Appendix I

INSTRUCTIONAL PROGRAMME

The instructional programme for acquisition of process skills is based on constructivist model for curriculum development (Driver, 1989) and on Principles of co-operative learning (for details, refer section 1.7).

The preparation of the instructional programme consists of researchers interaction with Parents, Pupils, Teachers and Classroom observation (for details, refer section 5.2).

The instructional programme will be described with respect to Objectives, Components and Manual for usage.

A. Objectives of the Instructional Programme

The instructional programme was prepared
- to support the teacher initiatives to introduce process approaches to school curriculum.
- to facilitate the teacher to create learning environment in terms of 'context' of scientific investigation.
- to provide criteria for teachers in identifying and assessing process skills employed by the pupils.
- to facilitate the instructional effort of teachers and pupils through instructional components.

B. Components of the Instructional Programme

The instructional programme consists of the following components.

1. Instructional materials for teachers
2. Lesson plans
3. Instructional sheets for pupils
4. Teaching strategies
5. Assessment procedure

During the Instructional programme these components interacts with teacher and pupils to create the teaching-learning environment. This environment is referred as 'context' of scientific investigation. Thus the interaction during the context of scientific investigation is presented below.
Fig. 1 Interactions with Teacher, Pupils and Instructional Programme. ('Context' of Scientific Investigation)

The role of each component has been explained in Fig. 1.2, overview of the instructional Programme.
Fig. 1.2 An overview of the components of the Instructional Programme
B 1. Instructional materials for teachers

The instructional materials for teachers consist of four sub components. Which are derived from the work of Harlen (1993) on process skills. They are

a) Tips for making an activity scientific
b) Process skill indicator
c) Tips for enhancing process skills
d) Self evaluation Performa for teachers.

B. 1.a TIPS FOR MAKING AN ACTIVITY SCIENTIFIC

The tips for making an activity are addressed as a checklist to the teachers, while planning and organising the learning activities. Using the tips, teachers can differentiate between those activities, which are scientific and those, which are not necessarily scientific.

Ask yourself whether or not at some point in the activity you were involved in.
1. Raising a question, which could be answered by further investigation?
2. Suggesting a hypothesis to explain something?
3. Devising a test relevant to the question being investigated or to another question arising during the investigation?
4. Identifying and controlling variables, which had to be, kept the same for a fair test.
5. Deciding what was to be compared or measured?
6. Attempting to make measurements using appropriate instruments?
7. Taking steps to refine observations using instruments where necessary?
8. Applying scientific knowledge or ideas?
9. Recording findings in a table, graph, and bar chart or in some other systematic way?
10. Seeking for patterns or regularities in the results?
11. Drawing conclusions based on the evidence?
12. Comparing what was found with earlier ideas?
13. Justifying the conclusions by reference to the evidence?
14. Repeating or checking the results?
15. Recognising sources of error or uncertainty in the results?
16. Trying or at least discussing, different approaches to investigation or to part of it?
B.1.b PROCESS SKILL INDICATORS

These indicators are to be used by the teacher during the teaching learning process. These indicators are useful as a starting point for teachers to plan or assess during teaching learning situation.

OBSERVING

- Using the senses as many as safe and appropriate to gather information
- Identifying differences between similar objects or events
- Identifying similarities between different objects or events

RAISING QUESTIONS

- Asking questions which lead to inquiry
- Asking questions based on hypothesis
- Identifying questions, which they can answer by their own investigation.
- Putting questions into a form, which indicates the investigation which has to be carried out.
- Recognising that some questions cannot be answered by inquiry.

HYPOTHESISING

- Attempting to explain observations or relationships in terms of some principle or concept
- Applying concepts or knowledge gained in one situation to help understanding or solve a problem in another.
- Recognising that there can be more than one possible explanation of an event.
- Recognising the need to test explanations by gathering more evidence.
- Suggesting explanations, which are testable, even if unlikely against evidence.

COMMUNICATING EFFECTIVELY

- Using writing or speech as a medium for sorting out ideas or linking one idea with another.
- Listening to others ideas and responding to them
- Keeping notes on actions or observations
- Displaying results appropriately using graphs, tables, charts etc.
- Reporting events systematically and clearly.
- Using sources of information
- Considering how to present information so that it is understandable by others.
DESIGNING AND MAKING

• Choosing appropriate materials for constructing things which have to work or serve a purpose
• Choosing appropriate materials for constructing models.
• Producing a plan or design which is a realistic attempt at solving problem.
• Succeeding in making models that work or meet certain criteria.
• Reviewing a plan or a construction in relation to the problem to be solved.

PREDICTING

• Making use of evidences to make a prediction (as opposed to a guess which takes no account of evidence).
• Explicitly using patterns or relationships to make a prediction.
• Justifying how a prediction was made in terms of present evidence or past experience.
• Showing caution in making assumptions about the general application of a pattern beyond available evidence.
• Making use of patterns to extrapolate to cases where no information has been gathered.

FINDING PATTERNS AND RELATIONSHIPS

• Putting various pieces of information together (from direct observations or secondary sources) and inferring something from them.
• Finding regularities or trends in information, measurements or observations.
• Identifying an association between one variable and another.
• Realizing the difference between a conclusion that fits all the evidence and an inference that goes beyond it.
• Checking an inferred association or relationship.

DEVISING AND PLANNING INVESTIGATIONS

• Deciding what equipment, materials etc. are needed for an investigation.
• Identifying what is to change or be changed when different observations or measurements are made.
• Identifying what variables are to be kept the same for a fair test.
• Identifying what is to be measured to compare.
• Considering beforehand how the measurements, comparisons, etc are to be used to solve the problem.
• Deciding the order in which steps should be taken in an investigation.

MANIPULATING MATERIALS AND EQUIPMENTS EFFECTIVELY
• Handling and manipulating materials with care for safety and efficiency.
• Using tools effectively and safely.
• Showing appropriate respect and care for living things.
• Assembling parts successfully to a plan.
• Working with the degree of precision appropriate to the task in hand.

MEASURING AND CALCULATING
• Using an appropriate standard or non-standard measure in making comparisons or taking readings.
• Taking an adequate set of measurements for the task in hand.
• Using measuring instruments correctly and with reasonable precision.
• Computing results in an effective way.
• Showing concern for accuracy in checking measurements or calculations.

B.1.c TIPS FOR ENHANCING PROCESS SKILLS
The tips are meant for teachers to enhance the process skills of pupils while planning or during teaching learning process.

OBSERVATION
• Providing opportunity (which means both materials and time) and encouragement for children to make both wide-ranging and more focused observations.
• Arranging through the class organization, for children to talk about their observations to each other and to the teacher.
• Listening to the accounts of their observation and probing further (what else did you notice)
• Providing opportunities for children to observe events as they happen and use their observations as evidence in trying to explain what happened (developing hypothesis)
QUESTION RAISING

• Taking children questions seriously, so that they see for themselves how each kind is answered.

• Helping children to clarify their questions so that they can see how to find an answer.

• Giving invitations for children to raise questions (what would you like to find out about)?

HYPOTHESIZING

• Providing opportunities for children to investigate phenomenon which they are able to explain from their past experience.

• Encouraging children to check the possible explanations against evidence and so reject the ones, which are inconsistent with it.

• Making available sources which children can use to find ideas to add to their own (such as books, pictures, etc.).

DESIGNING AND MAKING

• Providing problems which are interesting for children to solve and which they are expressed to solve for themselves.

• Providing opportunities for children to suggest changes and in things around which will improve their use or solve a problem.

• Providing a range of materials and the opportunity to explore their properties.

• Expecting children to justify their choice of materials and to evaluate how effective they were in practice.

DEVISING AND PLANNING INVESTIGATIONS

• Leading children to problems which can be investigated but not giving them instructions for what to do, so that children have to do the planning for themselves.

• Helping the children to plan by giving some structure (perhaps through questions), as to what is to be changed and what is to be measured.

• Discussing plans with them and helping them to think through what they mean in practice.

• Reviewing investigations after they have been completed to consider how the planning could have been improved.
MANIPULATING MATERIALS AND EQUIPMENT EFFECTIVELY

- Providing materials for exploration and use suited to the physical development of the children.
- Encouraging children to extend their activity towards construction and the improvement of their constructions.
- Showing children how to use equipment and tools effectively, economically and safely and discussing reasons for rules of use but insisting on adherence to them.

PREDICTING

- Encouraging children to make predictions and to justify them before carrying out the action or observation that will check their accuracy.
- Discussing whether or not a reliable prediction can be made in a particular situation.

FINDING PATTERNS AND RELATIONSHIPS

- Providing activities where there are simple patterns or relationships to be found in practice.
- Asking children to express their ideas about relationship that they think exist in their findings.
- Expecting them to check any relationships carefully and not be cautious in drawing conclusions from them.

COMMUNICATING EFFECTIVELY

- Organising the class so that children can talk about their work to each others, sometimes informally and sometimes reporting more formally.
- Encouraging children to discuss and plan how their work will be best recorded and communicated to others.
- Providing opportunities for children to use information presented in the form of tables, charts and graphs.

MEASURING AND CALCULATING

- Encouraging children to quantify their observations by questions such as how much more --- is this than that?
- Providing questions for investigations, which require measurement.
- Providing a range of instruments for a particular quantity, such as measuring tape or rope etc.
• Discussing with children the accuracy of their measurements and how to increase this, when it is appropriate to do so.

**B.1.d SELF-EVALUATION PRO-FORMA FOR TEACHERS**

The purpose of this pro-forma is to make the teacher's aware of their actions and interactions with the pupils. The pro-forma needs to be used at the end of activities in a unit. Teacher should ask themselves, whether they have.

- Provided opportunity for children to explore/play/interact informally with materials
- Encouraged children to ask questions
- Asked the children open questions, and invited them to talk about their ideas
- Responded to questions by suggesting what the children might do to find out rather than providing a direct answer
- Provided sources of information suitable for helping the children to find more about the topic.
- Provided structured group talks so that the children knew what they were to do?
- Asked for writing, drawing or other products in which children expressed their ideas about why some thing happened or behaved in a certain way.
- Provided opportunity for children to present ideas or to describe their investigations to others.
- Noticed children working well without help.
- Kept silent and listened to the children talking.
- Been aware of the children's ideas about materials objects and events being studied
- Become aware of changes in children's ideas from one previously held.
- Made interpretations of the children's written or other products in terms of their ideas and skills
- Kept records of the children's experience.
- Assessed and kept records of the ideas and skills shown by children.
- Used the records of children's experiences and progress in planning further activities.
- Talked to children about the progress they are making in their learning.
Environmental Studies Std. - IV

B-2 LESSON PLANS

1. Unit – Soil

1.1 Lesson Sequence

Soil
  ↓
School soil
  ↓
Garden soil
  ↓
Soil (layers)
  ↓
Earth worm
  ↓
Grass soil
  ↓
Garden soil
  ↓
Ants

1.2 Duration: Twenty periods

Organization

1.3 Whole class activities

School soil
  ↓
Garden soil

1.4 Group activities

(Activity circus)

Soil
  ↓
Earth worm
  ↓
Grass soil
  ↓
Garden soil
  ↓
Ants

1.5 Teaching strategy

Whole class activity

1) Lecture / demonstration by teacher

2) Single activity for entire class

3) Students repeat teacher demonstration in groups

Group activities

* Students learn in co-operative groups through discovery approach.
1.3 Whole Class Activities

1.3.1 School Soil

a) **Aim:** To observe the school soil in terms of physical characteristics viz. colour, texture, and constituents of the soil.

b) **Material required:** Scale, hand lens, a plot of land.

c) **Procedure:** Let pupils select a plot of land in the school compound. The plot of land is marked by drawing a square on it by using a measuring scale. Let pupils observe this specific area. Pupils use hand lenses to observe the different living and non-living objects in the soil. Let pupils record their observations on a notebook.

1.3.2 Garden Soil

a) **Aim:** To observe the garden soil in terms of physical properties such as colour, texture, and constituents. To compare the Garden soil with the School soil in terms of physical properties such as colour, texture, and constituents.

b) **Material required:** Garden soil, hand lens, etc.

c) **Procedure:** Let pupils collect 3 or 4 handfuls of garden soil and spread it on a sheet of paper using handlers. Let pupils observe the physical properties of the garden soil and record it in their notebooks. Let pupils refer their notebooks and compare garden soil with school soil.

1.4 Group Activities

1.4.1 Soil (layers)

a) **Aim:** To identify the characteristics of upper and lower soil layers.

b) **Materials required:** Handlers, a plot of land, measuring scale, etc.

c) **Procedure:** Pupils draw a diagram of soil layer prior to the commencement of the activity.

Pupils choose a plot of land (measuring 30 cm x 30 cm) in the school compound. Pupils then mark the boundaries of the chosen plot and observe the soil surface i.e., the upper layer and record observations in their notebook. Let the pupils dig the surface by few cm. and observe the nature of the soil and draw its diagram. Let the pupils compare the initial and later diagram.

d) **Evaluation**

1. Give reasons for the changes you have observed in the diagrams of the soil.

2. Have you observed any changes in the diagrams of soil. Give reasons?
1.4.2 Earthworm

a) **Aim:** To observe the earthworms in terms of shape, size, movement, utility to soil, etc.

b) **Materials required:** Earthworms, hand lens, white paper, etc.

c) **Procedure:** Let pupils carefully select the earthworm (with the help of the teacher) and transfer it to a piece of white paper using hand lens. Observe the movements of earthworm, body, colour, utility to soil, etc. Draw the diagram of the earthworm.

d) **Evaluation:** How do earthworms get air for breathing inside the soil?

1.4.3 Grass soil

a) **Aim:** To observe the nature of soil present in the roots of the grass.

b) **Materials required:** Grass roots and hand lens

c) **Procedure:** Select the place in a school compound where the grass has grown. Observe the nature of the place where grass has grown. Pluck a few grasses along with roots and keep it on a sheet of paper. Observe the soil that is present in the roots of the grass with the help of a hand lens. Draw a diagram of grass roots with soil.

d) **Evaluation:** Did you observe bigger stones in the grass soil? Can you guess as to why stones of bigger size were not clinging to grass roots?

1.4.4 Garden soil

a) **Aim:** To enable the pupils to identify the different soil layers in the garden soil.

b) **Materials required:** Garden soil, a glass jar, a plastic bottle filled with water, a wooden stick.

c) **Procedure:** Take the garden soil and transfer into the glass jar. Slowly add water to it and stir the mixture with the help of a wooden stick. Leave the mixture for about 10-15 minutes. Observe the change in the glass jar. Let pupils record their observation in their note book.

d) **Evaluation:** The soil present on the upper layer was different from that of lower layers. Can you give reason?

1.4.5 Ants

a) **Aim:** To observe the ants in their natural habitat.

b) **Materials required:** Ants, hand lens, etc.
c) **Procedure:** Let pupils draw the diagram of an ant from their previous experiences. Then children observe ants in their living habitant, the body movement shape, colour, activities they undertake were carefully recorded. Children catch or 3 ants and observed one with the help of hand lens. Draw diagram of ants. Pupils compare their initial and final diagrams at the end of activity.

d) **Evaluation:** What are the similarities and differences you have observed while comparing ants diagram?

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**SOUND**

2. **Unit:** Sound

2.1 **Lesson sequence**

- Vibrations
- Game of foot
- More and less
- In and around
- Water and air
- Different objects

2.2 **Duration:** 20 periods

**Organization**

2.3 **Whole class activities:** Vibrations

2.4 **Group activities:** Game of foot, more and less, in and around, water and air, different objects.

2.5 **Strategies:** Teacher uses Group Investigation Model.

2.3.1 **Whole class activities**

2.3.2 **Vibrations**

a) **Aim:** To identify that sound is caused through vibrations.

It consists of two activities

**Activity (1) Drum beat**

b) **Materials required:** Drumstick, table, base drum
c) **Procedure:** Display the activity with pupils in groups. In the beginning pupils touch the surface of the drum. The drum is beaten with a stick, to produce sound. Again pupils touch the surface of the vibrating drum.

**Activity (2) scale**

b) **Materials required:** Metallic scale, table etc.

c) **Procedure:** Keep a metal scale on the edge of table. Swing the metal scale to and fro by holding the other hand by hand. Let pupils observe the vibrating metal scale.

### 2.4 Group activities

#### 2.4.1 Game of foot

a) **Aim:** To identify that amplitude of the sound becomes feeble with distance.

b) **Materials required:** Sticks, checklist and pencils.

c) **Procedure:** In this activity pupils were given a checklist. The teacher gave a demonstration on how to use the checklist during the activity. In this activity pupils were asked to take fifteen steps and mark these steps from 0 to 15 on the school ground. The activity involves two pupils where one pupil acts as a source, while another acts as an observer. The role of observer is to record the sounds on the checklist with respect to each step. The role of source is to generate sound by clapping hand.

The activity procedure involves observer to be stationary at step 0. While source keeps on moving from step one to step 15. In each step the source generates sound. The observer record the sound on the checklist using the symbols for sound clearly heard (\(\checkmark\)), for mildly heard sound (\(\square\)) for not heard the sound (\(\times\)). Pupils were instructed to make one entry in each step.

d) **Evaluation:** Did you observe any changes in the sound you have heard in the 15th and 30th step respectively. Can you give reasons?

#### 2.4.2 More and Less

a) **Aim:** To enable pupils to identify the high pitch and low pitch of a sound.

b) **Materials required:** Comb, cardboard, plate, spoon, etc

c) **Procedure:** Let pupils use the plate and spoon to create different sounds by beating a plate with the help of a spoon. Let pupils identify the reasons for different sounds. The specific observation is needed to record the sound of a high pitch and a low pitch.
Let pupils repeat the same activity by running the small piece of cardboard over a comb.

d) **Evaluation:** Why did you hear high and low pitch of sound in the plate and spoon activity.

### 2.4.3 In and Around

a) **Aim:** To make the pupils aware about different sound and their source in the school neighborhood.

b) **Materials required:** Piece of cloth, note book and pencil.

c) **Procedure:**

Pupils use their ears to recognize the sound and attempt to identify the source of this sound. Pupils in pairs do this activity, where one acts as a recorder and another acts as an observer. The observer ties a piece of cloth to his/her eyes and carefully listens to the sounds present in the school environment. The observer identifies the sounds along with the sources and the recorder list these sounds in a notebook. Later on pupils repeat the activity by changing the roles.

d) **Evaluation:** What are the different types of sound present in the school environment?

### 2.4.4 Water and air

a) **Aim:** To infer that sound travel through different medium such as water and air.

b) **Materials required:** Tuning fork, and a piece of rubber.

c) **Procedure:** This activity is done in two steps in all steps tuning fork is made to vibrate with the help of a rubber piece.

Step 1: A vibrating forks held near the ear and sound produced are heard.

Step 2: A vibrating fork is put on water in a vessel and sounds emanating are observed.

d) **Evaluation:**

Did you observe any changes in the sound of tuning fork in water and air. Can you give reasons?

### 2.5.5 Different objects

a) **Aim:** To hear the sounds produced by different objects.

b) **Materials required:** Different objects available in the school.

c) **Procedure:** Let each pupil in the group collect ten different objects (in pairs) from the school compound. Let pupils identify each object and list them in their book.
Now pupils beat each object with one another and identify the sound it produces. The name of the sound as coined by the pupils are duly recorded (against to the respective object) in the notebook.

d) **Evaluation:** Why is the sound produced by the each object is different?

3. **Water**

3.1 **Lesson sequence**

- Water evaporation
- Evaporation and Temperature
- Evaporation and air
- Evaporation and water
- Evaporation and surface area
- Evaporation and salt

3.2 **Duration:** 20 periods

3.3 **Whole class activities:** **Water evaporation**

3.4 **Group activities:** Evaporation of water with temperature, air, water, surface area, and salt.

3.5 **Strategies:** Teacher uses a group investigation model.

3.3 **Whole class activities:**

3.3.1 **Water evaporation**

a) **Aim:** To enable the pupils to observe the volume of the water decreases during the process of evaporation.

b) **Materials required:** Stove, vessel, glass of water.

c) **Procedure:** In the beginning show the pupils a glass full of water then transfer into a vessel over a stove and boil it for 5 to 10 minutes, then transfer the water from the vessel to the same glass. Let pupils compare, whether there is any decrease in the volume of water.

3.4 **Group activities**

3.4.1 **Evaporation and Temperature**

a) **Aim** To see the relationship between evaporation of water and temperature.

b) **Materials required:** Two ink fillers, a glass of water, two plates (small) of equal size and dry cloths, etc.
c) **Procedure:** Let pupils wipe the plate with dry clothes and using ink filler. Let them add one or drops of water on the plates. One plate is kept inside the classroom and other is kept in the hot sun. Through number counting or finger tapping. Let pupils find out the number at which water disappeared in each plate. Let pupils take 2 or 3 trails and through numbers. Let pupils infer whether water evaporated faster in hot sun or inside classroom.

d) **Evaluation:** Why did the water disappear faster in the hot sun than in the classroom (shade)?

### 3.4.2 Evaporation and Presence of Air

a) **Aim:** To see the relationship between evaporation of water and presence of air.

To reason out from the experimental data that evaporation of water varies with the presence of air.

b) **Materials required:** Pieces of chalk, wet cloth, fan, etc.

c) **Procedure:** Pupils draw two squares of equal size (30cm x 30cm) on the ground using a piece of chalk. (The squares are drawn with at least two feet distance in between them) rub the surface of the squares using a wet cloth and, one squares in dried using fan and other square is allowed to dry on its own. Let pupils take two or three trials and find out.

d) **Evaluation:** Why did the evaporation become faster when fans were used?

### 3.4.3 Evaporation and volume of water

a) **Aim:** To see the relationship between evaporation of water and volume of water.

b) **Materials required:** Ink filler, glass of water and plate.

c) **Procedure:** Let pupils take a drop of water from the ink filler and transfer into a plate. The plate is kept in the hot sun. Pupils start counting the numbers and record the numbers when the water gets dried up. Pupils repeat the procedure for second and third drop of water. Pupils promptly record the number at which water dries up. Let pupils infer from the data as volume of water increases the rate of evaporation decreases.

d) **Evaluation:** Why did the rate of evaporation was slower when we increase the volume of water?

### 3.4.4 Evaporation and surface area

a) **Aim:** To see the relationship between Evaporation of water and surface area.

b) **Materials required:** Beaker, Measuring cylinder, Plate and Glass of water.
c) **Procedure**: Add a drop of water from ink filler into the beaker, measuring cylinder and a plate. Now keep all of them in the hot sun. Let pupils observe in which case water dries up faster. Let pupils repeat the activity for one or more trial.

e) **Evaluation**: Why does the water dries faster in the plate than in the measuring cylinder.

### 3.5.5 Evaporation and salt water

a) **Aim**: To study the interrelationship between evaporation of water and evaporation of salt water.

b) **Materials required**: Concentrated salt water, ordinary tap water, ink filler, 2 cups of similar size.

c) **Procedure**: Let pupils add a drop of tap water in a cup. Similarly add a drop of salt water in another cup using ink filler. Let than be keep in hot sun. Let pupils observe among the two cups which one of them dries faster. Let pupils repeat the activity for two trials.

d) **Evaluation**: Which one of them dried faster, tap water or salt water. Can you give reasons?

**Note**: Lesson plans in English were translated into Kannada version for assisting the classroom teacher. The next page presents the lessons plans in Kannada.
B-2 LESSON PLANS
(KANNADA VERSION)

ಲಿಪಿ ಅಂಕೆಗಳು
(ಭಾಷೆ: - ಕನ್ನಡ)

೫. ಶಿಕ್ಷಣ-ಉದ್ಯಮ

೫.೧ ಆಡಿಕೆ:- ಅಂದು ತಮ್ಮದ ರೀತಿಯಲ್ಲಿ ಅಂಗೀಕರಿಸಲಾಗಿದೆ.
ಈ ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.
ಈ ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.
ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.
ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.

೫.೨ ಕಾಲಾಧಿಕೃತ ಧ್ವನಿ :- ೨೦ ಅಧ್ಯಯನಗಳು

ಭಾರತಾಂತರ

೫.೩ ಶಿಕ್ಷಣ ಸಂಬಂಧಿಸಿದರೆ :-
ಅಂದರೆ ತಮ್ಮದ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.
ಈ ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.

೫.೪ ವಿಭಾಗ ಸಂಬಂಧಿಸಿದರೆ :-
(ಪ್ರತಿಯೊಂದು ಶುದ್ಧ)
ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.
ಈ ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.
ಅಂದರೆ ರೀತಿಯಲ್ಲಿ ಚಾಲಿಸಲಾಗಿದೆ.

೫.೫ ಇಂದು ಸಂಬಂಧಿಸಿದರು :-
• ಶುದ್ಧಾಂಶಗಳು, ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು, ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು
• ಶುದ್ಧ ರೀತಿಯಲ್ಲಿ ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು
• ಶುದ್ಧ ರೀತಿಯಲ್ಲಿ ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು, ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು.

೫.೬ ವಿಷಯಗಳಲ್ಲಿ ಸಂಬಂಧಿಸಿದರು :- ಅಂದರೆ, ಅಂದರೆ, ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು, ಕುಟುಂಬ ಸಂಬಂಧಿಸಿದರು.

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Appendix-I

(Visited content not transcribed due to the presence of garbled text)}
Appendix-I

(1) ಹೊಂದಿಸಿದ್ದರೆ :- ಕೀವ ಬೇಡುವ ಬಾಲಸಿದ್ದ ಬರತ್ತಿಗಳಿಗೆ, ಸುಲ್ತಾನ್‌ಯಾರು ಬಳಸಿದ್ದ ಫ್ರೆಂಚ್ ಭಾಷೆಯ ವಿದ್ಯೆಯು?

(2) ಹೊಂದಿಸಿದ್ದರೆ :-

(3) ಬೆಳ್ಳಿಯಲ್ಲಿ ಬಯಸಿದ್ದರೆ :- ಬೇಲೆಯಿದ್ದು, ತುದಿಮಾಲೆ, ನಿಹತ್ತಿ, ಜಾತಿ.

(4) ಕೆಲವು :- ರಾಜವಂಶದ ವಿವಿಧ ವಿಭಾಗಗಳಿಗೆ, ಅಸಮಾನ ಸೇವೆಗಳಿಗೆ ಮತ್ತು ಮತ್ತು ವಿವಿಧ ಸಾಧನಗಳಿಗೆ ವಿವಿಧ ಸೇವೆಗಳಿಗೆ. ಸಾಮಾನ್ಯ ವಿವಿಧ ಪ್ರಕಾರಗಳಿಗೆ ಅಸ್ಪತಾಲಗಳಿಗೆ, ಅಸಮಾನ ಸೇವೆಗಳಿಗೆ ಮತ್ತು ಮತ್ತು ವಿವಿಧ ಸಾಧನಗಳಿಗೆ ವಿವಿಧ ಸೇವೆಗಳಿಗೆ.

(5) ಸಾಧನಗಳಿಗೆ :- ರಾಜವಂಶದ ವಿವಿಧ ವಿಭಾಗಗಳಿಗೆ, ಅಸಮಾನ ಸೇವೆಗಳಿಗೆ ಮತ್ತು ಮತ್ತು ವಿವಿಧ ಸಾಧನಗಳಿಗೆ ವಿವಿಧ ಸೇವೆಗಳಿಗೆ.

(6) ಪ್ರತ್ಯೇಕಿಸಿದ್ದರೆ :- ಪ್ರತ್ಯೇಕಿಸಿದ್ದರೆ, ರಾಜವಂಶದ ವಿವಿಧ ವಿಭಾಗಗಳಿಗೆ, ಅಸಮಾನ ಸೇವೆಗಳಿಗೆ ಮತ್ತು ಮತ್ತು ವಿವಿಧ ಸಾಧನಗಳಿಗೆ ವಿವಿಧ ಸೇವೆಗಳಿಗೆ.
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tsdsos d6336drt<& ^de. 53dra Cos ?
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9) ನಿವೃತ್ತಿಯ ಸಂಸ್ಥೆಗಳಂತೆ :- ಅಂಗೀರು ಬಾಣಿಜ್ಯ

7) ಅಧ್ಯಾತ್ಮ :- ಸಮುದ್ರ ಅಂಕಾಧಿಕ್ಷಣಗಳು, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ. ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಬಾಣಿಜ್ಯ ದಿನ ಅಂಕಾಧಿಕ್ಷಣಗಳು, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ ಸಂಸ್ಥೆಗಳಂತೆ, ಅಂಗೀರು ದಿನ ಅಂಕಾಧಿಕ್ಷಣಗಳಂತೆ.

8.3 ಕಾಲಾ ವಿಭ್ಜನಿಸಿದ್ದಾಗಿದ್ದು

8.3.1 ಜನಾ. ವಿಧ.

2) ರಾಜಾ :- ಅಂಗೀರು ಬಾಣಿಜ್ಯ, ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ.

3) ನಿಯಮ :- ರಾಜಾ ಅಂಗೀರು ಬಾಣಿಜ್ಯ, ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ.

4) ರಾಜಕೀಯಸ್ಮರ್ಣ :- 15 ಎಕರು 30 ಎಕರು ಅಂಗೀರು, ಅಂಗೀರು ಬಾಣಿಜ್ಯ, ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ.

8.3.2 ಸಂಗಳ, ಸಂಗಳ, ಸಂಗಳ, ಸಂಗಳ.

9) ಅಧ್ಯಾತ್ಮ :- ಅಂಗೀರು, ಬಾಣಿಜ್ಯ, ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ.

10) ಅಧ್ಯಾತ್ಮ :- ಅಂಗೀರು, ಬಾಣಿಜ್ಯ, ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ.

11) ಅಧ್ಯಾತ್ಮ :- ಅಂಗೀರು, ಬಾಣಿಜ್ಯ, ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ, ಅಂಗೀರು ಸಾಮರ್ಥ್ಯ.

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(4) *toSe> - S&03e>mJ) —C
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e) dggardd erog&dcsrtefo :- Ejdpdidocd, 353$ sdd), dd)©*.
e) dggardd :- s3do±> oddradSpbd dd$ dEorWda, ddO& ?
e) rt)Q:- dsopi) £>£$ dja$6dDdTOd D«d, rioed sdsb re^odS, d^drordd d ^ososdd^ dsddids&d.

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## Appendix-1

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(4) विवरण: क्रमांकहीन विवरणार्थ: - रूपकर, नवरी नव, अथवा अन्य वर्णनात्मक विवरणार्थ, उदाहरणही
वस्तुत: अनुसार.

(5) विवरण: - नवरी नवा नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी
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(6) विवरण: - नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी
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b) विवरण: - नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी नवरी
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Appendix-I

1) ವಿದ್ಯಾಸಿದ್ಧಿಯು ಇದರಿಂದ (30 x 30 ಮಾ. ಮೈದಾನದಲ್ಲಿ) ಅದರ ಎಣ್ಣೆಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯ ಸಂಖ್ಯೆಯಾದ 400 ಎಣ್ಣೆಗಳ ಸರಾಸರಿಯನ್ನು ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ಬಹುದು, ಬಹುಪದ್ಧತಿಯ ಬಾಯಿಕೆಂದು. ನಂತರ ಅದನ್ನು, ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯನ್ನು ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

2) ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯನ್ನು ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ಹೊಸಿದ್ದಾಗಿ ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯನ್ನು ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

3) ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯನ್ನು ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ಹೊಸಿದ್ದಾಗಿ ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯನ್ನು ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

4) ವಿದ್ಯಾಸಿದ್ಧಿಯು ಇದರಿಂದ (30 x 30 ಮಾ. ಮೈದಾನದಲ್ಲಿ) ಅದರ ಎಣ್ಣೆಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯಾಗಿ ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

5) ವಿದ್ಯಾಸಿದ್ಧಿಯು ಇದರಿಂದ (30 x 30 ಮಾ. ಮೈದಾನದಲ್ಲಿ) ಅದರ ಎಣ್ಣೆಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯಾಗಿ ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

6) ವಿದ್ಯಾಸಿದ್ಧಿಯು ಇದರಿಂದ (30 x 30 ಮಾ. ಮೈದಾನದಲ್ಲಿ) ಅದರ ಎಣ್ಣೆಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯಾಗಿ ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

7) ವಿದ್ಯಾಸಿದ್ಧಿಯು ಇದರಿಂದ (30 x 30 ಮಾ. ಮೈದಾನದಲ್ಲಿ) ಅದರ ಎಣ್ಣೆಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯಾಗಿ ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿಯ ಸಂಖ್ಯೆ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

8) ವಿದ್ಯಾಸಿದ್ಧಿಯು ಇದರಿಂದ (30 x 30 ಮಾ. ಮೈದಾನದಲ್ಲಿ) ಅದರ ಎಣ್ಣೆಯನ್ನು ಎರಡು ಆವರ್ತಿಕ ಸರಾಸರಿಯಾಗಿ ಪಡೆದಾಕೆಯುತ್ತಾ. ಅದರ ಸರಾಸರಿ�ಲ್ಲಿ ವಿದ್ಯಾತ್ಮಕ ಎಣ್ಣೆಯ ಸರಾಸರಿಯಾಗಿ ಪಡೆದ ಸರಾಸರಿಯನ್ನು ಅಮಾದಲ್ಲಿ ಬರೆಯುವ ಸರಾಸರಿಯನ್ನು ಆಯಾತಿಸುವ.

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4) ವಿಷಯವಿದ್ದು ವ್ಯವಹಾರ: ಮತ್ತು ಅವಳಿಯುದ್ದಕ್ಕೆ ಎಡವ ವಸ್ತುಸಂಶೇಷದ ಎಣ್ಣೆಗಳಿಗೆ ವ್ಯವಹಾರ ನಡೆಯುವ ರೀತಿಯನ್ನು ತೊಡಗಿಸಿದ್ದಾರೆ?

5. ಜನವಾಸ ಮತ್ತು ಜನನಿಷ್ಟ ಹೆಸರು: -
4) ರೈತ: ಮತ್ತು ಸಾಮಾನ್ಯವಾಗಿ ಎಡವ ವಸ್ತುಸಂಶೇಷದ ಎಣ್ಣೆಗಳಿಗೆ ವ್ಯವಹಾರ ನಡೆಯುವ ರೀತಿಯನ್ನು ತೊಡಗಿಸಿದ್ದಾರೆ.
4) ವ್ಯವಹಾರವಿದ್ದು ವ್ಯವಹಾರ: ಆದ್ಭುತವೇಳೆ, ಸ್ಥಿತಿ, ಅವಳಿಯುದ್ದಕ್ಕೆ ಎಡವ ವಸ್ತುಸಂಶೇಷದ ಎಣ್ಣೆಗಳಿಗೆ ವ್ಯವಹಾರ ನಡೆಯುವ ರೀತಿಯನ್ನು ತೊಡಗಿಸಿದ್ದಾರೆ.

4) ವಿಷಯವಿದ್ದು ವ್ಯವಹಾರ: ಮತ್ತು ಅವಳಿಯುದ್ದಕ್ಕೆ ಎಡವ ವಸ್ತುಸಂಶೇಷದ ಎಣ್ಣೆಗಳಿಗೆ ವ್ಯವಹಾರ ನಡೆಯುವ ರೀತಿಯನ್ನು ತೊಡಗಿಸಿದ್ದಾರೆ?

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B.3 INSTRUCTIONAL SHEETS FOR PUPILS

The instructional sheets serve the purpose of conducting the activities by the pupils. The sheets give the procedural details as to how an activity needs to be conducted by the pupils. Pupils follow the Instructional procedure and accordingly record the activities in their notebook.

SOIL

School Soil
1) Write the diagram of the soil in your note book.
2) Select a place in the school grounds (remember to select a place where less people are around).
3) On the soil, take the measurement of four scales length and draw a square.
4) Observe the different objects present within the square.
5) Dig the soil and examine the soil, present in the lower layers.
6) Did you observe any difference between upper layer and lower layer of soil.
7) Draw the diagram of the soil.
8) Compare the diagram of the soil, before and after the activity.

Earthworm
1) If you have seen earth worm earlier, draw the diagram of the earthworm.
2) Take an earthworm on a piece of white paper. Observe the size, shape and movement of earthworm.
3) Draw the diagram of earthworm.
4) How does earth is useful to plants? Give reasons?
5) How does earth worm gets air inside the soil?

Grass soil
1) Observe the grass present in the school grounds
2) Puck about 8 or 10 grasses from the soil along with its roots. Keep the grass on a sheet of paper. Observe the grass roots.
3) Draw the diagram of the grass roots. Observe whether soil is present in the grass roots.
4) Observe the nature of soil present in the grass roots.
5) Reason out as to why bigger stones are not attached to the roots?
Garden Soil
1) Observe the Garden soil. If bigger stones, bricks, spines are there, remove it.
2) Pour the soil into glass vessel while pouring observe if there is any dust in the soil.
3) Pour water into the glass vessel and stir with the stick.
4) Did you observe any changes in the vessel. Write your observations in the notebook.
5) Observe the soil by touching the upper layer and lower layer of the soil.

Ants
1) Draw the diagram of ants.
2) Observe ants in the school grounds. Observe the movement, colour and size of the ants.
3) Draw the diagram of ant.
4) Identify (before and after the activity) any difference between the ant’s diagram
5) If you have questions on ants do write it.

Game of steps
1) In which step did you hear the sound clearly?
2) In which step you did not hear the sound?
3) Among 1, 10 and 15 steps. In which steps you heard the sound clearly? Give your reasons
4) What did you learn from this game.

SOUND

More and less
1) Make more and less sounds with the help of spoon and plate.
2) Make more and less sound with help of comb and cardboard
3) Why did the more and less sounds came? Can you give reasons?

In and around
1) Tie a cloth around your eyes and with a help of your friend go near the school compound
2) Whatever the sounds you have heard, say it loudly so that your friend can list the various sounds heard by you?
3) With the help of your friend, identify whether you had made any mistake in recognizing the source of sound.
4) Close your ears with your hands and whatever the sounds you have heard, say it loudly so that your friend can list the various sounds heard by you.

5) Did you hear any sound despite you had closed your ears? Can you give reasons?

Water and air

1) Describe the vibrations of sounds in water and air.
2) Can you give the reason for vibrations in water and air.

Different objects

1) What were the ten different objects brought by you?
2) Did all the sounds heard in all the objects were same?
3) Identify the objects, which gives similar sounds?
4) Identify the objects, which gives dissimilar sounds?

WATER

Water Evaporation and Temperature

1) Take two cups of equal size and in each add a spoon of water.
2) Keep one cup in sunlight and another in shades.
3) Count 101 onwards and record the number at which got water got evaporated.
4) Did the water evaporated faster in shades or in bright sunlight. Give your reasons.

Water evaporation and air

1) Draw two square of the same size on the grounds.
2) Wet the cloth given to you.
3) Rub both squares with the wet cloth and start counting 101 onwards.
4) Dry one square with fan and another leave it to dry on its own.
5) What did you observe? Write down in your note book?

Water evaporation and water

1) Fill the cup with the water.
2) Transfer a drop of water from the cup on to the plate and start counting 101 onwards. Record the number at which water dries up.
3) Similarly add two drops of water from the cup and start counting 101 onwards, record the number at water dried up.
4) Repeat the procedure for 3, 4 and 5 drops and record the number at which water dries in each case.
Water evaporation and surface area
1) Add a half spoon of water in a cup and a vessel and keep in bright sun light. Start counting 101 onwards.
2) Identify number at which water dries up in cup or vessel.
3) Repeat the same activity for two or three times.
4) Identify whether water evaporates faster in cup and vessel.
   1) Wet the cloths given to you.
   2) Fold the one of the cloth two folds and another with four folds.
   3) Dry the clothes in the hot sun and identify which one of the clothes dries faster.

Water evaporation and salt
1) Take a cup and add \( \frac{1}{4} \) of water in to it.
2) Add 4 spoon of salt and make a salt solution.
3) Take \( \frac{1}{2} \) a spoon of salt solution on a cap and \( \frac{1}{2} \) spoon of ordinary water in another cup.
4) Count 101 onwards and stop till the water dries up in one of the vessels. Identify in which case water dries up.

Note: Instructional sheets in English were translated into Kannada version for assisting the pupils. The next page presents the instructional sheets in Kannada.
B.3 INSTRUCTIONAL SHEETS FOR PUPILS
(KANNADA VERSION)

1. পুলিলের জন্য স্থান কী হয়?
2. বিকল্প সম্পর্কে এবং এর পরিণামে সমস্ত জনগণের জন্য (সত্যিকরে সম্প্রতি নিজস্ব অর্থের জন্য এর ফলস্ম)
3. রাজ্যের উপর আইনের অন্তর্ভুক্তি করার জন্য প্রতিপত্তি দেওয়া প্রত্যেক সম্ভাব্য প্রতিক্রিয়া দেখে।
4. কেন এটি ঝুঁকিপ্পূর্ণ নয় বা সর্বাধিক ওয়ার্ডলাইটে কোনো ঠিক নয়।
5. কী প্রচলিত কমিশন প্রতিপত্তিচ্যুত নয়।
6. মাথায় স্থানের প্রথম পেশ একটি পরিসংখ্যান স্থাপন করার জন্য প্রতিদিন সমাবেশ করা।
7. কোনো মাসকে অন্য স্থানটি সর্বাধিক প্রতিচ্ছ্বাস দেয়।
8. অন্য মাসের প্রথম পেশ একটি পরিসংখ্যান স্থাপন করার জন্য প্রতিদিন সমাবেশ করা।

সংকল্পনা (অব্যাহতি)

1. স্থানের প্রথম পেশ করার জন্য পর্যালোচনা করা।
2. সীমাবদ্ধতা গ্রহণ করার জন্য প্রতিদিন সমাবেশ করা।
3. কমিশন প্রতিপত্তি করা।
4. মাসের প্রথম পেশ একটি পরিসংখ্যান স্থাপন করা।
5. কীভাবে স্থানটি প্রতিদিন সমাবেশ করা?

সংকল্পনা (অব্যাহতি)

1. স্থানের প্রথম পেশ করার জন্য পর্যালোচনা করা।
2. সীমাবদ্ধতা গ্রহণ করার জন্য প্রতিদিন সমাবেশ করা।
3. কমিশন প্রতিপত্তি করা।
4. মাসের প্রথম পেশ একটি পরিসংখ্যান স্থাপন করা।
5. কীভাবে স্থানটি প্রতিদিন সমাবেশ করা?

অন্যান্য বিষয়
Appendix-I

1. ವಿಭಾಗ ಮೂಲಕ ಉತ್ತಮ ಪ್ರಕಾರದಲ್ಲಿ ನಂತರ ವಿದ್ಯಾರ್ಥಿ ಎರಡುವಿಕೆಯಲ್ಲಿ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು? ಅಥವಾ ಅನುಮಾನ ಕರಬಹುದು?
2. ವಿಭಾಗ ಮೂಲಕ ಉತ್ತಮ ಪ್ರಕಾರದಲ್ಲಿ ಹೆಚ್ಚರಿಗೆ ಹಾಗೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
3. ಏನೇ ರಾಹಿನ ಹಾದು ಎರಡುವಿಕೆಯಲ್ಲಿ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು? ಅಥವಾ ಅನುಮಾನ ಕರಬಹುದು?
4. ಅಥವಾ ಅತಿ ಹಾದು ಎರಡುವಿಕೆಯಲ್ಲಿ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?

ಶಿಕ್ಷನ - ಶಿಕ್ಷಣ

1. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಅಥವಾ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು? ಅಥವಾ ಅನುಮಾನ ಕರಬಹುದು?
2. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಅಥವಾ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
3. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಅಥವಾ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
4. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಅಥವಾ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?

ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆ

1. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
2. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
3. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
4. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?

ಶಿಕ್ಷಣ

ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆ

1. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
2. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
3. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
4. 101 ವರ್ಷ ಆರ್ಥಿಕ ಅವಧಿ.
5. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?
6. ಶಿಕ್ಷೆ ಶಿಕ್ಷಣ ಪ್ರಕ್ರಿಯೆಯ ದಿನಗಳ ಒಂದು ವಿಷಯ ಸಂಖ್ಯೆ ಎಂದರೂ ಅನುಮಾನ ಕರಬಹುದು?

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Appendix-1

1. ಮೇಲೆ ಕೇವಲ ಅತ್ಯಂತ ಸ್ಥಿರವಾಗಿಲ್ಲದೇ ಲೇಖನದ ಮೇಲೆ ಭಾರತದ ಮೇಲೆ ನಿರ್ದೇಶ ಮಾಡಲು ಕಾರಣ.
2. ಅದರೊಂದಿಗೆ ಪ್ರತಿಕ್ರಿಯೆಗಳು ಮತ್ತು ಅಂಶಗಳು ನೀಡಲು ಸಂಬಂಧ.
3. ಲೇಖನದ ಮೇಲೆ ಅವಶ್ಯಾಕವಾದ ಸ್ಥಿತಿಗಳು ಮಲ್ಮೂಲವಾಗಲಿದ್ದೆ.
4. ಲೇಖನ ಜನರ ಲೇಖನದ ಮೇಲೆ ನಿರ್ದೇಶದಾಯಕರಾಗಿಲ್ಲದೇ ಕಾರ್ಯ ಕೆಲಸ.
5. ಇದರ ಅವಶ್ಯವಾಗಿಲ್ಲದೇ ಲೇಖನದ ಮೇಲೆ ಭಾರತದ ಮೇಲೆ ನಿರ್ದೇಶ.

ಎಲೆಕ್ಟ್ರೋಕ್ ಸಂಶೋಧನ

ಎಲೆಕ್ಟ್ರೋಕ್ ಸಂಶೋಧನ

ಎಲೆಕ್ಟ್ರೋಕ್ ಸಂಶೋಧನ

ಎಲೆಕ್ಟ್ರೋಕ್ ಸಂಶೋಧನ

ಅಣ್ಣದ ಸಮಯದ ಮೇಲೆ

1. ಅಣ್ಣದ ಸಮಯದ ಮೇಲೆ ಲೇಖನದ ಮೇಲೆ ಅಥವಾ ಯುಕ್ತಿಯೊಂದಿಗೆ ಅಣ್ಣದ ಸಮಯದ ಮೇಲೆ ಲೇಖನದ ಮೇಲೆ ಭಾರತದ ಮೇಲೆ ನಿರ್ದೇಶ ಮಾಡಲು ಕಾರಣ.
2. ಅದರೊಂದಿಗೆ ಪ್ರತಿಕ್ರಿಯೆಗಳು ಮತ್ತು ಅಂಶಗಳು ನೀಡಲು ಸಂಬಂಧ.
3. ಲೇಖನದ ಮೇಲೆ ಅವಶ್ಯಾಕವಾದ ಸ್ಥಿತಿಗಳು ಮಲ್ಮೂಲವಾಗಲಿದ್ದೆ.
4. ಲೇಖನದ ಮೇಲೆ ಅವಶ್ಯಾಕವಾದ ಸ್ಥಿತಿಗಳು ಮಲ್ಮೂಲವಾಗಲಿದ್ದೆ.
5. ಅತ್ಯಂತ ಕೆಲಸುವಾಗಿಲ್ಲದೇ ಲೇಖನದ ಮೇಲೆ ಭಾರತದ ಮೇಲೆ ನಿರ್ದೇಶ.
B.4 TEACHING STRATEGIES

B.4.a Discovery approach
This approach involves finding out by the pupil, instead of merely teaching of everything by the teacher. This approach demands complete self-activity on the part of pupils. This approach involves 3 phases.

- **Familiarisation phase**
  During this phase, teacher orient the pupils about the activities, gives the demonstration of an activity. Discuss the purpose of using instructional sheets, orient the pupils to work in groups.

- **Discovery phase**
  During this phase, pupils work in groups towards an activity. Pupils’ attempts to discover what is intended desired on by the teacher.

- **Evaluation phase**
  After the activity, pupils and teacher discuss about the way or progress during the activity. The teacher verifies and discusses with the groups about the extent which pupils have discovered or realised the objectives.

  - **Teacher’s Role**
    The teacher’s role is that of facilitator. During the initial stages the approach is centered towards teacher, later on it becomes learning centered approach. Teacher’s intervenes wherever is essential.

  - **Pupil’s role**
    Pupil’s role is to work in groups. Able to carry out the task as per the teacher’s instruction, encourage each other to work towards the activity.

  - **The climate**
    The classroom climate is that of a democratic environment where pupils and teachers participate equally to learn a given activity.

  - **Support materials**
    The support materials like paper, books, specimens, equipment are provided by the teacher.

B.4.b Group Investigation Model

*Modified from (Joyce, Weil and Showers, 1992)*
This model involves pupils to work in groups towards a problem imposed by the teacher. The pupils are required to conduct a scientific investigation in order to arrive
at the conclusion. This model is based on constructivist view of knowledge. The model consists of five phases.

1) **Phase one:**
   - Teacher identifies pupil’s initial ideas about the concept
   - Teacher identifies pupils initial ideas through writing/drawing/questioning

2) **Phase two – entering in to activity**
   - Teacher briefs about the investigations what is expected of pupils
   - Pupils carryout investigations

3) **Phase three – evaluating the progress of investigation**
   - Teacher arranges pupil’s records for group evaluation as per each item.
   - Pupils evaluate their own progress along with the work of other groups.
   - Pupils present into the whole class.

4) **Phase four – Teacher challenges each group for further investigations**
   - Pupils may select the activity for further investigation
   - Teacher provides new information through questions to challenge the pupils’ previous understanding.

5) **Phase five - Reflecting**
   - Teacher and pupils participate equally in analyzing the strength and weakness of each group.
   - Pupils write their ideas about the content after they complete activities in Phase 1 to phase 4.
   - Pupils compare their initial and after ideas about the content/concept and identify the changes with the help of the teacher.

   o **Teacher’s Role**
     Teacher’s plays a facilitative role directed at group process (help learners to formulate plan) act, manage group and requirements of inquiry (consciousness of method). He or she functions as an academic counsellor.

   o **Pupil’s role**
     Pupil’s role is to work in groups. Able to carryout the task as per the teacher’s instruction Pupils encourage each other’s to work together and negotiate during the group activities. Pupils learn to evaluate their progress by comparing their initial and final ideas.
The classroom climate

The climate is based on the democratic process and group decisions. In the initial phase 1, 2 and 3 teacher takes the control of the discussion and organizes the investigations in groups. In phase 4 and 5 pupils enjoy the autonomy of exercising their choice and reflecting on the activity. The classroom climate is one of reason and negotiation.

Support system/materials

The climate must be able to respond to a variety of learner’s demands. Teacher and students must be able to assemble what they need, when they need it.

B.5 ASSESSMENT PROCEDURES

The purpose this assessment is to identify the process skills employed by the pupils during the context of scientific investigation.

The assessing of pupils ideas includes information about the pupils action (what they do or say) or the products of their work (what they write, draw, make or set up) during the context of scientific investigations.

Pupils ‘actions’ were assessed through observation, interviews of pupils, while performing the activity. Pupils work included their drawing on the activities, the work recorded in their note books. Teacher maintains a dairy on children actions.

Pupil’s actions, pupils work and teacher notes, were seen through process skill (Harlen, 1993) indicators, to arrive at the understanding on the acquisition of process skills employed by the pupils.

C. MANUAL FOR INSTRUCTIONAL PROGRAMME.

The manual describes the procedures for using the components of the instructional programme for planning, implementing and assessing the teaching/learning experiences. The teaching/learning experiences are provided to understand the process skill employed by pupils. From this perspective teacher need not explicitly state the process skill to be attained. The attempt by the teacher is to design activates which concerns about ‘whole’ of scientific investigation not on focusing the development of individual skills.

The planning of the activities involves teachers to make decision on content, which has relevance to pupil’s hands on activities. The knowledge about constructivist approaches to learning, pupils prior ideas in a content. And practical
knowledge of schools is essential. From this background one should attempt to do the content analysis of the textbook. The unit selected through content analysis is subjected to planning lessons.

The procedure of planning, implementation and assessing lesson have been described below,

- Selecting a topic/unit from the textbook of environmental studies through content analysis procedures.
- Breakdown the content of the unit into different subunits.
- Formulate the Instructional Objectives to be attained.
- Determine the various resources in terms of time, materials, books etc.
- While formulating the activities, refer the tips for making the activity scientific, Tips for enhancing the process skills.
- Prepare the self-instructional sheets for pupils to conduct the activities.
- Organise the activities in terms of whole class activities and group activities
- Employ the teaching strategy, Discovery/Group Investigation Model or any other as desired by the teacher.
- During teaching/learning process keep a watch on pupils and teacher (your) actions. You may keep a notebook to record your observations during the class or after the class.
- Make pupils to record their observations on a notebook. If possible record the pupil’s verbal account of the activity on an audio recorder
- After two or three classes, review your actions and pupil’s actions through self-evaluation pro forma, tips for enhancing process skills and tips for making activity scientific
- Analyse pupil’s notebook and actions through process skill indicators, to identify the process skills employed by the pupils. Review your class accordingly to modify the learning experiences, teaching strategies and assessment procedures.