 groups in the class, distribute 5 to 6 pieces of alphabets to each group on a random basis.
- Encourage each group to make maximum words from their set of alphabet pieces.
- Additionally, ask them to total the numbers written on each alphabet piece.
- This way, Maths gets integrated with Hindi.
- Students can identify square shape or the other shape used to cut the paper pieces. These cards can be made of different geometric shapes which will help the students recall the concept of shapes.
- Also, it can be used in the form of a crossword puzzle as shown in the main picture.
- For the below picture, students can be asked questions such as making two words having one alphabet in common or totalling the numbers written on the pieces.

Number Board

TLM 6



Created by Teacher: Rakesh Gujral

School: GSBV, Ramesh Nagar, West A, Delhi

TLM for Classes 3 to 5

Subject : Mathematics

Topic : Learning material in mathematics

Brief description: Mathematical concepts can be taught with the help of some interesting games and activities that can be easily made using available material like newspaper, chart paper, cardboard sheet, bukram sheet, etc.

Other concepts that can be taught using this TLM: Concepts of numerals, various types of numbers, greater than less than, numbers in between, pattern, skip counting, basic operations, fractions, shapes etc.

Materials used: Chart paper, cardboard sheet, newspaper, sketch pen, scale, scissors, glue etc.

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Take chart paper/card board sheet as base.
2. Using a sketch pen, write numbers from 1 to 100 and create a Number Board.
3. Write tables from 1 to 9 on cardboard strips
4. For Napier Strips write on strips of cardboard counting in pattern from 1 to 15.
5. Making a fraction card -
   (a) Take any base and make fraction cards for 1/2 , 1/3, 1/4, etc., by pasting half portion for one-half, one third portion for one-third one fourth portion for one-fourth.
   (b) For each fraction use at least four different shapes so that concept of half means anything divided into two equal parts it may be square, rectangle, triangle, circle, strawberry, butterfly, etc.
   (c) Boundary of whole and fractional part must be done using bold marker or thread.
6. Paste chart paper/newspaper covering portions of geometric figures drawn on chart paper to depict fractions.

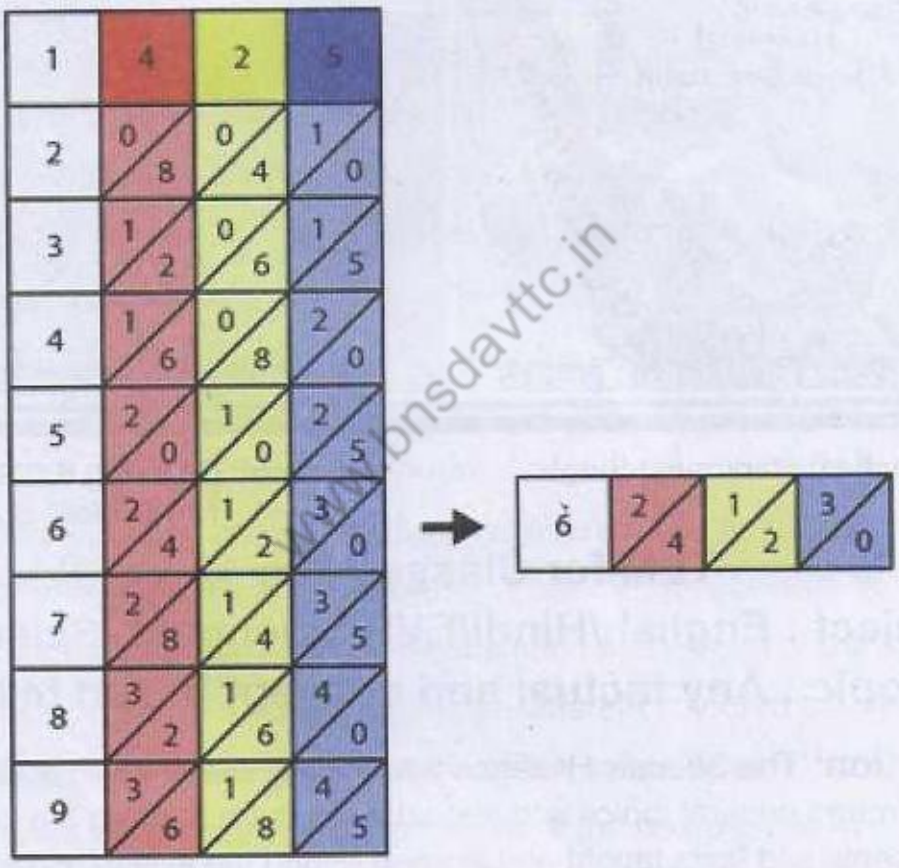
[More on Napier's strips: https://mathedu.hbcse.tifr.res.in/napiers-bones/]

How to use:

- **Number board:** (a) Ask students to recognise numerals by reading number board horizontally, vertically, pattern, ordering, before, after number, in between, skip counting, etc. (b) By counting ahead, concept of addition can be taught, for example, say, we have to add 2+3, for this count two then count ahead 3, read the number which comes as 5. Similarly, subtraction can be taught using backward counting. Similarly, tables, multiples and factors can be explained.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- **Napier strips:** By just writing tables from 1 to 9 various tables can be formed, for example, if we put strip of 1 and 3 together table of 13 as well as 31 is formed, by putting strips of 4, 7 and 5 we can get multiples of 475, 457, 574, 547, 745 and 754. . We need to add numbers between the diagonals, for example, 425×6=2(4+1)(2+3)0 = 2(5)(5)0 = 2550.



- **Fraction cards:** Concept of 1/2,1/3,1/4, etc., of a whole can be easily be given using newspaper, chart paper, glazed paper, bukram sheet by folding and pasting it on any \ chart paper or cardboard sheet. For example for giving concept of one half of a whole cut any shape and just paste its half part or fraction of its part on the shape.

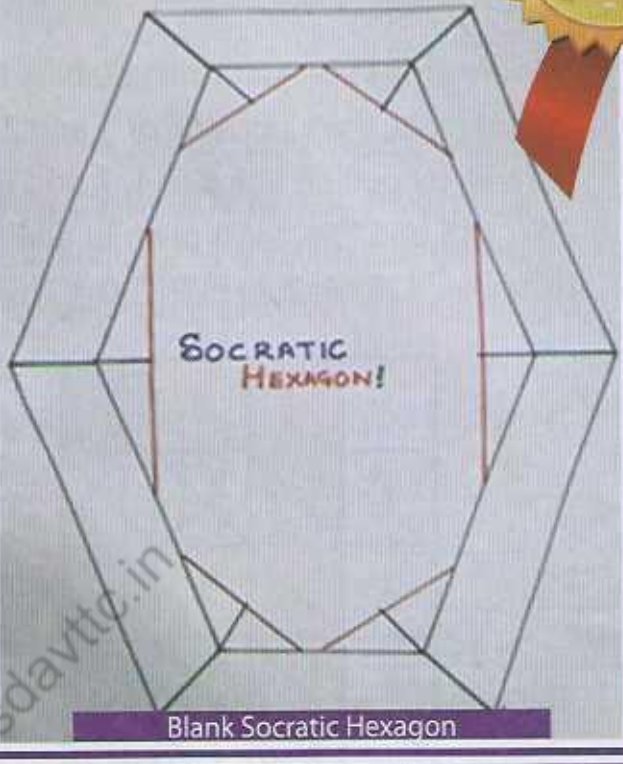
[Note: Fraction cards must be accurate.]

Socratic Hexagon

TLM 7

ERA AWARDED

Socratic Hexagon for Major Catastrophes



Blank Socratic Hexagon

Created by Teacher: Karamjeet Singh

School: G.Co-ed. S.S.Rampura Distt. North West-B Zone 11, Delhi

TLM for Classes 3 to 12
Subject : English/Hindi/EVS/Science/S. Science
Topic : Any factual and concept based text

Brief description: The Socratic Hexagon was initially designed as a language practice game around general topics and textual lessons for revising the characters or the various concepts and facts taught and learned during the lesson. However, it can be used for any topic as long as there are facts and concepts associated to it.

Other concepts that can be taught using this TLM: Language concepts can be integrated with subjects/concepts such as - Natural sciences, EVS, characters and events in the chapter, festivals of India, states and countries.

Materials used: A copy of the Socratic hexagon, a pair of dices- one numbered other one coloured, a pen and a notebook to write the questions and maintaining the score board.

Cost of the material used for making TLM (approx.): ₹Rs. 20 or less
(Xerox copies of the hexagon in colour might cost up, however, Help of students can be taken to prepare the hexagon by using materials such as chart papers, dices, and sketch pens, amounting the cost to be less than Rs. 20).

How to make:

For a class strength of 36-40 students a teacher would require to make 6-10 groups of 6-4 members in each group. ***[Note: It is always preferable to have even number of students in a group for equal strength of contesting teams.]***

1. To make a Socratic hexagon – Draw a hexagon as shown in the picture.
2. To make dices – Use some dices as is and for the other halves, paste a white chart paper such that each face is coloured with colours chosen for topics in the outer periphery.

3. To gamify the whole process, it was required to integrate the elements of curiosity, scoring, competitive spirit, and cooperation. Thus, two dices came in picture, one which was a usual numbered dice and the other being 6 coloured dice withcolours used for topics to be revised.
4. In the picture given above, the coloured dice have 6 colours, viz., green, red, yellow, purple, brown and orange, and numbered dice as usual have the numbers represented by dots, viz; 1-2-3-4-5-6.
5. To increase the possibilities of questions and randomness of the topics each question stem is again allocated with two different coloured triangles. The colours for question stems are restricted to the colours already used for the topics to be revised, thus, each colour gets 2 positions in the board game.

How to use:

Part 1: Preparation of the game

- To play the game, make 4-6 students sit in a group and divide themselves in two smaller groups that is, 3-3 or 2-2 or 2-3 as per the need.
- Each smaller group will choose one Scribe for their team who would both play and keep the record of the scores.
- To decide which team goes first, each team take their turn and the one getting the larger number will have the option to choose whether they would like to answer first or they will ask questions from the other team- **Maximum questions per round are 03**. (Questions once asked cannot be asked again.)
- If the team chooses to answer the questions, dices are given to the other team who will roll the pair of dices, thus, getting a combination of a number and a colour, like 3 - green. Now, the questioning team would frame the questions around the topic from the periphery according the colour and the question stem associated to that number.

Example – In the Socratic hexagon as shown in the picture, for the major catastrophes, if the team gets 3 - green it would mean one of the following topics as they are associated with green colour;

- AIDS
- EBOLA
- SPANISH FLU

Now, to formulate some of the possible questions based on the topics (here, names of some dangerous viral diseases) such as -

- Why AIDS was declared as a pandemic?
- When did EBOLA strike the world.
- Why Spanish Flu is called Spanish Flu?
- Why Spanish Flu is considered as one of the Major Catastrophes of the world.
- When did Spanish Flu end?
- Why do a patient of AIDS die?
- Why EBOLA/AIDS is so dangerous?

Part 2: Rules of the game

(i) Each team is given a minute to frame and ask maximum of three questions one from each of the three topics and at least 02 different question stems (They must know the correct answer themselves)

(ii) The Scribe will note down the questions as well as award 1 mark for each valid question. (To fix the validity of a question is the matter of group consensus, thus, left for the groups to decide).

(iii) Both the teams will keep track of the time. The answering team is given 3 minutes to discuss the possible answers and presented by any one of the members.

(iv) For each correct answer the team is awarded with 4 marks, 0 mark for passing the question and – 4 for each wrong answer.

(v) The question passed is to be answered by the questioning team and will be awarded with bonus of 2 marks for each correct answer but – 5 for not answering or giving the wrong answer to the question passed.

(vi) Each team can have three chances to raise the doubt on the answer given and the doubt clarity card once used cannot be used again, and doubt is clarified either by a teacher or Google if mobile or tab has been allowed in the classroom.

(vii) In case of non-clearance of doubt each team shall get 1 mark each. And the dices are handed over to the next team.

(viii) The game shall be played for 20-30 minutes and winning team is the one scoring higher at the time of end buzzer by the teacher or alarm as the case may be.

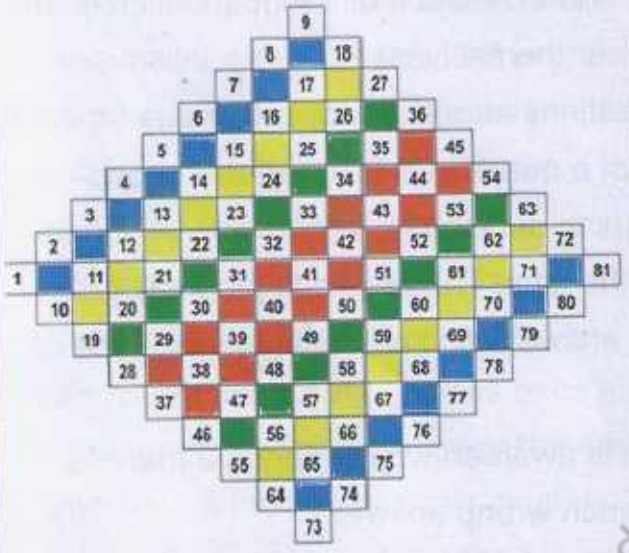
(ix) **In case of tie :** A 3 – minute of tie breaker of three rounds of rapid fire questions is given where each team can ask any factual question around the topics, that is, question stems **When/Where/Who** from the opponent team. Team answering correct more questions shall be declared as a winning team.

Playing with Numbers (Magic Squares)

TLM 8

ERA AWARDED

FUN SERIES OF MATHEMATICS



Created by Teacher: Jaspal Singh Negi

School: GBSSS, Janta Flats Nand Nagri, North East, Delhi

TLM for Class 4

Subject : Mathematics

Topic : Playing with numbers (magic squares)

Brief description: The students will be able to understand and identify different numbers, sequences of numbers, patterns, additions or sum of numbers (here the sum=369).

Other concepts that can be taught using this TLM: Multiplication, division and squares of number.

Materials used: White and coloured chart papers, sketch pens, marker, pencils, scale, pair of scissors and glue

Cost of the material used for making TLM (approx.): ₹30

How to make:

1. Make different shapes on the chart paper as shown in the figure.
2. Make a list of the numbers to be made. (Here, $9^2 = 81$, i. e., 1 to 81).
3. In square box 9 × 9, either mention the numbers in the above patterns or cut strips out of coloured chart papers of such numbers and paste them in a desired position with the help of glue. The magic square box, having a sum of 369, is obtained.
4. Take a 3 × 3 square box and form a magic box having a sum of 15.

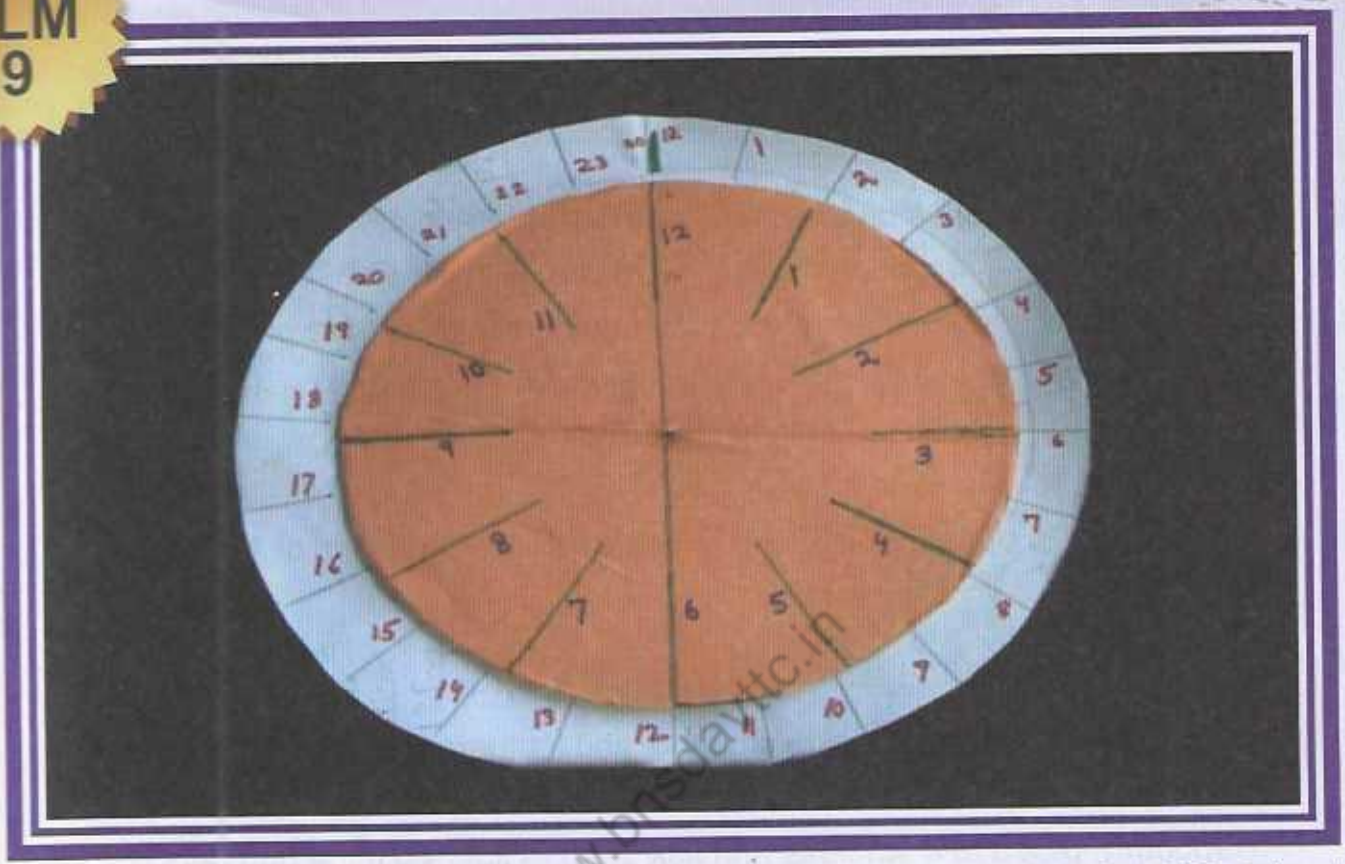
How to use:

- Show the magic square box to students and let them first guess and identify the numbers.
- Randomly, pick 3 to 4 students and ask them to figure out the numbers of their date of birth from the magic box. Explain with the help of example shared below.
- Example - Say, date of birth of one of the students is 25-5-2012. Figure out these numbers such as 25, 5, 20 and 12 from the magic box and arrange them as per the picture shown in the TLM and find out the sum of these numbers from each side.
- Now, guide students regarding the proper numbers of square magic boxes such as 3×3 to 9×9 and give them a task to form these square magic boxes at their home and perform sum of those numbers by easy methods.

[More info on Ramanujan's magic square box: https://gonitsora.com/ramanujan-magic-square/. As Ramanujan's date of birth was 22. 12. 1887 and he formed a magic box of 22, 12, 18 and 87, those sums from each side were 139.]

Time (AM and PM)

TLM 9



Created by Teacher: Uma Shankar Prasad

School: G Co-Ed S. School
Mahavir Enclave, Delhi

TLM for Class 4
Subject : Mathematics
Topic : Time (AM and PM)

Brief description: Students will be able to understand how time on the 12-hour clock get converted into the 24-hour clock.

Other concepts that can be taught using this TLM: Circle and rotation

Materials used: Two cardboards, sketch pen, pin and scissors

Cost of the material used for making TLM (approx.): ₹45

How to make:

1. Take both the cardboards and cut them into two concentric circles, one being bigger and the other smaller.
2. Mark 1 to 12 on the smaller circle at equal divisions.
3. Mark 1 to 24 on the bigger circle at equal divisions.
4. Fix the pin through the centre of the bigger circle into the smaller circle so that the smaller circle can rotate.

How to use:

- Show TLM to the students.
- Ask them how many divisions are there on the bigger circle and how many on the smaller circle.
- Demonstrate that when 12 of the 12-hour clock reaches 12 of the 24-hour clock, then the 12-hour clock rotates once. This is called AM on a 12-hour clock.
- Further, demonstrate that when 12 of the 12-hour clock reaches 24 of the 24-hour clock, then the 12-hour clock rotates once again. This is called PM on a 12-hour clock.
- Through this TLM, the teacher can help the student visualise a12 hour clock on a 24 hour clock.

Speaking Skill

TLM 10

Created by Teacher: Amita Budhiraja

School: RPVV, INA Colony,
District- South East, Delhi

TLM for Class 5
Subject : English
Topic : Speaking Skill

Brief description: 'A picture is worth a thousand words…' The visual shown above is used to prompt speaking skills among the students. Listening and speaking are the foremost skills in learning any language.
They are called the 'receptive skills' – the input, which fosters the enhancement of reading and writing skills – the output. The TLM has been used to enhance English proficiency among students.

Other concepts that can be taught using this TLM: Listening skills, critical thinking skills and creative writing skills

Materials used: The internet and some time to be invested by the teacher beforehand while planning the lesson

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Explore the sea of resources available on the Internet and customise it according to the needs of the students.
2. Requisites (to be arranged by the teacher):
   - A carefully chosen image
   - A chalkboard or a blank PPT slide or any online feature to record responses real-time.

How to use:

- Show zoomed-in image/ allowing students to observe carefully and make guesses. Towards the end reveal the answers (by showing the real zoomed-out images).
- Display the image through a PPT slide or an online means. ***(Note: While presenting the image/s to the students,teacher must be careful to create a free, fearless and non-judgemental space for the students to respond.)***

• **Initiating critical thinking skills**Initiate students' participation by asking questions such as:
   - What is happening in the picture? (polar bear on the metro station)
   - Why do you think the polar bear is there?
   - How do people feel when they see such a wild beast around them?
   - Imagine yourself as a metro-passenger greeted by this bear on the platform! How will you react?
   - Should animals be allowed to travel in public transport meant for humans?

• **Fostering speaking skills:**
   - Record every student's response on the chalkboard or whiteboard (in online setups). Soon, the board will start looking like a web diagram where multiple perspectives can be noticed.

Extension of the activity: The same image/responses can further be utilised to conduct a creative writing activity as explained below:

Option 1: The teacher can either tell students to randomly choose any 2-3 responses written on board.
Option 2: The teacher can categorise the responses in some way and then allocate one category to one group and so on.

Modality (for students): individual/group activity

In this creative writing activity, the students will attempt to draft a very short story in 50–80 words (which may be humorous or tragic, etc.) around the selected pointers (the responses picked from the perspective-pool on the chalkboard).

Then, they may share their stories with each other.

[Note: The teacher can furthermore plan to include components such as peer-evaluation in such activities.]

Fraction

TLM 11

Created by Teacher: Preeti Singhal

School: SKV, Badli, North West A, Delhi

TLM for Classes 4 and 5

Subject : Mathematics

Topic : Fraction

Brief description: Students will be able to have a conceptual understanding of fractions by visualising, realising, and generalising. Moreover, using storytelling by utilising eatables liked by them will be a fun and interesting way of learning fractions.

Other concepts that can be taught using this TLM: Differentiation between fractions and rational numbers, circle, sector, radius, diameter, and circumference of a circle

Materials used: Digital images, Kinemaster app, digital pen

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Create a story to make students understand the concept of fractions using the things known to them.
2. Collect images related to the story from Google search.
3. Using the Kinemaster app, prepare a slide show as per the progression of the conceptual story and the DOE worksheet for understanding the concept and answering practice questions.
4. Use a voice recorder in the app to tell the story for explaining the concept as per the slide and pen for explaining the DOE worksheet.

How to use:

- Capture some images of TLM to show the students to guess what it depicts.
- After getting their response, conclude the concept. Explain same concept through a story and share the video with them over a mobile or on screen if there is smart board in the class. Students love to listen to stories.
- Play the video. Use on/off buttons as and when required to explain the concepts, keep asking questions in between.
- Give students some more questions for practice.
- Ask them to figure out and name objects from their daily life where the concept of a fraction can be applied.

Use the link- https://youtu.be/bK297Gls1hM

Creating Fun Squares

TLM 12

Created by Teacher: Anu Gupta

School: SKV Anand Vihar, Delhi

TLM for Class 6

Subject : English

Topic: Creating fun squares to make learning interesting

Brief description: By using the 'Fun Squares', students will be able to frame a meaningful sentence. They can identify words with the pictures.

Other concepts that can be taught using this TLM: Sight words, articles, verbs, nouns, past tense and parts of speech

Materials used: Pastel sheets and sketch pens

Cost of the material used for making TLM (approx.): ₹20

How to make:

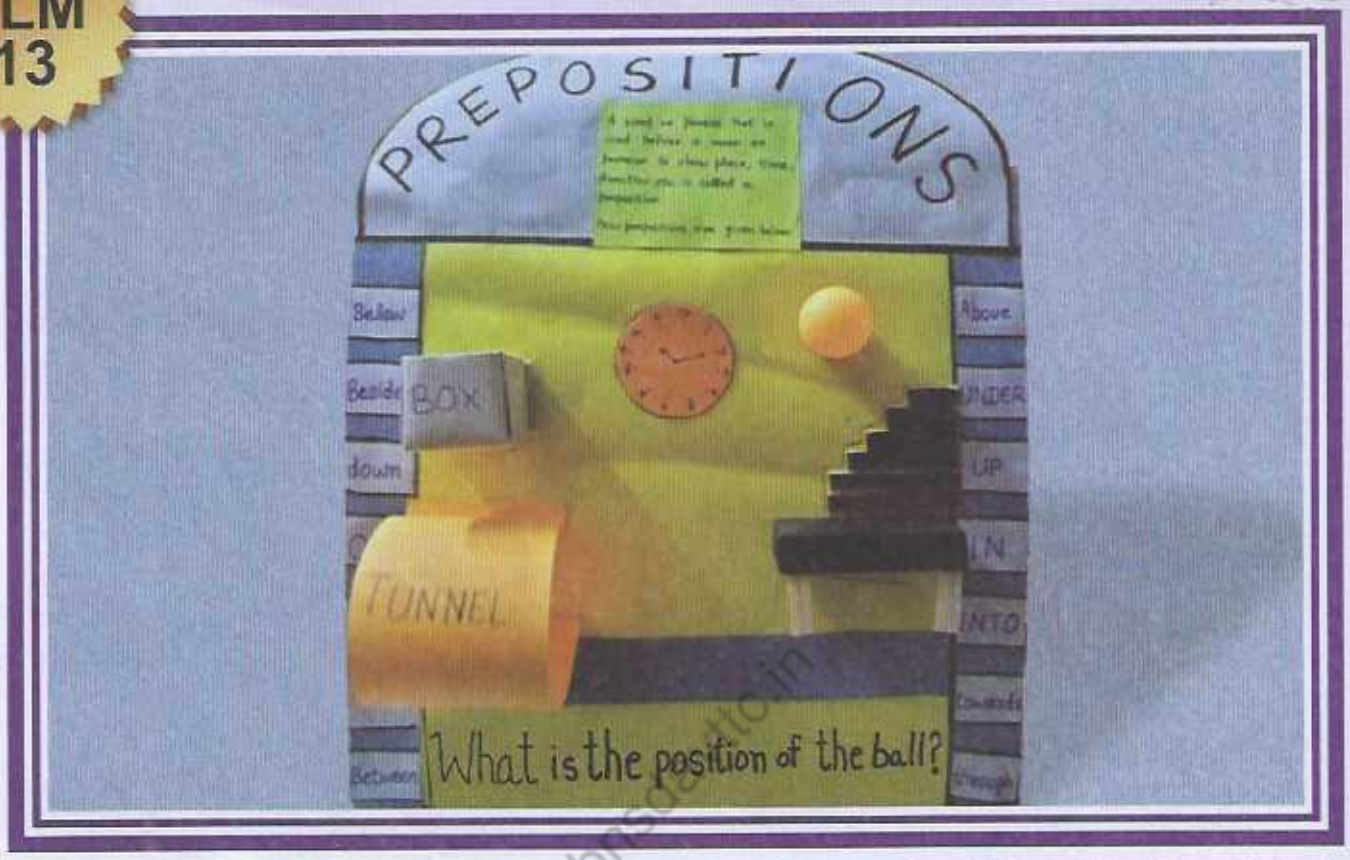
1. Write a sentence (on the strip of paper) related to the chapter going on in the class.
2. Cut the words of the sentence into squares (or any other shape) such that there is only one word in each square.
3. Try to draw some pictures related to the words given (refer to the picture on previous page), as it adds to the appeal of the activity. You may paste pictures rather than drawing.
4. The TLM, 'Fun Squares' is ready.

How to use:

- Take fun squares to the class, related to the chapter going on in the class. (For example, the two sentences shown in the picture of the TLM.)
- Jumble up the squares and keep them on the table.
- Take 5 to 6 different sentences such as these at a time so that the interest of the students remains intact till the end.
- Now, call upon every student, one by one, and ask them to make these squares into a meaningful sentence.
- There can be many sentences made with the given words. The teacher is suggested to accept every correct formation of the sentence.
- This activity can also be changed by asking students to make use of sight words, or to identify the nouns, verbs, etc., in the given squares.

Prepositions

TLM 13



Created by Teacher: Rekha

School: Co-ed Sr. Sec. School, ZP Block, Pitampura, Delhi

TLM for class 6
Subject : English
Topic : Prepositions

Brief description: Students will be able to identify and use prepositions to write complete sentences.

Other concepts that can be taught using this TLM: Magnetism

Materials used: Cardboard, chart paper, ice cream sticks, pair of scissors, glue, coloured pens, ping pong ball, and two spare magnets

Cost of the material used for making TLM (approx.): ₹30

How to make:

1. Cover the cardboard by using the chart paper chart paper and glue.
2. Make objects such as table, box, stairs, tunnel, etc., using paper and paste them on the cardboard using glue.
3. Take a ping pong ball and glue it to one of the magnets. On the backside of the cardboard, use another magnet to stick the ball on the front.

How to use:

- The ping pong ball is moved using the magnet placed at the backside of the cardboard.
- There are prepositions written at the extreme left and right sides of the cardboard. Move the ball over the cardboard to different objects and ask students to make sentences for the objects with the use of prepositions at the sides.
- This way different types of prepositions will be taught in class.
- Extension of the activity: Position of different things in the classroom can be asked.
- In this manner, students will be able to use different types of prepositions in short sentences.

Integers

TLM 14

Created by Teacher: Dr. Tapsa Verma

School: GGSSS No. 1, East of Kailash, South East, Delhi

TLM for Class 6

Subject: Mathematics

Topic: Integers

Brief description: Students will be able to understand the difference between positive and negative numbers and to add and subtract integers using this TLM.

Other concepts that can be taught using this TLM: Concepts of ascending order, descending order, skip counting, tables, addition, subtraction, LCM and HCF

Materials used: Bottle caps of used cold drink bottles, 5 sketch pens, A3 size sheet of paper, plastic sheet, used sweet box, scale, 2 dices, related Google pictures and tamarind seeds

Cost of the material used for making TLM (approx.): ₹18

How to make:

For preparing game of integers:

1. Collect bottle caps with the help of students.
2. Colour them using sketch pens and make smileys on their upper surface.
3. Take any waste cardboard box and keep bottle caps in it.

For preparing integer sheet:

1. Take the A3 sheet, and on it write counting, keeping zero as the center, and write forward, counting after zero.
2. Then, write integers in decreasing order, using the box just before zero as shown in the picture.

How to use:

- Divide students into small groups, ask them to think of a number less than zero.
- Encourage each group to summarise their discussion and have one member of each group share the number that group has finalised.
- Show students a few pictures (newspaper cut-outs or Google pictures) representing negative numbers.
- Ask students to explain the pictures.
- Ask students about the need for negative numbers.
- Explain to students the various situations where negative numbers are used.
- Tell students the difference between minus and negative numbers.

Game of integers:

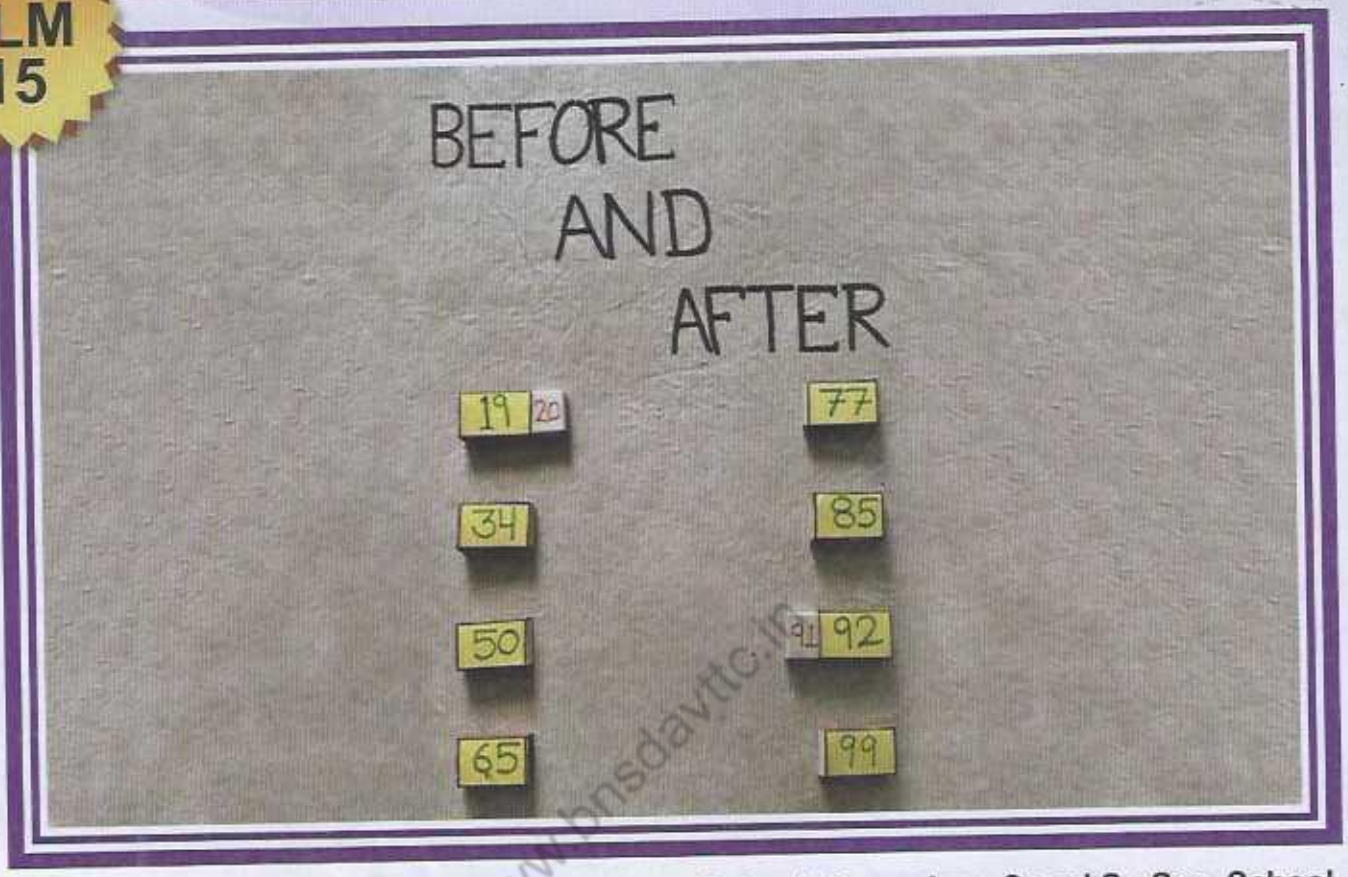
- Take a handful of coloured bottle caps and place them on the teacher's table.
- Tell students to collect bottle caps with upper smileys and ones with lower blank faces separately.
- Tell them to consider smileys as '1 or +1' and the blank caps as'-1'.
- The rule of the game is that one smiley and one back side will cancel each other out and the answer will be zero.
- Each group can repeat the process 3 to 5 times and note down the question and then find the answer.

TLM for assessment as learning:

- Take the number chart, keep a button/seed on zero and ask the students to throw the dice.
- Ask students to guess where they will reach if they move forward.
- Again, throw the dice and ask students to move backward according to the dice.
- Before moving on from any number, always ask students to guess.

Number Sequence - Before and After

TLM 15



Created by Teacher: Geetika Nandwani **School: Sarvodaya Co-ed Sr. Sec. School, ZP Block, Pitampura, Delhi**

TLM for class 6
Subject : Mathematics
Topic : Before and after

Brief description: Students will be able to understand the mathematical concept of; what comes before a number and what comes after a number, helping students to identify and learn number sequence dynamically.

Other concepts that can be taught using this TLM: Odd and even numbers, increase and decrease by 1.

Materials used: Waste cardboards, waste and used empty matchboxes, one coloured A4 sized sheet (used on one side), scissors, coloured pens and glue

Cost of the material used for making TLM (approx.): ₹15

How to make:

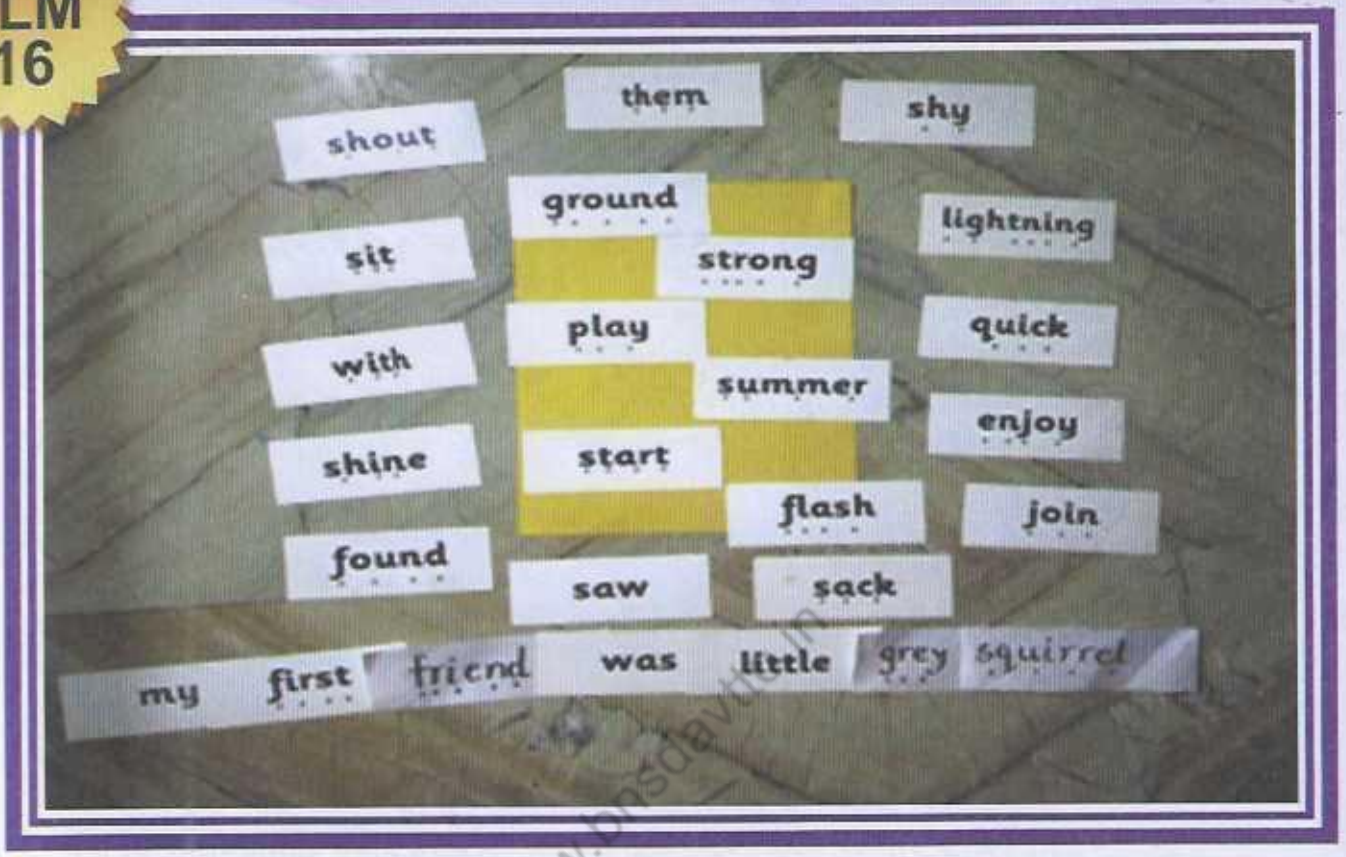
1. Take waste cardboard as the base.
2. Take 8 empty matchboxes, cut the A4 sheet into pieces of the size of matchboxes, back.
3. Paste cut-outs on the backside of each box.
4. Paste all eight matchboxes on cardboard, backside on top (refer the picture), in two columns of four rows.
5. Matchboxes should be pasted such that each matchbox can slide to its either side without any hinderance.
6. Write numbers of your choice on top of each matchbox in the middle as shown in the picture.
7. Slide out inner box of matchbox to its left to write one-less number as of top. Refer the picture.
8. Slide out inner box of matchbox to its right to write one-plus number as of top.
9. Slide back the inner box to its original closed position.
10. TLM is ready to be used for teaching.

How to use:

- Show the TLM to students and ask them to observe numbers written on outer matchboxes carefully.
- Randomly, select a few students and ask them, one by one to choose any number listed on the matchbox.
- Tell the student to slide-out the inner box to its left. This will show them the number which is 'Before' the parent number (written on top).
- Close the matchbox.
- Again, ask the student to slide-out the inner box. Now it should be to its right. This will show them the number which is 'After' the parent number (written on top).
- Explain them the concepts of before/after, number sequence, one minus/plus and odd/even, as they slide the box out to its left and right.

Word Spell with Counting Sounds

TLM 16



Created by Teacher: Preeti Aneja

School: G Co-Ed SS, Block 2, Geeta colony, East Delhi

TLM for Class 6

Subject : English

Topic : Word spell with counting sounds

Brief description: 'The students are made familiar with the words of the chapter to be read. They easily learn pronunciation by identifying the number of sounds in a given word and then, by joining the sounds, they can pronounce it clearly. After that, they can join the words to make sentences. They can frame the story by looking at pictures in the textbook and the words they are made familiar with.

Other concepts that can be taught using this TLM: Phonetics in language; pronunciation; sentence making; separation of subject and predicate; identification of nouns with types, verbs, adjectives, helping verbs, etc.

Materials used: Printouts on paper, waste cardboards, a pair of scissors and glue

Cost of the material used for making TLM (approx.): ₹10.00

How to make:

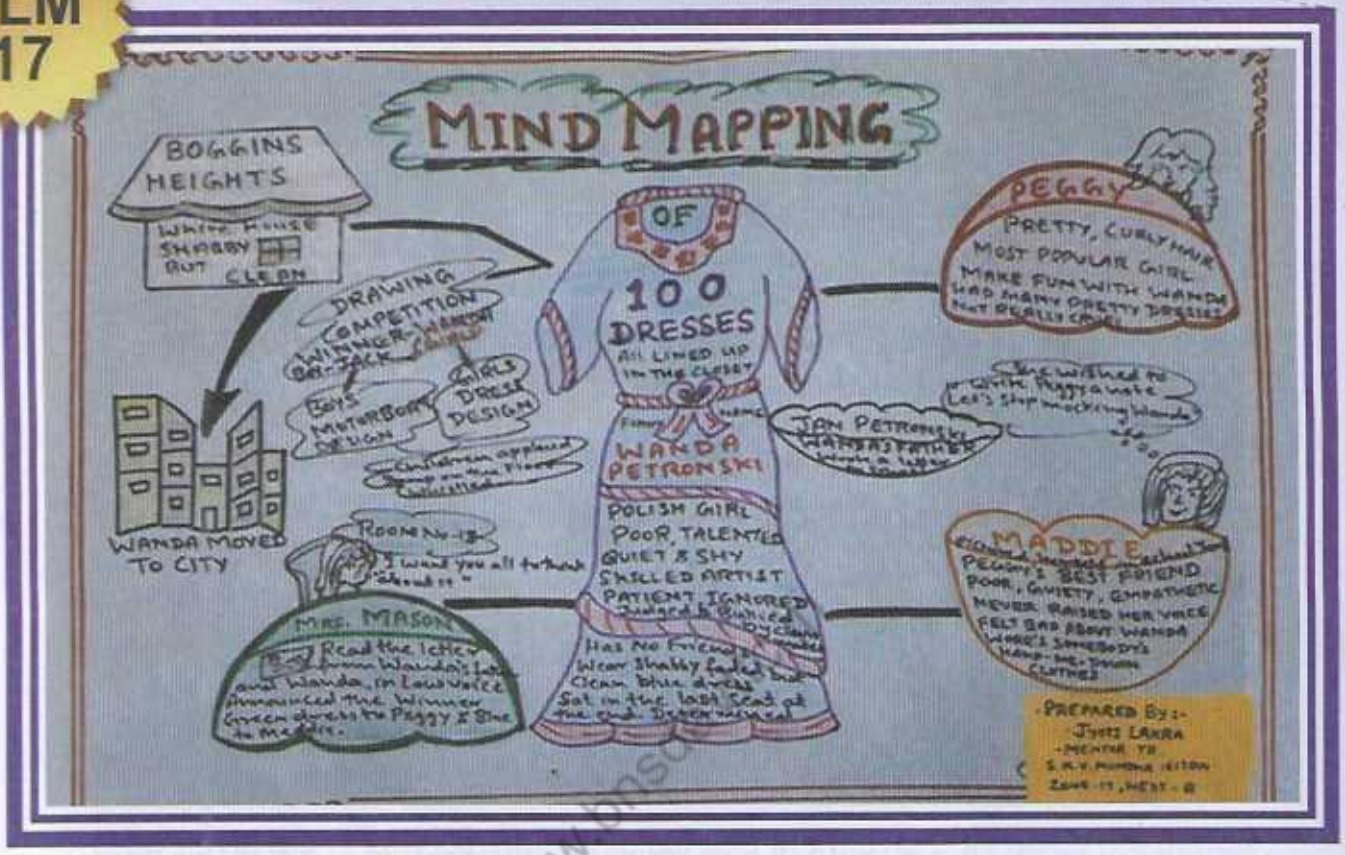
1. Choose some words from the text to be read.
2. Take printouts by typing as many words on one page as can fit, with the highlighting of sounds within the words with dots underneath. Refer the picture of the TLM.
3. Create word cards by cutting out different words from the printout of typed words and paste them on pieces of waste cardboard.

How to use:

- Distribute the various word cards among students when the chapter is to be introduced.
- During the circle time give them chance to identify sounds in the given word and join them while correctly pronouncing the word.
- Spread word cards on the table. Randomly, call a few students to choose words to make sentences.
- They may also weave a story out of these sentences by imagining the pictures in the textbook.

Use of Mind Map

TLM 17



Created by Teacher: MT Jyoti Lakra

School: SKV Mundka, Zone 17, West B, Delhi

TLM for Classes 6 to 8

Subject : English

Topic : Use of mind map

Brief description: This TLM is called a mind map. It can be used for any subject or any topic, either as pre-reading for setting the context, or post-reading for summarising topic/concept. Here, it is created for class 10th based on a story titled 'Hundred Dresses'.

Other concepts that can be taught using this TLM: Critical thinking, creative thinking and lateral thinking skills

Materials used: A plane paper, sketch pens

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

Mind maps can be made in the shape of bubbles, clouds or symbolic pictures related to the theme (as shown in the picture).

1. Draw a big bubble or a picture related to the topic mentioning the theme *(For example – Story name: Hundred Dresses and its main character Wanda Petronski).*
2. Draw some more bubbles for other characters and their characteristics. *(Example – Maddie, Peggy, Mrs. Mason, etc.)*
3. Draw some small cloud formations to write events and bullet points that come in the story *(Example – Drawing competition, winners, applaud by children, Maddie Stop mocking at Wanda).*
4. Also draw pictures of places that are mentioned in the story *(Example – classroom, Boggins Heights, New City House, etc.)*
5. Mind map of the story, 'Hundred Dresses' is ready!

How to use:

- Use the mind map as a post-reading tool to recreate the story in a more precise and creative manner so that students will be able to recall all important points in the chapter.
- Ask students to create their own mind maps in their notebooks as creatively as they can. This will promote effective learning in an engaging classroom.

[NOTE: Any topic, any subject, and learners of any age can be taught effectively using such type of creative tools. Mind map can also be used as a tool to assess students' understanding of the concept.]

Wall Magazine Umang (Monthly)

TLM 18

Created by Teacher: Monica Sharma

School: Sarvodaya Vidyalaya, FU Block Pitampura, Delhi

TLM for Classes 6 to 8
Subject : English (and other languages)
Topic : Wall magazine umang (monthly)

Brief description: The monthly wall magazine focuses on inculcating and practicing language skills in learners' such as listening, speaking, reading and writing in an authentic context. While developing the magazine, students not only understand the meaning of working in collaboration, but in fact, they learn to shoulder responsibilities and take onus of the team's success and failures.

Other concepts that can be taught using this TLM: Communication, collaboration, creativity, visual literacy, creative thinking, critical thinking, use of information technology in elementary grades.

Materials used: Pastel sheets (coloured), sketch pens, poster colours, scissors, thumb pins, Fevicol/glue, decorative material (usually old wedding cards and left-over material from art and crafts work) and notice boards from school resources

Cost of the material used for making TLM (approx.): ₹50-60

How to make:

1. Every month on the last working day, students submit their literary and creative contributions, which are then read by the selected team for the school magazine.
2. The original and authentic contributions are selected as entries to the school magazine.
3. The entries are then proofread.
4. The students work on making the cover page and developing the magazine during assembly time and zero periods.
5. The magazine is released by the end of the first week of the next month.
6. During the pandemic, the team even made e-magazines when physically meeting was not possible.

How to use:

- The magazine is displayed at all prominent places of the school, such as near the water tank, the library, and in front of the stairs.
- Sometimes a gallery walk is also organised for a few interested classes.
- All students in the school are encouraged to read the magazine and gain knowledge from it.
- While writing stories and while taking interviews of alumni and school staff, students develop language competencies. The illustrations are also developed by the students, thus, improving upon their creativity. Participating students not just get evolved themselves, they create a ripple effect in the school, encouraging students from all grades to share their original creations.

Need of Human Skeleton System (Body Movement)

TLM 19

ERA AWARDED

Created by Teacher: Kiran

School: GGSSS B-1 Vasant Kunj, New Delhi

TLM for Class 6
Subject : Science
Topic : Body movement

Brief description: The students will be able to understand the need of the skeleton system in the human body.

Other concepts that can be taught using this TLM: The relationship between the human skeleton system and body movement.

Materials used: Worn out clothes pieces, thread, glue and coloured sketch pens.

Cost of the material used for making TLM (approx.): ₹10

How to make:

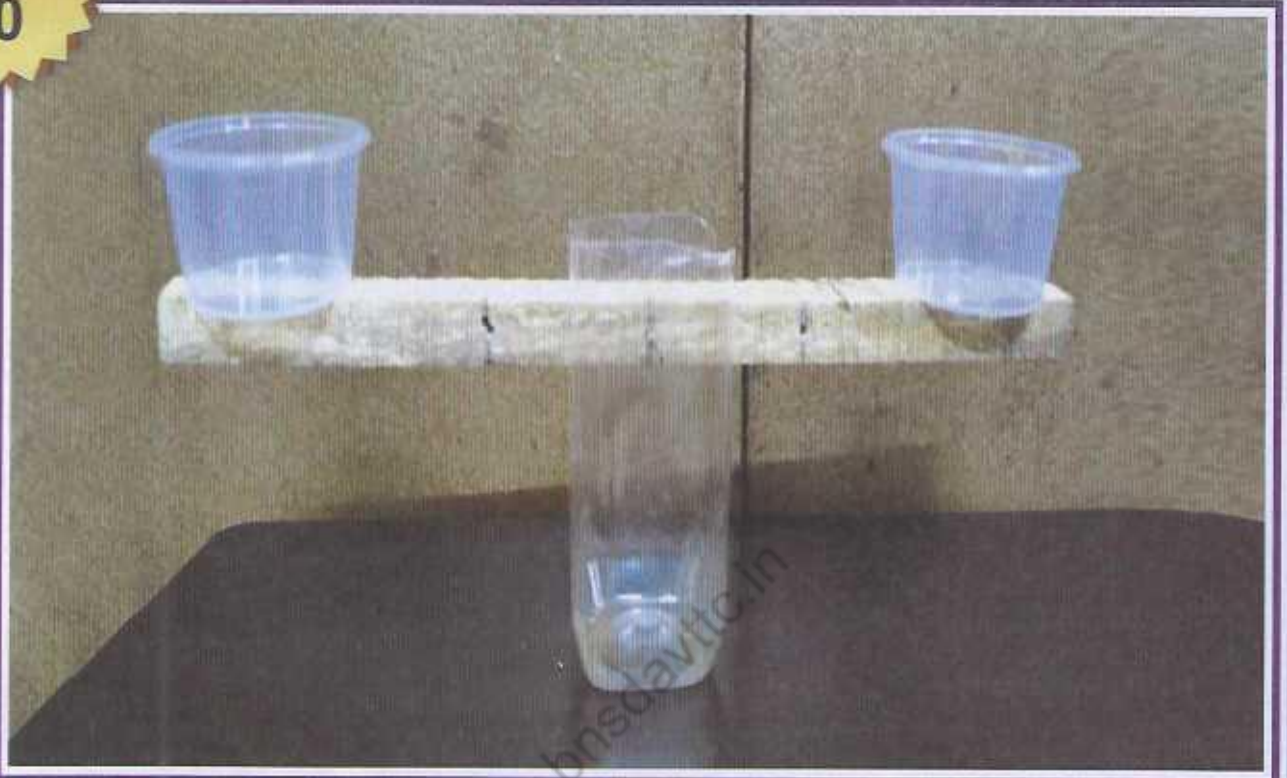
1. Take some colourful pieces of old, worn out clothes that are available at home.
2. Use thread and glue to make simple dolls.
3. Make the eyes and nose of the dolls using sketch pen colours.
4. Decorate the dolls with the available materials to make them look attractive.

How to use:

- After this activity, students will be able to explain the importance of the skeleton in human body.
- Students can be divided into groups. Give 1 or 2 handmade dolls to each group.
- Ask each group to observe the dolls carefully and pen down their observations on the classroom board (or on a chart paper).
- Ask students to make these dolls stand without any support.
- Now, ask each group to make a list of reasons why the dolls could not stand without any support.
- Students can list these reasons as a presentation in front of the class.
  In this way, students will be able to conclude relationship between the skeleton system and the body movement.

Type 1 Lever

TLM 20



Created by Teacher: Rajesh Kumar Singh

School: GBSSS No-1, Mohan Garden, Delhi

TLM for Class 6
Subject : Science
Topic : Type-1 lever

Brief description: Students will be able to understand how the shifting of fulcrum changes the mechanical advantage.

Other concepts that can be taught using this TLM: Weight and balance

Materials used: Two plastic cups, one plastic bottle (2 l approx.), a rectangular wood or thermocol (thick) piece and metallic wire

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

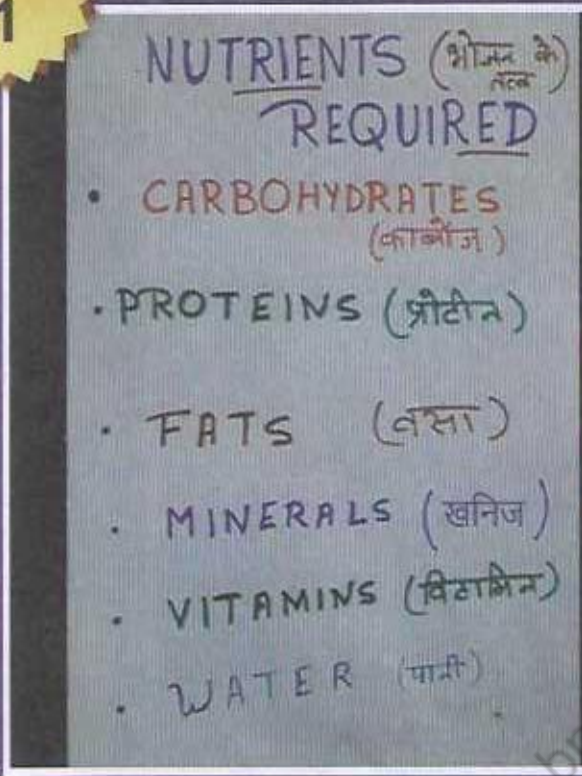
1. Take the plastic bottle and cut the upper side of the bottle such that the wood or thermocol piece can move on it freely.
2. Make two holes on the two opposite faces of the cut side of the bottle.
3. Take a wire piece and according to the size of the bottle supporting the wood or thermocol piece to move freely around the wire.
4. Fix two cups at two ends of the wood or thermocol piece and make three holes in the wood piece at different locations, one at the center and other two on either side of the center as shown in the picture. Make holes at equal distance from the center.

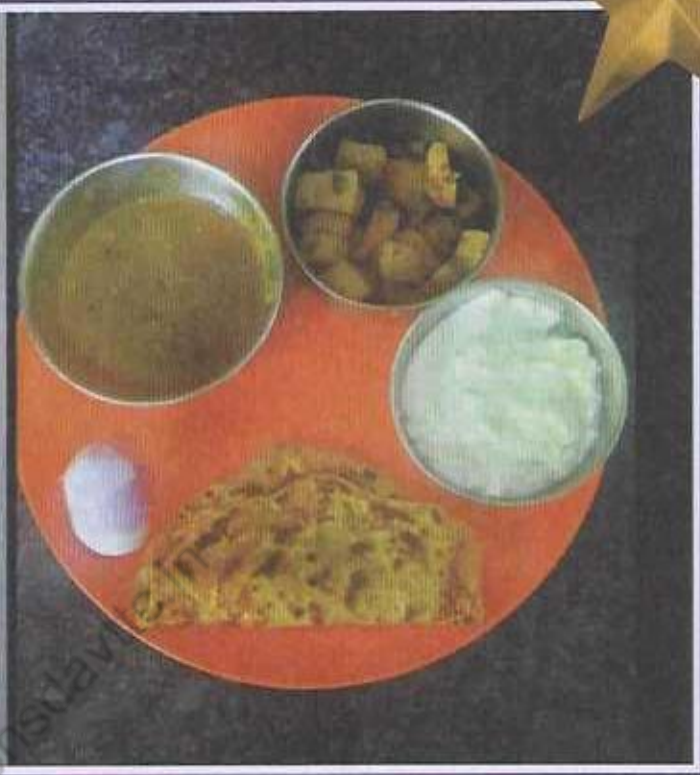
How to use:

- Show TLM to the students and insert wire at different locations and ask them to guess at which position of the wire it is easy to lift or move the load.
- Teachers may demonstrate or ask students to put a load or some pebble in one cup and marble in another cup and record the observation of how many marbles are needed to move the load.
- Repeat this process by shifting the position of metallic wire in different holes.
- Teacher will guide the discussion on how the arm length of effort and load change the mechanical advantage of a lever.

Balanced Diet

TLM 21





Created by Teacher: Sushma Goel

School: S Co-Ed SSS
Safdarjung Enclave, New Delhi

TLM for Class 6
Subject: Science
Topic: Balanced diet

Brief description: Students will be able to understand the meaning of a balanced diet.

Other concepts that can be taught using this TLM: In addition to nutrients and nutrition, digestion can also be explained as extended activity

Materials used: Paper sheets, sketch pens, food brought by students in a tiffin or midday meal

Cost of the material used for making TLM (approx.): ₹0 as paper and sketch pens are already available with the students and rest is the food they bring as lunch.

How to make:

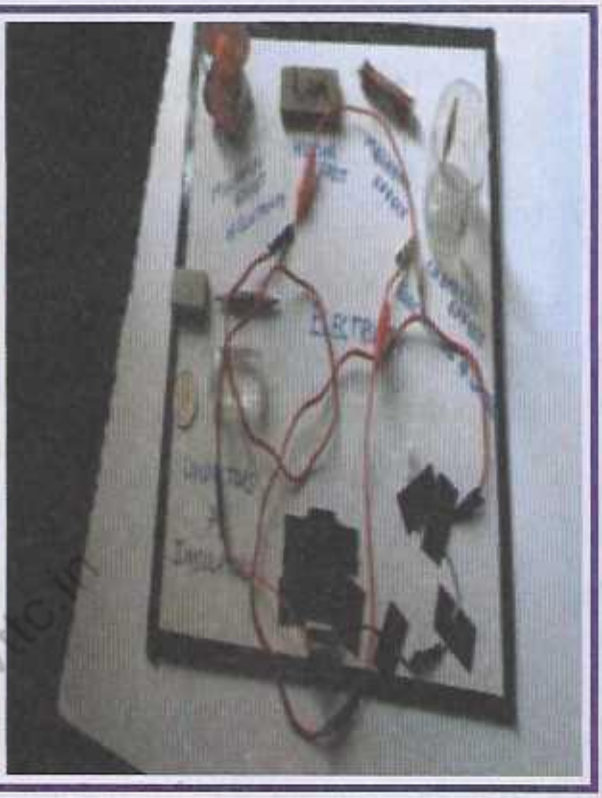
1. Write the information regarding balanced diet on sheets of paper using coloured sketch pens.
2. Keep the food brought in the tiffin or midday meal on a plate to formulate a balanced diet.

How to use:

- First show the sheets on which the name of the topic is depicted and place it on the board.
- Then illustrate the various nutrients required for a balanced diet.
- Then place the food in the tiffin/midday meal on a plate and call on the students to analyse it as to whether it is balanced or not.
- If not balanced, the students have to analyse and say how to make it balanced.
- For this, ask the students to match the food with the names of nutrients written on paper.
- Also, ask them to compare one nutrient in the plate with the other.
- If all the nutrients are there in the plate and in right proportion with one another then it is a balanced diet.

Effects of Electricity

TLM 22



Created by Teacher: Upma Mittal

School: SKV Prahalad Pur, North West A, Delhi

TLM for Classes 6 to 8
Subject : Science
Topic : Effects of electricity

Brief description: A simple and low-cost setup to explain different effects of electricity, i. e, light effect, mechanical effect, heating effect, and magnetic effect. This TLM helps in understanding of practical application of electricity concepts.

Other concepts that can be taught using this TLM: Conductors and insulators, electrolysis of water and electric circuit

Materials used: Battery, LED, wires, crocodile clips, waste heater wire, small motor, 2 pencils, eraser, glass made of waste plastic bottle, iron nail, a piece of copper wire, coin, allpins, wood, a piece of plastic, tape, Fevicol, a piece of waste cardboard and a marker pen

Cost of the material used for making TLM (approx.): ₹50

How to make:

1. Roll the copper wire around an iron nail.
2. Use the cardboard to cut out small fan blades. Attach these blades to the motor.
3. Take 3 small pencils and sharpen them at both ends.
4. Make a circuit with the help of a battery, an LED, wires and small crocodile clips.
5. Assemble all things as shown in the picture.
6. Sharpen both the pencils, keep them aside to be used in showing **'Effects of electricity'**.

How to use:

1. Effects of electricity

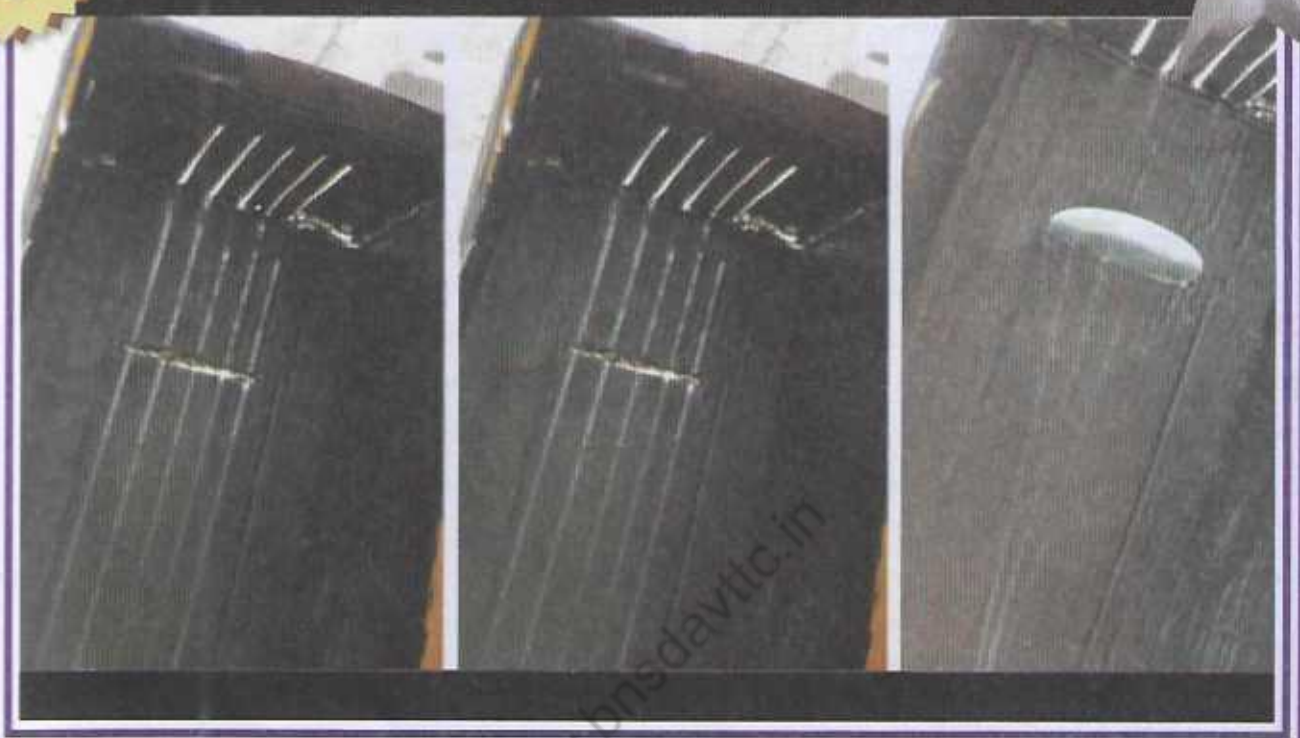
- **Mechanical effect:** When students touch the two terminals of the motor with the help of clips, the LED should glow and the fan will start moving. At this time, electrical energy is changing into mechanical energy.
- **Heating effect:** A small piece of heater wire has been attached to two small nails on a piece of wood as shown in the picture. When students touch the clips with these nails and touch the heater wire with their fingers, they will feel heat. At this time, electrical energy is changing into heat energy.
- **Magnetic effect:** Touch clips at the two ends of the iron nail with copper wire rolled around. Take an iron key or metal paper pins and bring them near to the nail. It will attract them. The nail is behaving like a magnet. At this time, electrical energy is changing into magnetic energy.
- **Chemical effect:** Put some water in the glass and add a few drops of acid or salt. Now, attach clips to the upper end of the sharpened pencils and place them inside the glass such that water should touch the graphite part. After some seconds, a few bubbles will arise at the lower end of the sharpened pencils. One pencil will behave as an anode and the other as cathode. At the lower ends of both pencils, students will observe air bubbles coming out, and also that the rate of bubbles coming out will be slower at the lower end of one pencil as compared to the other pencil. The pencil with lower rate of bubbles coming out acts as anode and the gas coming out there is oxygen, while the other end acts as cathode and the gas coming out is hydrogen. The process shows electricity is dissociating water into its elements, i. e., hydrogen and oxygen, process is called electrolysis of water.

2. Conductors and insulators

- With the help of crocodile clips, hold the eraser at opposite ends. The LED will not glow, implying the eraser(made of rubber) is an insulator as it is not conducting electricity.
- Touch both ends of a sharpened pencil to the crocodile clips, and the LED will glow. A pencil made of graphite conducts electricity, implying that graphite is a conductor. In this way, students can take different materials to demonstrate the difference between conductors and insulators.

Light

TLM 23



Created by Teacher: Upma Mittal

School: SKV Prahalad Pur, North West A, Delhi

TLM for Classes 6 to 8
Subject : Science
Topic : Light

Brief description: A simple and low-cost setup to explain different concepts of light such as light travels in a straight line.

Other concepts that can be taught using this TLM: Convergence and divergence of light rays using concave and convex lenses, light is made of seven colours

Materials used: An empty shoebox, a piece of thick paper, black colour, blade, Fevicol, two erasers, a piece of paper for decoration, convex lens, concave lens, a torch and a prism

Cost of the material used for making TLM (approx.): ₹20 (excluding the cost of lens and prism)

How to make:

1. Take the shoebox, and remove its one side breadth-wise.
2. Take a piece of thick paper and create 5 slits with the help of a blade as shown in the picture.
3. Paste this paper on the side of the shoebox where part of the cardboard has been removed.
4. Make a slit using a blade at the base of the box. Refer to the picture..
5. This slit will help in holding the lens upright.
6. Paste two erasers on the lower side of the box base at both sides of the slit.
7. These erasers will support the lens during the activity.
8. Colour the box black from the inside.
9. Decorate it from the outside using other pieces of paper available.

How to use:

1. Light travels in a straight line

- Place the side of the box with multiple slits towards sunlight or a torch such that light can enter the slits.
- Light enters the slits in the form of parallel rays showing that light travels in a straight line.

2. What is the parallel beam of rays?

- Place the side of the box with multiple slits towards sunlight or torch such that light can enter the slits.
- Through 5 slits, we can observe that 5 rays are entering the box. This shows parallel beam of rays.

3. Convex lens converges light rays, concave lens diverges light rays, what is focus, principal axis, etc. Place the side of the box with multiple slits towards sunlight or torch and fix the concave or convex lens in the slit inside the box, then ask students to observe light rays diverging or converging respectively while passing through the lens.

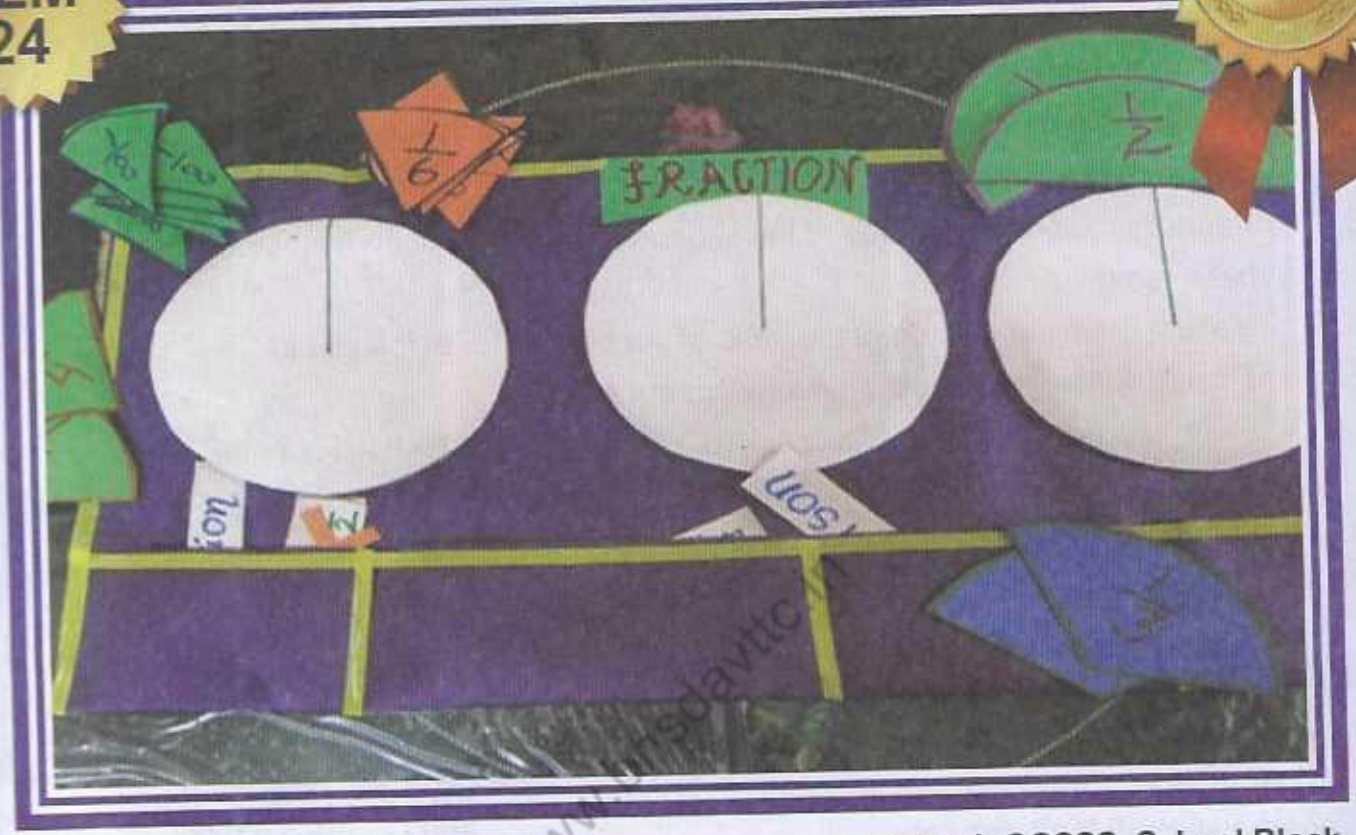
- Make students understand, the focus and the principal axis of a lens from this experiment.

4. Making of a spectrum and that white light is made of 7 colours Keep the shoe box on some elevated surface such that slits are facing sunlight and rays are entering the slits.

- Take a prism and place it on the base of the box.
- Adjust the position of the prism such that the spectrum or VIBGYOR is visible.

Fraction

TLM 24



Created by Teacher: Ms. Chhavi Gupta

School: GGSSS, School Block, Shakarpur, East District, Delhi

TLM for Class 6

Subject : Mathematics

Topic : Fractions

Brief description: Students will be able to understand the concept of fractions, compare fractions, and ascending or descending order in fractions.

Other concepts that can be taught using this TLM: Addition and subtraction of fractions, half and double of fractions

Materials used: Waste cardboard, pastel sheet, sketch pen, Fevicol, double-sided tape/Velcro

Cost of the material used for making TLM (approx.): ₹40

How to make:

1. Take three circular pieces of waste cardboard and paste them on the pastel sheet.
2. Pastel sheet has pockets as shown in the picture to keep cut outs and fraction slips.
3. Make a list of fractions that need to be represented.
4. Cut eight circular pieces from the pastel sheet the same size as the cardboard and cut them to represent the listed fractions as shown in the picture.
5. Make fraction slips that need to be compared, added or subtracted from.

How to use:

- Show the TLM to students and let them guess the fractions by placing cutouts of fractions.
- Ask any student to take a slip (in which two or three fractions are written) and represent those fractions on the cardboard circles, comparing which is big or small.
- Students can also place them in ascending or descending order.
- Let the students identify the difference between various fractions and relate them with the help of the TLM.
- Same procedure can be followed with the addition and subtraction of fractions.
- Let the students explore answers to various fractions and their operations with the help of such TLM.

Let's Play with Numbers

TLM 25

ERA AWARDED

Created by Teacher: Kusum Joshia

School: GGSSS No. 3, Badarpur, South East, Delhi

TLM for Classes 6 to 8

Subject : Mathematics

Topic : Playing with numbers

Brief description: The students can easily understand different concepts of numbers with the help of this TLM. This TLM introduces many games that can be played based on multiplication, addition, upward–downward, tables, etc. These games include magic cards, upward-downward, ascending-descending, Snakes and ladders, egg tray.

Other concepts that can be taught using this TLM: Addition, multiplication, subtraction, division and square root

Materials used: Coloured chart paper, used egg tray, used cardboard box, pair of scissors, glue, colours, used cardboard and old dice

Cost of the material used for making TLM (approx.): ₹10

How to make:

1. On the backside of the coloured chart paper, make a grid for numbers.
2. Cut the shapes of ladder and snake from the piece of chart paper.
3. Make magic cards as shown in the picture.
4. Make Tombola cards and number chits.
5. Take a quarter piece of egg tray and colour it.
6. Colour the cardboard box with old chart paper for storing all small components and label it as 'Magic box'.

How to use:

- Show this TLM to the students and let them know that they will be playing some games in the class.
- Divide the class in small groups.
- Show magic cards to the students. Place it anywhere on the number chart and ask students to add vertically and horizontally. The result will be the same.
- Ask students to add diagonally. Again, the result will be the same.
- Play the game of snakes and ladders on the designed numberboard with the help of a dice.
- Distribute Tombola cards among the students and play.
- Paste the number chart on the display board with the help of thumb pins.
- Put two small objects in the egg tray and give it to the students for shaking. Multiply the numbers on which the objects fall.
- Roll the dice. Find the square of the number which appears on the dice.
- Ask students to choose a number from the chart and calculate 10 numbers upwards and 10 numbers downwards.
- Invite the students for their ideas of games which they want to play with this TLM.

Learner-led Language Bingo

TLM 26

ADJECTIVE BINGO

FEB. 13 20XX			GRADE – VII				ENGLISH	
Good	Young Strong	Able	Bold	Significant	Happy	Popular		
Dangerous	Graceful	Beautiful	Elegant	Friendly	Healthy	Filthy	Lucky	Juicy
Lethal	Pleasant	Precious	Silky	Salty	Rough	Thick	Slim	Huge
Sharp	Shallow	Naughty	Talkative	Homely	Nutty	Jealous	Gentle	Nice
Dull	Confident	Cheerful	Energetic	Helpful	Hungry	Joyful	Fresh	

Created by Teacher: Karamjeet Singh

School: GSCV Rampura, North West B1, Delhi

TLM for Classes 6 to 10
Subject : Language (English)
Topic : Learner-led language bingo

Brief description: Learner-led language bingo (LLLB) is an extended and adapted approach to bingo, also known as Tombola. In LLLB, learners take the lead, and the teacher can introduce, assess, or strengthen language topics such as grammar, vocabulary, and pronunciation without spending a single penny. It can be used for classes 6th to 10th for various language related topics. LLLBs have been phenomenal in–

- Developing language skills like listening, writing, reading, etc.
- Teaching and assessing language elements like grammar, vocabulary, pronunciation, etc.
- Developing attentiveness, promptness, leadership, sportsmanship, etc.

Other concepts that can be taught using this TLM: Literary skills in other languages such as Hindi, Sanskrit, Punjabi, etc., concepts of EVS and Social Science

Materials used: Bingo slips, chalk and board

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Take some sheets, may be used or fresh, of any colour.
2. Use blank side of the sheets (if using used sheets), cut them into 3' by 6' pieces.
3. Make an empty grid of 4x3 cells. The size of these cells should be big enough to accommodate words in each cell.

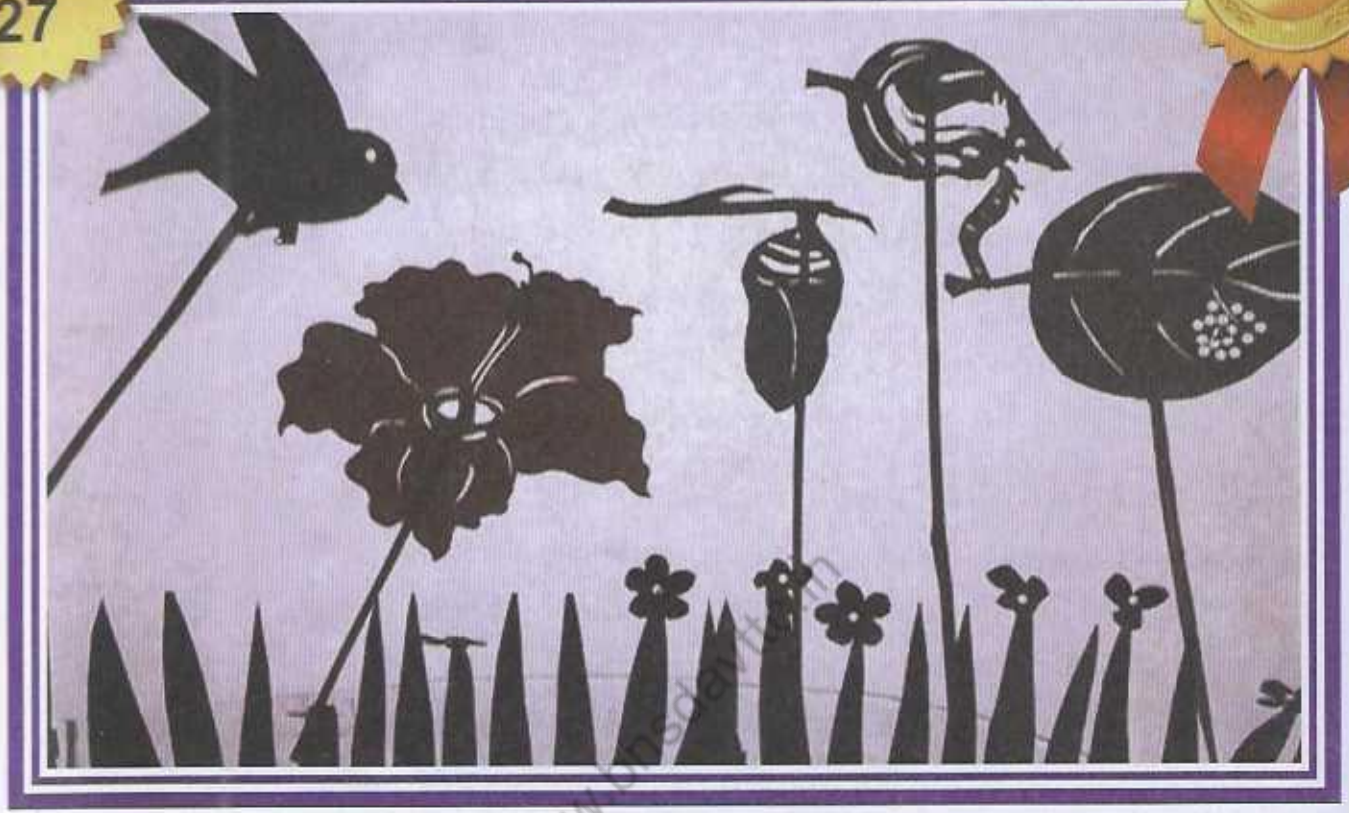
How to use:

- The basic rules of bingo remain the same, such as bingo slips, announcing numbers or words, striking off the words and multiple winners.
- Ask each student to speak an adjective or a describing word.
- A student will write the words on the board (35–40 words). (The teacher may select the student randomly or by turn. The teacher must elicit correct spelling from the class if any of the words on the board are misspelled.)
- Ask students to pick 12 words randomly from the board and fill out their bingo tickets.
- Pick another student to randomly pick a word from the board and call it out loudly so that the students who are playing may strike off the word from their ticket if they have the spoken word in their grid. (To keep track of words already spoken, the writer of the words must strike off the word from his board.)
- The first student to have all the words struck off shouts 'BINGO!' for categories such as: (i) fastest four (ii) first row (iii) second row (iv) third row and finally, (v) full house
- Continue calling out words and students continue striking off and calling out Bingo with the category name as they strike off the words. For example, if a student has struck off all the words of the 2nd row, he will shout, 'Bingo! 2nd Row'. In the event of a tie, the one who said bingo first will be rewarded.
- The round ends when an individual strikes off all the words and shouts, 'Bingo! Full House'.

Life Cycle of a Butterfly through Shadow Puppetry

TLM 27

ERA AWARDED



Created by Teacher: Mrs Kalpana

School: SKV No. 1 D Block, Janakpuri, South West A, Delhi

TLM for Class 7

Subject : Science

Topic : Life cycle of a butterfly through shadow puppetry

Brief description: Using puppetry as pedagogy, the life cycle of butterflies is explained in an interesting manner.

Other concepts that can be taught using this TLM: : Formation of shadows, transparent, translucent, and opaque objects, metamorphosis in insects, etc.

Materials used: Cardboard or hard paper sheets, 3 to 4 broomsticks, butter paper (to use as screen), torch or mobile (as a source of light), pencil, blade, Fevicol, etc. (to make cut-outs)

Cost of the material used for making TLM (approx.): ₹15-20

How to make:

1. With the help of a pencil draw the shapes of various stages of the life cycle of butterflies on a hard paper sheet.
2. Cut out the shapes with the help of a blade.
3. Fix a broomstick to each cut out with the help of Fevicol to move it freely.
4. To make a screen, take a cardboard box then remove the bottom part of it and fix butter paper over it.

How to use:

- Use the video link given at the bottom of the page and share with the students over mobile or smart board.
- Ask students to build their own stories using the same TLM.
- Explain terms such as metamorphosis to the students, ask them what do they understand by other terms such as transparent, opaque and translucent.
- Motivate students to prepare their own puppets/cutouts and build a creative story and present it to the whole class (flipped teaching).
- Encourage students to produce their own stories on topics such as awareness of Corona, pollination, water cycle, etc.

https://youtu.be/bamJ75W4BmIhttps://youtu.be/bamJ75W4BmI

Adaptations in Plants

TLM 28

Created by Teacher: Preeti Batra

School: GGSSS, Bindapur, West B, Delhi

TLM for Class 8
Subject : Science
Topic : Adaptations in plants

Brief description: This is a small video about adaptations in plants and how teachers can use a role-playing method to demonstrate such a concept to the students. Tap on the link to view the video.

Other concepts that can be taught using this TLM: Structure of plants, types of leaves and habitat.

Materials used: Two potted plants and a mobile camera

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Place two potted plants nearby (choose two different types of plants for better understanding). Here, rose and cactus plants have been used.
2. Label on the outer side of both the pots correctly.
3. Use the mobile camera to video shoot as per the requirement of the concept/s to be taught.
4. Tip for videography - It would be good to have a script readied and to use it in one go.

How to use:

- Show the video, let the students watch it, ask questions based on the points explained in the video.
- When students see plants talking to each other, it intrigues them and makes them curious.

Use the link- https://youtu.be/mvzslVfHaAY

Making a Newton's Disk (Firki)

TLM 29

Firki or Newton's Disk made from discarded CD.

Created by Teacher: Rajesh School: GBSSS Ayanagar, South-24, Delhi

TLM for Class 8
Subject : Science
Topic : Colours of light

Brief description: Simple working model of Newton's disk.

Other concepts that can be taught using this TLM: Light and colours.

Materials used: Waste CD, waste plastic, computer printout and a piece of wood

Cost of the material used for making TLM (approx.): ₹5

How to make:

1. Take a colour printout of a Newton's disk.
2. Glue it on a waste CD.
3. Insert a wooden stick in the hole in the middle of the CD.
4. The *firki* is ready to be used.

How to use:

- Rotate the *firki*. Check for the seven colours on the CD.
- The seven colours merge and appear as white colour.
- The *firki* can be used to explain how the seven colours make white light which is the primary source of light on earth.
- Also, explain relation between three primary colours and seven rainbow colours, and formation of multiple colours thereafter.

Air Pressure in Liquids and Gases

TLM 30

Soap Dispenser Hand Pump

How to use Syringe to make a simple water Dispenser and Hand pump at home using Simple waste material.

Material Required

1. Syringe (5 ml) - 1
2. Syringe (2.5 ml) - 1
3. Small Plastic Pipe
4. Small Iron Balls / Plastic Balls
5. Glue
6. Plastic Bottle

Usage

1. To demonstrate the mechanism behind Suction hand pump.
2. To Relate the importance of ground water for community supply of water.
3. To promote Recycle, Reuse and Reduce plastic waste.
4. To encourage for Do It Yourself (DIY) activities.

Created by Teacher: Harpreet Kaur

School: G Co-Ed SSS, Possangipur, B-1 Janakpuri, West B, Delhi

TLM for Classes 8 and 9
Subject : Science
Topic : Air pressure

Brief description: The students will be able to understand and identify the role of atmospheric pressure in liquids and gases. They will be able to understand this principle on which a simple instrument such as a syringe works.

Other concepts that can be taught using this TLM: Recycling, reused and reduced use of plastic

Materials used: Syringe 5 ml, syringe 2. 5 ml, small plastic pipe, small iron balls/plastic balls, plastic cutter, glue, used plastic bottle

Cost of the material used for making TLM (approx.): ₹25-30

How to make:

1. Take a used plastic water bottle and make a hole in its cap equal to the diameter of a big syringe of 5 ml.
2. Now, take out the plunger from the bigger syringe and insert the smaller syringe of 2.5 ml in it.
3. To pour out liquid from the bottle, insert the plastic tube in the smaller syringe at 90 degrees.
4. Add the iron or plastic balls to the bigger syringe to prevent backflow of water.
5. Glue the cap on the syringe to seal it.
6. Pull the small syringe making it act as a piston.
7. Pressure inside the syringe drops when it is inserted into liquid and its smaller syringe acts as its piston is pulled outwards.
8. The atmospheric pressure acting on the surface of a liquid such as soap, water, and sanitizer is more, therefore, the liquid is pulled up into the syringe.

How to use:

- Show the TLM to the students and let them guess what happens when the liquid is pulled up?
- Create variations by loosening the cap of the bottle and asking them about the expected change in atmospheric pressure and its result.
- Use the TLM as a sanitizer bottle or soap dispenser.
- Create awareness about how groundwater is pumped and used as a source of water.

Stars and the Solar System

TLM 31

ERA AWARDED

Created by Teacher: Surinder Kaur

School: SKV, IARI, Pusa, Delhi

TLM for Class 8

Subject : Science

Topic : Stars and the solar system

Brief description: The students will be able to learn more about stars and the solar system with the fun activity. Also, the effort is to build up the topic from the students and not the teacher, which will be done by using elaborate questioning.

Other concepts that can be taught using this TLM: Chapter 10, English, class 6th - An Indian-American woman in space; class 7th - An Alien Hand and shapes.

Materials used: Paper bowls, paper cups, cake base cardboard/plastic, colours, colourful paper sheets, glue, a pair of scissors

Cost of the material used for making TLM (approx.): ₹10

How to make:

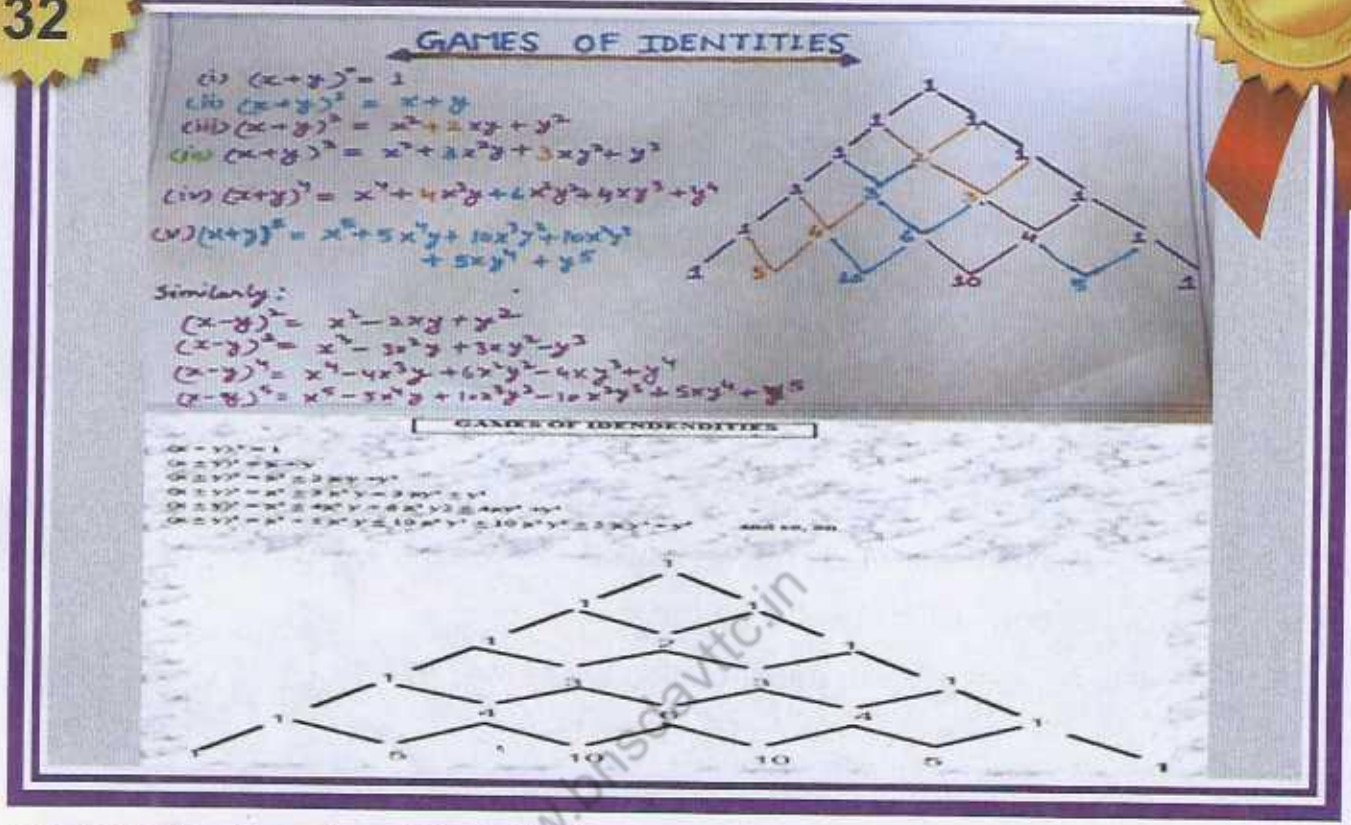
1. Take a recycled cardboard/plastic base of cake and paste a white paper bowl upside down using glue/Fevicol and decorate.
2. As shown in the picture, make an alien with a paper bowl and paste the dress and antenna using the colourful sheets. This alien can be worn on hand as a puppet by just adding a broad paper ring of appropriate size at the back.
3. Make a four-level tower made of paper, which will be the rocket.
    - A paper bowl will be used as a base.
    - Paste an upside down paper cup on top of the bowl.
    - Paste another paper cup on top of the first paper cup.
    - Cover the top with a cap-shaped cone made from the red pastel paper.

How to use:

- Show all the parts of the TLM to the students and give them sufficient time to observe first and then respond.
- Teacher will pick up the cue words such as stars, sun, moon, planets, universe from the responses of students.
- Maneuver the discussion in the desirable direction of the topic and ask them if they would like to know more about stars and our solar system.
- Referring to the TLM, ask students questions such as 'Have they ever seen them before?', 'What is 'they' and 'them' being referred in the question?
- Record their responses on what do 'they' remind them of?
- Take a lead to the main topic after having the discussion.
- Give every student time and material in the class to make his/her own alien, spaceship and rocket.

Algebraic Identities

TLM 32



Created by Teacher: Jaspal Singh Negi

School: GBSSS, Janta Flats Nand Nagri, North East-II, Delhi

TLM for Class 9

Subject : Mathematics

Topic : Algebraic identities

Brief description: Students will be able to understand and identify different algebraic identities such as $(a+b)^2$, $(a-b)^2$, etc.

Other concepts that can be taught using this TLM: $(a+b)^3$, $(a-b)^3$, (a^3+b^3), and (a^3-b^3), $(a+b)^4$, $(a-b)^4$, $(a+b)^5$, $(a-b)^5$ and Pascal's triangular identities.

Materials used: Chart papers, sketch pens and scale

Cost of the material used for making TLM (approx.): ₹20

How to make:

1. Take white paper and make the shapes using sketch pens and scale as shown in the picture.
2. Make a list of numbers in powers (exponents) that will be drawn using the algebraic identities. Let us take here, the power n = 5.
3. Using different sketch pens, draw diagrams for identities by the play-way method and do not memorise them as most of the students do.
4. These diagrams can be extended up to any power by taking 1–1 outsides and adding the middle numbers. These are actually coefficients of the identities.

How to use:

- Show the TLM to the students and let them guess and identify various patterns of numbers.
- Ask them to make more such patterns of numbers and how they can use them to develop the algebraic identities.
- When the students make such patterns, then ask them to write $(x+y)^2$ in such a way that when the power of variable x decreases, the power of variable y increases, such that powers always remain the same (here, it means 2).
- This method will apply to $(x+y)^3$ and so on. Use variables x and y instead of a, b as mentioned above, so that students can understand that any variable can be used.
- Finally, put the numbers shown in patterns as coefficients of the variables one by one and also use the sign systematically for required algebraic identities.

Volume of Sphere and Hemisphere

TLM 33

Created by Teacher: Preeti Singhal **School: SKV, Badli, District North West A, Delhi**

TLM for Class 9

Subject : Mathematics

Topic : Volume of sphere and hemisphere

Brief description: Students will be able to correlate between different 3D objects using concrete objects to arrive at the formulas. Using concrete objects available at their home, students will be able to have a conceptual understanding of volume of the sphere and hemisphere by visualising, and understanding the concepts by themselves. This TLM can be used offline, online or for the blended teaching-learning process.

Other concepts that can be taught using this TLM: Critical thinking and problem-solving skills.

Materials used: Chana dal, waste paper, glue, pair of scissors, pencil, compass, two hemispherical bowls, marker pen, Whiteboard/ waste sheet, Kinemaster app

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Collect and arrange all the required materials.
2. Make a cone out of waste paper, equal to the diameter and height of the hemispherical bowl.
3. Make one video on deriving formulas of calculating the volume of 3D objects with the use of cone, chana dal, hemispherical bowls, marker pen, whiteboard or chart paper, etc., explaining the DOE worksheet.
4. Using the Kinemaster app, prepare a slide show for the videos mentioned in point no. 3 as per the progression of the topic and the DOE worksheet.
5. Use a voice recorder in the app for explaining the concept as per the slide.

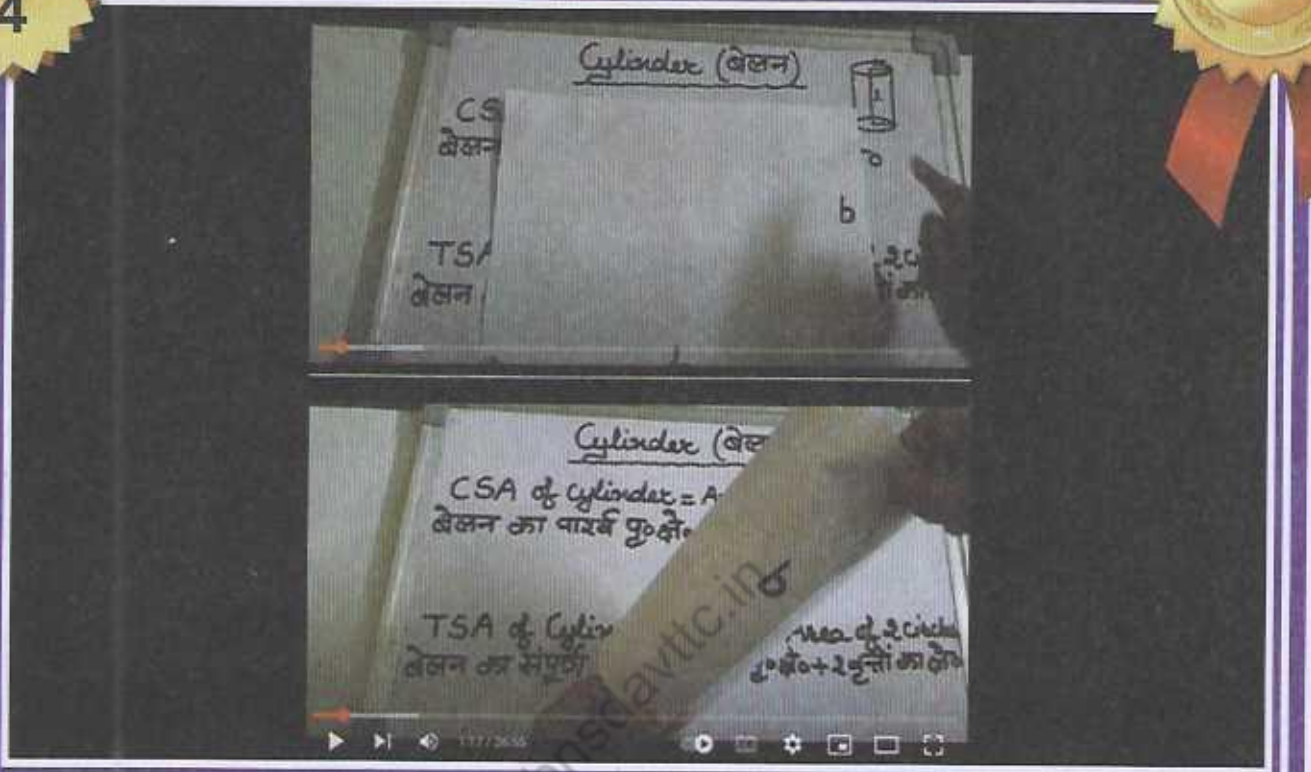
How to use:

- Capture some images from the TLM to let the students figure out 3D shapes.
- Play the video on an online/ offline/ blended learning mode. Use on/off as and when required to give more clarity or ask questions in between.
- Give them questions for practice.
- Ask students to observe more such objects that are similar in shape to the objects studied in school. They should be able to validate the relational nderstanding through critical thinking.

Use the link- https://youtu.be/qmyPEdZ1zb4

Curved Surface Area and Total Surface Area of Cylinder

TLM 34



Created by Teacher: Preeti Singhal **School: SKV, Badli, District North West A, Delhi**

TLM for Class 9

Subject : Mathematics

Topic : Curved surface area and total surface area of a cylinder

Brief description: Students will be able to visualise, realise and generalise the curved surface area and total surface area of the cylinder by themselves using concrete objects.

Other concepts that can be taught using this TLM: Critical thinking and problem-solving skills

Materials used: Waste rectangular paper, marker pen, whiteboard/waste sheet, Kinemaster app.

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Collect and arrange all the required materials.
2. Make one video for arriving at generalisation of curved surface area and total surface area, another for explaining the DOE worksheet.
3. Using the Kinemaster app, prepare a slide show correlating the videos mentioned in point 2 as per the progression of the topic and the DOE worksheet (for a better understanding of the concept.)
4. Use a voice recorder in the app for explaining the concept as per the slide.

How to use:

- Prior to video watching, pose some questions such as 'Can a rectangle be converted into a cylinder?' to the students.
- Play the video on an online or offline mode. Use on/off as and when required to give more clarity on the relationship between two 3D shapes or any questions in between.
- Give questions for practice.
- To enhance their mathematical skills, ask students to explore situations from their daily life where curved surface area and total surface area can be applied.

Use the link- https://youtu.be/qmyPEdZ1zb4

Economic Activities

TLM 35

Flash cards for types of economic activities

Flashcards for economic activities

Flash cards for non-economic activities

Created by Teacher: Gita Tangania

School: GGSSS No. 3, Sarojini Nagar, South West A, Zone 19. Delhi

TLM for class 9

Subject : Social Science (Economics)

Topic : Economic activities

Brief description: Flash cards have been used to define the economic activities and know more about the different sectors of the economy.

Other concepts that can be taught using this TLM: Different economic activities

Materials used: Cardboard, sketch colour, blank sheets of paper A4 size

Cost of the material used for making TLM (approx.): ₹20

How to make:

1. Cut the cardboard into shapes of square and rectangle.
2. By using glue, cover each cardboard cut piece with a blank sheet of paper.
3. Draw a tertiary primary and secondary economic and non-economic activities on a piece of cardboard so that each piece of cardboard depicts one of the listed activities.

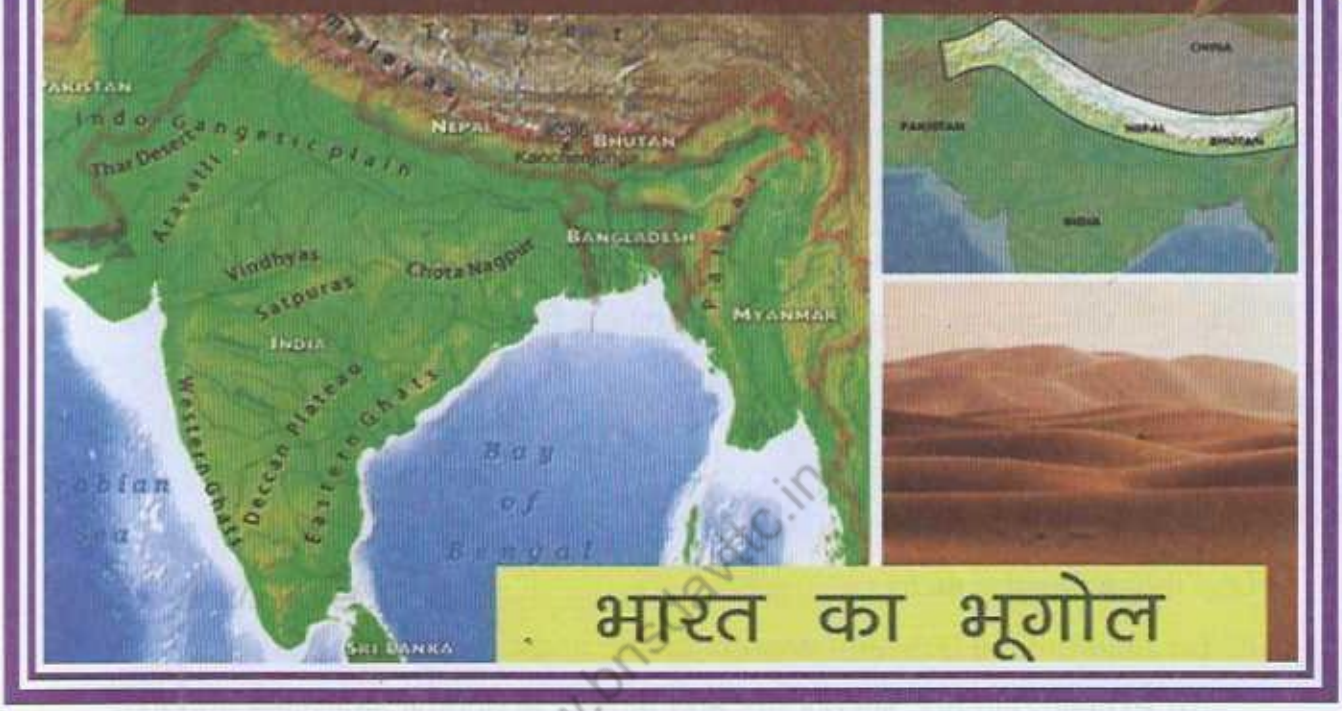
How to use:

- Use these flashcards to
  (a) differentiate between economic and non-economic activities
  (b) explain primary, secondary and tertiary economic activities and to differentiate between them.
- Help the students to think critically, analyse and understand the difference between economic and non-economic activities.

Physical Features of India

TLM 36

भारत का भौतिक स्वरूप



Created by Teacher: Kusum Joshia

School: GGSSS No. 3, Badarpur, South East, Delhi

TLM for Class 9

Subject : Social Science (Geography)

Topic : Physical features of India

Brief description: It is a digital TLM through which students can easily understand the physical features of India. It gives students and facilitators the opportunity to pause and write/discuss any part of the video. It is easily accessible and easy to use in both synchronous and asynchronous modes.

Other concepts that can be taught using this TLM: Geographical topography

Materials used: Laptop or mobile phone

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Write a script.
2. Collect all the relevant copyright-free pictures and videos to be used.
3. Record the audio for the written script.
4. Edit and finalise the video using Windows video editor app.

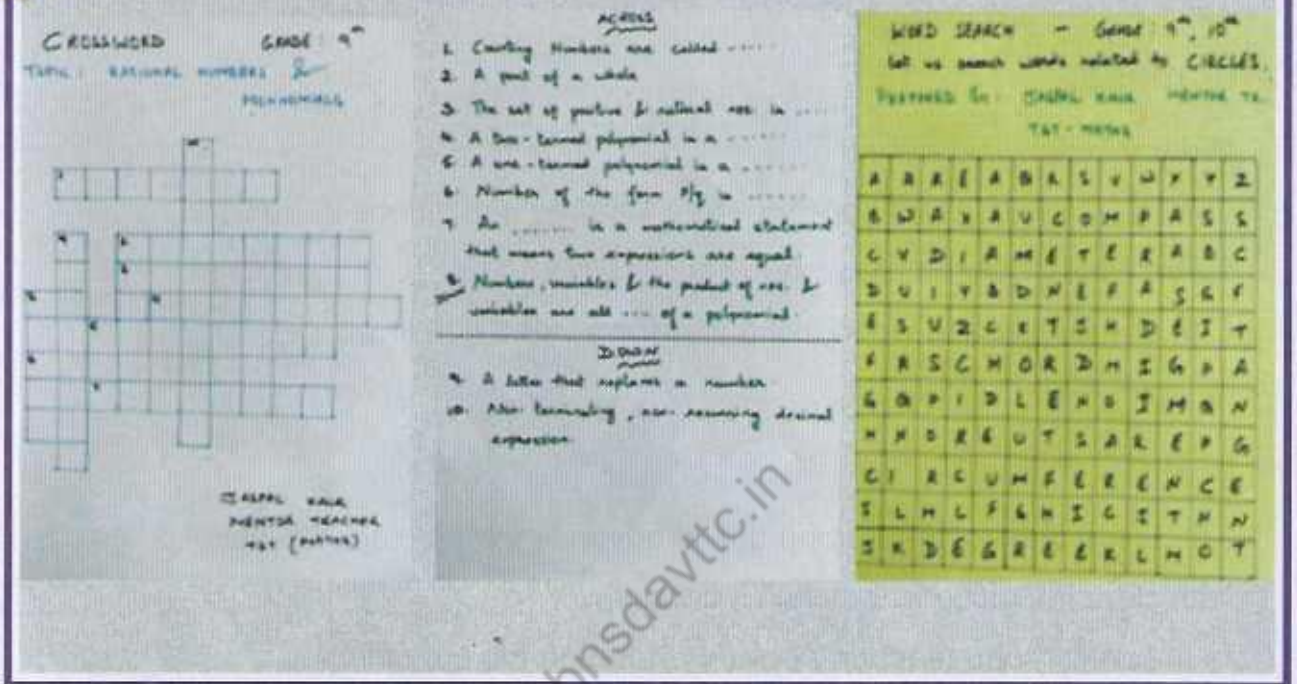
How to use:

- The video can be shared one day in advance on the class's WhatsApp group, with clear instructions to watch it carefully.
- In the classroom, teacher plays this video on the projector.
- Randomly, call upon 4 to 5 students to explain this video and help them explain it according to their needs.
- For a better understanding, keep pausing the video as and when required on a particular slide.
- Create gives an open platform for the students to ask questions related to the topic.
- Ask students to collect more information about the topic. They can even create their own such videos which will improve upon their ICT skills while learning to learn better!

Link to the video: https://youtu.be/glGU3zbAaoY

Crossword, Cross Sums and Word Search

TLM 37



Created by Teacher: Jaspal Kaur

School: School of Excellence, Sector 17, Rohini, Delhi

TLM for Classes 9 and 10
Subject : Mathematics
Topic : To learn rational numbers, polynomials, and circles from crossword/sum puzzles

Brief description: Crossword and word search are great ways to hone students' mathematical and vocabulary skills. They test the basic concepts of the students and at the same time make them comfortable learning mathematics. These games help the students to comprehend the clues, recall and then review their answers. Puzzles such as crosswords and word search boost the confidence of students and help them overcome their phobia of mathematics. In cross sums, all the clues are sums or word problems involving any or all operations.

Other concepts that can be taught using this TLM: Numbers, operations (addition, subtraction, multiplication, division), multiples, fractions, geometrical concepts, etc.

Materials used: A4 size sheet of paper, sketch pens, scale, pencil, and eraser

Cost of the material used for making TLM (approx.): ₹5

How to make:

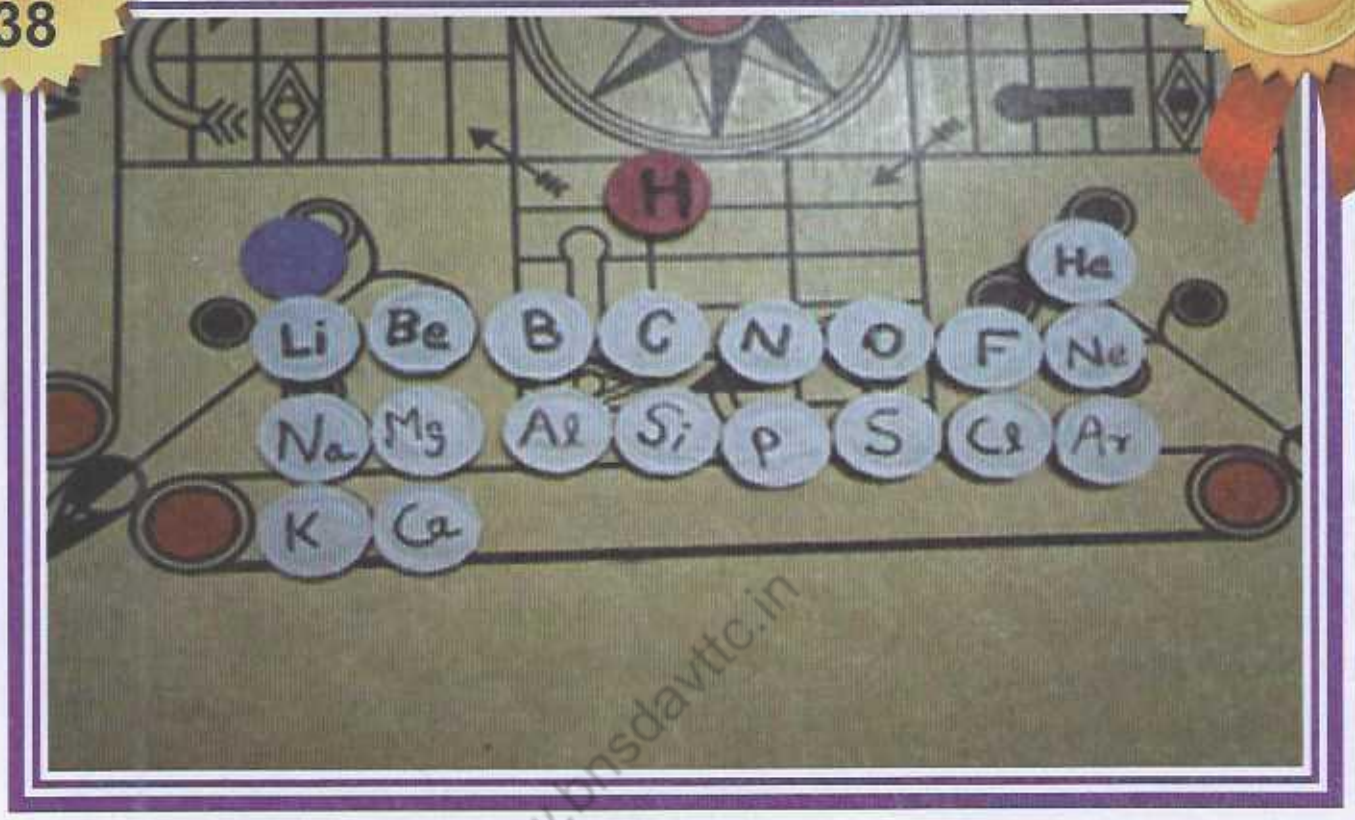
1. Draw a 12 by 12 grid with a pencil on the A4 size sheet of paper.
2. Make a list of words or numbers with the questions that are to be included in the crossword for cross sum. It is always better to take one or a maximum of two topics at a time.
3. Now, write the words or numbers on the grid with a pencil.
4. Then, number the starting square for each word or number with a sketch pen.
5. Use another sketch pen to highlight the used squares.
6. Erase the remaining squares of the grid from the sheet.
7. The crossword or cross sum is ready.

How to use:

- Learning from this TLM can be done in pairs where the students discuss mathematical concepts and clear their misconceptions.
- Consider using crossword/cross sum/word search in the classroom as warm-up exercise, independent practice, partner games, homework, concept review for building of mathematical concepts and vocabulary building.
- We can have both paper and digital versions of these activities.
- The children take the help from the given clues and start answering the crossword or cross sums.
- They are guided to take the easiest clue first. Also, they are guided to take up small, 3 to 4 lettered words initially to give a kick start to the puzzle.

Metals and Non-metals

TLM 38



Created by Teacher: Dr. Ramesh Chand Sharma

School: Kautilya Govt S CoEd V Chirag Enclave, New Delhi

TLM for Classes 9 to 11

Subject : Science (Chemistry)

Topic : Metal and non-metals

Brief description: To make students understand metals and non-metals, with the help of a game.

Other concepts that can be taught using this TLM: Properties of metals and non-metals and valency of the elements in periods 1 and 2

Materials used: A carrom board, carom coins (with names of elements stuck on the coins), black pen, chart paper, a striker, scissors and glue stick.

Cost of the material used for making TLM (approx.): ₹20 (carromboard should be a used one, not to be bought for this TLM)

How to make:

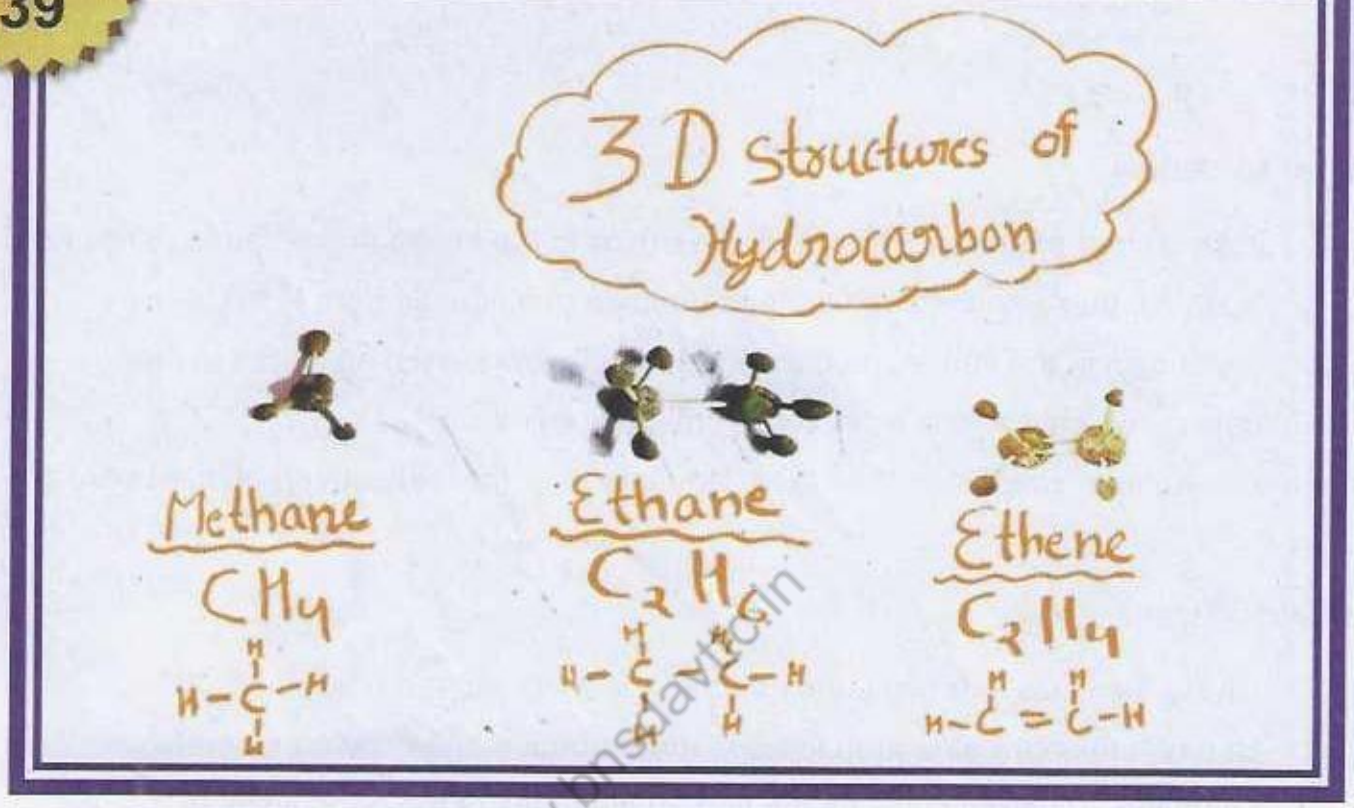
1. Take a chart paper and draw multiple circles in the shape of the carrom coins (20).
2. Now, cut these shapes and write the names of elements from H to Ca (as shown in the image) on the coins. Take hydrogen (H) as queen in the game, you may colour it different from other coins.
3. Paste these shapes on the coins (Do remember that H is queen on the board).

How to use:

- Divide the class into two teams, namely, team A and team B.
- Use carom board as a prop to learn more about metals and non metals.
- Label the 20 carom coins as the first 20 elements of the periodic table.
- Team A has to collect the metals. And Team B has to collect the non-metals. On getting the wrong element, the team selecting the same needs to surrender one gained coin or lose a turn if they have no coin to forfeit.
- Hydrogen being both electropositive and electronegative acts as queen on the board, and therefore as per rule cannot be taken alone. It has to be won along with the respective choices of the teams.
- Whichever team manages to collect all the metals or non-metals first will be the winner of the game.

3D Models of Hydrocarbons

TLM 39



Created by Teacher: Dr. Neeta Verma School: Govt. Sarvodaya Co-ed Sr. Sec. School, Possangipur, B-1 Janakpuri, West B. Delhi

TLM for Class 10

Subject : Chemistry (Science)

Topic : 3D models of simple hydrocarbons

Brief description: This TLM will help students visualise the molecular structure of simple hydrocarbons such as methane, ethane, ethene, etc., and understand the bonding between the number of carbon and hydrogen atoms.

Other concepts that can be taught using this TLM: Hybridisation and molecular bonding.

Materials used: Kneaded flour, burnt match sticks or broom sticks.

Cost of the material used for making TLM (approx.): ₹5 (no cost if normal clay, waste broom sticks or used match sticks are used)

How to make:

1. Knead the flour tightly and make 5 big balls and 14 small balls.
2. Break the broom sticks or used matchsticks into equal sizes.
3. Insert the equal-sized sticks into big and small balls, as shown in the picture, to show the 3-D model of the given hydrocarbons.
4. For perfection, we can even fix the sticks at a certain angle and show the bonding.

How to use:

- Display the models in the classroom so that they are visible to each student. Students can even come forward and touch the models.
- Tell students to consider the bigger balls as the atoms of carbon and the smaller balls as hydrogen.
- Now, ask students to prepare models of bigger hydrocarbons. They may do so as a group activity or individually.
- Students can be asked to give simple presentations based on the models prepared by them.

Longitudinal Section and Reproductive Parts of a Flower

TLM 40

Created by Teacher: Kusum Joshia

School: GGSSS No. 3, Badarpur, South East, Delhi

TLM for Class 10

Subject : Science

Topic : Longitudinal section and reproductive parts of a flower

Brief description: It is a digital TLM through which students can easily understand the longitudinal section and reproductive parts of a flower. Students can understand the diagram and learn the parts' names. It is easy to share on WhatsApp, which is in asynchronous mode, so students can use it at their convenience.

Other concepts that can be taught using this TLM: Dissection of a flower

Materials used: Laptop or mobile phone

Cost of the material used for making TLM (approx.): ₹0.00

How to make:

1. Write a script.
2. Collect all the relevant information and draw the diagram of a flower.
3. Record the audio for the written script.
4. Edit and finalise the video using the Windows video editor app.

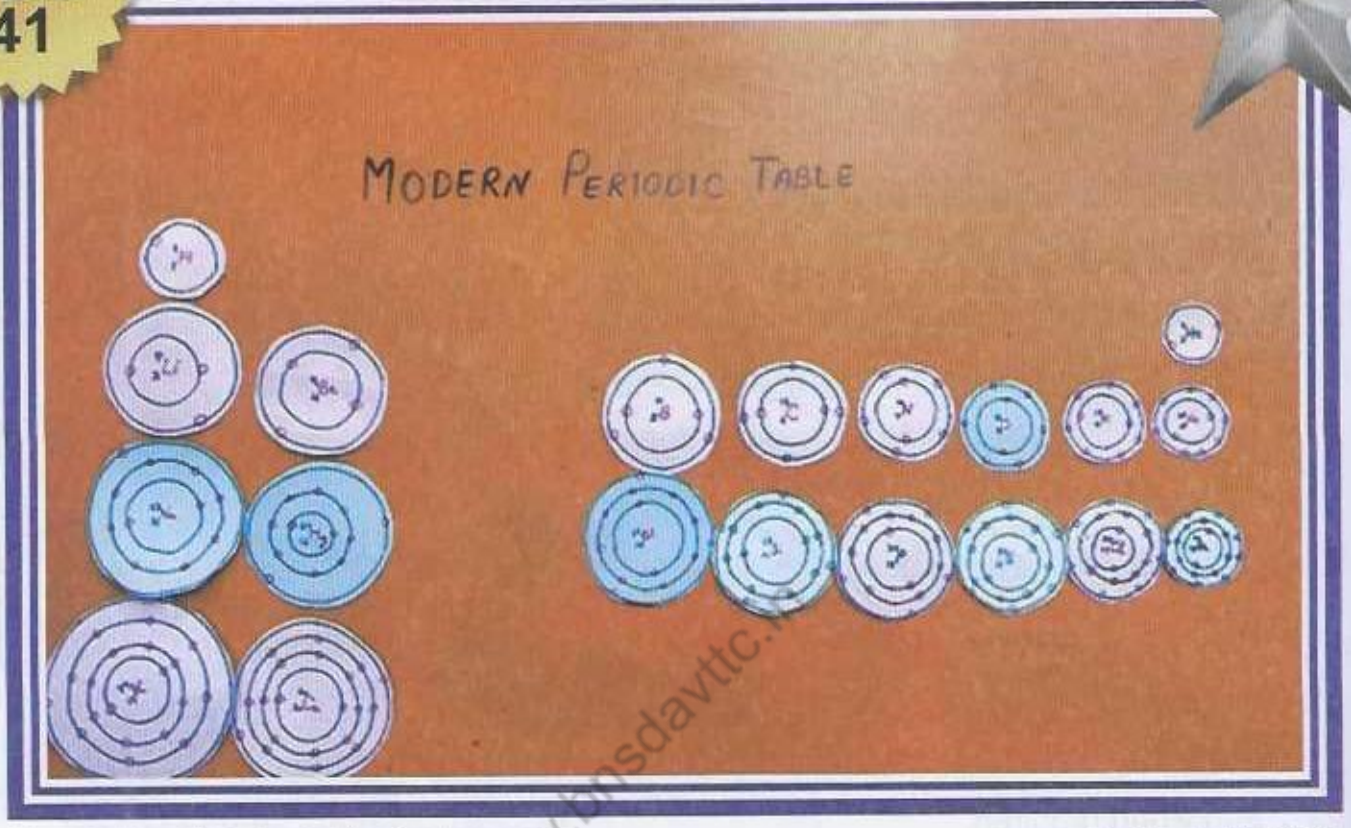
How to use:

- Play the video over mobile phone or on the projector in classroom or biology lab.
- Invite 4 to 5 students students to explain the video and helps them as and when required.
- Create an open platform for the students to ask questions related to the topic.
- Ask students to draw the structure of a flower with the help of the video clip as their homework.

Link to the video: https://youtu.be/fedKvriOTMs

Trends in Modern Periodic Table

TLM 41



Created by Teacher: Manju Bhandari

School: GGSSS, Jhilmil Colony, East Delhi

TLM for Class 10

Subject : Science

Topic : Trends in the modern periodic table (Periodic classification of elements)

Brief description: Students will be able to easily understand the trends in the modern periodic table, i. e. valency, atomic size, metallic and non-metallic character through visualisation.

Other concepts that can be taught using this TLM: : Different shells and the distribution of electrons in different shells

Materials used: Chart paper, waste paper or cardboard, compass sketch pens, thread or any waste ribbon, scissors, glue or double-sided tape

Cost of the material used for making TLM (approx.): ₹20

How to make:

1. First, take a piece of chart paper or cardboard. Then, with the help of a pencil and compass, draw circles on the chart paper.
2. Now, cut these circles. Take care of the size of each circle.
3. As you move down the periodic table, the size of the circles increases. So take care of the size while cutting the circles.
4. Now write the symbols, atomic number and atomic mass of the elements on each circle, taking care of their sizes.
5. If needed, paste circles on the blackboard, use double-sided tape. If needed, hang the circles on the blackboard, use thread and tape.

How to use:

- Place the circles according to the modern periodic table.
- Students will now be able to recognise by simply looking at the circles that their size increases when moved from top to bottom in a group.
- Also, by seeing the outermost circle in a group, students can see that each element has the same number of electrons. Thus, it is made clear that valency remains the same within a group.
- Students can be made aware of the fact that as size increases, the tendency to lose electrons also increases. Thus, metallic character, which has the tendency to lose electrons, increases within a group.
- Students can clearly observe that the size of the circles is decreasing as the move from left to right in a period. So a decrease in size can reveal the atomic radius.
- The number of electrons increases from left to right, the tendency to lose electrons decreases, and valency first increases and then decreases.
- Metallic character decreases as the tendency to lose electrons decreases, while non-metallic character increases.
- Students can easily visualise the circles with the name and the atomic number of the element, as the use of more sense organs means more clarity of the concept.

Reproduction in Animals

TLM 42

Created by Teacher: Vikas Drall School: GBSSS Mundka, West-B, Delhi

TLM for Class 10

Subject : Science

Topic : Sexual and asexual reproduction

Brief description: The students will be able to understand and identify sexual and asexual modes of reproduction. Their curiosity and queries can be resolved via this TLM kit especially designed for the topic.

Other concepts that can be taught using this TLM: Sex determination in animals, fertilisation process and the formation of embryo, fusion of male and female gametes, female reproductive system, fertilisation in frogs, asexual reproduction, types of asexual reproduction and importance of reproduction.

Materials used: Bubble making gun/Improvised bubble maker, matchstick, colour sheets, pair of scissors, colours, hollow pipe/straw, modelling clay, disposable tea cup, soap-water, discarded socks, marker, chart paper, glue, black sesame or mustard seeds

Cost of the material used for making TLM (approx.): ₹60

How to make:

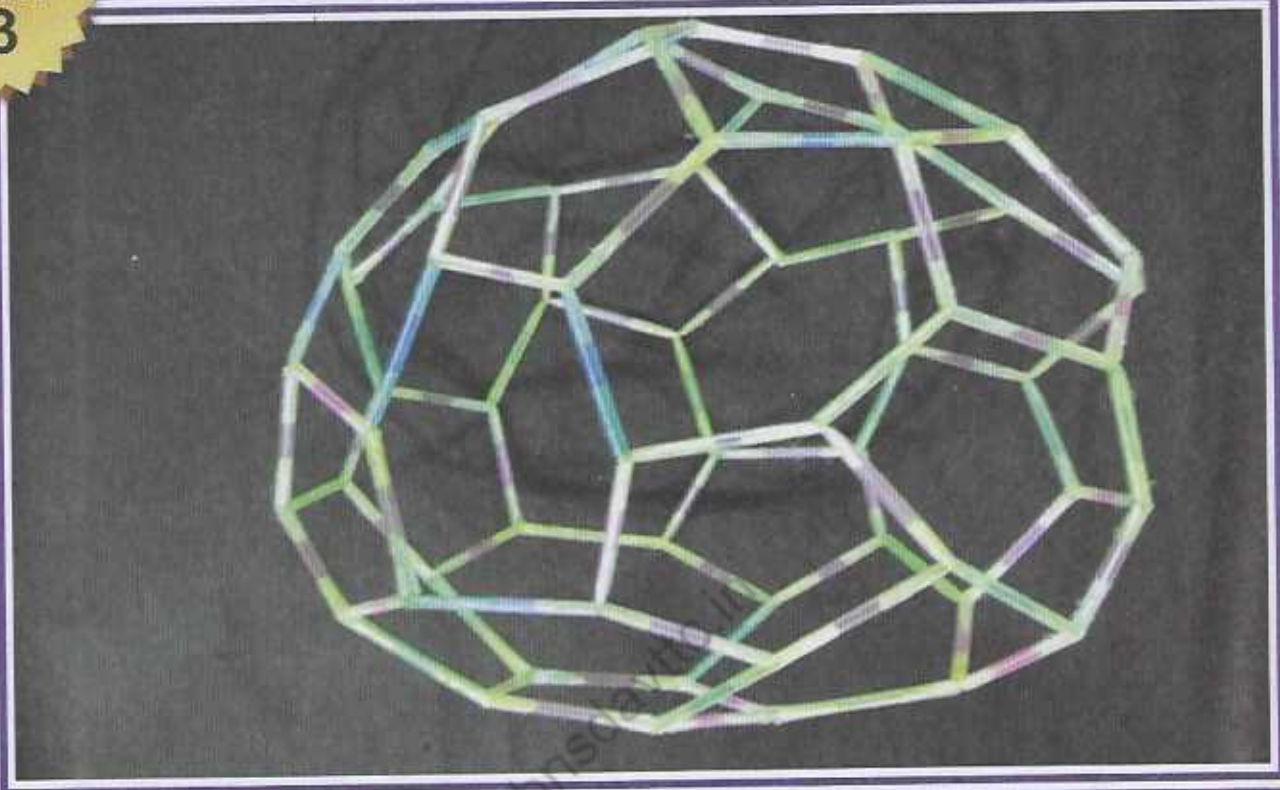
1. Tie socks to a hollow pipe/straw such that you can blow from the other end of the pipe.
2. Prepare some soap water in a beaker.
3. Cut the shapes of sperm and ovum from the colour sheets and paste them accordingly.
4. Design Amoeba, Hydra and other micro-organisms with asexual mode of reproduction using clay.
5. Make a chart showing the female reproductive system.

How to use:

- Demonstrate (by blowing soapy water from the socks attached with the pipe/straw) how the frog reproductive cells looks like outside the body to make a connect with the students.
- Showcase the shape of ovum and sperm in front of the students for better understanding of male and female gametes.
- Blow a big bubble with the bubble gun on a disposable tea cup and insert a matchstick carefully into the bubble demonstrating the fusion of male and female gametes.
- Explain the process of sexual reproduction with the help of a coloured chart paper.
- Showcase/demonstrate the process of budding in hydra and fission in amoeba.
- Demonstrate asexual reproduction in any other organisms as per the syllabus.

Buckminsterfullerene: 3D Model

TLM 43



Created by Teacher: Rajesh

School: GBSSS Ayanagar, South-24, Delhi

TLM for Class 10

Subject : Science

Topic : Buckminsterfullerene, an allotrope of carbon

Brief description: The TLM shows 3D model of Buckminsterfullerene which is an allotrope of carbon.

Other concepts that can be taught using this TLM: Bonding in carbon compounds, allotropes.

Materials used: Plastic straws and glue

Cost of the material used for making TLM (approx.): ₹10

How to make:

1. Cut the plastic straws into equal size.
2. Join the plastic straws replicating the diagram of carbon allotropes.
3. Seal the joints with glue.
4. TLM is ready to be used.

How to use:

- Bring the model to the class and ask students to explain their understanding of the compound.
- Randomly, call upon few students and ask them to count number of hexagons and pentagons in the model.
- Give an open platform for the students to initiate discussions on Buckminsterfullerene, other allotropes of carbon, allotropes of some other elements.

Surface Area and Volume

TLM 44

ERA AWARDED

Created by Teacher: Anuradha Jain

School: GGSS, Ashok Nagar, North East, Delhi

TLM for Class 10

Subject : Mathematics

Topic : Surface area and volume

Brief description: The students will be able to identify the surface area to be calculated from the combined 3D solids. They will be able to calculate the TSA, CSA and volume of combined 3D solids as this learning aid helps them to visualise actual solid, which is formed by combining two or more 3D solids.

Other concepts that can be taught using this TLM: Concepts of 3D shapes and combined shapes

Materials used: Moulding clay or play dough

Cost of the material used for making TLM (approx.): ₹25 to 30

How to make:

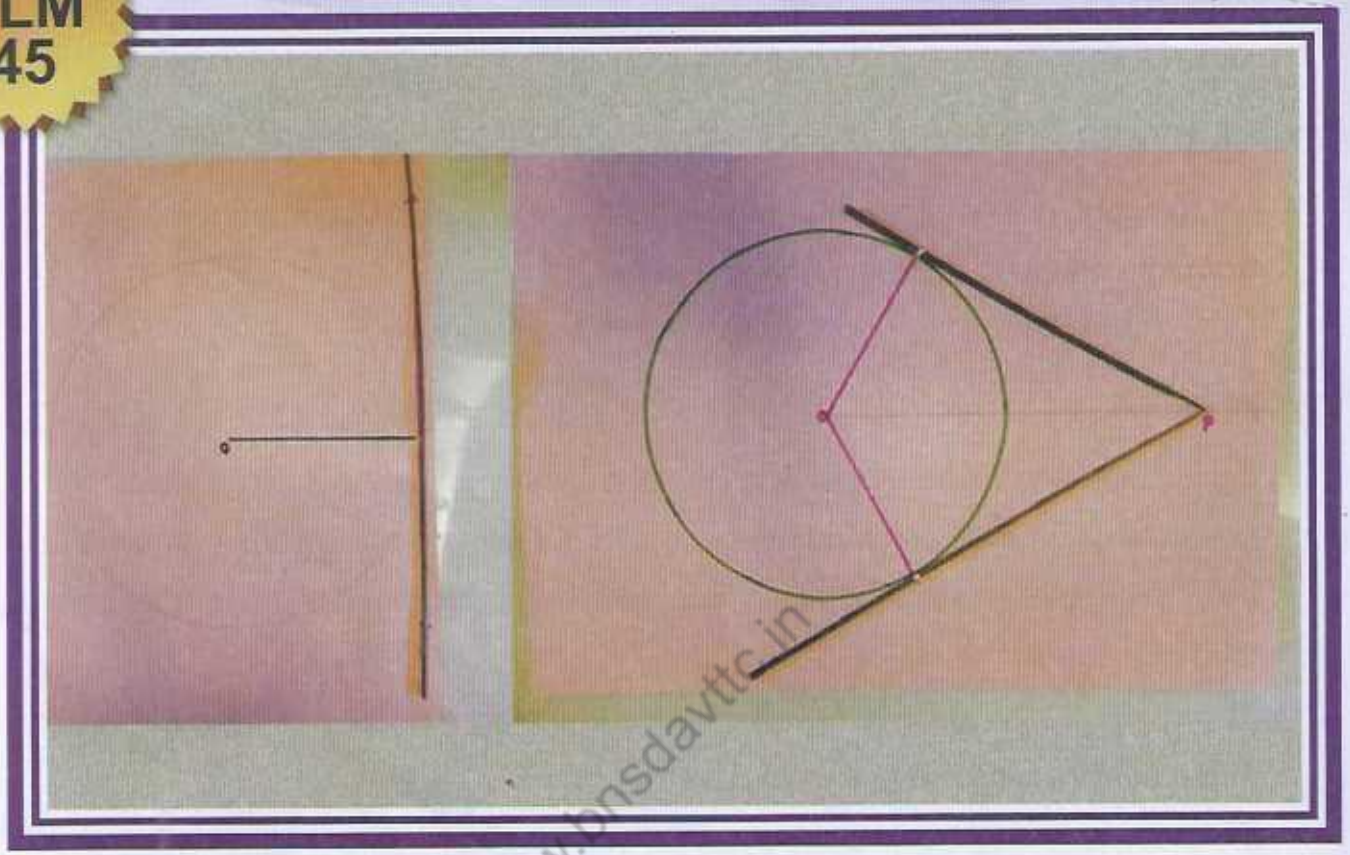
On the spot, give shape to the required solid (combine, cut portion, or convert from one shape to another) with your hand.

How to use:

- To calculate the surface area of a combined solid, make the desired solids first separately and then combine them, or take out some portion from a particular solid of another shape, such as scooping out a hemispherical shape from one face of a cube.
- The students can observe how the total surface area is to be calculated (as some of the surface gets merged or exposed).
- They can calculate volume by visually combining the figures.
- The clay can be used to experiment with the conversion of solids from one shape to another while maintaining the volume constant.

Circles

TLM 45



Created by Teacher: Jyoti Dhingra

School: SKV C, Block Sultanpuri, North West B1, Delhi

TLM for Class 10
Subject : Mathematics
Topic : Circles

Brief description: **Part 1** - Explain the difference between a secant and a tangent. This will help students understand the angle formed by radius and tangents. No tangent can be drawn to a circle which passes through a point that lies inside it. Using the TLM, students can visualise and prove the theorem, 'Tangent to a circle at any point is perpendicular to the radius of the circle that passes through the point of contact'.

Part 2 - The TLM helps students understand the difference between tangent line and the length of tangents, thereby, explaining the theorem, 'Two tangents are of equal length when the tangent is drawn from an external point to a circle.'

Other concepts that can be taught using this TLM: More concepts of tangents and secants and construction of circles

Materials used: Pastel sheet of paper, broomstick, thread, marker pen, pencil, measuring scale and compass

Cost of the material used for making TLM (approx.): ₹20

How to make:

1. Take coloured paper and cardboard and draw circle using a compass and pencil.
2. Mark the centre and draw the radius of the circle.
3. Paste it on cardboard and cut the sides of the cardboard to have the circle in the centre.
4. Take a stick from a broomstick and attach it to the circumference of the cardboard circle at a single point.
5. Make another cardboard circle. Take two sticks from a broomstick.
6. Fix them at one end and keep the other end free. Place the two connected sticks in such a way so that from their unconnected ends each of them has a point of contact on the circle's circumference.
7. Fix one end of two sticks just outside the cardboard circle. Consider it to be the external point. Now mark the points on the cardboard circle where the two sticks touch the circumference of the circle.
8. Measure the length of stick between external point and point of contact with the circumference of the cardboard circle.

How to use:

- To introduce the concept of tangent, take a stick representing a line which may: (i) intersect a circle at two points; (ii) does not touch or intersect a circle; (iii) touches the circle at a single point; such a line touching the circle at a single point is called a tangent.
- Tangent becomes a secant as it just changes its angle or moves towards the centre, and a secant becomes a tangent on changing its angle or as it moves away from the centre of a circle.
- Ask the students to observe relationship between radius and tangent to help them to understand that radius and tangents are always perpendicular to each other. Ask questions such as -
- 'If tangent is a line then what is the length of a tangent?'
- Explain that length of a tangent is the length of the line from the point of contact with the circumference of the circle and the external point.
- Motivate students to make their own model and verify what has been taught in the classroom. Give students complete imaginative freedom to prove the points, learnt in the classroom.