

# Computational Thinking in Science Curriculum

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Pre-Orientation Workshop on Curriculum Framing and Syllabus  
Preparation for Science and Mathematics

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# Outline

Introduction

Example: Conditional Statement - If Then Else

Example: Cooling of Water

Example: Loop Iteration

How to Identify Computational Thinking Moments in the Science Textbooks?

Computational thinking is a set of problem-solving methods that involve expressing problems and their solutions in ways that a computer could also execute.

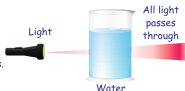
# 4 S2 III Transparent, Translucent and Opaque objects

Some objects allow light to pass through them. This helps us to see through them as the window of a bus. Let us see how different objects behave with light.

## 1. Transparent Objects

Transparent objects allow the light to pass through them. So, we can see other objects clearly through transparent objects.

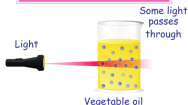
**Examples:** Air, glass and pure water.



## 2. Translucent Objects

Translucent objects allow some light to pass through them. So, we cannot see objects clearly, but we see them as blurred images through them.

**Examples:** Paper soaked in oil, snow and vegetable oil.



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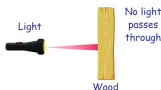
4th Science Unit 2: Matter and Materials.indd 96

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## 3. Opaque objects

Opaque objects do not allow light to pass through them. So, we cannot see through these objects.

**Examples :** Wood, stone and metals.



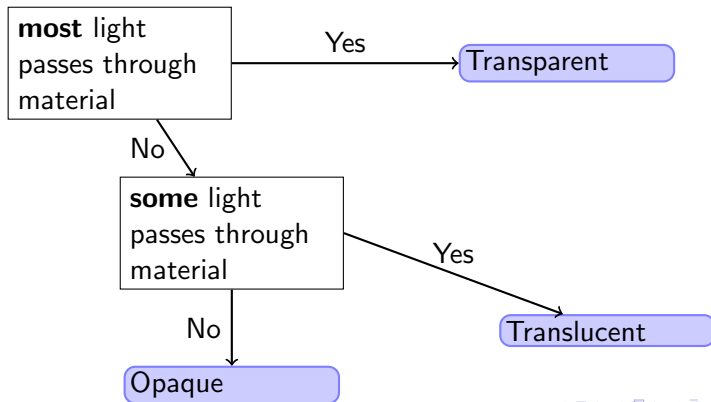
Think and Answer

## 4 S2 III Transparent, Translucent and Opaque objects

### Exercise

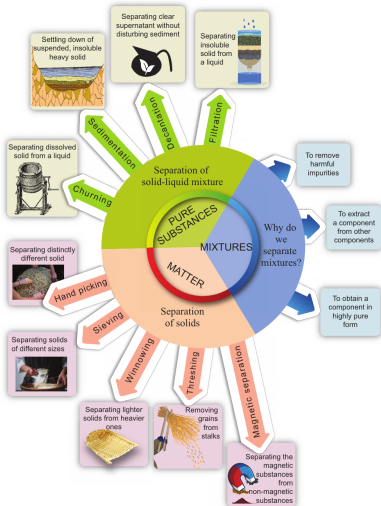
Classify the objects given below as transparent, translucent or opaque materials.

Air, Rock, Water, Aluminium foil, Mirror, Snow, Wooden board, Polythene bag, CD, Oil soaked paper, Glass tumbler and Coloured glass



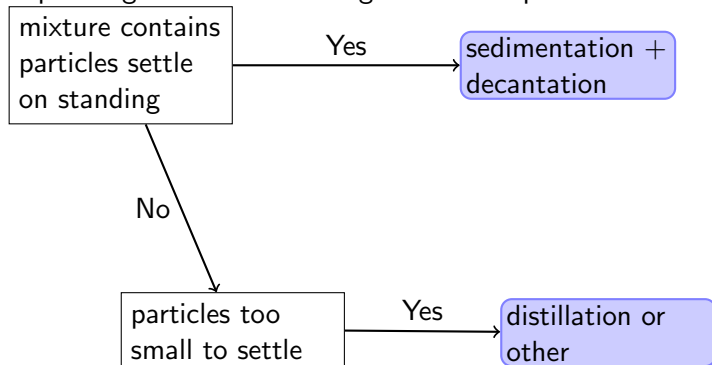
## 6.3.6 Separation of Mixtures

### Separation Techniques

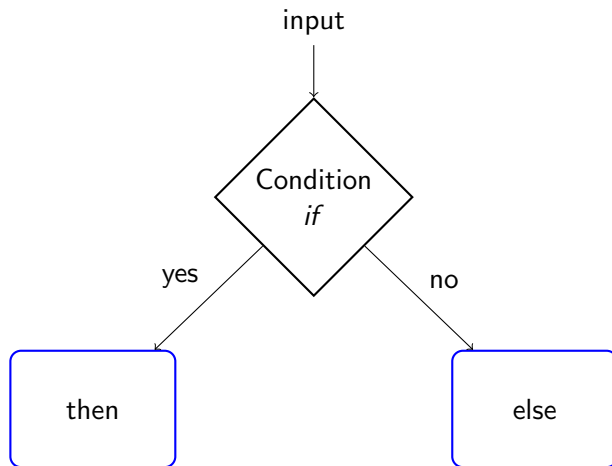


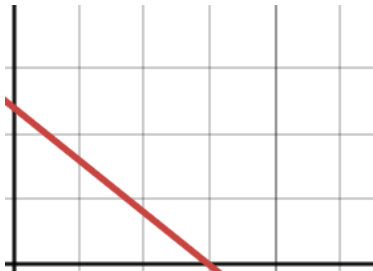
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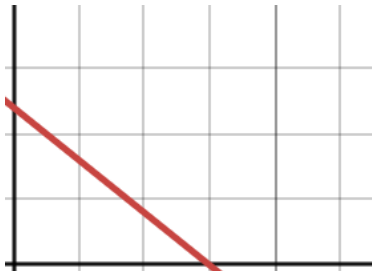
Separating mixture containing solid and liquid



# If-Then-Else Flow Diagram

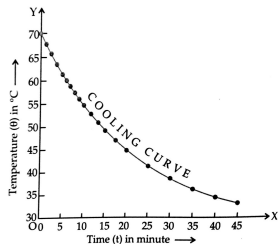






Data Table

Temperature of water (°C)	Time seconds (in second)	Room temperature (°C)	The difference of temperature (°C)
74.0	0.0	22.0	52.0
72.0	51.0	22.0	50.0
70.0	112.0	22.0	48.0
68.0	174.0	22.0	46.0
66.0	240.0	22.0	44.0
64.0	311.0	22.0	42.0
62.0	378.0	22.0	40.0
57.0	550.0	22.0	35.0
52.0	822.0	22.0	30.0
47.0	1150.0	22.0	25.0
42.0	1545.0	22.0	20.0
37.0	2110.0	22.0	15.0
32.0	3011.0	22.0	10.0
27.0	4656.0	22.0	5.0
22.0	6140.0	22.0	0.0



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# Kerala SCERT Class 7, 8. Wonders of the Sky

how many days it takes for the Moon to reach the New Moon from Full Moon?

Class - VII

2023  
MAY

Sun	Mon	Tue	Wed	Thurs	Fri	Sat
	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			

The date of Full Moon in the calendar

May 5

The date of New Moon in the calendar

Number of days taken to reach New Moon from Full Moon

Examine the next month's calendar also . Find out how many days are needed for the Moon to reach the next New Moon from the Full Moon?

2023  
JUNE

Sun	Mon	Tue	Wed	Thurs	Fri	Sat
			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
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The date of Full Moon

Date of New Moon in the calendar

The number of days between two consecutive New Moons by checking both the calendars.

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Date of New Moon in the calendar

The number of days between two consecutive New Moons by checking both the calendars.

1. Identify full-moon date;
2. Identify next new-moon date;
3. Compute difference;
4. Repeat for next month.

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Decomposition/  
Defining subrou-  
tines/ functions

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Number of days taken to reach New Moon from Full Moon

Detecting regularities  
e.g. loop iteration  
count or periodicity  
in data.

Algorithm → Follows  
a clear sequence: find  
full-moon date → find  
next new-moon date →  
subtract → record →  
repeat for next month.

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- ▶ Testing, debugging, evaluation test the solution, reflect on limitations, verify fairness of test

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- ▶ Abstraction and pattern recognition, focusing on relevant features.
- ▶ Testing, debugging, evaluation
- ▶ Data visualisation Use of charts/tables/graphs to represent results

## UNDERSTANDING THE PROBLEM

**First.** *What is the unknown? What are the data? What is the condition?*  
Is it possible to satisfy the condition? Is the condition sufficient to determine the unknown? Or is it insufficient? Or redundant? Or contradictory?

You have to *understand* the problem.

Draw a figure. Introduce suitable notation.  
Separate the various parts of the condition. Can you write them down?

## DEVISING A PLAN

**Second.** Have you seen it before? Or have you seen the same problem in a slightly different form?

Find the connection between the data and the unknown.

You may be obliged to consider auxiliary problems if an immediate connection cannot be found.

You should obtain eventually a *plan* of the solution.

*Do you know a related problem?* Do you know a theorem that could be useful?

*Look at the unknown!* And try to think of a familiar problem having the same or a similar unknown.

*Here is a problem related to yours and solved before. Could you use it?*  
Could you use its result? Could you use its method? Should you introduce some auxiliary element in order to make its use possible?

Could you restate the problem? Could you restate it still differently?  
Go back to definitions.

*How to Solve It*

If you cannot solve the proposed problem try to solve first some related problem. Could you imagine a more accessible related problem? A more general problem? A more special problem? An analogous problem? Could you solve a part of the problem? Keep only a part of the condition, drop the other part; how far is the unknown then determined, how can it vary? Could you derive something useful from the data? Could you think of other data appropriate to determine the unknown? Could you change the unknown or the data, or both if necessary, so that the new unknown and the new data are nearer to each other?

Did you use all the data? Did you use the whole condition? Have you taken into account all essential notions involved in the problem?

*How to Solve It*

## CARRYING OUT THE PLAN

**Third.** Carrying out your plan of the solution, *check each step*. Can you see clearly that the step is correct? Can you prove that it is correct?

*Carry out* your plan.

## LOOKING BACK

**Fourth.** Can you *check the result*? Can you check the argument?  
Can you derive the result differently? Can you see it at a glance?  
Can you use the result, or the method, for some other problem?

*Examine* the solution obtained.

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