

ISEC

MODULE DESIGN

TOOL

KIT

This document can be considered to be a handbook that can be referred for designing the invention and sustainability education curriculum. It also elucidates the procedure for creating the modules.

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INVENTION AND SUSTAINABILITY EDUCATION CURRICULUM

ISEC is learner-centered ,inquiry-based and emphasizes the use of evidence in constructing explanations. Concepts and skills in Life Sciences, Physics, Chemistry, and Earth Sciences are presented with increasing levels of complexity from one grade level to another (spiral progression), thus paving the way to deeper understanding of the concepts

VISION

ISEC envisions the creation and development of scientifically and environmentally literate productive members of society who manifest skills as informed decision maker's, critical problem solvers, innovators, responsible stewards of nature and effective communicators who work on providing sustainable solutions to the prevailing problems of the society.

GOALS

The goal is to enable students to develop capabilities in six key areas:

- i) Conceptual understanding
- ii) Clarity of thought
- iii) Identifying the root causes of problems
- iv) Thinking about solutions
- v) Empathy
- vi) Communication and collaboration
- vii) Leadership and advocacy for the improvement of the human conditions

APPROACH

ISEC emphasizes nurturing clarity of thought, understanding of concepts associated with various topics and applying to solve real life problems, rather than just memorizing the facts and failing to apply the knowledge in real life. The need for invention in creating sustainable solutions is paramount given the dynamic changes in the society and the new problems arising at every front.

THEMES AND TOPICS IN ISEC

- » PHYSICAL WORLD
- » MATERIAL WORLD
- » LIFE SCIENCE
- » EARTH SCIENCE
- » IMBALANCE



Topics in Physical world:

Magnetism
Electricity
Mechanics
Simple Machines
Energy

Topics in Life Science:

Evolution
Body organization
Habitat
Life processes
Functions
Interaction and interdependencies

Topics in Material world:

Matter
Structure and properties
Reactions
Chemistry in Daily life

Topics in Earth Science:

Soil
Water
Air
Minerals
Astronomical systems

Topics in Imbalance:

Climate Change
Waste management
Depletion Resources
Biodiversity
Calamities

ISEC is meant for 3 levels; depending on the level of understanding the levels can be considered to be for grade 6, 7 and 8



The 3 facets of ISEC

INVENTION
SUSTAINABILITY
PROBLEM SOLVING

01

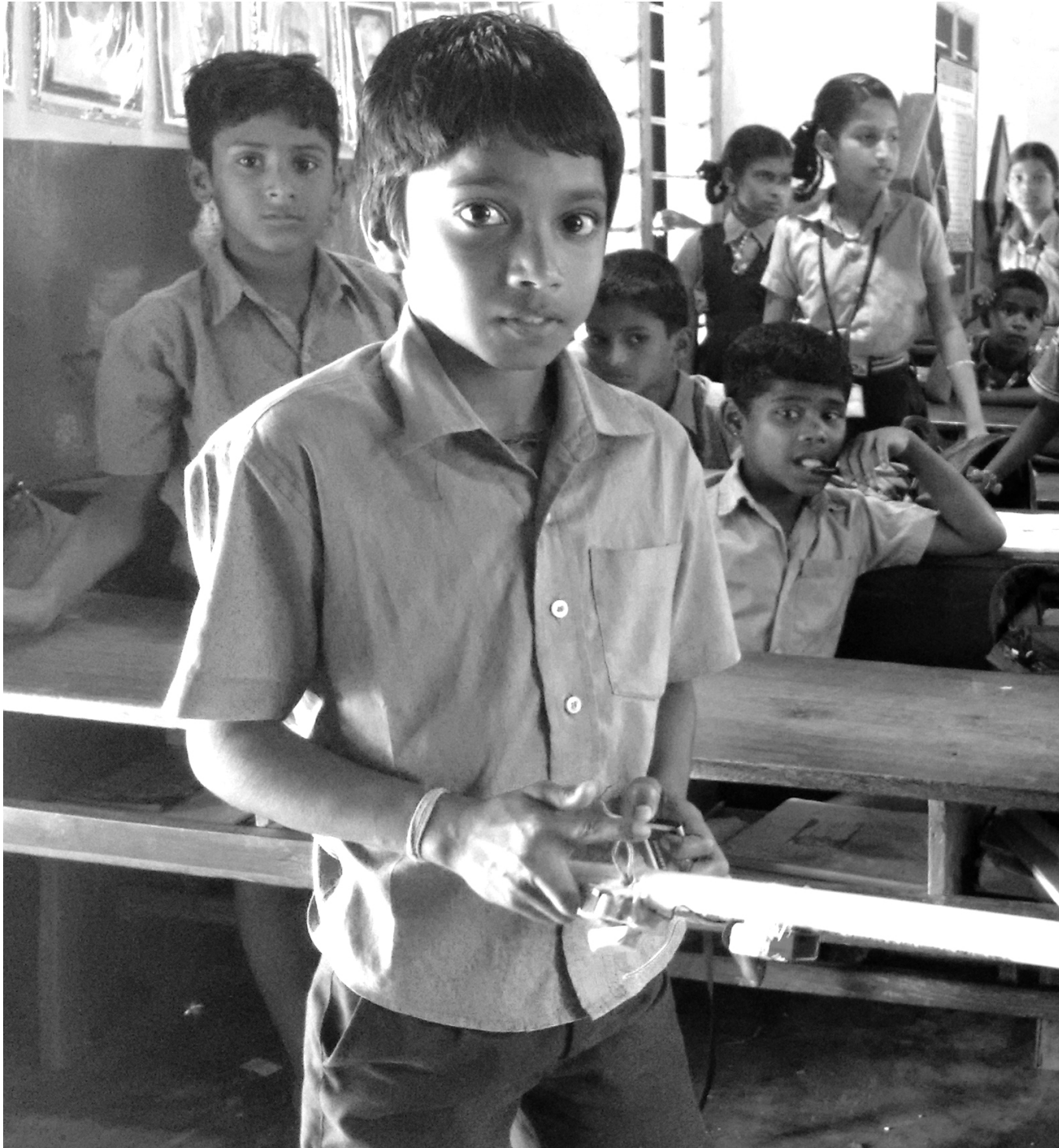
INVENTION

Invention refers to the act of creating something. It need not be the creation of a device or an object. It could range from a material invention to a system invention. It could also be the creation of a process or a means to reach out to people. The main aim is to train students to think like inventors, to work like improvers and become creators.

For this, they either need to understand some concepts and principles, or just need a push to apply what they already know.

A bank of experiments/toy-making has been created on topics that come under ISEC which can assist the children to inculcate creative thinking like that of inventors

THE KEY TO REAL
INVENTION IS TO LET
CHILDREN EXPLORE
ALL POSSIBILITIES
AND NOT JUST THE
ONES YOU ARE AWARE
OF.
ALL YOU NEED TO DO
IS ASSIST THEM.





SUSTAINABILITY

Sustainability is the ability to continue a defined behaviour indefinitely. Be it in the field of environment or be it in the socio-economic sense, sustainability is the demand of the day.

ISEC focusses on both the aspects of sustainability and blends it through the curriculum. It makes children understand what a sustainable model of invention could be. It believes in the philosophy that there is no need of inventing something which is not sustainable as it will not last for long.

We are spoiling the environment at a rampant rate and along with us, we need to impart this information to the coming generation as well. They may not be the ones spoiling the environment the most, but they are surely going to learn from the same practices.

These children are the future and if today they are informed about sustainable means and are inspired to intervene in that direction, we can still hope to see a brighter future for the world.

The children we are targeting are exposed to sustainable practices more than the average children. They are aware of the problems in the current scenario as they are the biggest victim of these problems. We need to give them a chance to solve these issues by giving them the extra exposure they need.

ISEC originally had 6 themes. Sustainability was the sixth one.

But as sustainability is the baseline of invention, now the modules are designed in such a way that the aspects of sustainability have to be part of all modules.





PROBLEM SOLVING

Children are natural problem solvers, and early childhood settings - where children interact with one another and participate in decision making - offer countless opportunities for children to grow in their problem-solving abilities. These important experiences help children learn to value different kinds of thinking, to think logically and creatively, and to take an active role in their world.

PROBLEM SOLVING APPROACH IN ISEC

Observe and understand the surroundings through the lens of social, economical and environmental perspectives

Identify and assess the issues/problems in the system in social, economic & environmental perspectives

Critically think about what can be done by using various thinking processes such as Meta-cognition (ability to reflect on one's assumptions and thinking for the purposes of deeper understanding and self-evaluation) and Analytical thinking (separating problems or issues into their component parts) to result in:

- » Prioritizing the problems
- » Deciding a feasible solution
- » Ability to develop solutions
- » Conceptual understanding
- » Reasoning-logical thinking & decision making



Awareness about existing solution / exposure to what a solution can be like

Generating and selecting from alternatives based on desired outcomes

Creativity that involves

Ideation: Using a wide range of idea creation techniques

Imagination: Using intellectual inventiveness to generate, discover, and restructure ideas or imagine alternatives

Innovation implementation: Acting on creative ideas to make a new contribution

Ability to plan & execute solutions keeping in mind the

- Resources
- Stakeholders
- Stages of execution
- Impact analysis
- Adapt & explore sustainable lifestyles

Evaluate the solutions in social, economic & environmental perspectives through Discussion, Analysis, feedback, conflict resolution, collaboration, communication mock/dry run.

Solutions could be either of the following:

Model

Mock up

Processes (creation/modification)

Product (creation/modification)

System

Knowledge sharing/transfer/spreading awareness





APPROACH TO BE TAKEN

The idea is to make the ISEC a ready-to-use product.

The content and kit for each topic is to be made in such a manner that it develops into a complete package.

Once the content, activities and collaterals are ready for each topic, the products have to be packaged together either theme-wise or topic-wise.

ISEC aims to be a part of the school time table and be absorbed as part of the regular class-schedule.

When ISEC is at a stage to be replicated, school teachers should be trained to take it up on their own



TARGET AUDIENCE

This has to be tested in the current schools under Invention education. After testing (each module) and gathering feedback; it can be taken to different schools





DURATION OF THE MODULES

Schedule for schools

ISEC classes take place before or after school hours;
Classes are taken separately for grade 6, 7 and 8

Time for each class

The time given for each school for each grade is one hour per week.

Time given to each module

Create the modules such that it lasts for 2 weeks i.e. for 2 hours.

Consider extending the modules only when the module is content heavy for example Electricity and Electromagnetism

Prepare for the least time

Make the content as crisp as possible

ISEC aims to be a part of the school time table and be absorbed by the school schedule.

01

Make sure of comparing the content with the global content for the same levels and how you can include to keep the level of understanding of students matched with the global standards.

MAPPING AND SELECTION OF CONTENT

Careful judgement and understanding of the curriculum is required.

As ISEC aims to reach out to all the states, it should not only be matched to the state board of Karnataka, but also be adaptable to national standards. The content created so far is quite general in nature and does not involve extreme specificity. It can be modified as per the requirements of individual state boards.

Criteria of selecting the content:

- » It's existence and timing of a topic in the state board curriculum
- » National science standards
- » Aspects of sustainability and invention in it
- » It's ability to make the basics strong

For grade 6 students your content may or may not be heavy but you have to make them feel like they are learning to become problem solvers and maybe even future scientists

Grade 8 is the level where we can add the difficulty level in solving problems.

The topic selection criteria is also based on their curriculum and the need to increase their level (based on the previous year's content)

There is a need to choose the content in such a way that one can get invention as an output.

TIP

One needn't just add difficulty in content. We need to expose the students to problems which need more applications.

SPIRAL CURRICULUM

It is a course of study in which students will see the same topics throughout their school career, with each encounter increasing in complexity and reinforcing previous learning.

02

WHAT SHOULD BE SPIRALLED

SPIRAL THE CONTENT

For topics like Electricity, Matter and Structure etc. that are content heavy and have a lot of details to look into, it's important to spiral the content than teach only a part to a class or the entire content in one year.

SPIRAL A SKILL

For topics like Chemistry in daily life or topics which are more general; the content may not be spiralled directly. At times it is more important to develop a skill through the years

Some examples that should be developed and reinforced throughout the years:

Skill of learning that there is chemistry or chemical reaction in all food elements or a skill to observe things around you.

There are times when you spiral both the skill and the content together. For example, learning to read evolving into reading to learn.

CONSIDERATIONS

While spiralling the content

- » One needs to map the content with the curriculum of the state board.
- » Evaluate and change based on what all can be added or eliminated to it Which will be important for the students to learn and lead to an invention. The content topics in the lower grade become the basis of the topics in the higher grades.
- » Make sure there are revision tools adopted in the higher grades

While spiralling the Skill

- » Keeping the skill as the base; one needs to decide the activities and methodologies.
- » For higher grades the focus will go on how to APPLY the skill.
- » If the topic is not content heavy and rely more on observation- make sure you focus on that being one of the skill you want to develop.
- » You can even choose a 'process' to spiral in the 3 levels

03

FLOW of content

How to define

Once your topics are mapped you need to define how you want to take the students through the content.

Make sure the topics link with each other such that one topic leads to the other or have some connection so that the child is able to understand things easily.

Considerations to define the flow of the lesson

- » Content
- » Level of content
- » Mapping of content with the classroom curriculum
- » Once you have mapped the content properly:
 - » See what can intrigue the student to know more about the topic
 - » Which topic can lead to the next topic
 - » What is the most understandable topic and if that can be linked to the other topics
 - » See if you can link the start of the lesson and create a loop (refer to Chemistry -Soaps)

While deciding the Facilitator flow

Make sure you have evaluated and selected the topics which need a human voice

Make sure you have imagined the class in the context

When you are in doubt about any step- Find a group of adults(if not children) and make them role-play as children. Make them understand the topic as a child would.

Based on their responses, make the Facilitator guide/content delivery.

Use of collaterals in this context

To break the class monotony, there is a need to use creative collaterals for children to enjoy what they are doing.

You can easily use a tabulated A4 sheet of paper but that might create monotony in the class and they might not like the activity of simply observing and noting down. The activity has to be made interactive and attractive.

Use of models

One needs to use models that can be created and tested easily. Students should be given things that have instant and prominent results and understanding of the scenario.

Always consider what they can create fast and test so that they are motivated to do the same.

Importance on the details

Importance should be according to the learning objectives which need to be mapped to the 3 main points of ISEC that is, Students should be able to invent; produce sustainable results; identify and solve problems in areas around them.

PEDAGOGIES AND METHODOLOGIES



PEDAGOGIES

Experiential learning
Activity based
Socrates methods - Inquiry learning
Blended Learning
Flipped Classroom
Learning by teaching
Story telling
Project based
Cooperative learning
Scenario based learning
Contextual learning
Game and game design

METHODOLOGIES

Peer instructions
Inductive learning
Deductive methods
Outdoor games
Puppet shows
Toy making
Nature walks
Physical movement based
Involvement
Memory games
Board games
Interviews
Question boards
Analogies
Reading sessions
Radio clubs
Newsletters
Journal writing
Talking pages
Pictorial Learning
Graphical learning
Audio Visual
Flash cards
Role plays
Audio tapes
Dialogue classes
Converting lessons in songs
Resource book
Scrap box





05

LESSON HOOK

Make sure you have a lesson hook in the starting of the class which makes the students interested in the subject.

Lesson hooks should also be used in the middle of the class depending on how difficult and new a concept is for the students.

The lesson hook needs to be defined according to the

- » Course taken
- » Content of the course
- » Age group
- » Prior knowledge about the content

OPTIONS OF LESSON HOOKS AND ACTIVITIES

- » **Show & Tell:** Use a prop from a story students are about to read.
- » **Story:** Tell a quick and engaging story that goes directly to the material.
- » **Analogy:** Offer an interesting analogy that touches students' lives.
- » **Media:** A picture, or a piece of music, or brief video
- » **Inventions:** Talk about the inventions done in this field and motivate these
- » **Challenge:** Offer students a very challenging task and let them try to solve it.
- » **Place objects in a brown bag.** Have students reach in and make observations about the contents of the bag
- » **Gallery Walk:** Using images or objects, students move from station to station making observations. The goal is for students to come to a conclusion about the objects/images that is related to a particular concept.
- » **Survey:** Survey your students by asking questions and having them step to a side or corner of the room that represents their response.
- » **Prediction:** Present a scenario and have students make a prediction (great for probability, statistics and data analysis).
- » **Outdoor visits**
- » **Song:** Play a song as the students enter the room. Leave it on during the warm-up. Ask students how the song might be related to a given concept. Let them share their ideas before you explain your purpose for doing it
- » **Experiment:** Conduct an experiment that illustrates a concept.
- » **Vocabulary connections:** Give students a group of words related to the lesson. Make them guess the topic or find the word that doesn't fit in the group.
- » **News:** Bring in a newspaper article or online news clip that addresses an area of interest or importance to your students.
- » **Skit/Dress-Up:** Give students roles and have them act out a skit.

» **Layout or arrangement of sitting:** In their classes can also make them interested. For example if you are testing/investigating some things then the lesson hook could be making a set up where they feel like scientist and investigators.

» **Riddles, Brain Teasers, scavenger hunt**

» **Ask a Question :** In order to get your students engaged in an upcoming lesson, ask them a question that will interest them and activate prior knowledge.

» Example: Ask students to recall their favourite movie or favourite story from earlier in the year. Ask students to recall who the story is mostly about and use this as an opening to introduce main character.

» **Use a book:** Using a picture book at the start of the lesson can be an effective strategy to motivate students and provoke interest. Picture books help make learning new concepts more accessible to students by highlighting the concepts in cultural context.

» **Play a game:** Playing a quick game in order to recall prior knowledge can be an effective strategy for getting students engaged in the lesson and prepared to build off prior knowledge.

» **Tell a story:** In order to highlight a concept, a teacher can choose to tell a story that is closely related to the concept.

» **Use manipulatives or models:** Teachers can use physical models to prepare students to learn a specific concept or better highlight the critical attributes of new concepts.

ACTIVITIES AND LESSON HOOK SELECTION CRITERIA

- » Simplicity of understanding
- » Ease of executing
- » Material availability
- » Interest generation
- » The ability to understand the concept with the activity and create and urge to know more
- » The skill students develop from that



CLASS BREAKERS

- » Picture prompts
- » Think breaks
- » Choral responses
- » Instructor storytelling
- » Pass the pointer
- » Empty outlines
- » Classroom opinion polls
- » Total physical response
- » Hand held response cards
- » Student polling
- » Self-assessment of ways of learning
- » Everyday ethical dilemma
- » Make them guess – about new sessions
- » Make it personal
- » Punctuated lectures- listen, stop, reflect/ write give feedback. Students become self-mentoring listeners
- » Interest/knowledge skill checklist
- » Energizers- chants
- » Shout out exercises

06

ASSESSMENT

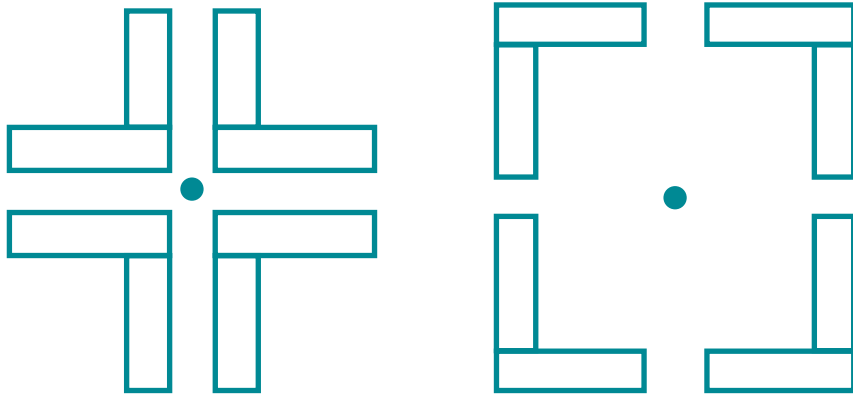
ISEC believes in formative assessments rather than summative. For most of the PBL approaches; the assessment is the process itself. Assessments that cannot be done through a process can be done as an activity.

Students have to be made to believe that assessment does not happen just at a test level and can be made fun and innovative



CLASS LAYOUTS

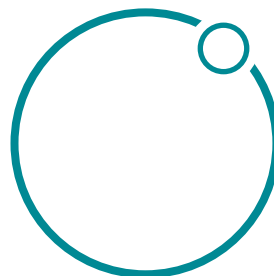
Experimentation setup



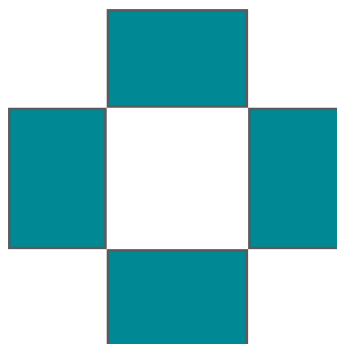
Demonstration setup



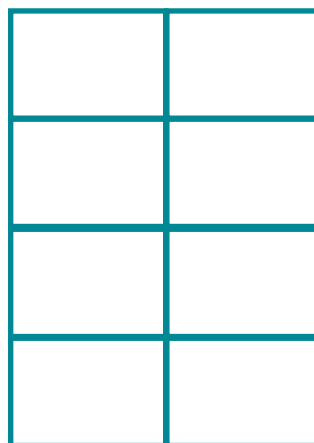
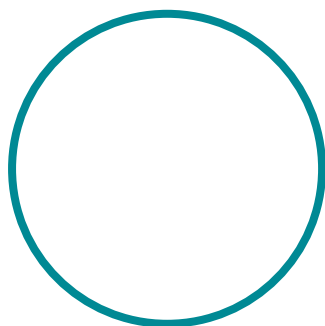
Discussion setup



Desk layouts



Markings on the floor





MODULES

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MODULES



MODULE 1

THEME: IMBALANCE

TOPIC: CLIMATE CHANGE

LEVEL 1

Consult the module for entire content and execution methods

Learning objective 1:

Understanding and revising the basics of climate

Topics to be explained - based on the understanding of climate change:

Temperature
Rainfall
Weather
Climate
Atmosphere
Photosynthesis

01 —
02

The content spiralling is done by making level 1 as the base for level 2.

Level 2 is an application of level 1 by merging the concepts of level 1 and problem solving

CLASS START:

Activity/lesson hook chosen:
Card based revision: To involve each child in the class and to let the information come from children itself.

Criteria of selection of the activity:

There was more than one small topic to be revised.
Each of these topics had 2-3 small points

Activity explanation:

Card reading activity
There are 30 cards on Temperature, rainfall, weather, climate, carbon dioxide, photosynthesis and atmosphere
Distribute the cards in the class (randomly) and make them read those cards according to the specified order.

04
|
05

PART 2

01

Learning objective 2

Understanding the advanced concepts of climate change

Topics:

Carbon cycle
Greenhouse effect
Global warming
Climate change

Activity: Using a media - picture; led by facilitator explanation

The advanced topics need to be explained by the facilitator as they are intense and need verbal guidance along with visual techniques. Visual clues are used instead of the board to give the students a break from regular teaching methods.

PART 3

06

Assessment

Indirect and formative assessment

Description:

Puzzle activity:

The setup has one sheet of questions on its base. There are puzzle pieces which are printed on both the sides. On one side there are answers and on one side of the puzzle pieces.

The children have to place the puzzle pieces on the base question sheet in such a way that the answers are facing the question and the back side forms a picture.

When they are done with this, they will see an image which tells the effect of global warming i.e. icebergs melting, floods occurring etc.



FLOW CONSIDERATION:

The visual on the flip side of the puzzle was chosen keeping in mind the flow of the topics; it will lead to a discussion on the next topic

The activity was conducted to assess what they learnt. The assessment is a question-answer session but it also develops visual interpretation skills.

This activity changes the format of assessment, wherein the questions lead to another interpretation thus it is a combination of a puzzle and matching tiles.



WEEK 2

01	04	05
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Learning objective

To test the temperature change in the presence of extra carbon dioxide

The objective was defined to make children believe they can prove things by testing

Activity type: Hands-on

Cases:

Earth in one and Plant in one – note the temperature
Soil with Carbon Dioxide and Soil without Carbon Dioxide – note the temperature
Plant with CO₂ and just CO₂ – note the temperature
Plant with or without Carbon dioxide – note the temperature

Instructions

Divide the class into groups of 4 and distribute the 4 cases among them (repeating is not a problem). In each case-2 are observing the behaviour in each of the bottle Give each of the group a specific location in the class. (They can use the duct tape to mark their area of experimentation)

You may put charts in class and write the Driving questions, hypothesis and conclusion.

Motivation and preparation: Let them know that nothing might happen to any of the temperatures and this is the first time they are going to find out, just like how scientist do

PART 2:

Learning object: To understand the human impact and reasons of climate change

04

Presentation: Story scroll on the wall

Human impact was chosen to be explained through storytelling as stories can make anyone understand the most difficult concepts easily.

For students to accept what has happened to the environment and what has to be done, it is most suitable to explain concepts through storytelling.



HOME ACTIVITY:

Activity: Sticker pasting

The topics are:

1. Products that are made by deforestation
2. Smoke
3. Cattle rearing
4. Waste that cannot be reused
5. Things that use fossil fuel in them
6. Plastic collection

Reason:

Stickers to be made as assessment:

To make students concerned about the environment and make them inform people

Also, assess them if they got the concepts properly.





LEVEL 2

Revision:

Video: It can brush through all the easily and quickly with proper understanding

03

PART 2:

Objective: To understand different scenario

To role play entities around them

To brainstorm and look for solutions that them solve the problems around them

06

Brainstorming activity:

Through storytelling and scenario building

This activity is to make them discuss about the problems around them. It's a way to brainstorm, discuss and solve the problems.

Role-playing, plays, dramas are a different way to make students handle problems in a different way.

Once they understand the idea, there has to be a discussion leading to solutions based on the scenarios they are told.

Cards and booklets were chosen as it can hold the attention of the child.

MODULE 2

THEME: MATERIAL WORLD

TOPIC: CHEMISTRY IN DAILY LIFE



Spiralling of the curriculum:

Chemistry was treated as a process.

Children get the idea of why and what is happening than just doing.

Spiralling of sustainability was also a major consideration

Based on their course and level of the topics the content was divided.

02

Content hook: Not spiralling the content, but spiralling the skills.

LEVEL 1**Skill to be developed by this course end**

Knowing the why of what of things around them

Effective communication

The methodologies used to focus on improving the conceptual understanding, communication and collaboration

PART 1**Learning Outcomes**

Learn how chemicals are used in food preparation - (fermentation) using yeast.

Learn about the chemistry of fermentation using yeast and ENO.

Using chemical to test the purity of food items.

01



LESSON HOOK

Based on that objective, there was a need to start with an experiment; hence the workspace itself was treated as the lesson hook

A layout was made based on the existing furniture and class space.

Assistance of collaterals – as the lesson hook was the workplace, there is a need for it to be assisted with the collaterals. The collaterals that are needed for the workstation are workstation names and instructional guidelines.

The other aspects have been explained through Facilitator guidance.

ASSESSMENT

Assessment has been made into a lesson outcome where the students are made sensitive to their surroundings and they find the reason of why and what is happening.

They have to empathize with the different scenarios and different people.

Role Play:

This methodology was selected based of the time and empathy it involves while increasing their knowledge about their surroundings.

05

06

|

04

LEVEL 2

01

Learning Outcomes:

Learning outcomes were defined by mapping it with the expected skill outcome and the state board curriculum

Skill: understanding the why and how of chemistry

Understanding the aspects of sustainability

Understanding that soaps are cleaning agents - by testing different kinds of soaps

Understand that there are natural cleaning agents available, that can be used instead of a soap. Also, make a soap with natural detergent and learn about its properties.

LESSON HOOK

It was selected to involve the children in a discussion based on recalling the things they see around them

Class hook:

05

A Wall – everything in this module goes on the wall

The wall is the element that links the entire session together.



ACTIVITY 1

Make one student fill the poster which asks them about soaps used for cleaning.

After it's filled- Paste it on the wall.

Why: A poster/chart is a lesson hook that is used to start the lecture; we need to quickly build their interest. The poster is just a medium of starting a conversation with the children and involving them in writing the answers together.

ACTIVITY continuation

Bringing in of characters:

Criteria: It is to make them relate to the characters and make them understand the concepts and questions through them. Eventually each child will relate to one or the other character.

ACTIVITY 2

Hands on activity: Experimentation with different soaps

Analysis of the activity:

Comparison of soaps - Not putting in comparison directly; but indirectly making them analyse and compare the solution

04

03

FLOW

The module is made in such a way that it completes a loop.

In this module the hook was to start with an advertisement and end in the same way.



ACTIVITY 3

A part of the evaluation happens after a month by testing the pesticides and coming up with the best one for a given scenario

For the formative assessment, they are just given a small brief and they have to come up with the form of a presentation. By this, their spontaneity is tested and improved along with improving their presentation and decision making skill.

04

06

LEVEL 3

LESSON HOOK

Hands on learning

ACTIVITY 1

Candle flame oxygen experiment

ACTIVITY 2

Make students develop model of a particulate matter for testing of the particulate deposit placed at 3-4 different locations.

Use of models: The model of particulate matter is also a hook as they try a model in the real scenario. it is good to give such things to students that can be tested easily and have instant results.

03

05

ACTIVITY 3:

Making them build their own solution

Approach/pedagogy followed:

Project based learning:

Here the project was on combustion and the solution of a problem can be found by breaking the existing problems/solutions into smaller parts or by adding and replacing solutions.

The tool that could be used for the same is SCAMPER which was simplified and put in a chart form for execution

04

06





MODULE 3

THEME: PHYSICAL WORLD

TOPIC: ELECTRICITY AND ELECTROMAGNETISM

MAPPING AND SPIRALLING OF CONTENT

01

The content was mapped on the basis of the state board curriculum but was altered based on the how simply we can present the content and how much of it can be explained to level 1, 2 and 3

02

LEVEL 1

Learning Objective

To study about static electricity; electric current; current, voltage and resistance

ACTIVITY 1: Static electricity

LESSON HOOK

05

Starting with an activity that leads to a question

Static electricity forms the foundation for understanding the role of charges (positive, negative, neutral) in atoms.

A topic may not be in the order as per the curriculum of the state board but you have to see if the topic can generate curiosity in the child to know about the 'why' behind it.

Explanation:

Assistance of props is taken into consideration to explain difficult concepts easily.



PART 2

METHODOLOGY: Analogies

Analogies make a concept extremely simple to understand. For a concept like electricity where the elements like Voltage, Current and resistance are new - analogies can be helpful to explain the concepts easily.

Criteria to choose an analogy: Something that students already are aware of.

WEEK 2

The rest of the module was chosen to be experiment based along with facilitator explanation.

04

01

04



Revision

Methodology:

Peer teaching; Student driven classroom; flipped classroom

Description

Give them 4-5 sheets of reading material: Make them go through it for 3 days (home assessment).

Ask the students to read the material, understand what is given, create 4-5 questions on the content that they read, write the questions in the space provided on the workbook and come to next class with those questions. The questions that the students create can be either on the topics they understood as well as the topics that they did not understand.

After 3 days: they are divided into 4 groups of 5 and asked to discuss the questions amongst themselves and choose 5 questions which they then write on the cards.

LEVEL 2

04 03

Reason:

Students are supposed to revise the data before hand with the given material.

Asking the students to prepare questions will make them study their topic carefully and they can learn indirectly

PART 2

The rest of the module was chosen to be experiment based learning along with facilitator explanation as it needs a to have a direct explanations and need to be delivered by assessing level of the class.

LESSON HOOK

Inquiry based activity

An activity is added to a question-answer session to keep the students motivated throughout the session

Description:

There will be a question answer session where there are 4 options. Class has 4 spots:

Spot 1-4

Children decide their option and run to spot 1, 2, 3, 4 – depending on the answer

LEVEL 3

05



PART 2

Activity methodology: Game and activity based learning
Inquiry based learning and treasure hunt

Reason:

Inquiry-based is one of the most effective tools for learning especially when it has to do with joining the dots. Treasure hunt is a tool used when step based learning is required.

Treasure is considered to be in formation, truth, or knowledge, and hunt implies inquiry, which is a systematic investigation. Treasure hunt is an inquiry activity in which one systematically seeks knowledge with questions.

04

Description

This game is to understand the grid lines and the channelizing of different ways to produce energy.

There are 5 ways of producing energy:

Coal

Hydroelectric

Wind energy

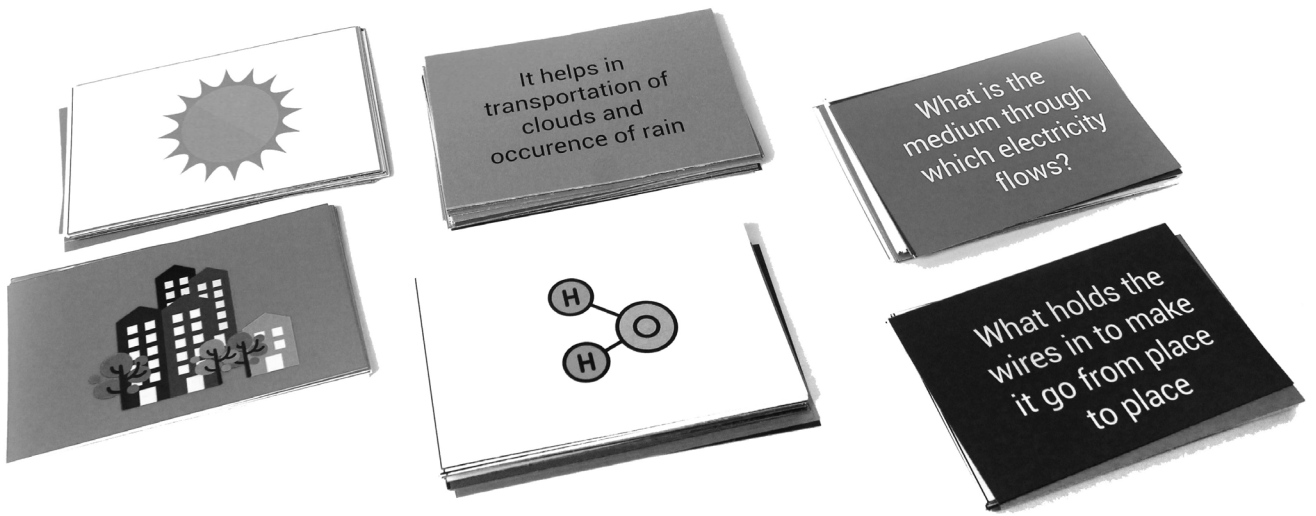
Biomass

Geothermal

Solar

In each way, there are different steps to produce energy

In this game based activity, these steps have a question corresponding an answer and each question has answer on a flag kept somewhere in the field.





MODULE 4

THEME: LIVING WORLD

TOPIC: INTERACTION AND INTERDEPENDENCIES

Skill to be developed

Observation; expression and empathy

02

SPIRALLING

Skill and sustainability are the aspect that spiralled in all the levels, along with the content itself.

For higher grades- There is no direct revision but an application of what is done in the lower grades.

LEVEL 1

LESSON HOOK

Observation through drawing

Description:

05

Making the students sit in a circle facing outwards and making them draw the view at 3 different eye levels. Then assembling the sheets together and making a panorama of it.

04

By drawing with a constraint; children observe as much as possible. It is not to judge how they draw but what all they are able to notice.

A panorama view is taken as they can themselves see later what all was around them and not in their frame.

WEEK 2

FLOW OF ACTIVITY

ACTIVITY 2

To explain the food web, trophic levels and the breaking of food chain

When multiple concepts need to be explained through one activity, it needs to have a flow. In this activity there are 3 concepts and concept has to lead to the other



02

Food web – Trophic level chart – breaking of food chain

Once the students get the first phase i.e. the trophic level chart; they have done enough looping to understand where they stand in the Trophic level chart

And once that is done – they can understand the concept of extinction by leaving/breaking the chain/web

ASSESSMENT

Assessment here is a homework which looks like a craft based activity where students are creating, drawing and indirectly memorizing the chain.

06

LEVEL 2 Learning objectives

01

» Understand the structure of Habitat by quadrat sampling method

» Understand the interactions and interdependencies at different levels by making a BOTTLE ECOSYSTEM and interpreting the interactions.

» Understand that ecosystem is sustained only if all interactions within an ecosystem are balanced.

04

All the objectives are explained using Activity and experiment based learning as the methodology. The activities were made to improve the observation; thus spiral of skill.



Learning objective

By the end of the class, students will be able to:
Understand the extinction of species with habitat loss
Know about the various processes that cause destruction of habitat

PART 1

LEVEL 3

LESSON HOOK

Activity to explain the content.
The activity itself is made to explain the content and not just for experimental purposes.

05

PART 2

It aims on applying the concepts they've learnt and observed in the lower grades.

04

Methodology: Project based learning (PBL)
In PBL, there is no need not make an additional assessment; the process itself becomes the assessment.

In this, the project is to build an ecosystem.
It is a project which includes the entire system.

A problem solving project was purposely not given as it can become overbearing for the child to deal with the content

TAKE HOME BOOKLET



TAKE HOME BOOKLETS

Take home booklets are made for every module and are given out to the children after the module is over.

It is not meant to be used as a medium used to teach.

It's purpose is to give students a reference material to study and refer once the classes are over.

It should also be referred to recall the concepts before the invention fair.

CONSIDERATIONS

- » Concept explanation has to be properly articulated in it
- » Consult the facilitator notes for the content
- » Include examples and inventions that have happened in the corresponding field
- » Use as many visuals and graphics as possible



These steps have been taken into consideration on the basis of the study conducted. They are subject to change and can be modified after implementation and thorough evaluation.

KIT
JOOT

KIT
TOOL



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