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Teacher Training Module:

Science

Learning Cycle Eighteen

Cellular Organization

Sindh Technical Assistance – Development through Enhanced Education Programme (STA-DEEP)

School Education & Literacy Department (SE&LD)

Government of Sindh.

Introduction and Rationale of the Training

Dear Teachers!

Welcome to the School Education & Literacy Department (SE&LD) Government of Sindh's Teachers Continuous Professional Development (CPD) Program. This school Cluster-based Teachers' Continuous Professional Development (CPD) program has been developed and is being implemented under the revised School Clustering Policy of 2021 and CPD Model of 2022.

This Content-Based Learning Cycles (CBLCs) series, consisting of cycles 11 to 20, has been developed to further enhance your knowledge and skills in content-based classroom teaching practices. The initial 10 Learning Cycles (LCs) focused on improving pedagogical skills to create interactive, participative, and enjoyable classrooms for students. Building upon these skills, CBLCs 11 to 20 will provide learning opportunities in Mathematics, Science, English, Urdu, and Sindhi for students in grades 1-8 will equip you with modern teaching strategies and subject knowledge to effectively manage classroom situations.

CPD Program vision

The CPD program aims to improve the quality of teaching practices in schools all over Sindh so that students become active and collaborative learners, problem solvers, and critical thinkers who approach tasks creatively and confidently. These CBLCs would help students clearly understand the subject knowledge and connect learned knowledge and acquired skills to the world around them. To make this possible, teachers must be better prepared for the classroom teaching requirements of pedagogy and the subjects' content. Moreover, this program provides specialised training to teachers at the school level through School Cluster-based CPD to make an impact and substantially increase students' learning outcomes.

CPD Program Teaching Philosophy

The CPD training sessions, including this one, adhere to a participatory teaching philosophy. This approach encourages participants to actively engage in collaborative learning while fostering self-reflection and peer reflection, ultimately creating a community of practice. The main goal is to enhance teaching practices and promote an understanding of the subject content theory and the strategies that enable students to confidently and effectively apply the learned knowledge in their daily lives.

Supporting You

The training module is designed to support you in your classroom teaching instruction practices. It will introduce you to the subject content and some approaches for use in the classroom. This will make your teaching more manageable and help you grow as a skilled teacher.

Online CPD portal for teachers

An online CPD portal has been developed for teachers to ask questions to experts, exchange ideas, and share personal learning experiences and difficulties in rolling out the CBLCs. The online CPD portal would help teachers connect with other teachers from all the districts and subject experts to share and learn as a community of teachers. Online portal: https://stadeep-cpd.com/

Note: CBLCs have been developed in alignment with the School Education & Literacy Department (SE&LD), Government of Sindh notified curriculum and textbooks of English subject from grades 1-8 under STEADA and PITE supervision. English textbooks of Grade 1-8 have been used in this LC as a reference.

CBLCs: 1-20: Please refer to the last page of this LC to see the complete list of topics for 1-20 LCs.

Acknowledgement

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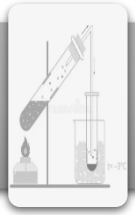
Learning Objectives: By the end of the session, the teachers will be able to:

Describe the similarities and differences between plant and animal cells.



Recognize different levels of cellular orgainzation (cell, tissue, organ, organ system, organsim)

Session Plan

Instructional strategies/activities

Time	Objective/purpose of the activity	Activities/learning experiences	Materials/resources
 10 mins	**Welcome** Remind the rules of the workshop. The facilitator will help teachers connect with their experience of the last learning cycle	Quick recall of the rules of the workshop. Ask each participant to share one key takeaway from classroom implementation of the previous learning cycle.	Sticky notes/paper chits
 10 mins	**Warm-up**  The facilitator aims to trigger teachers' understanding of the concept of 'Cellular Organization' using video/concept cartoon.	The facilitator will show a video about the concept of cell. Ask the teachers to watch carefully and note important point from the video. Take response from the teachers and note on white board. After watching the video facilitator will post some questions. a) What was the main theme of the video? b) How many types of cells were discussed in the video? Or The facilitator will show a concept cartoon about the concept of cell.	Urdu https://youtu.be/LtJdwbSSta0 or English https://youtu.be/_u3GEXZPDa8 Or Handout 18.1 - Concept Cartoon

		Take response from the teachers and note on white board The facilitator will introduce the topic "Cellular Organization" by relating to the video /concept cartoon.	
10 mins	**Input**  Facilitator will engage the teachers in the discussion and reflect on cell organelles.	The facilitator will reinforce the core concept of cell organelles through diagrams and their key role in a cell.	Textbook (cellular organization). Handout 18.2, 18.3 and 18.4
60 mins	**Practice**  Facilitator will engage teachers in a group activity.	**Activity 1** Facilitator will divide the teachers two groups. a) **Group A** will identify the plant cell organelles along with their functions (refer to the textbook - cellular organization) and fill in the worksheet (handout 18.2). b) **Group B** will identify the animal cell organelles along with their functions (refer to the textbook -	Handout 18.2, 18.3 and 18.4

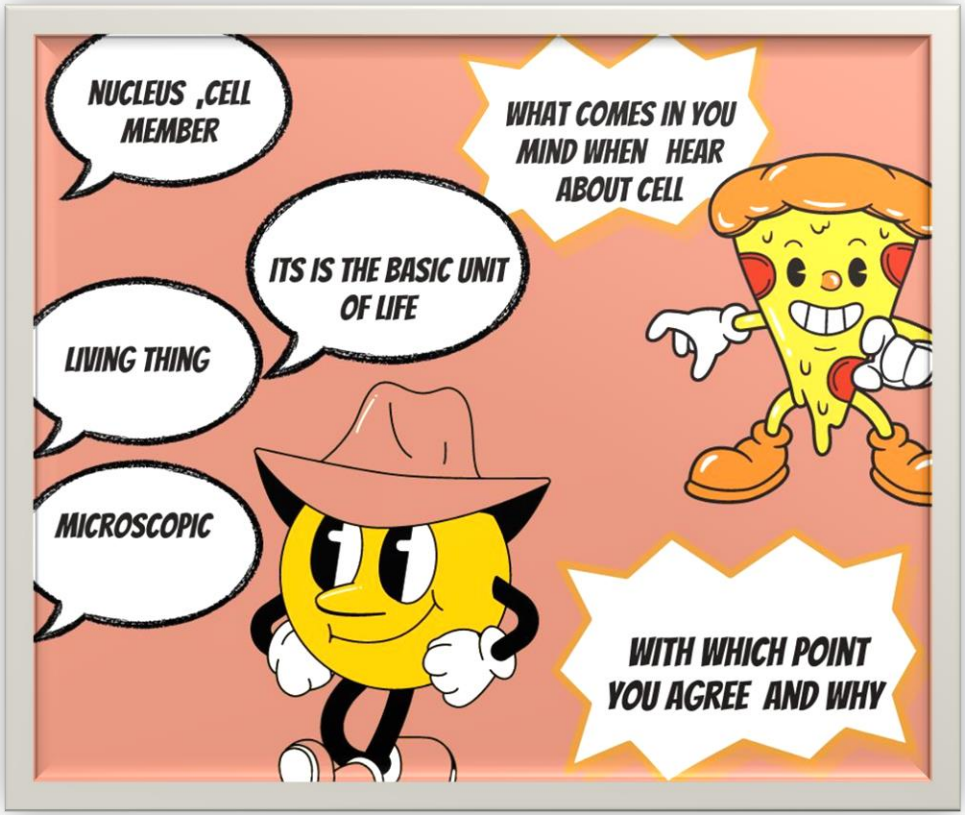
		cellular organization) and fill in the worksheet (handout 18.3). After completing the task, each group will present their work to the other group. Finally, each teacher will fill the Venn Diagram work sheet (Handout 18.4) as formative assessment. **Activity 2** First, the **f**acilitator will give an overview of unicellular and multicellular organism by displaying the pictures in front of the class (Handout 18.5). a. Facilitator will give them 2 minutes to think about the pictures. b. Facilitator will ask questions relate to the pictures. c. What is the difference between the two sets of organisms? d. How are the organisms composed? e. Facilitator will note the responses on white board. f. Compile the ideas of the teachers and give a briefly describe the unicellular and multicellular organisms.	Handout 18.5 and 18.6

		The facilitator will divide the teachers into 2 group and assign them one topic (they may refer to the textbook too). Each group will respond to their assigned topic (Handout 18.6). **Group 1:** cell, tissues, organ. **Group 2:** organ system, organisms. Teachers will present in front of the class. Finally, the facilitator will assess teachers' understanding of cellular organization by this formative assessment strategy by pasting numbers on floor (1^{st},2^{nd},3^{rd}, 4^{th},5^{th}, 6^{th}, 7^{th}). The facilitator will provide words; cell, tissues, organ, organ system, organisms. The teachers will rank them based on simple to complex.	
10 mins	**Conclusion**  The facilitator will provide video poem to the class	The facilitator will use the poem as summary of the session.	https://youtu.be/RB9na6b3tC8

20 mins	**Assessment** 	Facilitator will provide a worksheet (Handout 18.7) to assess teachers' understanding of Cellular Organisation.	Handout 18.7

Handout# 18.1

Concept Cartoon



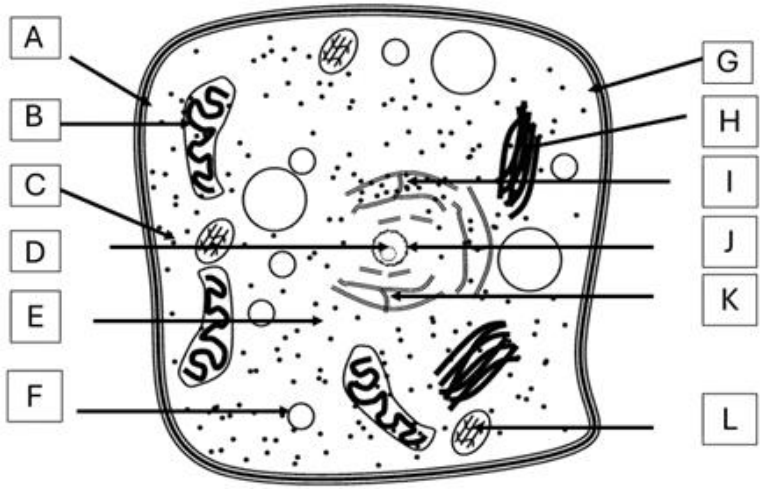
Handout# 18.2

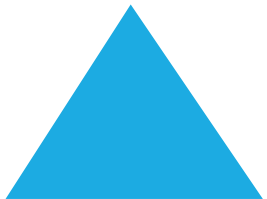
Worksheet 2

Name: _____

The Plant Cell

Directions: Place the correct letter in the data table to indicate the correct organelle. Describe the function / purpose of each organelle in the cell.





Organelle	Diagram Location (Letter)	Function
cell (plasma) membrane		
cell wall		
cytoplasm		
Golgi complex		
chloroplast		
mitochondria		
nuclear membrane		
nucleus		
nucleolus		
ribosome		
rough endoplasmic reticulum		
smooth endoplasmic reticulum		
vacuole		

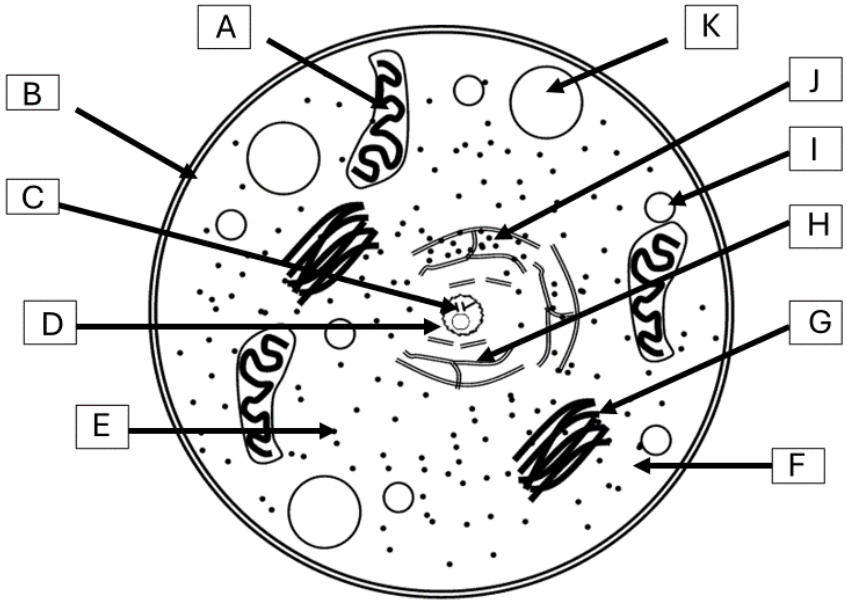
Handout# 18.3

Worksheet 3

Name: _____

The Animal Cell

Direction: write the correct letter in the data table to indicate the correct organelle. Describe the function / purpose of each organelle in the cell.

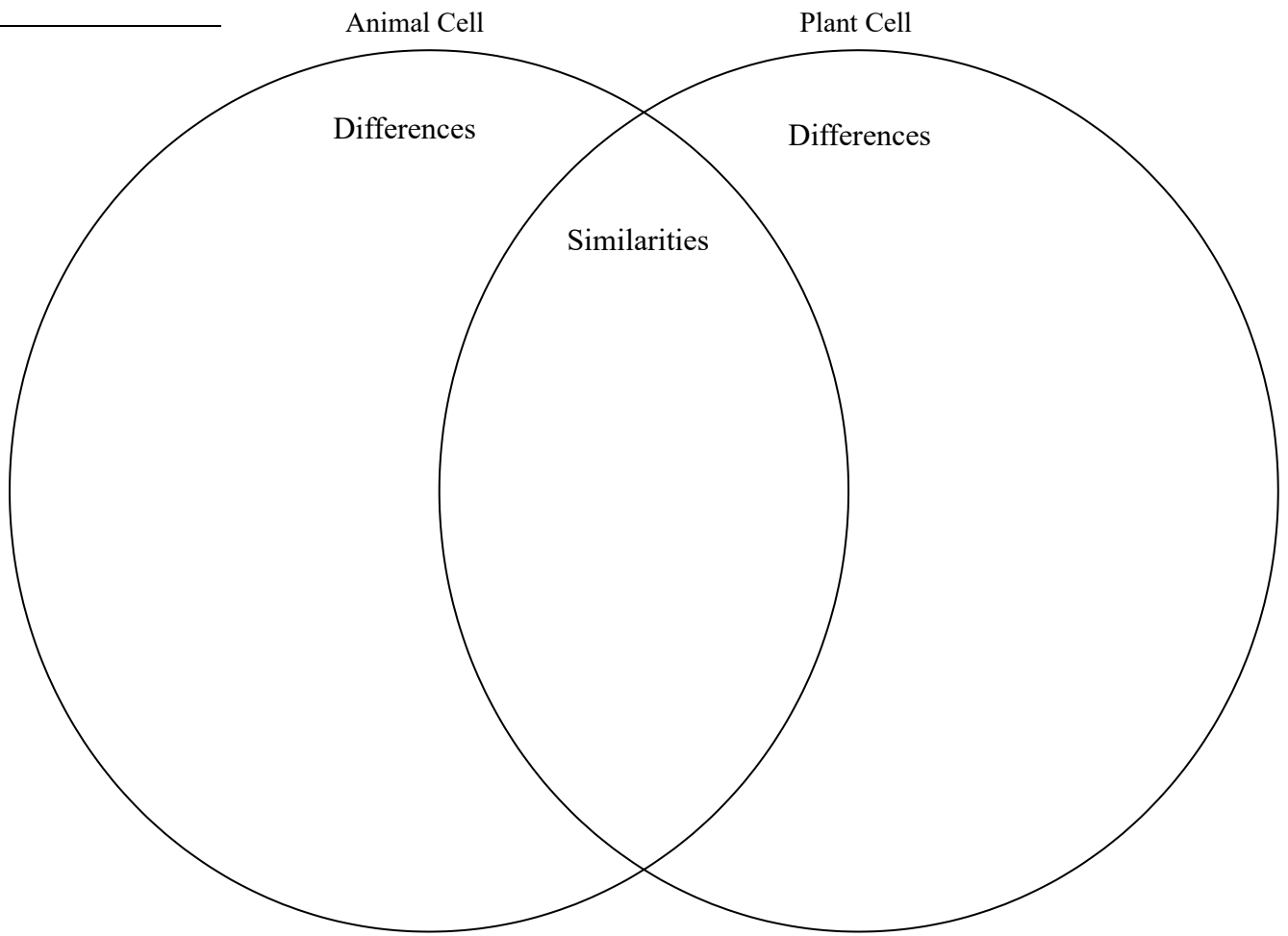


Organelle	Diagram Location (Letter)	Function
cell (plasma) membrane		
centriole		
cytoplasm		
Golgi complex		
lysosome		
mitochondria		
nucleus		
ribosome		
rough endoplasmic reticulum		
smooth endoplasmic reticulum		
vacuole		

Handout# 18.4

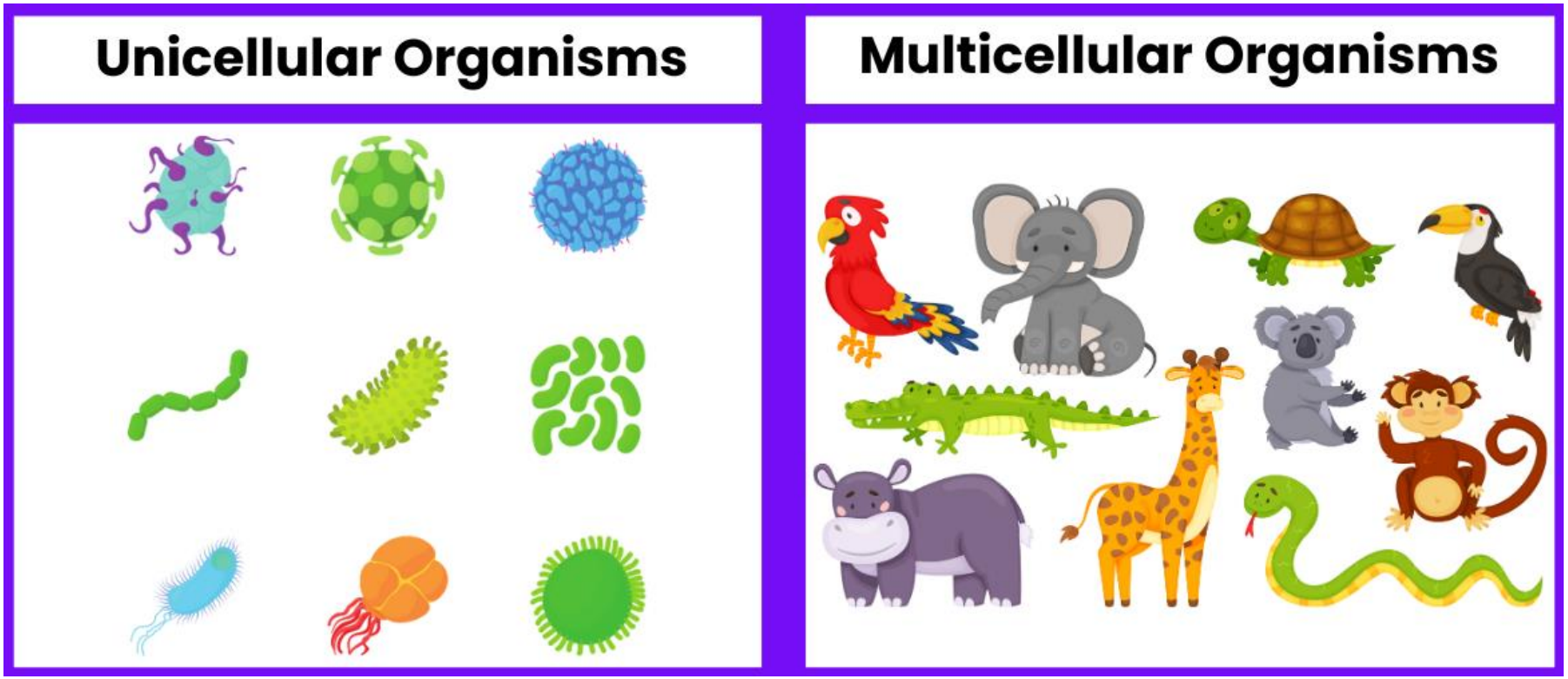
Worksheet 4 - Animal and Plant Cell Venn Diagram

Name _____



Handout# 18.5

Observe and discuss



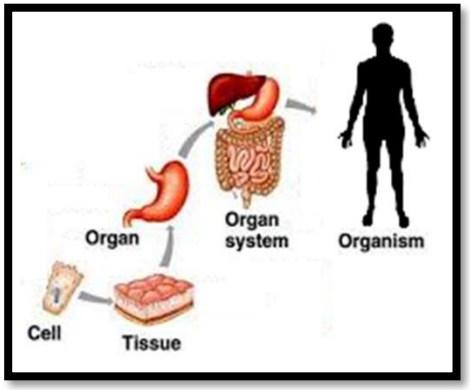
Handout# 18.6

Cells are the simplest basic building blocks of life. Many chemical reactions occur inside our cells to keep us alive.
Examples of cells:

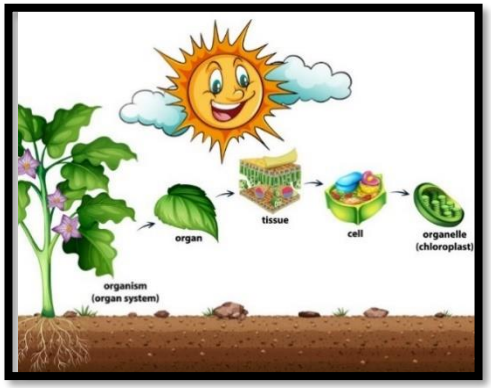
Plant Cell

Brain cell (Neuron)

When the same type of cells combines to serve a particular set of functions, they are collectively known as a simple ***tissue*** (e.g. muscle tissue). Complex tissues on the other hand are made up of different types of cells (e.g. Blood, xylem tissue). Different tissues may combine to form ***organs*** (e.g. stomach, leaf). When the different organs work together for a common purpose, they form a organ system. The ***organism*** is made up of numerous organ systems working together to support basic survival needs.



Cellular organization in animals (Humans)



Cellular organization in plants

Handout# 18.7

Name: _____

1. **What are the different levels of cellular organization?**

   _____

   _____

2. **How do these levels interact and depend on each other?**

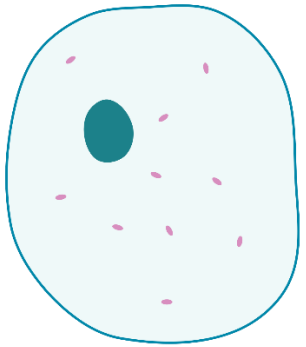
   _____

   _____

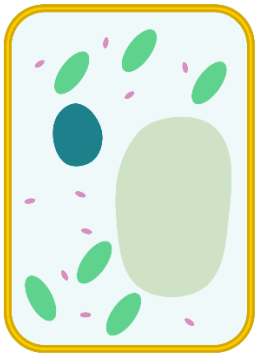
3. **Can you think of an analogy to represent your understanding of cellular organization?**

   _____

   _____



Animal Cell



Plant Cell

4. **Label only those cell organelles that differentiate plant cell from animal cell and vice versa.**

   _____

   _____

Additional Resources

- https://sepup.lawrencehallofscience.org/cells-unit-modeling-cell-structure-and-function/
- https://games.legendsoflearning.com/game/cell-assembler/3542?partner=legends-public&media=video
- https://orise.orau.gov/resources/k12/documents/lesson-plans/levelsoforganization.pdf

For reference:

List of 1-20 LCs topics

Learning Cycles (LCs)	Topics
LC-1	Orientation to Science
LC-2	Food and Health
LC-3	Ecology
LC-4	Matter and its States
LC-5	Mixture and Compound
LC-6	Force and Machines
LC-7	Forms of Energy
LC-8	Heat and Temperature
LC-9	Earth and Space
LC-10	STEM
LC-11	Sound
LC-12	Electricity
LC-13	Atomic Structure
LC-14	Microorganisms
LC-15	Pollution
LC-16	Light
LC-17	Chemical Equation
LC-18	**Cellular Organisation**
LC-19	Human Organ Systems
LC-20	Technology in Everyday Life

For reference:

List of Resource Items for LCs (11-20)

Items	No. of items	LC-11	LC-12	LC-13	LC-14	LC-15	LC-16	LC-17	LC-18	LC-19	LC-20
Sticky notes	3 set	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A4 Paper	1 set	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pencils	12	✓				✓	✓	✓	✓	✓	✓
Thumb pins	1 box	✓				✓					
Balloons	12	✓									
Wooden blocks	1	✓									
Blind fold ,	2	✓									
Board marker,	5	✓									

Speaker	**1**	✓									
Plastic ruler	**2**	✓									
Metallic ruler	**4**	✓									✓
Rubber band	**1 packet**	✓									
Wooden ruler	**2**	✓									
Human ear structure	**1**	✓									
Aluminum foil sheet	**7 meter**	✓					✓				
Card stock or construction paper	**12**	✓									
Straw	**24**	✓								✓	

Ping pong ball	**5**	✓									
Bell	**2**	✓		✓							
Bucket or Tub	**2**	✓									
Chart	**24**		✓	✓	✓	✓	✓				
Lemon	**6**		✓								
Paper clip	**2**		✓								
Copper wire	**1 fold**		✓								
Comb	**1**		✓								
Battery	**5**		✓								
Small bulb / Led light	**3**		✓								

Marker	**10**			✓	✓	✓					
Chart of atomic structure	**1**			✓							
Agar plates	**2**				✓						
Yeast	**1 small packet**				✓						
Tap	**2**	✓				✓	✓				
Clear plastic	**2 pieces**					✓					
Mirrors	**2**					✓					
Wax paper	**2 pieces**					✓					
Torch / laser	**3**					✓					
Paper bags	**4**									✓	
1 litter bottles	**2**									✓	
Cardboard	**2 box**										✓
Cutter	**3**										✓

Meter tape	**3**										✓

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