I am a research scholar undertaking research in the area of Population Education. I would like to know the prevailing practices followed by secondary level teachers for teaching population education. A questionnaire is attached herewith. Kindly state your answer either by a tick mark [√] or by information. The data will be kept confidential and will use for research purpose only. Your co-operation is solicited.

Thanking you,

Yours sincerely

REGI P. MATHEW
Please fill in the blanks given below:

A. **Personal Information:**

1. Full Name (in capital letters): ______________________
2. Male: ______________________ Female: ______________
3. Age (in years): _________________
4. Religion: ______________________
5. Caste: _________________________
6. Residential Address: _____________________________

7. Educational Qualification : _________________________

B. **Professional Information :**

8. Current Designation : ______________________________
9. Subject Specialisation : __________________________
10. Teaching Experience (in years) : ___________________
11. Achievement in extra curricular activities :
12. Association with Population Education Club since:

C. **Prevailing Practices in Teaching Population Education**

Kindly state your answer either by a tick mark [√] or by information.
1. What methods you use in the classroom for teaching Population Education?
_________________________________________________

2. Do you ever prepare visual aids or handouts yourself, in order to make your teaching more effective?
   Yes_______  No_______

3. When you find students uninterested in the subject matter, or when they find the concepts too difficult to comprehend, which of the following are you most likely to do?
   (a) Reinforce the lesson with other teaching methods [      ]
   (b) Change the subject matter to something more interesting even if it means deviating from the lesson plan [    ]
   (c) Probe into the student’s difficulties/diagnose their problem
   (d) Insist on teaching as usual [    ]
   (e) Using Computer Assisted Instruction strategies [    ]
   (f) Others, please specify ______________________

4. Details of Population Education Activities taken up so far (Please tick).
   (a) Seminars :_________
   (b) Symposia :_________
   (c) Workshops :_________
   (d) Lectures :_________
   (e) Development of audio-visual aids :_________
   (f) Conducting competitions :_________
   (g) Any other, Specify :_________

5. What innovations in developing learning strategy, if any, have you introduced in teaching population issues to your students?
   None _____
   If yes, give details about your Innovations:
   ______________________________________________
6. In terms of professional development, what have you done to improve your teaching competency in the area of Population Education?

a. Attend Population Education training programmes, seminars, etc.: [ ].
b. Read Population Education books, materials, references: [ ].
c. Consult with experts, supervisors, on difficult subjects: [ ].
d. Searching through internet: [ ].
e. Others, please specify: ________________________________

7. Do you experience any difficulty in handling the population education activities?

   No _____ Yes ______.
   If yes give details: __________________________________________

8. Has your training and classroom experience in Population Education helped you to improve your teaching ability?

   Yes_______ No_______
   If no, why?
9. Do you have any specialized experience?
   
   No ______ Yes ______.

   If yes give details: _______________

   (a) Preparation of text book: ______________________

   (b) Curriculum development: ______________________

   (c) Development of instructional material:
       ________________ Development of audio-visual aids:
       ____________________

   (d) Preparation of achievement test: ______________________

10. Please give your suggestion to improve your teaching competency in the area of Population Education?
I am a research scholar undertaking research in the area of Population Education. I would like to know the Awareness about Blended Learning among the Secondary Level Teachers for teaching population education. An inventory is attached herewith. Kindly state your answer by a tick mark [✓]. The data will be kept confidential and will use for research purpose only. Your co-operation is solicited.

Thanking you,

Yours sincerely

REGI P. MATHEW
### GENERAL INFORMATION

Name of the Teacher :  
Age :  
Sex :  
Academic Qualification :  
Teaching Experience :  
Name of the School :  
Location of the School : Rural / Urban  
Type of the School : Govt./Govt.AidedManagement /Private  

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Statements</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Blended learning strategy is a new innovation in education</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Blended learning strategy demands more time for preparation.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>It does not nourish enquiry process of learning.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The idea of blended learning is to synthesis a number of different approaches to create high impact learning.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Through blended learning strategies teacher can optimize the use of available resources.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Blended learning strategy is not practical in the present educational environment</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Blended learning strategy is a combination of different modalities of teaching.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Blended learning strategy helps to create layers of learning using a variety of resources to target a specific goal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students explore their ideas through blended learning strategy.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>It is very difficult to combine two modalities.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Students are not taking responsibility for their own learning in a blended learning atmosphere.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>By blending various methods or models teacher can maximize the quality of teaching.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>It is very difficult to evaluate students in a blended learning environment.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Students get chance to demonstrate their abilities in a variety of forms in a blended atmosphere.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>The inherent defects of certain methods can be eliminated by blending with other methods in a scientific way.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Students does not exhibit curiosity and ponder observations.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>The blended learning strategy is very complex</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Students use scientific investigations to satisfy their own questions.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>It is very difficult to blend two methods</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Students get adequate opportunity to interact with their peers.</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>The learner uses his maximum capacity to constraint knowledge.</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>In a blended atmosphere knowledge is constructed in the minds of learners.</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Blended learning strategy does not agree with the constructionist principles.</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>In a blended learning atmosphere, teacher is exchanging and exploring information with students.</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>In a blended atmosphere, the interaction with teacher and student does not take place.</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>The work load of the teacher increases in a blended learning class room.</td>
<td></td>
</tr>
</tbody>
</table>
27. Students are not interested to learn in a blended learning atmosphere.
28. This strategy is a big challenge for teachers.
29. Teacher are not familiar with blended learning strategy
30. Blended learning strategy improves the strata of teacher’s knowledge and skills.
31. Blended learning strategy makes interest in learning and experiment.
32. Lack of adequate number of computers affects the computer related blending modalities.
33. Blended learning strategy is highly effective.
34. Blended learning strategy is against the conventional methods of learning strategy.
35. Teacher needs extra training to blend various learning methods and strategies.
36. Blended learning strategy is against the psychological principles of learning.
37. Teachers lack adequate training in blended strategy.
38. Due to lack of flexibility in time table, it is difficult to introduce blended learning strategy in the class room.
39. Learners aren’t even aware that they participating in blended learning.
40. Blended learning strategy is less effective than the non-blended approaches.
41. Technology based blending strategy implement in the class room due to change investment.
42. It is very difficult to administer a blended learning activity in the class room
43. For the better receptivity of blended learning strategy demands management skills for teachers.
44. There is no orientation among the teachers about the blended learning practices.
45. Teachers get chance to enhance creativity in the class room.
46. Teaching learning process through technology makes learning an entertainment.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>47.</td>
<td>Learner get chance to develop their innovation and experimentation in learning.</td>
</tr>
<tr>
<td>48.</td>
<td>The blended learning strategy develops creative thinking skills of teachers.</td>
</tr>
<tr>
<td>49.</td>
<td>This learning strategy improves and enriches the group as well as collaborative learning.</td>
</tr>
<tr>
<td>50.</td>
<td>Blended learning strategy makes use of the strengths of face – to – face learning in technology supported environment.</td>
</tr>
<tr>
<td>51.</td>
<td>Blended learning strategy promotes aesthetic appreciation.</td>
</tr>
<tr>
<td>52.</td>
<td>Implementation of blended learning strategy reduces the seriousness of teaching learning process.</td>
</tr>
<tr>
<td>53.</td>
<td>Learning through blended learning strategy helps in concretizing abstract ideas and make learning meaningful.</td>
</tr>
<tr>
<td>54.</td>
<td>Teachers are not familiar with scientific steps for blending instructional modalities.</td>
</tr>
<tr>
<td>55.</td>
<td>Blended learning is the progressive convergence of traditional face to face learning environment and computer mediated learning.</td>
</tr>
<tr>
<td>56.</td>
<td>In a blended learning environment the students get chance to develop thinking skills.</td>
</tr>
<tr>
<td>57.</td>
<td>In a blended learning classroom computer can serve as a catalyst for facilitating constructionist perception for knowledge.</td>
</tr>
<tr>
<td>58.</td>
<td>The weakness of technology focused models can be rectified by blending with face to face models effectively.</td>
</tr>
<tr>
<td>59.</td>
<td>Blended learning strategy enhances the self confidence of the teacher.</td>
</tr>
<tr>
<td>60.</td>
<td>Blended learning strategy helps to develop social and cultural values among students.</td>
</tr>
<tr>
<td>61.</td>
<td>It does not motivate the students</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>62.</td>
<td>Blended learning strategy caters the educational needs of all intelligent, average and below average students.</td>
</tr>
<tr>
<td>63.</td>
<td>Students gains more insight about the various concepts through blended learning strategy.</td>
</tr>
<tr>
<td>64.</td>
<td>Blended learning strategy students can verify the occurrence of the problem situation.</td>
</tr>
<tr>
<td>65.</td>
<td>Blended learning strategy is moderately structured with the teacher manages the whole activity.</td>
</tr>
<tr>
<td>66.</td>
<td>The intellectual environment is open to all relevant ideas and teachers and students should participate as equals where ideas are concerned.</td>
</tr>
<tr>
<td>67.</td>
<td>Blended learning strategy encourages maximum interaction among students.</td>
</tr>
<tr>
<td>68.</td>
<td>It does not foster process skills</td>
</tr>
<tr>
<td>69.</td>
<td>The social system is co-operative; teacher and students become a team working with new material together.</td>
</tr>
<tr>
<td>70.</td>
<td>It cannot maintain co-operative spirit in a blended environment</td>
</tr>
<tr>
<td>71.</td>
<td>Blended learning strategy improves the imaging capacity through convergent information – oriented learning</td>
</tr>
<tr>
<td>72.</td>
<td>In a blended learning atmosphere, creativity is nourished, and ease with playful creative thought is encouraged.</td>
</tr>
<tr>
<td>73.</td>
<td>Blended learning strategy is not suitable for large class rooms.</td>
</tr>
<tr>
<td>74.</td>
<td>It is not suitable in an inclusive class room.</td>
</tr>
<tr>
<td>75.</td>
<td>In a blended learning class room both teacher and students take the opportunity to try out and persevere with their own ideas</td>
</tr>
<tr>
<td>76.</td>
<td>Teacher’s act as a researcher of investigator.</td>
</tr>
<tr>
<td>77.</td>
<td>In a blended learning environment, students get more freedom.</td>
</tr>
<tr>
<td>78.</td>
<td>Learning becomes too artificial.</td>
</tr>
<tr>
<td>79.</td>
<td>It is very difficult to implement in the class room.</td>
</tr>
<tr>
<td>80.</td>
<td>It enhances the sense of intellectual power.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>81.</td>
<td>The learner cannot develop their learning style through this strategy</td>
</tr>
<tr>
<td>82.</td>
<td>Blended learning strategy does not tame the learners to develop empathy</td>
</tr>
<tr>
<td>83.</td>
<td>It is very difficult to maintain discipline in the classroom</td>
</tr>
<tr>
<td>84.</td>
<td>It reduces the role of the teacher</td>
</tr>
<tr>
<td>85.</td>
<td>There is scope for initiatives and positive actions from the side of students.</td>
</tr>
<tr>
<td>86.</td>
<td>Teacher discourages free expression of feelings</td>
</tr>
<tr>
<td>87.</td>
<td>There is no scope to develop communication skills through blended learning approach.</td>
</tr>
<tr>
<td>88.</td>
<td>It can be useful in individualized and group learning environment</td>
</tr>
<tr>
<td>89.</td>
<td>This strategy discourages self initiation and self direction of learning</td>
</tr>
<tr>
<td>90.</td>
<td>It ensures a free intellectual environment</td>
</tr>
<tr>
<td>91.</td>
<td>It disables the students to work at his own rate through units of study in a learning sequence.</td>
</tr>
<tr>
<td>92.</td>
<td>Blended learning strategy is not a novel idea and innovation.</td>
</tr>
<tr>
<td>93.</td>
<td>It reduces the mastery of subject areas</td>
</tr>
<tr>
<td>94.</td>
<td>Teaching through blended learning strategy makes learning long lasting.</td>
</tr>
</tbody>
</table>
I am a research scholar undertaking research in the area of Population Education. I would like to know the Awareness about Blended Learning among the Secondary Level Teachers for teaching population education. An inventory is attached herewith. Kindly state your answer by a tick mark [✓]. The data will be kept confidential and will use for research purpose only. Your co-operation is solicited.

Thanking you,

Yours sincerely

REGI P. MATHEW
### GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Name of the Teacher</th>
<th>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>:</td>
</tr>
<tr>
<td>Sex</td>
<td>:</td>
</tr>
<tr>
<td>Academic Qualification</td>
<td>:</td>
</tr>
<tr>
<td>Teaching Experience</td>
<td>:</td>
</tr>
<tr>
<td>Name of the School</td>
<td>:</td>
</tr>
<tr>
<td>Type of the School</td>
<td>: Government/Govt.Aided Management/Private</td>
</tr>
<tr>
<td>Location of the School</td>
<td>: Rural / Urban</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Statements</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The idea of blended learning is to synthesis a number of different approaches to create high impact learning.</td>
<td>S A N D S D</td>
</tr>
<tr>
<td>2.</td>
<td>Blended learning strategy is not practical in the present educational environment</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Blended learning strategy is a combination of different modalities of teaching.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Blended learning strategy helps to create layers of learning using a variety of resources to target a specific goal</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Students explore their ideas through blended learning strategy.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Students are not taking responsibility for their</td>
<td></td>
</tr>
</tbody>
</table>
own learning in a blended learning atmosphere.

7. It is very difficult to evaluate students in a blended learning environment.

8. The inherent defects of certain methods can be eliminated by blending with other methods in a scientific way.

9. Students do not exhibit curiosity and ponder observations.

10. Students get adequate opportunity to interact with their peers.

11. In a blended atmosphere knowledge is constructed in the minds of learners.

12. Blended learning strategy does not agree with the constructionist principles.

13. In a blended learning atmosphere, teacher is exchanging and exploring information with students.

14. In a blended atmosphere, the interaction with teacher and student does not take place.

15. The work load of the teacher increases in a blended learning classroom.

16. Students are not interested to learn in a blended learning atmosphere.

17. The blended learning strategy develops creative thinking skills of teachers.

18. Due to lack of flexibility in time table, it is difficult to introduce blended learning strategy in the classroom.

19. Blended learning strategy is less effective than the non-blended approaches.

20. For the better receptivity of blended learning strategy demands management skills for teachers.

21. Learner get chance to develop their innovation and experimentation in learning.

22. Blended learning strategy is against the psychological principles of learning.

23. This learning strategy improves and enriches the group as well as collaborative learning.
<table>
<thead>
<tr>
<th></th>
<th><strong>Blended learning strategy makes use of the strengths of face – to – face learning in technology supported environment.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>25.</td>
<td>Teachers are not familiar with scientific steps for blending instructional modalities.</td>
</tr>
<tr>
<td>26.</td>
<td>In a blended learning class room computer can serve as a catalyst for facilitating constructionist perception for knowledge.</td>
</tr>
<tr>
<td>27.</td>
<td>The weakness of technology focused models can be rectified by blending with face to face models effectively.</td>
</tr>
<tr>
<td>28.</td>
<td>Blended learning strategy helps to develop social and cultural values among students.</td>
</tr>
<tr>
<td>29.</td>
<td>It does not motivate the students</td>
</tr>
<tr>
<td>30.</td>
<td>Blended learning strategy students can verify the occurrence of the problem situation.</td>
</tr>
<tr>
<td>31.</td>
<td>Blended learning strategy is moderately structured with the teacher manages the whole activity.</td>
</tr>
<tr>
<td>32.</td>
<td>Blended learning strategy encourages maximum interaction among students.</td>
</tr>
<tr>
<td>33.</td>
<td>It cannot maintain co-operative spirit in a blended environment</td>
</tr>
<tr>
<td>34.</td>
<td>Blended learning strategy improves the imaging capacity through convergent information – oriented learning</td>
</tr>
<tr>
<td>35.</td>
<td>In a blended learning atmosphere, creativity is nourished, and ease with playful creative thought is encouraged.</td>
</tr>
<tr>
<td>36.</td>
<td>Blended learning strategy is not suitable for large class rooms.</td>
</tr>
<tr>
<td>37.</td>
<td>In a blended learning class room both teacher and students take the opportunity to try out and persevere with their own ideas</td>
</tr>
<tr>
<td>38.</td>
<td>In a blended learning environment, students get more freedom.</td>
</tr>
<tr>
<td>39.</td>
<td>The learner cannot develop their learning style through this strategy</td>
</tr>
</tbody>
</table>
| 40. | Blended learning strategy does not tame the }
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>learners to develop empathy</td>
<td></td>
</tr>
<tr>
<td>41. There is no scope to develop communication skills through blended learning approach.</td>
<td></td>
</tr>
<tr>
<td>42. This strategy discourages self initiation and self direction of learning</td>
<td></td>
</tr>
<tr>
<td>43. It disables the students to work at his own rate through units of study in a learning sequence.</td>
<td></td>
</tr>
<tr>
<td>44. Teaching through blended learning strategy makes learning long lasting.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX IV

MANUAL OF DIRECTIONS FOR
BLENDING LEARNING STRATEGY AWARENESS INVENTORY

For Secondary Level Teachers

Prepared by:

REGI. P.MATHEW and Dr. A. SUDHARMA

Nature and purpose of ‘Blended Learning Strategy Awareness Inventory

Blended Learning Strategy awareness inventory for teachers is a tool for measuring the awareness of Blended Learning Strategy. Blended Learning Strategy awareness inventory has 44 items, both positive and negative items and five alternative responses are given against each statement, viz, Strongly agree, Agree, Neutral, Disagree and Strongly disagree. The subjects have to indicate using a tick mark [√] in any one of the alternatives which is very much appropriate as far he/she is concerned. The test scores provide us with valuable information regarding awareness of Blended Learning Strategy among secondary level students.

Development of the Draft Blended Learning Strategy Awareness Inventory

As the first step for the preparation of the draft Blended Learning Strategy awareness inventory, all the available related literature pertaining to the area are reviewed and a number of statements relating to the awareness of Blended Learning Strategy are prepared. These statements are subjected to criticism by experts in the field and as per the suggestions received, some items are deleted and others are modified. The items are scrutinized with utmost care and items which are found to be ambiguous, lengthy, double barreled and of difficult vocabulary are eliminated. Thus, an edited scale consisting of 94 items are selected for the draft scale in which 47 positive statements and 47 negative statements are included.
Item Analysis

The items in the draft scale are subjected to item analysis and the items with “t” value greater than 1.75 are selected for the final scale. 50 items are discarded and the final Blended Learning Strategy awareness inventory consists of 44 statements.

Validity and Reliability of Blended Learning Strategy Awareness Inventory

The procedure adopted for developing Blended Learning Strategy awareness inventory, especially the procedure of item selection, helped to ensure the internal validity of Blended Learning Strategy awareness inventory. The face validity of Blended Learning Strategy awareness inventory is ascertained by showing the prepared Blended Learning Strategy awareness inventory to experts for their assessment. Content validity is based upon careful examination of standard text book and judgments of subject matter specialists.

Reliability of Blended Learning Strategy awareness inventory is established using the split half, odd and even number method. To establish reliability, the scores obtained by the teachers are used. The reliability coefficient is found to be .68 indicating that the Blended Learning Strategy awareness inventory is reliable.

Directions for Administering ‘Blended Learning Strategy’ Awareness Inventory

While administering Blended Learning Strategy Awareness inventory, the following points should be borne in mind:

1. The examiner should be familiar with the Blended Learning Strategy awareness inventory and manual of directions. She/he should preferably try to test himself/herself in a bonafide manner, so that he/she can anticipate the doubts that can be raised during the administration of ‘Blended Learning Strategy awareness inventory’. This may help the examiner to prepare her better.
2. The purpose of the test should be explained to the respondents at the beginning. The examiner should encourage the subjects to have a congenial and co-operative attitude towards the test. He/she should stimulate them to put forth genuine responses and should guarantee the confidential treatment of the responses.

As the ‘Blended Learning Strategy Awareness Inventory’ is self-administering, no instructions are necessary except those given in the ‘Blended Learning Strategy Awareness Inventory’.

**Scoring Procedure**

The arbitrary weighing method is used for scoring the Blended Learning awareness inventory. The scores to the five alternatives for positive and negative statements are shown in the table below. The scores of all the items are summated to obtain the blended learning awareness inventory score of an individual.

**Directions for Scoring**

Hand scoring can be done easily and rapidly. Care must be taken to invalidate items having more than one answer. The positive items are given scores 5, 4, 3, 2 and 1 to the alternatives, strongly agree, agree, no option, disagree and strongly disagree respectively while for the negative items, the scores are given in the reverse order. The table below gives the Scoring Procedure for Positive and Negative Statements in Blended Learning Awareness Inventory
Scoring Procedure for Positive and Negative Statements in Blended Learning Awareness Inventory

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Scores</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive Statements</td>
<td>Negative Statements</td>
<td></td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

As the ‘Blended Learning Strategy Awareness Inventory’ consists of 44 items, the total score of an individual ranges from 44 to 220. The scoring key prepared for the Blended Learning Strategy Awareness Inventory is given below.

<table>
<thead>
<tr>
<th>Item Numbers</th>
<th>Nature of the Items</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3,4,8,10,11,13,17,21,23,24,26,27,28,30,31,32,34,35,37,38,44</td>
<td>Positive</td>
<td>SA 4 1 2 5 A 3</td>
</tr>
<tr>
<td>2,5,6,7,9,12,14,15,16,18,19,20,22,25,29,33,36,39,40,41,42,43.</td>
<td>Negative</td>
<td>A 1 2 3 4 D 5 SD</td>
</tr>
</tbody>
</table>
Norms for Blended Learning Strategy Awareness Inventory

Norms for Blended Learning Strategy Awareness Inventory are determined following one of the conventional method adopted by researchers in the field of Psychology and Education (Rogers 1931).

The norms for Blended Learning Strategy are based upon secondary level teachers. The scores obtained can be interpreted with the help of the table of norm provided below.

**Norm values for Blended Learning Strategy Awareness Inventory for Secondary Level Teachers.**

<table>
<thead>
<tr>
<th>No</th>
<th>Level of awareness</th>
<th>Norm Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High awareness (m+ )</td>
<td>Scores above 207</td>
</tr>
<tr>
<td>2</td>
<td>Medium awareness between (m- ) &amp; (m+ )</td>
<td>Scores between 161 and 207</td>
</tr>
<tr>
<td>3</td>
<td>Low awareness (m- )</td>
<td>Scores below 161</td>
</tr>
</tbody>
</table>
APPENDIX V

M.G. UNIVERSITY – KOTTAYAM

SCHOOL OF PEDAGOGICAL SCIENCES

Achievement Test in Population Education

Class: IX

Topic: Overpopulation in India and its consequences

Marks: 25

This test is the part of a research study. It is meant to assess your Knowledge and understanding in this particular area of the topic before you start learning it and after you have completely learnt it.

The test consists of three major parts namely Part -A, Part -B and Part-C. Follow the instruction given under each part.

Answer sheets will be provided. After you have written the test, please return both the question paper and the answer sheets.

Part -A

Choose the correct answer from the brackets given below

1. According to the 2001 census, the population of India was ------.
   [A. 101 Crore   b. 105 Crore   c. 110 Crore   d. 102 Crore]
2 The Major cause for poverty in India is ________.
   [a. Migration  b. Urbanization  c. Industrialization
d. over population]

3 India is the home of ________ a percentage of world population.
   [a. 6.2  b. 10  c. 12  d. 17.5]

4 India is the ________ largest thickly populated country in the world.
   [a. First  b. Second  c. Third  d. Forth]

5 In India the growth rate of population and growth rate of employment opportunities are ________.
   [a. Proportionate  b. Same  c. Disproportionate  d. None of the above]

6 The present population of India is ________.
   [A. 121 Crore  b 131 Crore  c. 111 Crore  d 135 Crore]

7 One of the major causes for environmental pollution is
   [a. Overpopulation  b. zero population growth  c. Negative Population growth  d. None of the above]

8 If the number of the family members increases, the expenditure of the family becomes ________.
   [a. Constant  b. Increases  c. Decreases  d. None of the above]
9. The country with a larger population than that of India is -------.
   [a. Indonesia b. China c. Russia d. France]

10. For the past several years the population of India has been -------
    [a. Exploding b. almost constant c. Fluctuating d. Declining]

**Part - B**
Answer the following questions in two or three sentences

(5 x 2 = 10 Marks)

11. What are the causes of over population in India?

12. Why do fewer people die in these days in comparison with the past?

13. How population growth can be an obstacle to economic development?

14. Define poverty?

15. On the given the outline map of India, mark the following places.

**Part - C**
Answer the following question in six or eight sentences

(5 x 1 = 5 Marks)

16. Examine the relationship between over population and environmental pollution

   Or

17. What are the consequences of Population explosion? Examine the remedies for checking of Population explosion?
SCORING KEY FOR ACHIEVEMENT TEST IN POPULATION EDUCATION

1. 102 crore.
2. over population
3. 17.5 percent
4. Second
5. Disproportionate
6. 121 crore
7. over Population
8. Increases
9. China
10. Exploding

11. The major causes of over population are child marriage, joint family system, backwardness of women, high birth rate and low death rate, illiteracy, religious barriers, and boy preference are the major causes of over population in India.

12. In India, increased accessibility to medical care occurred under the national health programme have promoted more diagnosis, health care facilities, and increased reporting of disease conditions. The latest developments in the health sector reduced the death rate and increased the life expectancy. Because of this reason, fewer people die in these days in comparison with the past.
Over population results low per capita income, low rate of capital formation, unemployment and under – employment, more pressure on land, increased density of population, poverty, low standard of living, unfavorable balance of payment, and growth of slums. Therefore, unless the rate of population growth is reduced, economic progress is difficult.

Poverty is a situation where people fail to satisfy their basic needs. Poverty means a situation where human beings experience hunger, do not have enough clothes, do not have a house, do not have access to medical facilities, do not have access of education, are not able to get a job, are denied opportunities, and are denied freedom.

Usually population and nature are in a balance. If there is a disturbance in any one of these factors the equilibrium will be disturbed. This results in the imbalance of nature. Two kinds of imbalances are present in nature, the first is natural and the other is man-made. The effect of man-made imbalance is
more hazardous in that. Most often it results in the complete depletion of natural resources. The main cause for all these is the rapid increase in population. Uncontrolled urban and industrial development, environmental pollution, the unequal distribution of income and land, unnecessary destruction of forests, depletion of water resource etc combined with increasing population have damaged the world environment. The alarming increase of the population of the earth is threatening the very existence of human being in this planet. Thus the pressure on environment is increasing day by day due to population explosion as the consequent of unscientific and uncontrolled developmental activities.

17. The major consequences of Population explosion are shortage of food, undernourished population, poverty, wide gap between the ‘haves’ and ‘have-nots’, uneven age structure, unemployment, under-employment, increased pressure on land, pollution, unhygienic living condition of the people, growth of slums, economy, heavy imports of some commodities, illiteracy, fatalist attitude.

The remedies for checking of Population explosion are categorized into three they are as follows.

<table>
<thead>
<tr>
<th>Economic Measures</th>
<th>Social measures</th>
<th>Family Welfare Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Industrial development and expansion.</td>
<td>1. Eradication of illiteracy.</td>
<td>1. Use of media in creating awareness about population explosion.</td>
</tr>
<tr>
<td>2. Generation of more employment opportunities.</td>
<td>2. Improvement in the condition of women.</td>
<td>2. Expansion of health and sanitation services.</td>
</tr>
<tr>
<td>4. Equitable distribution of wealth.</td>
<td>4. Change in social outlook.</td>
<td>3. Propagating small family norm.</td>
</tr>
</tbody>
</table>
M.G. UNIVERSITY, KOTTAYAM
SCHOOL OF PEDAGOGICAL SCIENCES

POPULATION AWARENESS TEST

Developed By Vasuki, N. and Regi P. Mathew

Personal Data

1. Name of the Student: 
2. Class: 
3. Sex: Male / Female 
4. Community: SC ST / OBC / FC 
5. Name of the School: 
6. Location of the school: Rural / Urban 

Part – I

Answer the following by putting a tick ( ) mark against the right answer.

1. In India, ________percentage of the population consists of children below the age of 15 years.
   (a) 42  (b) 75  (c) 15  (d) 30 

2. The annual growth rate of population of Kerala is ____________-
   (a.) 2.5%  (b) 3.5%  (c). 3%   (d). 1.5%
3. In Kerala, the lowest rate of population growth is found in _________ district.
   (a) Thrichur  (b) Palakkad   (c) Kottayam   (d) Pathanamthitta

4. The age at which women attains bodily maturity is between _________ years
   (a) 8 – 10   (b) 12 – 15   (c) 16 – 20   (d) 20 – 22

5. For infants, supplementary food should be started at the period of _________.
   (a) 6 months   (b) 1 year   (c) 2 year   (d) 3 years

6. If the number of family members increases, the expenditure of the family
   (a) Increases (b) decreases (c) constant (d) none of the above

7. In rural areas, the number of big families are very high because,
   (a) Large family is a status symbol    
   (b) Lack of knowledge about birth control devices
   (c) To increase the income of the family
   (d) All the above

8. The major cause of poverty in India is ___________.
   (a) Population explosion       (b) urbanization
   (c) Industrialization          (d) migration

9. According to the 2001 census, the population of India was___________.
   (a) 150 crore   (b) 102 crore
   (c) 2 billion    (d) 203 million
10. In India, the growth rate of population and the growth rate of food production is ______.

   (a) Proportionate  (b) same  (c) disproportionate  (d) none of the above

11. One of the major cause of the rapid population growth has been _______ in the last few decades

   (a) increase in birth rate and death rate
   (b) decrease in birth rate and increase in death rate
   (c) increase in birth rate and decrease in death rate
   (d) decrease in death rate and increase birth rate

12. One of the merits of nuclear family is _______

   (a) reduces freedom  (b) each child gets adequate attention
   (c) increases income  (d) increases the expenditure

13. In India, a person needs ______ calories of food daily.

   (a) 2400  (b) 3000
   (c) 4000  (d) 1500

14. The present population of India is ________.

   (a) 121 crore  (b) 100 crore
   (c) 200 crore  (d) 150 crore

15. The most populated district in Kerala is ________.

   (a) Thrissur  (b) Ernakulam
   (c) Kottayam  (d) Malappuram


   (True / False)

17. Extra marital relations never lead to AIDS.

   (True / False)
18. Rapid population growth is a threat to overall development of our country

(True / False)

19. Small family lead to healthy family.

(True / False)

20. Killing female child is not a sin.

(True / False)

21. India is the second largest populated country in the world.

(True / False)

22. The parents need a boy child in order to reach heaven after death.

(True / False)

23. Population explosion destroys the balance between man and environment.

(True / False)

24. The population of the India is growing annually at a rapid rate of 5 %

(True / False)

25. Illiteracy is one of the reasons for over population.

(True / False)

26. The forest helps us to,

(a) maintain the balanced climate
(b) convert more lands for housing
(c) make money through cutting trees
(d) give more lands for agricultural purpose.

27. Mans relationship between nature should be based on,

(a) harmony with nature 
(b) conquering the nature 
(c) submission to nature 
(d) transforming the nature.

28. A good food is one which is,

(a) very tasty 
(b) balanced diet 
(c) purely non vegetarian 
(d) sweet and delicious

29. In rural areas, the number of big families are very high because,

(a) large family is a status symbol 
(b) Lack of knowledge about birth control devices 
(c) Religious restrictions 
(d) All the above

30. The benefit of the family planning is,

(a) reducing birth rate and happy family life 
(b) splits in the family 
(c) arise family problems 
(d) income of the family increases

31. The solution of our population problem lies essentially in

(a) accepting one child family norm of China 
(b) ensuring a drastic reduction in birth rate 
(c) increase the number of children 
(d) propagating big family norm.

32. At the rate of two percent annual growth rate, the population would double itself in _____ years.

(a) 25        (b) 100 
(c)  75      (d) 50
33. If population of India controlled, what will be the position of economic development?

(a) successful  
(b) unsuccessful  
(c) ineffective  
(d) standstill

34. The increase in the atmospheric temperature due to the increase of carbon dioxide in the atmosphere is called ______.

(a) Catination  
(b) Carbon cycle  
(c) Ozone lair depletion  
(d) Green house effect

35. Inhaling Carbon monoxide from the air is poisonous and it reacts with the _______ in the human body.

(a) Brain cells  
(b) Lungs  
(c) Hemoglobin  
(d) Kidneys

36. The density of population in Kerala is ______ per square kilometers.

(a) 159  (b) 989  
(c) 785  (d) 859

37. The sex ratio in Kerala is ______.

(a) 1084 females per 1000 males  (b) 910 females 1000 males  
(b)985 females per 1000 males  (d) 1015 females 1000 males

38. In Kerala the population is lowest in ______ district.

(a) Kollam  (b) Idukki  
(c) Wayanadu  (d) Thrissur
39. In Kerala the density of population is highest in _______ district.
   (a) Ernakulum                        (b) Kottayam
   (c) Thiruvananthapuram              (d) Malappuram

40. The present literacy rate of Kerala is _______.
   (a) 90.31%  (b) 99 %
   (c) 95.80%  (d) 93.91%

41. The literacy rate is lowest in _______ district in Kerala.
   (a) Palakkad                        (b) Malapuram
   (c) Idukki                         (d) Wayanad

42. The most populous state in India is _______.
   (a) Uttar Pradesh                  (b) Maharashtra
   (c) Kerala                         (d) Kashmir

43. Among the Indian states literacy rate is lowest in _______.
   (a) Punjab                         (b) Tamil Nadu
   (b) Bihar                          (d) Assam

44. The present population of Kerala is _______.
   (a) 21 crore                      (b) 10.9 crore
   (c) 40 crore                      (d) 3.34 crore

45. What percentage of world population lives in India?
   (a) 20%                            (b) 15%
   (c) 16%                            (d) 17.5%

46. The major cause of increasing unemployment in India is _______.

(a) low literacy  (b) increase in population  (c) lack of natural resources  (d) lack of industrial development

47. Out of the total world land what percent is in India?

(a) 1.2  (b) 2.4  (c) 4.2  (d) 4.8

48. What percentage of world population lives in India?

(a) 17.5  (b) 11.44  (c) 12.11  (d) 15.53

49. The cause of backwardness of rural women in India is______.

(a) lack of education  (b) increase in income  (c) rapid increase in the educational facility  (d) girls do not get admission in school

50. The present literacy rate of India is__________.

(a) 74.04  (b) 86.07  (c) 57.62  (d) 68.14
## SCORING KEY FOR POPULATION AWARENESS TEST

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42</td>
<td>26</td>
<td>Maintain the balanced climate</td>
</tr>
<tr>
<td>2</td>
<td>1.5%</td>
<td>27</td>
<td>Harmony with nature</td>
</tr>
<tr>
<td>3</td>
<td>Pathanamthitta</td>
<td>28</td>
<td>Balanced diet</td>
</tr>
<tr>
<td>4</td>
<td>12-15</td>
<td>29</td>
<td>All the above</td>
</tr>
<tr>
<td>5</td>
<td>6 months</td>
<td>30</td>
<td>Reducing birth rate and happy family life.</td>
</tr>
<tr>
<td>6</td>
<td>increases</td>
<td>31</td>
<td>Ensuring a drastic reduction in birth rate</td>
</tr>
<tr>
<td>7</td>
<td>All the above</td>
<td>32</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>Population explosion</td>
<td>33</td>
<td>successful</td>
</tr>
<tr>
<td>9</td>
<td>102 crore</td>
<td>34</td>
<td>Green house effect</td>
</tr>
<tr>
<td>10</td>
<td>disproportionate</td>
<td>35</td>
<td>Hemoglobin</td>
</tr>
<tr>
<td>11</td>
<td>increase in birth rate and decrease in death rate</td>
<td>36</td>
<td>849</td>
</tr>
<tr>
<td>12</td>
<td>each child gets adequate attention</td>
<td>37</td>
<td>1084 females per 1000 males</td>
</tr>
<tr>
<td>13</td>
<td>2400</td>
<td>38</td>
<td>Waynadu</td>
</tr>
<tr>
<td>14</td>
<td>121 crore</td>
<td>39</td>
<td>Thiruvananthapuram</td>
</tr>
<tr>
<td>15</td>
<td>Malappuram</td>
<td>40</td>
<td>93.91%</td>
</tr>
<tr>
<td>16</td>
<td>True</td>
<td>41</td>
<td>Palakkad</td>
</tr>
<tr>
<td>17</td>
<td>False</td>
<td>42</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td>18</td>
<td>True</td>
<td>43</td>
<td>Bihar</td>
</tr>
<tr>
<td>19</td>
<td>False</td>
<td>44</td>
<td>3.34 crore</td>
</tr>
<tr>
<td>20</td>
<td>False</td>
<td>45</td>
<td>17.5%</td>
</tr>
<tr>
<td>21</td>
<td>False</td>
<td>46</td>
<td>Increase in population</td>
</tr>
<tr>
<td>22</td>
<td>True</td>
<td>47</td>
<td>2.4%</td>
</tr>
<tr>
<td>23</td>
<td>True</td>
<td>48</td>
<td>17.5</td>
</tr>
<tr>
<td>24</td>
<td>True</td>
<td>49</td>
<td>Lack of education</td>
</tr>
<tr>
<td>25</td>
<td>True</td>
<td>50</td>
<td>74.04</td>
</tr>
</tbody>
</table>
Lesson Designs Based on
Computer Assisted Instruction (CAI) Model
For Teaching

POPULATION EDUCATION

Prepared By
REGI P MATHEW and Dr A SUDHARMA

School of Pedagogical Sciences
M G University
Kottayam
Dear students,

Welcome to the Computer Assisted lessons on the topic “Overpopulation in India”. This is a programme designed for learning few aspects of Overpopulation in India. As the topic is interdisciplinary in nature, the sub units are selected from Social Science, Chemistry, and Biology.

In this programme, you will find learning materials followed by an objective type questions. Study each material carefully and write your response for the given question. After stating your responses check them with the correct answer given in the following slide. If your answer is correct proceed to the next paragraph by clicking on the right arrow button. If your answer is wrong or you do not understand anything, again go back to the material by clicking on the left arrow button. Now you can come to your lesson and study the lesson at your own pace........
SUB-UNIT 1
POPULATION SITUATION IN INDIA

IN THIS UNIT
• POPULATION BOMB - A BIG THREAT
• CAUSES OF OVER POPULATION IN INDIA
• CONSEQUENCES OF OVERPOPULATION IN INDIA
• POPULATION SITUATION IN KERALA
• HOW TO SOLVE OVERPOPULATION IN INDIA

Instructional Objectives:
By the end of this sub-unit the student should:
1. Understand the problem of overpopulation in India.
2. Understand the causes of overpopulation.
3. Understand the consequences of overpopulation.
4. Develop a keen insight into the inter relationship between overpopulation and socio-economic welfare vis-a-vis the individual, the nation and the world.
5. Be able to understand the remedial measures to control overpopulation in India.
POPULATION BOMB-A BIG THREAT

• ACCORDING TO THE UNITED STATES CENSUS BUREAU ESTIMATES, THE CURRENT WORLD POPULATION IS ABOVE 7 BILLION. THE WORLD POPULATION IS GROWING AT 1.2 PERCENT ANNUALLY.

• THE CARRYING CAPACITY OF THE EARTH IS AROUND 1.8 BILLION PEOPLE, ONE-THIRD THE WORLD’S CURRENT NUMBERS. IS CONTINUING INCREASE IN POPULATION, GOOD FOR THE PLANET IN THE LONG RUN?

The population explosion is now so far beyond control it has emerged as the single most powerful force driving government policy and worldwide inflation.
Overpopulation is defined as the situation of having large numbers of people with too few resources and too little space. Overpopulation can result from either a high population density (the ratio of people to land area) or from low amounts of resources, or from both.

A high population pressures the available resources in the country, as the resources can only support a certain number of people.

POPULATION EXPLOSION – SOME FACTS

• EVERY SIXTH PERSON IN THE WORLD IS AN INDIAN.
• INDIA RANKS SECOND IN WORLD POPULATION.
• ACCORDING TO THE 2011 CENSUS POPULATION OF INDIA IS 1,21,74,24,708.
• INDIA IS THE HOME OF 17.5% OF WORLD’S POPULATION WITH ONLY 2.42 PER CENT OF THE WORLD’S LAND AREA.
**THE GROWING POPULATION IN INDIA**

- The United Nations estimate shows that the population of India in mid-1988 was 818.78 million and would increase to 1,455.54 million by 2025.
- The annual growth rate of population is 1.9 percent.
- If this trend continues, India will beat up China by 2025 A.D., making India the most populous nation in the world.
- Among the Indian states, Uttar Pradesh with a population of 139.1 million is the most populous state in India.

---

**Causes of Over Population in India**

- Lack of knowledge about family planning techniques.
- High birth rate and low death rate.
- Marriage at early age.
- Boy preference.
- Superstition.
- Religious factors.
- Low literary rate.
- Joint Family system.
- Large Family Concept.
- Economic backwardness.
- Neglect of Women Education.
CONSEQUENCES OF OVERPOPULATION IN INDIA

POVERTY-
- UNDER NUTRITION
- GROWTH OF SLUMS
- PROBLEM OF SHELTER

UNEMPLOYMENT-
- INEQUALITY
- SOCIAL UNREST

LOW AGRICULTURAL PRODUCTION-
- SCARCITY OF FOOD
- INFLATION
- INCREASING PRESSURE ON LAND

CONSEQUENCES CONTINUES……………..

- RESTRICT SOCIAL WELFARE
- INCREASING CRIME
- NATURE POLLUTION
- LOW CAPITAL FORMATION
- LOW PER CAPITA INCOME
- SOCIAL BACKWARDNESS
- LOW ECONOMIC GROWTH
- RESTRICT SOCIAL WELFARE
- NATURAL IMBALANCE
THE REAL WORLD AROUND US

POPULATION SITUATION IN KERALA

• The present population of Kerala are 3,33,87,677 i.e. 3.34 crores.

• Kerala account for 1.3 % of India’s land area but supports 3.44 % of the population.

• Among the 14 Districts of Kerala, Malappuram is the most populous District.

• The density of Kerala is 859 persons per km². Kerala is one of the densest states in India.
HOW TO SOLVE OVERPOPULATION IN INDIA

THROUGH ECONOMIC MEASURES

THROUGH SOCIAL MEASURES

EDUCATIONAL EMPOWERMENT

HEALTH MEASURES

ECONOMIC MEASURES

• GENERATION OF MORE EMPLOYMENT OPPORTUNITIES

• REMOVAL OF POVERTY

• DEVELOPMENT AND EXPANSION OF INDUSTRY

• ADOPTING MEASURES TO REDUCE INEQUALITY IN THE SOCIETY

• IMPLEMENT ECONOMIC WELFARE PROGRAMMES
SOCIAL MEASURES

- Improve the status of women
- Raise the minimum age of marriage
- Change in social outlook
- Popularise small family norm
- Propagate family welfare programmes
- Empowerment of rural women

EDUCATIONAL EMPOWERMENT

- Popularise education
- Use of media in creating awareness about overpopulation
- Expand adult and continuing education programmes
CREATE AWARENESS ABOUT HEALTH AND SANITATION
PROPAGATION OF SMALL FAMILY NORM
EXPANSION OF HEALTH SERVICES
CREATE AWARENESS ABOUT HEALTH AND SANITATION

SOLUTION FOR OVERPOPULATION IS IN OUR HANDS
WE HAVE TO CONTROL OVERPOPULATION, WE WILL CONTROL IT. IT IS IN OUR HANDS HOW WE HAVE TO ACT.
DO YOU REMEMBER

1. The present population of India is ---core.
   [ a. 121 b. 221 c. 90 d. 321 ]

2. Among the 14 Districts of Kerala, ---- is the most populous District.
   [ a. Thrissur b. Malappuram c. Kollam d. Idukki ]

3. India is the home of ---- % of world’s population.
   [ a. 21 b. 32 c. 10.5 d. 17.5 ]

4. The density of Kerala is ----persons per km².
   [ a. 859 b. 959 c. 465 d. 674 ]

ANSWER KEY

1. 121 Crore.
2. Malappuram.
3. 17.5 %
4. 859
SUB-UNIT 2
OVER POPULATION AND ITS EFFECT ON ENVIRONMENT

IN THIS UNIT
Stress On Environment Due To Population Explosion
Types Of Pollution
Air Pollution-causes
Main effects of Air pollution
Green House Effect
Global Warming
Acid Rain
Remedial Measures To Solve Air Pollution

Name of the Teacher : Regi P. Mathew
Name of the School : 
Standard : IX
Subject : Chemistry
Topic : Overpopulation in India
Sub-unit2 : Overpopulation and it’s Effect on Environment
Time : 45Minute

Instructional Objectives:
By the end of this sub-unit the student should...
• Understand the relationship between overpopulation and environmental pollution
• Understand various types of pollution
• Identifies the causes and effects of air pollution
• Realizes the importance of protecting nature from pollution
• Identifies the remedial measures to protect nature from pollution
• Develops a positive attitude to save the nature.
Unbalanced population growth results in depletion of resources – material and non-material. It implies environmental stress on earth, water, air and space etc.

Stress on Environment due to Population Explosion

- Demand for fresh water has steadily risen with increasing population.
- Chronic water shortages exist in many areas of the world.
- Up to half of the forests that originally covered the earth have been cleared.
- The amount of croplands available is decreasing as population increases.
- The over exploitation of natural energy sources results in energy source depletion in the near future.
- Increasing number of vehicles are a major contributor to greenhouse gas emissions, urban air pollutions, urban congestion and health hazards.
- The intensive use of fuels has led to global emission of carbon dioxide (CO₂) and the built-up of greenhouse effect, are contributing factors in global warming.
Pollution can be defined as an undesirable change in physical, chemical or biological characteristics of our environment i.e. air, water and soil that may harmfully affect human, animal and the plant life directly or indirectly.

It is one of the most horrible ecological crisis to which we are subjected today.

Pollution is brought by the addition of waste products of human activity to the environment. The materials which cause pollution of the environment are called pollutants.

TYPES OF POLLUTION

- Air Pollution
- Water Pollution
- Land Pollution
- Noise Pollution
- Visual Pollution
- Odor Pollution
- Indoor Pollution
- Radiation Pollution
When air is contaminated by unwanted substances which have a harmful effect on both the living and the non-living, it is referred to as air pollution. The substances which contaminate the air are called air pollutants.

**Causes of Air Pollution**

- Mining, quarrying, use of fertilizers and pesticides, factories, incineration of wastes, vehicles,
- burning of plastics, chlorofluorocarbons and their sources, natural pollutants, warfare-gaseous, chemical, biological warefare.
Taj Mahal in Agra is one of the Seven Wonders of the World. But the beauty of this monument in white marble is being threatened by Acid Rain caused as a result of air pollution in the area surrounding Taj.

Main Effects of Air Pollution

• Global Warming
• Greenhouse Effect
• Acid Rain
• Health problems
Green House Effect

The increase of atmospheric temperature due to the increase of carbon dioxide in the atmosphere is called Green House Effect.

How Green House Effect takes place in the nature?

Due to the increased pollution in atmosphere, the quantity of Oxygen becomes less. If the quantity of Oxygen is less or the quantity of Carbon is more, combustion takes place as given below:

\[ 2C + O_2 \rightarrow 2CO \]

The gas CO i.e. Carbon Monoxide that is formed as a result of this reaction is poisonous. Inhaling this gas is harmful to health.
What are the possibilities of Carbon Monoxide being formed in the environment?

- In vehicles.
- In factories.
- Burning plastics.
- At home.
Carbon monoxide reacts with the haemoglobin in blood and a compound Carboxyhaemoglobin is formed. Due to this, blood loses its ability to absorb oxygen and becomes harmful to health.
Global Warming

The average temperature in the atmosphere of earth increases due to greenhouse effect. This is called Global Warming.

Acid Rain

Many industries produces gaseous pollutants in the air. It contains sulphur dioxide and nitrogen dioxide. These gaseous pollutants reacts with the water vapour present in the atmosphere to form sulphuric acid and nitric acid. The acids drop down with rain, making the acid rain.
Remedial Measures to solve air pollution

- Testing, monitoring, controlling of pollution,
- Popularize waste management practices,
- Use of biological indicators to monitor pollution,
- Use of alternate non-conventional sources of energy,
- Creating awareness through environmental programmes,
- Implementation of governmental laws to control pollution,
- Involvement of individuals, schools and voluntary organizations in environmental protection.
- Grow more trees to purify air.
- Make sure vehicles are serviced properly and regularly.
- Keep environment free from garbage and waste.
1. The increase of atmospheric temperature due to the increase of carbon dioxide in the atmosphere is called ---. 
   [a. fog  b. smog  c. Green House Effect].
2. Carbon monoxide reacts with the hemoglobin in blood and a compound ---- is formed. 
   [a. Carboxyhemoglobin  b. plaque  c. carbohydrate].
3. When air is contaminated by unwanted substances which have a harmful effect on both the living and the non-living, it is referred to as ----. 
   [a. Water pollution  b. air pollution  c. noise pollution].
4. The beauty of Taj Mahal is being threatened by ----- caused as a result of air pollution. 
   [a. acid rain  b. ozone hole  c. green house effect].

**Answer Key**
1. Green House Effect
2. Carboxyhemoglobin.
3. Air pollution
4. Acid Rain
Instructional Objectives:

By the end of this sub-unit the student should...

• Understands the importance of balanced diet
• Understands the need and significance of proper nutrition
• Recognizes the main causes and effects of under nutrition
• Identifies the relationship between overpopulation and under nourishment
• Realizes the need for reducing population growth for the welfare of the society
• Develops a sense of belongingness towards the fellow human beings
DO YOU KNOW?

Healthy children are full of energy. They run, jump and play. What you eat will influence your health to remain healthy.

IMPORTANCE OF BALANCED DIET

To remain healthy you have to take a balanced diet. Balanced diet consist of Carbohydrates, protein, fats, minerals and vitamins in a fixed proportion.
WE MUST TAKE A VARIETY OF FOOD STUFF

- CERIALS
- PULSES
- GREEN VEGETABLES
- FRUITS
- MILK
- EGG
- FISH
- MEAT

SCARCITY OF FOOD DUE TO OVERPOPULATION

Currently, world population is growing over 80 million per year i.e. one billion (100 crores) people every 12 to 13 years. This rapid population growth in the world leads to serious constraint to increasing agricultural production. One-third of the world population lack food security now. Thus better distribution of food is an essential component of any world strategy to improve food security.
The inadequacy of essential nutrients leads to under nourishment.

On an average, an Indian should get 2400 calories to be fully nourished. If the intake falls below 2400, it becomes a definite case of under nourishment.
In poor countries, especially where population is growing rapidly, hunger and under nutrition are often critical problems. Each year about 18 million people, mostly children, die from starvation, malnutrition and related causes. Under nutrition is a condition, which occurs when the body does not get the proper kind of food needed for maintaining health.

Under nourishment has been defined as inadequacy in calories intake resulting in loss of normal body weight or reduction in physical activity for the same body-weight or both.
CAUSES OF UNDER NOURISHMENT

• OVERPOPULATION
• UNEMPLOYMENT
• INADEQUATE FOOD PRODUCTION
• SCARCITY OF FOOD
• INFLATION
• POVERTY
• STARVATION

It is a fact

DESPITE INDIA’S RECENT ECONOMIC BOOM, 46 PERCENT OF OUR CHILDREN UP TO THE AGE OF THREE STILL SUFFER FROM UNDER NUTRITION MAKING THE COUNTRY HOME TO A THIRD OF THE WORLD’S UNDER NOURISHED CHILDREN.

Three forth of our population is hunger stricken and suffering poverty.
ILL EFFECTS OF UNDER NOURISHMENT

- Under nourishment during early childhood delays physical and mental growth and such children are slow in attaining their milestones and are slow learners in school.

- Under nourishment increases the susceptibility of the individual to infections because of the deficiencies it induces in the defensive mechanisms, which in turn will increase the degree of under nutrition.

- Under nourishment during pregnancy may affect the fetus resulting in intrauterine growth retardation, still birth, premature birth etc. In short nutrition affects human health from birth to death.

NEED FOR CONTROLLING OVERPOPULATION IN INDIA

In India rapid population makes it difficult for agricultural production, to keep pace with the rising demand for food. The scarcity in food production results in inflation. Rising prices of food items make the situation more serious by increasing poverty. Poverty leads to starvation and finally results under nutrition.

SO WE HAVE TO REDUCE OUR POPULATION FOR ACHIEVING A BETTER FUTURE LIFE.
DO YOU REMEMBER?

1. Each year about ____ million people, mostly children, die from starvation.
   [a. 90  b. 45  c. 63  d. 18]

2. Inadequacy in calories intake resulting in loss of normal body weight or reduction in physical activity for the same body-weight or both are called as____.
   [a. poverty  b. starvation  c. diet  d. under nutrition].

3. One of the major cause for under nutrition is___.
   [a. Overpopulation  b. literacy  d. balanced diet  d. habit]

4. To remain healthy you have to take ____.
   [a. Balanced diet  b. Ice cream  c. chocolate  d. cake].

ANSWER KEY

1. 18 MILLION
2. UNDERNUTRITION
3. OVERPOPULATION
4. BALANCED DIET
Instructional Objectives:
By the end of this sub-unit the student should...

- Identifies the multidimensional problems of poverty
- Derives to measure poverty line and poverty ratio
- Develops a sense of belongingness to the poor people
- Develops an attitude to help the poor people
- Sympathizes toward the sufferings of poor people
- Identifies the relationship between overpopulation and poverty
Poverty - A Multi – Dimensional Problem

Poverty means a situation where human being :-

• Experience hunger.
• Do not have enough clothes.
• Do not have a house.
• Do not have access to drinking water.
• Do not have access to medical facilities.
• Do not have access to education.
• Are not able to get a job.
• Are denied opportunities.
• Are denied freedom.

WE WANT FOOD
What do you understand from above picture?

This is also a reality of the present day. Even when we are advanced in terms of economic growth, poverty still continues to be a big problem. The picture shows the existence of large scale poverty. This contrast of prosperity of a few and poverty of the masses is more of the challenges that India faces today.

CAUSES OF POVERTY IN INDIA

• INCREASING POPULATION
• INEQUALITY OF INCOME
• UNEMPLOYMENT
• ILLITERACY
• RURAL BACKWARDNESS
• LOW PRODUCTIVITY
• AGRICULTURAL FAILURE
• INFLATION
WHO IS POOR?

As per the World Bank estimate, a person who earns income of less than $1.25 per day at 2005 prices is considered below the poverty line.

For example, when a dollar is equaling to Rs. 48, people who do not have Rs. 60 to buy their daily requirements are considered to be poor. Accordingly 140 cores of people were considered poor in 2005.

DO YOU KNOW?

The poor are identified using a yardstick of expenditure needed to fulfill the basic needs. The amount required for this has to be determined and those who earn less than this level are considered to be living below poverty.

Dadabhai Naoroji, who was one of the important leaders of our national movement, was the person who first scientifically calculated the poverty in India.
Measuring Poverty in India

The first stage to identify the poor is to fix the poverty line. This is an imaginary line. Deciding the physical energy requirement of an individual for his daily life is the first phase. Physical energy is calculated in calories in India. A person in the rural area needs 2400 calories and in the urban area 2100 calories for his daily needs. Food articles required to obtain that amount of energy have to be ascertained. Then, the income required to buy the amount of food articles has to be calculated.

On the basis of this, in 2004-2005, it was decided that a person earning less than Rs. 356.30 in rural areas and Rs. 538.60 in urban areas, in a month, falls below the poverty line.
What is Poverty Ratio?

Poverty ratio shows the percentage of people living below the poverty line. Poverty ratio can be found out by dividing the number of poor by the total population.

\[
\text{Poverty ratio} = \frac{\text{No of people below the poverty line}}{\text{Total population}} \times 100
\]

In 2004, the poverty ratio in India was 27.5. It means that out of the total population 27.5% were living below the poverty line.

RELATION BETWEEN POPULATION EXPLOSION AND POVERTY

POVERTY AND OVERPOPULATION ARE INTER RELATED. INCREASING POPULATION LEADS TO UNEMPLOYMENT. IT INCREASES STRESS ON AGRICULTURE. OVER DEPENDENCY IN AGRICULTURE IS A SERIOUS CONSTRAINT TO AGRICULTURAL PRODUCTION. IT RESULT IN SCARCITY OF FOOD AND INFLATION. ULTIMATE RESULT IS POVERTY AND STARVATION. IT AFFECT THE WELFARE OF SOCIETY AND NATION.
Poverty in Kerala

Kerala is known all over the world for its achievements in human development, low infant mortality, low mortality rate, high life expectancy and high literacy rate. Although Kerala has made progress in all these areas, poverty has not been completely eradicated. According to the Planning Commission, 15% of the people are poor in 2004-05. In Urban areas, 20.6% are poor. Poverty in rural area is severe among the agricultural laborers and craftsmen.
**ILL–EFFECTS OF POVERTY**

<table>
<thead>
<tr>
<th>• VALUE DEGRADATION</th>
<th>• FATELIST ATTITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CRIME</td>
<td>• POLLUTION</td>
</tr>
<tr>
<td>• ILL HEALTH</td>
<td>• HIGH BIRTH RATE</td>
</tr>
<tr>
<td>• UNDER NOURISHMENT</td>
<td>• HIGH DEPENDENT POPULATION</td>
</tr>
<tr>
<td>• INEQUALITY</td>
<td>• EXPLOITATION</td>
</tr>
<tr>
<td>• SOCIAL UNREST</td>
<td>• SLOW ECONOMIC GROWTH</td>
</tr>
<tr>
<td>• UNEMPLOYMENT</td>
<td>• CHILD LABOUR</td>
</tr>
<tr>
<td>• ILLITERACY</td>
<td>• INCREASING SUPERSTITION</td>
</tr>
<tr>
<td>• GROWTH OF SLUM</td>
<td></td>
</tr>
</tbody>
</table>

Let us see what can be done to reduce poverty and to protect the poor people.

• Control overpopulation in India
• Strengthen the Public Distribution System.
• Make available basic amenities like good roads, water supply, education facilities and medical facilities to the poor.
• Make available land, house and other assets to the poor.
• Strengthen local self government institutions.
• Provide universal free education.
The major poverty eradication programmes of the Indian Government

- National Rural Employment Guarantee Scheme (NREGS).
- Indira Avas Yojana (IAY).
- Swarnajayanthi Grama Swarosgar Yojana (SGSY).
- Swarna Jayanthi Shahari Rozgar Yojana (SJSRY).
- Integrated Housing and Slum Development Programme (IHSDP).
- Total Sanitation Mission (TSM).

We have to control the population growth. Let us join together to solve the problems of overpopulation. It is the beginning of hope. !!!!!!!!!!!!!!!!!!!!!!!
EVALUATE YOURSELF

1. The Major cause for poverty in India is ___.
   [a. Migration b. Urbanization c. Industrialization d. over population]

2. A person in the rural area needs ___ calories for his daily needs.
   [a. 2400 b. 2000 c. 3400 d. 1500].

3. The percentage of people living below poverty line is called as ____.
   [a. poverty life b. poverty ratio c. mortality rate d. life line]

4. The person who first scientifically calculated the poverty in India was ___.

ANSWER KEY

1. OVER POPULATION.
2. 2400.
3. POVERTY RATIO.
4. DADABHAI NAOROJI.
Lesson Designs Based

on

Futures Wheel Method

For Teaching

POPULATION EDUCATION

Prepared by

REGI P MATHEW and Dr A SUDHARMA

School of Pedagogical Sciences

M G University

Kottayam
APPENDIX-VIII

FACT SHEET ABOUT
FUTURES WHEEL METHOD

The Futures Wheel, a method of identifying and packaging secondary and tertiary consequences of trends and events, was invented in 1971 by Jerome C. Glenn. The method first entered the literature in 1972. Subsequent variations of the Futures Wheel have been called the Implementation Wheel, Impact Wheel, Free Wheel, Mind mapping, and Webbing. Although the Futures Wheel is a simple technique, requiring only blank paper, a pen, and one or more fertile minds, it is also an extremely powerful method of exploring the future. The Futures Wheel is currently used by planners and policymakers throughout the world to identify potential problems and opportunities, technology related social problems, population issues, new markets, products, and services and to assess alternative tactics and strategies. The Futures Wheel is a way of organizing thinking and questioning about the future a kind of structured brainstorming. The name of a trend or event is written in the middle of a piece of paper, and then small spokes are drawn wheel-like from the centre. Primary impacts or consequences are written at the end of each spoke. Next, the secondary impacts of each primary impact form a second ring of the wheel. This ripple effect continues until a useful picture of the implications of the event or trend is clear.

Population Education focuses on the quality of life by recognizing the past and present experiences and plans for the future. In teaching Population Education, the Futures Wheel used as a method to create forecasts about the issues in relation with population explosion within alternative scenarios. The Futures Wheel can help identify positive and negative feedback loops. The higher-order consequences occasionally cycle back to the original item. This sequential is a natural way to tie the Futures Wheel into the development of a formal systems model. The Futures Wheel also helps move the mind from linear, hierarchical, and simplistic thinking to more network-oriented, organic, and complex thinking.
Characteristics of Futures Wheel Method

First, Futures Wheel Method reveals the nature of events which shall occur in future. It makes probabilities statements about the future events. While nearby futures may be visible with more clarity the distant futures may be appearing with more haziness.

Secondly, one may say that future is not certain. But portrayals of future scenarios through Futures Wheel Method do not lead us to total uncertainty. Futures Wheel Method explores plausible futures of the man and the society.

Third, Futures Wheel Method is action oriented. Since past is gone nothing can be done regarding the dead events. On the other hand it helps us to identify the goals and opportunities. It helps us to take decisions about present activities. Moreover it acts as signal points, especially in the context of giving cautions to avoid future crisis.

Fourth, future is change prone. The past does not repeat itself. The present does not remain static. Not only the exploration of the nature and possibilities of change is important, but also the exploration of the direction of change is important for development oriented society. Futures Wheel Method aims at identification of directions of change.

Fifth, Futures Wheel Method makes it possible to know the unknown. Since future events have not occurred so far, they remain unknown. It helps to expand our vision about those unknown events.

Sixth, Futures Wheel Method link past and present experiences with futuristic vision and thus is more comprehensive in nature. While futures may be of very different nature, there exists continuity in the process of change. Such process may be linear as well as non linear in nature.

Seventh, Futures Wheel Method is problem oriented.

The Consequence or Futures Wheel is most commonly used to:

- Develop multi-concepts
- Think through possible impacts of current trends or potential future events.
- Organize thoughts about future events trends
- Identify potential consequences of a strategy
- Show complex interrelationships

Steps for Futures Wheel Exercise

1. Identification of concepts, trends or issues related to the problem.
Teacher introduces the problem. The problems can be of any nature like social, political, economic, health, education, transportation, energy, food, environment etc. The trends can be of positive or negative types. For instance eradication of illiteracy is a declining trend whereas increasing rate of population is an upward trend.

II Advanced Discussion.

Teacher divides the students into groups. The students are explained about their role in the Futures Wheel exercise. The students engage in group discussion at this stage. The parameters or trends related to the problem are explored at this stage. The students are requested to express free and unbiased responses about the consequences. On the basis of group discussion such trends can be identified and listed out. After the discussion, each group expresses their ideas about the trend or issue through the futures wheel exercise.

III Futures Wheel Exercise and Writing Consequences.

Teacher supplies a chart paper to each group. Depending upon the topic there may have 3 or 4 stages in a Futures Wheel exercise.

STAGE: 1 Writing the event or trend.

STAGE: 2 Primary impact or consequence analysis of the event or trend

STAGE: 3 Second round analysis of each consequences or impacts.

STAGE: 4 Consequences of IIIrd round consequences are explored.

In the central place the trend is to be written. At least 3 consequences of this trend or issue are to be filled in by the respondents. This is the 1st round consequence analysis. In the 2nd round analysis each consequence must be followed by its further consequences. In the 3rd round the consequences of 2nd round consequences are explored. In the 4th round respective consequences of 3rd round consequences are to be written on the wheels.

For convenience it has been highlighted that each consequence can be followed by its consequences. Such number can be more than two. The
consequences can be of positive or negative in nature. One consequence may be repeated in the wheel. In this sense all the wheels may not have consequences respectively. Overlapping of consequences does not hinder the exercise. The timing for such exercise can be either controlled or uncontrolled depending on the criticality of a trend. Futures Wheel exercise can be done in group as well as individualized manner. Individual respondent takes three times more than the group respondents while filling up the wheels. To save the time, the individualised Futures Wheel can be given as home assignment. In the present study investigator selected group futures wheel exercise in a controlled timing to cope up with the overall time table of the school. The example for a Futures Wheel is given in Figure below.

STAGE-1

![STAGE-1 Diagram](image)

STAGE-2

![STAGE-2 Diagram](image)
IV Analysis of Futures Wheel and writing of Scenario.

Content analyses of filled-in Futures Wheel charts are to be done qualitatively. Here, the emphasis is given to agreements rather than
disagreements. Once, the content analysis is done, a final wheel can be developed on the basis of such analysis. This paves the way for writing scenarios about future events or impacts of existing trend. Futures Wheel supplies ideas in a more logical form for developing scenarios. Such scenarios can be developed either as an individual effort or as a group effort.

After completing the futures wheel exercise, students develop a clear vision about the problem in a futuristic perspective. The Futures Wheel is easy and enjoyable to use and no hard work is necessary. It gets people thinking about the future quickly and easily. Futures Wheel is an important method of generation of likely consequences of population trends. In other words this is understood as a method of study of future consequences of certain existing trends. The trend can be identified as overpopulation, population growth, unemployment, poverty, pollution etc. The exercise is given on a specific format to seek response of participants in terms of stepwise consequences of a major trend. The consequence generation process almost follows a linear path. Building different scenarios of the future is the outcome of Futures Wheel method.

While preparing the lesson designs based on the Futures Wheel Method for teaching Population Education, investigator followed the above explained steps of Futures Wheel Method. The topic “Overpopulation in India” is selected for teaching Population Education based on Futures Wheel Method. While preparing the lesson designs, the investigator selected content from Social Science, Chemistry, and Biology. Before planning the lesson designs, investigator made a thorough analysis of topic selected. The sample lesson designs are given below:

Sub unit1: Population situation in India
Sub unit2: Effect of Overpopulation on Environment
Sub unit 3: Food Problem in India
Sub unit 4: Overpopulation and Poverty
Sample Lesson Designs for Teaching Population Education
Based on Futures Wheel Method

Name of the Teacher : Standard: IX
Name of the School : Division :
Subject : Geography Duration: 45 minute
Topic : Overpopulation in India Date :
Name of the Sub-Unit 1: Population Situation in India

In this unit the students will learn about,

- Population bomb-a big threat to ecological balance.
- Causes of over population in India.
- Consequences of overpopulation in India.
- How to solve overpopulation in India?

Instructional Objectives

By the end of this sub-unit the students should be able to …

1. Create an awareness about population situation in India
2. Understand the problem of overpopulation in India and the strategies adopted to meet this critical situation.
3. Develop a keen insight into the inter relationship between overpopulation and socio-economic welfare vis- a-vis the individual, the nation and the world.
4. Think through possible impacts of current population growth in India
5. Develop a healthy rational and scientific attitude towards the problem of overpopulation.
6. Organize thoughts about the relationship between overpopulation and socio-economic development of India.
7. Promote curiosity and exploration about the future changes in our country
8. Develop co-operative learning skills
9. Develop individual responsibility in nation building
10. Forecasts within alternative scenarios about future events.
11. Explores complex interrelationships between overpopulation and socio-economic development of India.
12. Develops scientific enquiry skills
13. Nurtures a future-conscious perspective; and
14. Realizes the importance of small family norm

SYNTAX

Phase I: Identification of concepts, trends, or issues related to the problem

Teacher introduces the topic **Population Situation in India** and develops a keen insight into the interrelationship between overpopulation and socio-economic welfare vis-à-vis the individual, the nation and the world.

Teacher highlights the demographic picture of India and Kerala.
Teacher briefly explains the problems and consequences of overpopulation in India.

The pupils:
1. Identify the issue of overpopulation in India and Kerala
2. Analyses the problems and consequences of overpopulation in India.
3. Understand the problem of overpopulation in India and the strategies adopted to meet this critical situation.

Phase II: Idea Generation through Group Discussion.

Teacher divides the class into discussion groups of 4 to 6 members with each group led by a chairperson. Teacher encourages each group to discuss the issue "**What would happen if the present population growth continues in India?**" students examine the solutions for the issue and they work without direct instruction from the teacher.
Phase III – Futures Wheel Exercise

During this stage, teacher supply chart paper to each group for doing Futures Wheel Exercise. Students collectively analyze the problems and consequences of overpopulation in India by sharing their observations, and organizing information in cooperative groups. They record their observations in the chart paper by doing Futures Wheel Exercise.

The Pupils:
1. Develop co-operative learning skills.
2. Develop individual responsibility in nation building.
3. Forecast within alternative scenarios about future events.
4. Develop scientific enquiry skills.
5. Nurture a future-conscious perspective; and
6. Realize the importance of small family norm.
FUTURES WHEEL DEPICT THE CONSEQUENCES OF
OVERPOPULATION IN INDIA

- Loss of social welfare
  - Low standard of living
  - Poverty
  - Increasing crime
  - Social unrest
  - Global warming
  - Ozone whole
  - Change in climate

- Low per capita income
  - Unemployment

- Health problems
  - Starvation
  - Malnutrition

- Poverty
  - Low agricultural production
  - Problem of shelter

- Ecological imbalance
  - Slow economic growth

- Pollution
  - Depletion of natural resources
  - Health problems
  - Acid rain

- Inequality
  - Lack of social welfare

- Scarcity of oil
  - Global inflation

- Social problems
  - Growth of slums
  - High price
  - Scarcity of food
  - Depletion of natural resources
  - Growth of slums
  - Inflation
  - Poverty
  - Health problems
  - Deaths
  - Starvation
  - Malnutrition
  - Social unrest
  - Lack of social welfare
Phase IV : Analysis of futures wheel and presentation of the scenario.

After the Futures Wheel Exercise each group think through the implications of, and organize thoughts about possible future social events or trends related to the problem of environmental problems created by overpopulation. Each group suggest plans to accelerate desirable consequences and to check undesirable consequences each group presents their futures wheel analysis in front of the whole class. Based on the futures wheel presentation of all groups, students prepare the scenario about the problem of overpopulation in India.

In November 2011 the world population reached 7 billion i.e.700 crore. Among the world nations, Indians are number two with 1,21,74,24,708 people on 2011. India is the home of 17.5% of world’s population with only 2.42 per cent of the world’s land area. Today India ranked second in the world after China. If the current population trend continues, India will beat up China by 2025 A.D., making India the most populous nation in the world. India is facing intense problem of population outburst. Our civilization is being squeezed between rising population densities. Many factors are directly or indirectly associated with causes of over population in India. They are illiteracy, poverty, rural backwardness, unemployment, superstitions, preference for sons, orthodox mentality, joint family system, religious restrictions regarding family planning, early marriage, polygamy,
and lack of health consciousness, low death rate and high birth rate, and low status of women. If the population issue is ignored, it will have dangerous consequences. In large part of India, people have strong preference for sons which leads to population growth. Population adversely affects the welfare of our nation. People often experience a shortage of employment opportunities, but they should understand that job opportunity is not related to population. Many young men and women do not get employment according to their education therefore they involve in criminal activities and become drug peddler. Overpopulation can cause many problems that people are not aware. They are: increasing unemployment, poverty, economic inequality, scarcity of food, inflation, depletion of natural resources, energy crisis, environmental pollution, ecological imbalance, scarcity of land and water, social unrest, crime, starvation, growth of slums, malnutrition, health and hygiene issues. India should take better precaution to curb the increasing number of people. The government should therefore be strict with laws to limit over population without hurting the feeling of the general public. The government should implement effective awareness programs through media and education to reduce unplanned births and also they should try to provide assistance to people. Population control program is essential because of the growing problems related to social welfare and economic problems. Unless the size of population is brought under control, no progress can be attained by our country.
Lesson Designs in Population Education

Based on Futures Wheel Method

Name of the teacher : 
Name of the School : 
Subject : Chemistry
Name of the Sub- Unit 2 : Overpopulation and Its effect on environment

In this unit the pupils will learn about,

- Stress on environment due to population explosion
- Types of pollution
- Air pollution: causes
- Main effects of air pollution
- Green house effect, Global warming, Acid rain
- Remedial measures to solve air pollution

Instructional Objectives

By the end of this sub-unit the pupils should…

1. Understand the relationship between overpopulation and environmental pollution

2. Identify the causes and effects of air pollution and develop multi-concepts about environmental pollution.

3. Think through possible impacts of current growing environmental pollution on potential future events.

4. Realise the need and importance of protecting nature from pollution

5. Identify the remedial measures to protect nature from pollution

6. Develop a positive attitude to save the nature
7. Develop future forecasting skills related to ecological trends.
8. Organize thoughts about the relationship between overpopulation and environmental pollution.
9. Promote curiosity and exploration about the future changes in our environment.
10. Develop co-operative learning skills

SYNTAX

Phase I: identification of concepts, trends, or issues related to Problem

Teacher introduces the issue **Overpopulation and its ill effect on our environment**

Teacher encourages the students to elicit various types of pollution with examples and promote curiosity and exploration about the future changes in our environment.

Pupils classify various types of pollution with examples. They are smoke from vehicles and factories, burning of plastic etc.

Teacher defines the term **pollution**. When air is contaminated by unwanted substances which have a harmful effect on both the living and non–living, it is referred to as **air pollution**. The substances which contaminate the air are called **air pollutants**.

The pupils:
1. Identify the issue air pollution and analyze the sources of air pollution
2. Analyze the ill effects of air pollution
3. Develop a positive attitude to save the nature
Phase II: Idea Generation through Group Discussion.

Teacher divides the class into discussion groups of 4 to 6 members with each group led by a chairperson. Teacher encourages each group to discuss the issue "What would happen to the environment in future if pollution continues?"
Pupils discuss about possible impacts of current growing environmental pollution on potential future events collectively.

Phase III – Futures Wheel Exercise

During this stage, each group examines the issue and they work without direct instruction from the teacher. They analyses the evidence and data, recording and organizing information, sharing observations, and working in cooperative groups.

The pupils:
1. Identify the remedial measures to protect nature from pollution
2. Develop a positive attitude to save the nature
3. Develop future forecasting skills related to ecological trends.
4. Organize thoughts about the relationship between overpopulation and environmental pollution.
I LL EFFECTS OF OVERPOPULATION ON ENVIRONMENT

- Terrorism
- Inflation
- Energy Sources Depletion
- Spread Epidemic
- Destroys Land, Air, Water
- Depletion Of Natural Resources
- Problem of Waste
- Unhealthy competition
- War to Get Oil Monopoly
- Increases Oil Prices
- Deforestation
- Fragmentation of Agricultural Land
- Reduces Food Production
- Changes Climate
- Increases Food Prices
- Poverty
- Scarcity of Food
- War to Get Oil
- Health Problems
- Health Problems
- Radiation
- Ozone Hole
- Acid Rain
- Global Warming
- Drought
- Health Problems
- Pollution
- Land Pollution
- Water Pollution
- Air Pollution
- Changes Climate
- Depletion Of Natural Resources
- Inflation
Phase IV  : Analysis of futures wheel and presentation of the scenario.

The Futures Wheel Exercise is an eco-friendly future-conscious perspective activity. Each group thinks through the implications of, and organizes thoughts about possible issues related to the problem of environmental problems created by over population. Each group presents their futures wheel analysis in front of the whole class. Based on the futures wheel presentation of all groups, students prepare the scenario about the problem of environmental pollution. The Futures Wheel Exercise helps to develop cooperative learning skills and scientific enquiry skills.

**Presentation of the scenario**

Most people are not aware of the fact that the environmental problem is associated with growing population. There is a strong link between the global population and climate change. Resources are limited in the environment and if people keep using them all, then there will be a crisis for future generation. Others believe that unmanaged population growth could lead to catastrophe because of the earth’s finite resources. Therefore, it can be said that majority of population is concerned about the impact of overpopulation on their lives, the earth and the future.

Pollution of the environment is one of the most horrible ecological crisis to which we are subjected today. Pollution refers to any undesirable change in the physical, chemical, or biological characteristics of our environment i.e. air, water, and soil which adversely affect humans or other species of our biosphere directly or indirectly. Various types of pollution are air pollution, water pollution, land pollution, noise pollution, visual pollution, odor pollution, indoor pollution, radiation pollution. The WHO defines air pollution as the presence of materials in the air in such concentration which are harmful to man and his environment. Pollution is also related to
overpopulation. As the population grows, the demand for the consumption of energy such as electricity, use of automobiles and other energy resources increases which in turn affects the nature. If population growth is controlled, people can control the ever increasing of burning energy that might hamper their future. Various sources of air pollution are burning fossil fuels, emissions from automobiles and industries, spraying insecticides, explosives used in wars, and natural causes like gas emissions from volcanoes, marsh gas, spores of fungi and pollens etc.

The ill-effects of air pollution are ozone hole, global warming, and green house effect, and climate change, dust, smog and health problems. Many industries produce gaseous pollutants in the air. It contains sulphur dioxide and nitrogen dioxide. These gaseous pollutants react with the water vapor present in the atmosphere to form sulphuric acid and nitric acid. The acids drop down with rain, making the acid rain. The increase of atmospheric temperature due to the increase of carbon dioxide in the atmosphere is called Green House Effect. The average temperature of the earth and its atmosphere increases due to the green house effect. This is called Global Warming. To control global warming, population must be controlled. Many countries in the world are global warming polluter, contributing greenhouse gas emissions primarily from transportation, industry and power plant sources. The other thing that people should be concerned about the infrastructure. Automobiles and factories release huge quantity of Carbon monoxide. Carbon monoxide reacts with the hemoglobin in blood and a compound Carboxyhaemoglobin is formed. Due to this, blood loses its ability to absorb oxygen and becomes harmful to health.

Air pollution is the big problem of the present society. It is the need of present day to make social as well as legislative measures to protect the environment. This can be done by following measures:

1. Regular testing, monitoring, controlling of pollution.
2. Popularize scientific waste management practices.
3. Use of biological indicators to monitor pollution.
4. Using of alternate non-conventional sources of energy.
5. Creating environmental awareness through various programmes.
6. Implementation of governmental laws to control pollution.
7. Population growth, which is the main cause of pollution, should be brought under control.
8. Active involvement of individuals, schools and voluntary organizations in environmental protection.
9. More trees should be planted to purify air.
10. Make sure vehicles are serviced properly and regularly
11. Keep environment free from garbage and waste.
Sample Lesson Designs for Teaching Population Education
Based on Futures Wheel Method

Name of the teacher : Standard: IX
Name of the School : Division :
Subject : Biology Duration: 45 Minute
Name of the Sub- Unit 3 : Food Problem in India Date :

In this unit the student will learn about,

- Importance of balanced diet
- What is meant by under nutrition?
- Causes of under nourishment
- Ill effects of under nourishment
- Need for controlling overpopulation in India

Instructional Objective

By the end of this sub-unit the students should…

1. Understand the importance of balanced diet
2. Understand the need and significance of proper nutrition
3. Identify the relationship between overpopulation and under nourishment
4. Forecast within alternative scenarios about future health status of India if present population growth continues.
5. Realise the need for reducing population growth for the welfare of the society
6. Identify the causes and effects of under nourishment.
7. Realise under nourishment lead to bad health and deficiency diseases.
8. Develop co-operative learning skills
9. Develop a sense of belongingness towards the basic needs of fellow human beings
10. Nurture a futures-conscious perspective about the various impact of under nourishment.

**SYNTAX**

**Phase I: identification of concepts, trends, events or issues related to the problem**

- **Teacher introduces the issue** Food Problem in India
- **Teacher defines the term** balanced diet. Balanced diet consists of Carbohydrates, protein, fats, minerals and vitamins in a fixed proportion. On an average, an Indian should get 2400 calories to be fully nourished. If the intake falls below 2400, it becomes a definite case of under nourishment.
- **The pupils:**
  1. Identify the issue of food problem in India
  2. Analyze the causes of under nourishment.
  3. Nurture a futures-conscious perspective about the various impact of under nourishment.
- **Teacher encourages the students to elicit various causes of under nourishment and helps to develop a sense of belongingness towards the basic needs of fellow human beings.**
- **1. Pupils identify several causes of under nourishment.** They are unemployment, inadequate food production, scarcity of food, inflation, poverty, starvation.
- **2. They explore complex interrelationships between overpopulation and under nourishment.**
Phase II: Idea Generation through Group Discussion.

During this stage, the teacher assigns roles to the individual students working in a group or let students choose the role according to their strengths or interests. Teacher divides the class into discussion groups of 4 to 6 members with each group led by a chairperson. It provides a direction to the mental process for forecasting future events. Teacher encourages each group to discuss cooperatively the issue what are the causes of under nutrition?

Phase III – Futures Wheel Exercise

Each group examines the solutions for the issue; and they work without direct instruction from the teacher. They establish a chain of learning by linking the evidence and data, recording and organizing information, sharing observations, and working in cooperative groups. Each group thinks through the impact of the problem of under nutrition indirectly created by over population.

The pupils:
1. Forecast within alternative scenarios about future health status of India if present population growth continues.
2. Realise the need for reducing population growth for the welfare of the society.
3. Identify the causes and effects of under nourishment.
4. Realise under nourishment lead to bad health and deficiency diseases.
5. Develop co-operative learning skills.
FUTURES WHEEL DEPICTS THE CAUSES OF UNDER NUTRITION

- Poverty
- Overpopulation
- Terrorism
- Social unrest
- Scarcity of Food
- Increase crime
- Increase Food Prices
- Inflation
- Food Scarcity
  - Hoarding
  - Value crisis
  - Black marketing
  - Family unrest
  - Unemployment
    - Starvation
      - Frequent diseases
      - Massive death
      - Spread Epidemic
    - Unemployment
      - Low agricultural production
      - Inadequate Food Production
      - Drought
      - Massive Death
    - Poverty
    - Starvation
    - Value degradation
    - Weak Manpower
      - Food Scarcity
  - Social unrest
  - Increase Food Prices
Phase IV : Analysis of futures wheel and presentation of the scenario.

Pupils forecast within alternative scenarios about future health status of India if present population growth continues. Each group presents their futures wheel chart in front of the whole class. Based on the futures wheel presentation of all groups, students prepare the scenario about the problem of under nutrition.

Presentation of the scenario

Hunger is one of the most acute problems in India. As a nation we are ill fed and ill nourished. Millions of people simply do not get enough to eat, where they have enough to eat; many do not get enough of the right kind of food to eat. In other words many are under nourished. The uneven growth of population and inequitable distribution of food production creates many problems. Currently world population is growing over 80 million per year-that is by one billion (100 crores) people every 12 to 13 years. This rapid population growth in the world leads to serious constraint to increasing agricultural production. One-third of the world population lack food security now. Thus better distribution of food is an essential component of any world strategy to improve food security. Majority of the population are poor and they are under nourished. Under nutrition is a condition, which occurs when the body does not get the proper kind of food in the amounts needed for maintaining health. Children, especially, are very vulnerable to the ill effects of malnutrition which is the biggest contributor to child morality in our country. They may be under weight, frequent diseases sleepy and dull performance poor in daily life. The undernourished children are more proven
to diseases than the nourished ones. To remain healthy you have to eat a balanced diet. Balanced diet consists of Carbohydrates, protein, fats, minerals and vitamins in a fixed proportion. We must eat a variety of food stuff like cereals, pulses, green vegetable, fruits, milk, egg, fish, and meat. The major causes of under nutrition are overpopulation, unemployment, and inadequate food, supply, and scarcity of food, inflation, poverty, and starvation. To solve our food problem, two prolonged strategy is essential. On the one hand we have to produce more food and on the other we should control population progressively decreasing the rate of its multiplication. It is very difficult to increase our food capacity due to the scarcity of cultivable land. Thus the only solution for food problem is controlling ever increasing population.
Lesson Designs in Population Education
Based on Futures Wheel Method

Name of the teacher : Standard: IX
Name of the School : Division :
Subject : Economics Duration: 45 minute
Topic : Overpopulation in India Date :

Name of the Sub-Unit IV: Overpopulation and Poverty

In this unit the students will learn about,

- Poverty - A Multi – Dimensional Problem
- Causes of Poverty In India
- Ill –Effects of Poverty
- Measuring Poverty in India
- What is Poverty Ratio?
- Relationship between Population Explosion and Poverty
- Major Poverty Eradication Programmes of the Indian Government

Instructional effect

By the end of this sub-unit the students should be able to …

1. Create awareness about relationship between poverty and overpopulation
2. Derive to measure poverty line and poverty ratio
3. Develop a sense of belongingness to the poor people
4. Sympathise toward the sufferings of poor people
5. Identify the relationship between overpopulation and poverty
6. Analyse the major causes of poverty
7. Understand the problem of poverty in India and the strategies adopted to meet this critical situation
8. Organize thoughts about the relationship between overpopulation and socio-economic development of India.
9. Develop co-operative learning skills
10. Develop confidence and responsibility in nation building,
11. Forecast within alternative scenarios about future.
12. Explore complex interrelationships between overpopulation and poverty
13. Realize the importance of small family norm
Phase I: Identification of trends, events or issues related to the problem

Teacher introduces the topic **Relationship between Poverty and Overpopulation in India**

**Teacher defines the term poverty and gives a brief description about the causes and effect of poverty in India.**

Poverty means a situation where human being experience hunger, do not have enough clothes, do not have a house, do not have access to drinking water, do not have access to medical facilities, do not have access to education, are not able to get a job, are denied opportunities, are denied freedom.

**The pupils:**

1. Identify and create awareness about relationship between poverty and overpopulation
2. Identify the multidimensional problems of poverty
3. Analyze the problems and consequences of poverty India.
4. Understand the problem of poverty in India and the strategies adopted to meet this critical situation.
Teacher explains the term poverty line. This is an imaginary line. The physical energy requirement of an individual for his daily life is the base for calculating poverty line. Physical energy is calculated in calories in India. A person in the rural area needs 2400 calories and in the urban area 2100 calories for his daily needs. A person who cannot earn money to buy physical energy requirement is called poor.

**Pupils:**
1. Create awareness about the relationship between poverty and overpopulation.
2. Sympathise toward the sufferings of poor people.

**Phase II: Idea Generation through Group Discussion.**

Teacher divides the class into discussion groups of 4 to 6 members with each group led by a chairperson. Teacher encourages each group to discuss the issue "Is there any relationship between poverty and overpopulation in India?"

**Phase III – Futures Wheel Exercise**

During this stage, students examine the solutions for navigating question and they work without direct instruction from the teacher. They analyses the issue, by organizing information, sharing observations, and working in cooperative groups. The pupils:

1. Identify the relationship between overpopulation and poverty
2. Analyse the major causes of poverty
3. Understand the problem of poverty in India and the strategies adopted to meet this critical situation
4. Organize thoughts about the relationship between overpopulation and socio-economic development of India.
Phase IV  : Analysis of futures wheel and presentation of the scenario.

The teacher encourages the students to forecast about the interrelationship between poverty and overpopulation by making connections from prior understanding to new situations that encourage the application of concepts and problem solving skills with a future perspective through natural sense of curiosity and exploration. Each group presents their futures wheel analysis in front of the whole class. Based on the futures wheel presentation of all groups, students prepare the scenario about the issue.

Presentation of the scenario about the problem

India is facing intense problem of population outburst. People are experiencing the crisis such as unemployment, poverty, shortage of food and also severe starvation that are all related to the ever-increasing population. Our civilization is being squeezed between rising population densities. It can be said that if such trends continue, there will be a severe shortage of employment opportunities. The eruption of population has affected the standard of living of the people. Village people started migrating to cities where they can get employment. Today, in some places, people have started fighting for food, water and place to live. Many social and economic problems are directly or indirectly associated with over population. Some issues are relating to crime growth and also less of employment opportunities. Therefore, the only best thing to do in such a case is to better educate them with the merits of smaller family. Today, life is very expensive and few people can afford to meet the essentials needs of their family.
People live a world that has given us an ample of resources to sustain them and it is up to human beings on how they use the same. As the number of people grows, the amount of earth space is reduced. It should be remembered that people live in a world that has three parts water and one part land and if that falls short than they have no other option but to build man made islands to accommodate the ever increasing rise of population. The need to address the family planning scenario has become a very important concern and many countries have joined hand in taking up the matter to educate the general public about the consequences of having a large family. Therefore, government should impose the law that a family shall not have more than one or two kids so that they can curb the population growth and also save the environment from the misuse of the energy by millions of people. People survive on food and water. If stern action is not taken from the government to regulate population control then the country will become unrecognizable slums filled with broken-down housing, bad transportation, and hungry and thirsty people living on the filthy edge of human survival. If better facilitates are not provided then many young people take up the path of crime just to sustain themselves and this also becomes a major concern of the government as the inmate population also increase and they have to build various other infrastructure to hold them. However, the major concern regarding over population is that of nature and shortage of food and water. Developing country like India, should take better precaution to curb the increasing number of people as many would thing that they might find opportunities in these areas because they are still yet to be developed. The government should therefore be strict with laws to limit over population without hurting the feeling of the general public. Many of the goals of national population control programs do not correspond exactly with local attitudes. The government should implement program to reduce unplanned births and also they should try to provide assistance to people. Population control program is essential to meet the
future population crisis. If this issue is ignored, it will have dangerous consequences.

**Note**

Investigator developed the Synthetic Model Lesson Designs for teaching Population Education by blending Computer Assisted Instruction Model and Futures Wheel Method. While blending the Synthetic Model lesson designs, investigator used the same lesson designs used for teaching Computer Assisted Instruction Model group and Futures Wheel Method group with adequate modification.
Respected Sir,

I am a research scholar undertaking research in the area of Population Education. As a part of my research, I developed a model Synthetic Model (details of which are given) for Teaching certain selected topics in Population Education at the secondary school level. A judgment schedule and a Fact Sheet about the Synthetic Model are attached herewith. There are certain statements related to select learning outcomes. Kindly read each statement carefully and rate the effectiveness of the Synthetic Model with that of Existing Method in attaining select Educational Outcomes included under Cognitive, Affective, Process Skills and Social dimensions against a 3 point rating scale [Great Extent (GE); Some Extent (SE), Not a All (NA) ]. Indicate the rating by a (√) mark in the appropriate column.

Yours Sincerely,

REGI P. MATHEW.
<table>
<thead>
<tr>
<th></th>
<th>OUTCOMES</th>
<th>MODEL</th>
<th>GE</th>
<th>SE</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motivates the students to know more about population explosion</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Identifies the relationship between ecological balance and population changes.</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Understands the relationship between overpopulation and unemployment</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Establishes relationship between poverty and family size</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Analyses about causative factors of population growth.</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Develops better understanding about population dynamics</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Identifies relationship between overpopulation and social problems.</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Develops positive attitude towards Controlling overpopulation.</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Develops interest in protecting the nature</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Develops interest in population issues having future implications</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Discovering Relationship between overpopulation and unemployment</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Clarifies existing population related beliefs and values</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Develops rational attitude towards customs and traditions</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Develops curiosity and skill in forecasting future.</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Understands the impact of overpopulation on economic development</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Develops interest in population decisions having Global implications</td>
<td>SM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|17 | Appreciates small family norm | SM  
|   |   | EM |
|18 | Develops understanding about responsible parenthood | SM  
|   |   | EM |
|19 | Develops interest in protecting the mother nature | SM  
|   |   | EM |
|20 | Develops curiosity to know more about population phenomenon | SM  
|   |   | EM |
|21 | Applies learned facts in real life situations | SM  
|   |   | EM |
|22 | **Helps to develop skills in:**  
Observation | SM  
|   |   | EM |
|23 | Classification | SM  
|   |   | EM |
|24 | Formulating hypothesis | SM  
|   |   | EM |
|25 | Analyzing and Interpreting the population trends | SM  
|   |   | EM |
|26 | Future forecasting | SM  
|   |   | EM |
|27 | Problem Solving | SM  
|   |   | EM |
|28 | Inferring | SM  
|   |   | EM |
|29 | Predicting | SM  
|   |   | EM |
|30 | Derives generalizations | SM  
|   |   | EM |
|31 | Maximizes socialization among students. | SM  
|   |   | EM |
|32 | Promotes sense of belongingness to a group | SM  
|   |   | EM |
|33 | Develops spirit of team work and oneness. | SM  
|   |   | EM |
|34 | Provides opportunities for developing leadership quality among students | SM  
<p>|   |   | EM |</p>
<table>
<thead>
<tr>
<th></th>
<th>Provides Excellent situations for group discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>SM</td>
</tr>
<tr>
<td>36</td>
<td>Promotes situations for social values</td>
</tr>
<tr>
<td>37</td>
<td>Promotes Teacher-student interaction</td>
</tr>
<tr>
<td>38</td>
<td>Develops communication skills of students</td>
</tr>
<tr>
<td>39</td>
<td>Stimulates sharing of ideas in groups</td>
</tr>
<tr>
<td>40</td>
<td>Develops social values</td>
</tr>
<tr>
<td></td>
<td>SM</td>
</tr>
<tr>
<td></td>
<td>EM</td>
</tr>
</tbody>
</table>
FACT SHEET

ABOUT THE SYNTHETIC MODEL

The present teaching method of teaching Population Education is inadequate to fulfill the needs of present technology world. At present teachers are focusing only on cognitive aspect of Population Education. They are not aware of the affective aspect which promotes a greater understanding of the nature, causes, and consequences of population changes as affected by every individual, family, communities and nations. In this context the method used to teach population education must be appropriate enough to shape students knowledge and attitudes so that they will make population related decisions in the future based on scientific information. So, the investigator intends to develop a new teaching model named Synthetic Model based on Blended Learning Strategy to create proper knowledge and awareness regarding population related aspects among the secondary level students.

The investigator assumes that the present teaching methods lack futuristic vision. After the detailed analysis of the various teaching methods, strategies, and models and based on the results of needs analysis the investigator selected two models i.e. Computer Assisted Instruction Model and Futures Wheel Method and analyzed its strengths and weaknesses for effective blending. So, the present study proposes to investigate a blend between two models i.e., Future Wheel Method and Computer Assisted Instruction. The Future Wheel Method helps to analyze a trend or event and make one to forecast the future in a systematic way. According to Graham (2003), a truly blended solution “involves the strengths of each type of learning environment and none of the weakness”. Through a detailed evaluation of the two methods, investigator developed Synthetic Model.

Research in blended learning strategy has been a weak link in India. Graham identifies six major advantages of blended learning. These advantages include: pedagogical richness, access to technology, social interaction, personal agency, cost effectiveness, and ease of revision.
A brief description of Synthetic Model is given.

**Syntax of the Synthetic Model**

The syntax or phases of the Synthetic Model described as the model in action. It involves the description of the model interims of sequence of activates. It is the plan of action a teacher has to follow while using synthetic model in the class room. The synthetic model consists of seven phases arranged in an integrated and sequential manner. These phases are sequenced in the order given below:

**Phase I** – Identification of concepts, trends, events or issues related to the problem.

**Phase II** – State the navigation question.

**Phase III** – Presentation of the computer assisted learning material related to the topic.

**Phase IV** – Idea generation through group discussion.

**Phase V** – Supply of futures wheel and writing consequences.

**Phase VI** – Analysis of futures wheel and writing of scenario and presentation.

A brief explanation of the syntax of synthetic model is given below.

**Phase I – Identification of concepts, trends, events or issues related to the problem.**

During the first phase teacher sets the stage for learning. This is accomplished by stating the purpose of the lesson. The first phase is also a means of getting the students attention and focus. By using attention-grabbing demonstration the teacher creates ways to hook the students into learning and generate interest and curiosity, which sets the
stage for exploring and analyzing about a particular phenomenon, issue, or problem. From a construction perspective, the first phase provides an opportunity for the teacher to activate learning, assess prior knowledge, and have students share their prior experiences about the topic. Often, the teacher introduces the topic of the lesson and status the explaining what the students should know and be able to do by the end of the lesson or unit the first phase is also a means of getting the students attention and focus.

**Phase II State the Navigation Question**

In synthetic model, students are cycled back into the processes and pathways of the concept, trend or event by generating a question to be answered. Synthetic model built around the art and spirit of imagination. It is the scientific process of active exploration by which the students use critical, logical and creative lateral thinking skills to raise and engage in questions of far reaching future implications. Driven by genuine curiosity and exploration, synthetic model involves generating a navigation question about the trend or event to identify the impacts or consequences. To analyze the impacts or consequences of the trend or event, ask the navigation questions in the following manner:

a) If this happens, then what happens next? or

b) What goes with this event a trend? Or

c) What are the impacts or consequences?

Through generating navigating question, the problem is presented in a suitable form so that a range of different ideas concerning the problem can be obtained the navigation question stimulate the thinking processes of each student. Teacher encourages students to think around the navigation questions.
Phase III – Presentation of the computer assisted learning material related to the topic.

Presentation of the computer assisted learning material related to the topic enables students to build on a common experience as they go about their investigation. This common experience is essential because students will enter the classroom with different levels of experience and knowledge about the topic being studied. This presentation stage enables all students to experience hands on learning and help to get a common idea in a culturally diverse classroom.

Phase IV: Idea generation through group discussion

Once the problem is presented through computer assisted learning material, the idea generation exercise is scratched on through advanced group discussion. The core view of constructivist learning suggests that learners actively construct (rather than acquire) their own knowledge, strongly influenced by what they already know. The learners are divided into small groups with 4 to 6 members. Each group led by a chairperson, and allows each group to discuss the problem under study.

Phase V – Supply of futures wheel and writing consequences.

This stage is an excellent time to engage students in inquiry. During this Stage, students examine the solutions for navigating questions; and work without direct instruction from the teacher. They analyses the evidence and data, recording and organizing information, sharing observations, and working in cooperative groups.
Phase VI – Analysis of futures wheel and writing of scenario

Content analysis of a number of filled-in futures wheel charts are to be done qualitatively. Here, the emphasis is given to agreements rather than disagreements. Once, the content analysis is done, a final wheel can be developed on the basis of such analysis. This paves the way for writing scenarios about future events or impacts of existing trend. The final step in the Synthetic Model is the presentation of scenario in terms of the evaluation of terminal behavior of the learners. Presentation of scenario in turn implies the feedback of the entire learning activity.
Principles of Reaction

Principle of reaction tells the teacher how to regard the learner and how to respond to what the learner does. During the first phase, the teacher motivates the students to use their acquired data to explore a problem situation, event, or issue. Teacher facilitates the new information through computer assisted instruction strategy followed by a group discussion. Here the teacher is the designer of computer assisted instruction learning material and a facilitator. In the group discussion stage teacher provides opportunities for students with diverse experiences to share their different understandings and broaden the perspective of the entire class. During this stage, the teacher may choose to assign roles to the individual students working in a group or let students choose the role according to their strengths or interests. Students may assume the recorder, reader, or group manager role.

Social System

A teacher using the synthetic model plays different roles, which ranges from planner, designer, facilitator and challenger to manager. The social system is democratic and governed by decisions developed from or at least validated by the group within boundaries and in relation to puzzling through preparing future wheel. The activities of the group emerge with a computer assisted learning atmosphere provided by teacher. Teacher planes the learning activities and according to these designs a computer assisted learning material on the subject matter.

Support System

The main requirements of the synthetic model are computer assisted learning material on the topic and Futures Wheel Charts.

Instructional effects.

The synthetic model developed by blending of CAI with Futures Wheel Method is an art of analyzing and evaluating future with a view to improving it. The effect of a learning environment can be direct-designed to come from the content and skills on which the activities are
based or, effects can be implicit in the learning environment. Learning through synthetic model provides the combined effect of computer assisted instruction model and future wheel methods. Synthetic Model has the ability to analyze, understand and evaluate an issue, event or an argument in futuristic vision. Through this model, students actually improve their abilities to analyze the problem in an effective way.

**The instructional effects of the Synthetic Model are,**

1. Develop the scientific knowledge, attitude and awareness of an issue, event, or a problem.
2. Develop future forecasting skills with the help of technological support.
3. Develop the critical thinking skills to analyze positive and negative consequences of the problem.
4. Aid in group brainstorming.

**The Nurturant effects**

Encourage students to think around the questions engaging. Students in the group discussions open the door for opportunities to integrate higher order thinking skill across the curriculum. During the discussion phase students are usually involved in sharing their commonly held theories comparing and contrasting their ideas and understanding, justifying their positions and theories analyzing relevant information by choosing avenues of action and explaining alternative solution in forecasting perspective. During the futures wheel exercise, students put their collective reasoning skills into action by implementing a possible solution to the problem.

**The Nurturant effects of the Synthetic Model are,**

1. Develops social commitment.
2. Think through possible impacts of current trends or potential future events
3. Develop future forecasting skills
4. Organize thoughts about future events or trends;
5. Promote curiosity and exploration among students
6. Develop co-operative learning skills
7. Develop confidence and responsibility,
8. Create forecasts within alternative scenarios;
9. Show complex interrelationships;
10. Develop scientific skills
11. Develop multi-concepts;
12. Nurture a futures-conscious perspective; and
MAHATMA GANDHI UNIVERSITY – KOTTAYAM.
SCHOOL OF PEDAGOGICAL SCIENCES

RECEPTIVITY ANALYSIS QUESTIONNAIRE
FOR EXPERTS AND SECONDARY SCHOOL TEACHERS

Read the following questions and give your opinion regarding this in the ten point scale by putting a tick mark (√).

<table>
<thead>
<tr>
<th>No.</th>
<th>QUESTIONS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>To which extent you are able to appreciate the essence and importance of Synthetic Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>To which extent you believe that Synthetic Model could be implemented in teaching Population Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>To which extent you appreciate that Synthetic Model will result in bringing effectiveness in teaching Population Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Any other remarks that you would like to mention about Synthetic Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Respected Teacher,

I am a research Scholar undertaking research in the area of development of Models for teaching Population Education at the Secondary Level. As part of my study, developed a model i.e. Synthetic Model for teaching select topics in Population Education Standard IX. I would be obliged if you could give your opinion regarding the effectiveness of the developed model with regard to Availability of Resources for learning Population Education, Extent of practice of using the models, suitability of the models with regard to existing curricular factors and practical difficulties encountered likely to be encountered while using the models. Kindly record your opinion by a (√) mark in the appropriate column.

Yours Truly,

REGI P. MATHEW.
QUESTIONNAIRE FOR SECONDARY SCHOOL TEACHERS

PART A

Read the following statements and rate each statement. Please Assign scale values GREAT EXTENT (GE), SOME EXTENT (SE), and NOT AT ALL (NA).

<table>
<thead>
<tr>
<th>Sl No</th>
<th>ASPECT</th>
<th>GE</th>
<th>SE</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Availability of resources for learning Population Education by using Synthetic Model.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Extent of practice of Synthetic Model practiced in the classroom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Suitability of Synthetic Model in terms of existing curricular aspects: Syllabus Time Table Evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PART B**

Please give your opinion by putting a tick mark (√) regarding the Practical Difficulties likely to be encountered by teachers if the Synthetic Model is adopted in the classroom as a learning strategy.

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Practical difficulties likely to be encountered</th>
<th>Response of teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Lack of library reference facilities</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td>Rigid Timetable</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Inadequate knowledge about innovative Blended Practices</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Lack of co-operation from the management</td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Difficulty in maintaining discipline</td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>Lack of confidence to implement new innovative teaching models</td>
<td></td>
</tr>
<tr>
<td>7)</td>
<td>Lack of adequate computer facilities</td>
<td></td>
</tr>
<tr>
<td>8)</td>
<td>Lack of time required for preparing Blended Learning models</td>
<td></td>
</tr>
<tr>
<td>9)</td>
<td>Overcrowded classrooms</td>
<td></td>
</tr>
<tr>
<td>10)</td>
<td>Lack of suitable evaluation measures</td>
<td></td>
</tr>
</tbody>
</table>
PART C

Please give your suggestions for the modification of existing curricular factors for implementing Synthetic Model for teaching Population Education at the secondary level schools.

<table>
<thead>
<tr>
<th>suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>
Respected Sir,

I am a research scholar undertaking research in the area of Population Education. As a part of my research, I developed a model i.e. Synthetic Model for teaching certain select topics in Population Education for Standard IX students. [A handout and a lesson design format for synthetic model are attached herewith] I wish to collect your opinion in this innovation. An opinion is attached herewith. Kindly read each statement carefully and give your opinion against a 3 point rating scale: Agree (A), Neutral (N), and Disagree (D). Indicate the rating by a (√) mark in the appropriate column. The data will be kept confidential and will use for research purpose only. Your co-operation is solicited.

Thanking you,

Yours Sincerely,

REGI P. MATHEW.
WILLINGNESS SCALE FOR SECONDARY LEVEL TEACHERS TO IMPLEMENT THE SYNTHETIC MODEL FOR TEACHING POPULATION EDUCATION

Read the following statements carefully. Please put a tick mark (√) for the response given after each statement: Agree (A), Neutral (N), and Disagree (D).

<table>
<thead>
<tr>
<th>NO.</th>
<th>STATEMENT</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disagree</td>
</tr>
<tr>
<td>1</td>
<td>The inclusion of synthetic model in the present educational scenario can enhance learning in population education.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Research on synthetic model based on blended learning strategy should be disseminated for classroom implementation.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The implementation of synthetic model in teaching population education is not practical.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I find synthetic model based on blended learning strategy is more effective than the existing method of teaching population education.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Learning through synthetic model is an interesting and joyful experience for students.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adequate computer facilities for implementing synthetic model are not available in my institution.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Synthetic model is suitable to the present secondary school curriculum.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I feel difficult to use the synthetic model based on Blended learning strategy.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>The synthetic model is suitable For large as well as small class rooms.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I do feel competent to handle the various faces of the model.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I am not interested to use the synthetic model for teaching population related topics.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I like to share my knowledge about synthetic model with my colleagues and friends in the teaching field.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>I like to use synthetic model for teaching other subject area also.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Implementation of synthetic model is a not a burden for teachers.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>My school management will not allow me to implement Synthetic model for teaching.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Synthetic model based on blended learning strategy is a new innovation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>While teaching through synthetic model it is very difficult to maintain discipline in the class room</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>The synthetic model is inadequate to fulfill the needs of present younger generation</td>
<td></td>
</tr>
</tbody>
</table>
**LIST OF EXPERTS**

<table>
<thead>
<tr>
<th></th>
<th>Name and Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. K.R. Sivadasan, Former Professor and Head Department of Education, University of Kerala, Thiruvananthapuram.</td>
</tr>
<tr>
<td>2</td>
<td>Late Dr. N. Vedamani Manual, Former Professor and Head, Department of Education University of Kerala, Thiruvananthapuram.</td>
</tr>
<tr>
<td>3</td>
<td>Late Dr. K. Sivadasan Pillai, Former Director, Centre for Adult and Continuing Education, University of Kerala, Thiruvananthapuram.</td>
</tr>
<tr>
<td>4</td>
<td>Dr. V.M. Sasikumar, National Vice President, Council for Teacher Educators, Southern Region, South India.</td>
</tr>
<tr>
<td>5</td>
<td>Dr. Supriya A.R. Asst. Director (PERC/CACEE) Department of Adult Education, University of Kerala, Thiruvananthapuram</td>
</tr>
<tr>
<td>6</td>
<td>Late Dr. Gulab Chaurasia, Fellow of CCEA and Former President of WCCI, National President CTE, Bhopal, Madhya Pradesh</td>
</tr>
<tr>
<td>7</td>
<td>Sr. Omana P.L., Associate professor, St. Joseph college of Teacher Education For Women, Ernakulum.</td>
</tr>
<tr>
<td>8</td>
<td>Dr.Prof.GeorgeV. Antony, Director, De-Paul School of Management, Ernakulum.</td>
</tr>
<tr>
<td>9</td>
<td>Miss Jayanthi A., Lecturer in Education, JPE Teacher Training College, Thrissur.</td>
</tr>
<tr>
<td>10</td>
<td>Mrs. Siji .C. B. Lecturer in English Education, JPE Teacher Training College, Thrissur.</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------</td>
</tr>
<tr>
<td>11</td>
<td>Mrs. Praseeda T. N.</td>
</tr>
<tr>
<td>12</td>
<td>Miss. Bisa K.</td>
</tr>
<tr>
<td>13</td>
<td>Sr. Meena K. Cheruvathur</td>
</tr>
<tr>
<td>14</td>
<td>Dr. Sunandha C.</td>
</tr>
<tr>
<td>15</td>
<td>Mary C. J.</td>
</tr>
<tr>
<td>16</td>
<td>Mrs. Sheethal Suryan</td>
</tr>
<tr>
<td>17</td>
<td>Miss Ancy Davis</td>
</tr>
<tr>
<td>18</td>
<td>Sindhu P.A.</td>
</tr>
<tr>
<td>19</td>
<td>Mary Joffy</td>
</tr>
<tr>
<td>20</td>
<td>Dr. Jayasree M.</td>
</tr>
<tr>
<td></td>
<td>List of Schools Selected for the experimental study</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------</td>
</tr>
</tbody>
</table>