

Google Cloud

PRESENTS

Agentic AI Day

Build the next generation of intelligent agents

Powered by **I2S**

Team Details

- a. **Team name:** Qurious Sharks
- b. **Team leader name:** A Jeffrey Rufus
- c. **Problem statement:** Empowering Teachers in Multi-Grade Classrooms

Github Link: https://github.com/Qurious-Sharks/QURIOUS_SHARKS_IDEA_SUBMISSION

Brief about the idea

Sahayak360 – An AI-Powered Multilingual Teaching Companion for Multi-Grade, Low-Resource Classrooms

Sahayak360 is a unified AI-based teaching assistant platform designed to empower rural educators by bridging critical gaps in **lesson planning**, **concept explanation**, **visual aids**, **differentiated learning**, and **local content generation** — all in **regional languages**, with **voice input**, and built for **offline resilience**.

Instead of relying on fragmented tools or inaccessible online resources, Sahayak360 delivers a **modular suite of AI agents** that work seamlessly together to support every phase of a teacher's day — from planning to explaining, visualizing to customizing — all tailored for multi-grade teaching in low-connectivity areas.

✦✦ Powered by Gemini, TinyLlama, Vertex AI, and Tesseract — but made *for* grassroots education.

Opportunities

- How different is it from any of the other existing ideas?

Feature	Conventional Solutions	Sahayak
Aspect	Conventional EdTech Tools	Sahayak 360 AI Agent
Language Support	Primarily English	Fully multilingual (Hindi, Marathi, Tamil, etc.)
Internet Dependency	Needs constant internet	Offline-first with fallback via TinyLlama, Tesseract, etc.
Content Types	Limited (e.g., just quizzes or videos)	12+ formats: stories, poems, diagrams, games, explanations
Grade Differentiation	Generic, one-size-fits-all	Tailored outputs for Grades 1–2, 3–5, and 6+
Teacher Input Mode	Typing, complex UIs	Simple voice or text in local language
Cultural Context Awareness	Generic or globalized	Hyperlocal, culturally embedded content
System Integration	Standalone, fragmented tools	Unified multimodal AI suite (5 integrated agents)
Output Formats	Static formats	PDF, calendar, drawings, TTS, shareable digital files
User Persona Fit	Urban, digitally fluent teachers	Rural, low-digital-literacy educators

- How will it be able to solve the problem?

Sahayak360 is designed to function as an **always-accessible, culturally fluent teaching co-pilot** that directly tackles the core challenges faced by teachers in low-resource, multi-grade classrooms

1. Teachers can **speak** their requests in regional languages
2. Receive **contextually rich, grade-wise** outputs (stories, diagrams, worksheets)
3. Works **without internet** via offline fallback (TinyLlama + SQLite + Tesseract)
4. Everything from one dashboard: no fragmented tools, no technical complexity

In short: Sahayak360 solves the "**too many tools, not enough time**" problem by giving teachers **one AI-powered platform** that feels like a smart colleague, not another digital burden.

- USP of the proposed solution

Sahayak 360: The First Culturally-Aware, Offline-Resilient, Multilingual AI Teaching Suite Designed for India's Grassroots Educators

- All-in-One Agentic Platform:** Seamlessly integrates 5 AI agents — for planning, visualizing, explaining, differentiating, and localizing content — under a single, teacher-friendly interface.
- Built for Bharat, Not Silicon Valley:** Respects linguistic diversity, classroom chaos, multi-grade realities, and low/no connectivity environments.
- Culturally Rooted, Not Just Translated:** Generates content grounded in students' lived experiences — using a lightweight RAG engine trained on **local-language datasets** of regional festivals, characters, idioms, and folk wisdom. This enables the system to retrieve culturally relevant context before generation, ensuring that outputs reflect local realities, not just translated global templates.
- Resilient by Design:** Offline fallback using TinyLlama, Tesseract, and SQLite ensures learning never stops — even without internet or power.
- Voice-First Simplicity:** Enables teachers to speak naturally in their own language and instantly get age-appropriate content ready for the blackboard.

List of features offered by the solution

Integrated AI Modules

- **Weekly Lesson Planner** – Voice-driven scheduling with automatic worksheet/doc/calendar generation
- **Knowledge Explainer Bot** – Grade-wise, analogy-rich answers for complex student questions
- **Visual Aids Generator** – Diagrams, sketches, Mermaid.js flowcharts with multilingual voice prompts
- **Differentiated Worksheet Generator** – Grade 1–4 worksheets from a single textbook image
- **Hyperlocal Content Engine** – Culturally relevant stories, poems, games, and festival content

Multilingual & Voice Support

- Voice input in **regional languages** (Hindi, Marathi, Tamil, etc.)
- Output in the **teacher's chosen language** – not defaulted to English
- Supports voice-to-text & optional text-to-speech (TTS)

Classroom-Ready Outputs

- Printable PDFs for diagrams, stories, worksheets
- Calendar export for scheduled lessons and activities
- Local save, WhatsApp share, and USB transfer

List of features offered by the solution

Offline-First Intelligence (RAG + Caching)

- **TinyLlama + llama.cpp** for on-device generation
- **SQLite-powered RAG** system retrieves pre-cached content chunks
- Local Q&A and worksheet banks indexed with **semantic keyword matching**
- Auto-syncs cache & updates when back online
- **Tesseract OCR** for offline image-to-text extraction

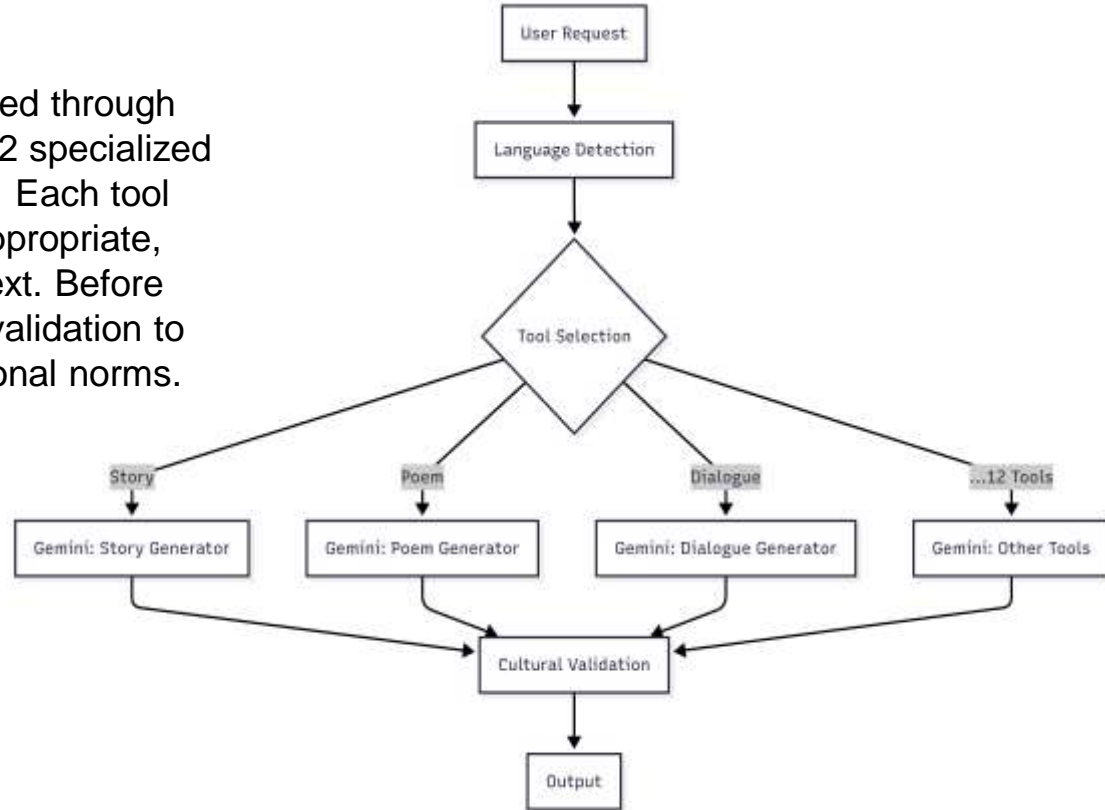
Modular, Smart, Extensible

- **JSON schema**-based tool orchestration
- Blackboard canvas editing
- **“Explain Again”** & **“Create Quiz”** auto-generation options
- Editable offline DB + feedback logging for missing content

Process flow diagram or use-case diagram

Generate Hyper-Local Content

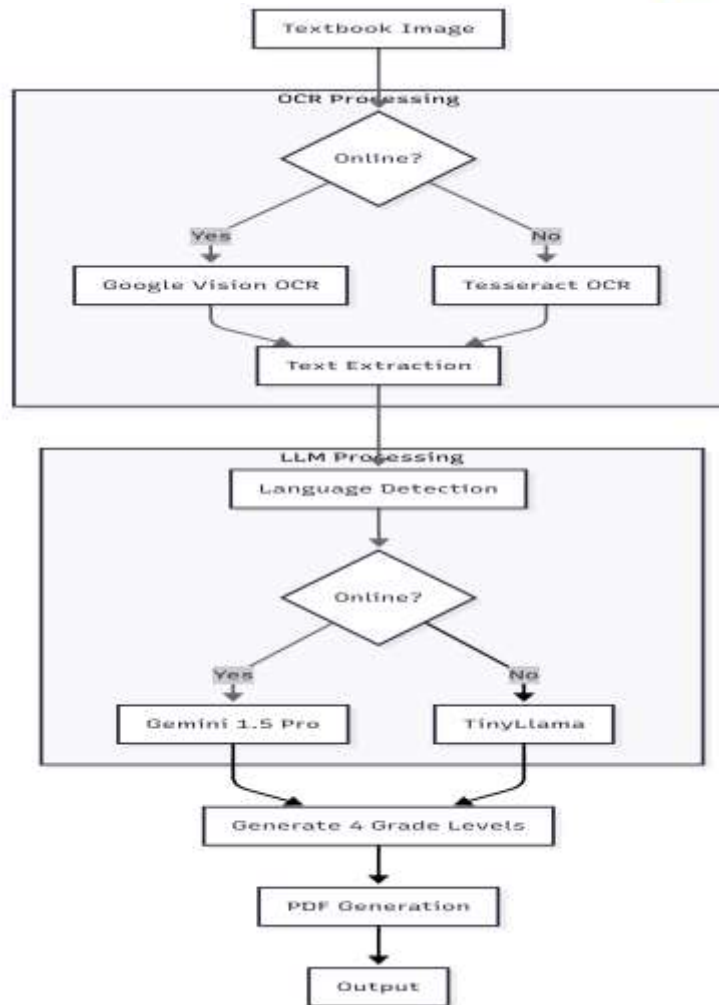
In this flow, a teacher's request is processed through language detection and routed to one of 12 specialized content tools (e.g., story, poem, dialogue). Each tool leverages Gemini to generate culturally appropriate, localized content based on the input context. Before final delivery, content undergoes cultural validation to ensure relevance and alignment with regional norms.



Process flow diagram or use-case diagram

Create Differentiated Material

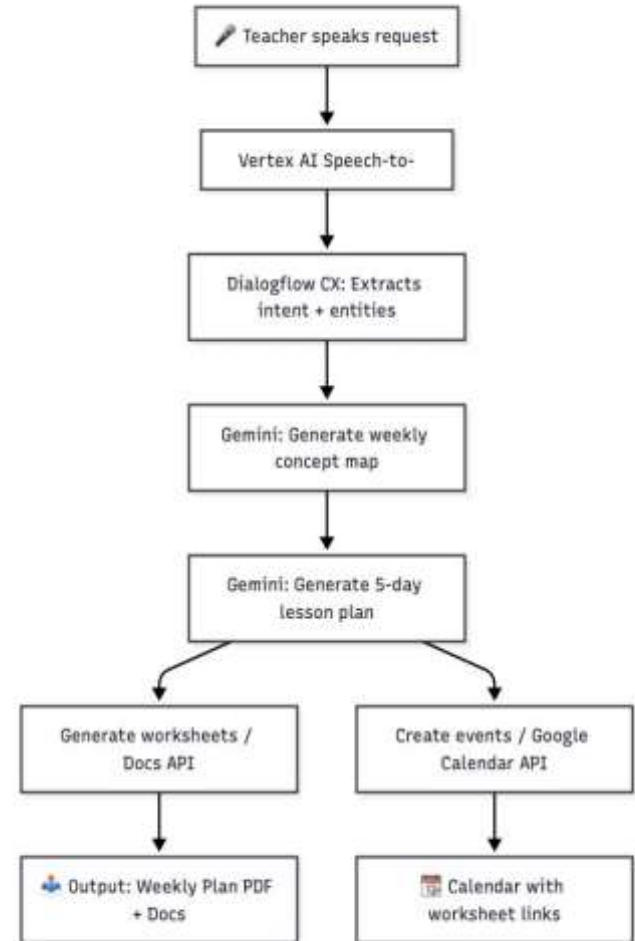
A textbook image is uploaded and processed through OCR (Google Vision online or Tesseract offline) to extract text. Language detection and connectivity status determine whether Gemini or TinyLlama will generate the worksheet. The result is a 4-grade-level differentiated worksheet exported as a single printable PDF.



Process flow diagram or use-case diagram

Weekly Lesson Planner

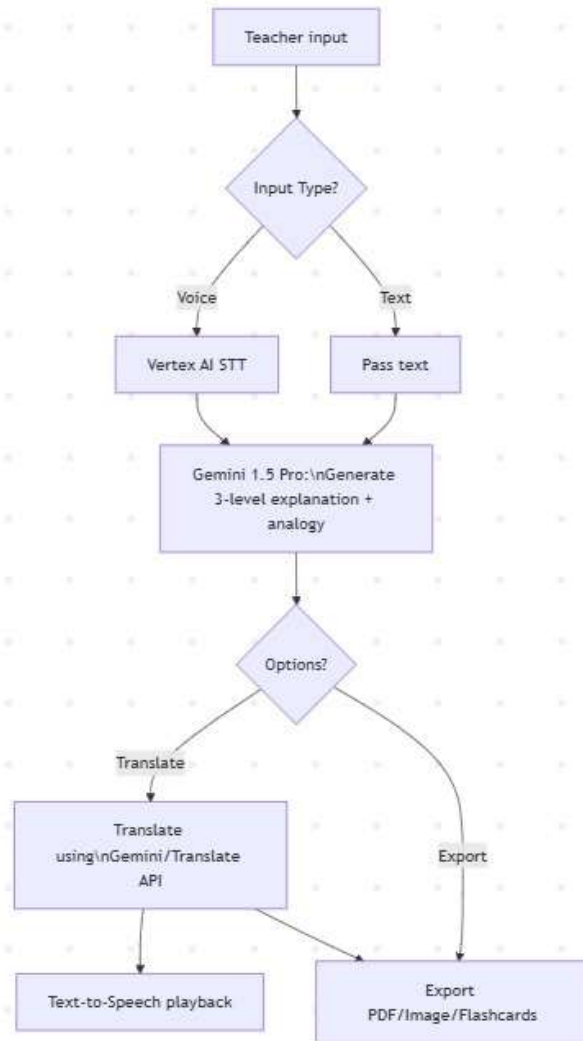
Teachers speak their weekly lesson planning request, which is converted to text using Vertex AI STT. Dialogflow CX extracts intent and entities, and Gemini generates a concept breakdown and detailed 5-day lesson plan. Worksheets are created via Google Docs API, and linked events are added to the teacher's calendar using the Calendar API.



Process flow diagram or use-case diagram

Act as an Instant Knowledge Base

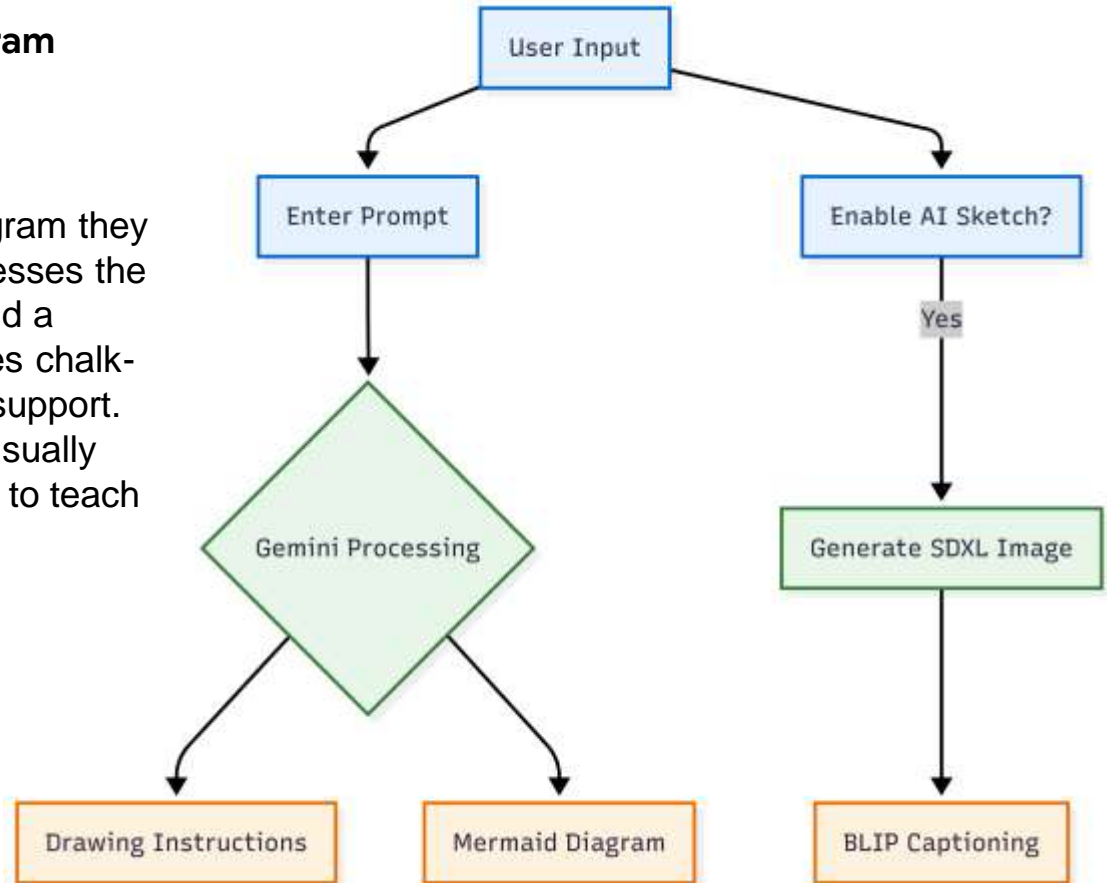
This flow represents how a teacher inputs a question via voice or text, which is then transcribed and processed by Gemini 1.5 Pro. The system generates a three-tiered explanation with analogies, suitable for different grade levels. Depending on the teacher's needs, the output can be translated and exported as audio, images, or printable flashcards.



Process flow diagram or use-case diagram

Design Visual Aids

Teachers input a prompt describing a diagram they need, either by voice or text. Gemini processes the prompt to produce drawing instructions and a Mermaid.js diagram, while SDXL generates chalk-style sketches and BLIP adds captioning support. This combination allows for multilingual, visually optimized classroom visuals that are easy to teach from and print.



Technologies to be used in the solution

1. AI & LLMs

Gemini 1.5 Pro - Multimodal prompt generation (text, vision, diagrams)

Text-Bison / PaLM API - Used for structured lesson planning and worksheet generation

TinyLlama + llama.cpp - Offline-friendly LLM for fallback generation and low-memory inference

2. Speech & Audio

Vertex AI Speech-to-Text API - For real-time multilingual voice input

Google Cloud Text-to-Speech - Optional playback of explanations in regional languages

Speech_Recognition (fallback) - Lightweight offline STT for poor-connectivity scenarios

3. Vision & OCR

Google Cloud Vision API - Online OCR for textbook photo analysis

Tesseract OCR - Offline, open-source OCR engine for regional script support

4. Retrieval & Offline Caching

SQLite / JSON - Preloaded databases for Q&A, diagrams, stories, and worksheets

RAG Pipeline - Lightweight semantic retrieval over local content banks

Smart Sync Engine - Auto-updates local cache when internet resumes

Technologies to be used in the solution

5. UI & Frontend

Streamlit - Interactive web interface for quick prototyping and deployment

Flutter - Planned Android-first deployment for school tablets and phones

Gradio - Rapid testing of agent tools during dev cycles

6. Content Generation Toolkit

Mermaid.js - Renders flowcharts/diagrams in chalkboard format

SDXL (via Hugging Face API) - Line-art chalk-style sketch generation

BLIP - Captioning and visual description of AI-generated diagram

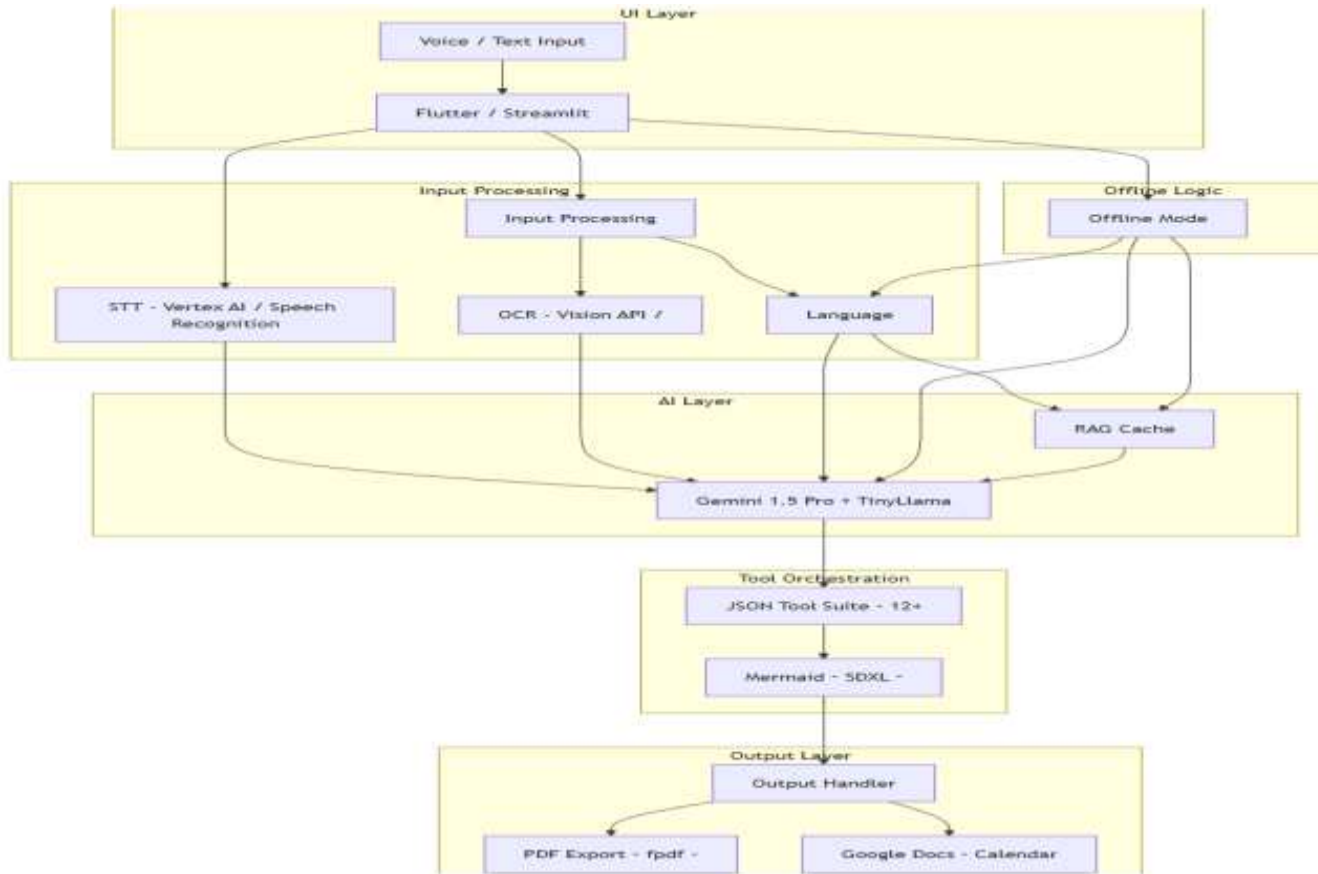
7. Output & Exports

fpdf2 / reportlab - PDF generation for worksheets, visual aids, and handouts

Google Calendar API - Weekly lesson plan scheduling

Google Docs/Sheets API - Auto-generation of lesson documents (where applicable)

Architecture diagram of the proposed solution



Wireframes/Mock diagrams of the proposed solution

1. Create Differentiated Materials

Upload a textbook image and get differentiated worksheets for Grades 1-4. The assistant auto-detects language and works offline if needed.

Upload textbook page

What do we find? Do we find some ingredients common for different food items? Discuss in class.
So, where do these ingredients come from?

1.2 FOOD MATERIALS AND SOURCES

It may be easy for us to guess the sources of some of the ingredients that we listed in Table 1.2. Fruits and vegetables, for instance (Fig. 1.2a). Where do they come from? Plants, of course! What are the sources of rice or wheat? You may have seen paddy or wheat fields with rows and rows of plants, which give us these grains (Fig. 1.3).

And then, there are food items like milk, eggs and meat, which come from animals (Fig. 1.2b).

Clear

Submit

Generated Worksheets

Online Mode

Detected Language: English

— Extracted Text —

What do we find? Do we find some ingredients common for different food items? Discuss in class.
So, where do these ingredients come from?
1.2 FOOD MATERIALS AND SOURCES
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— Generated Worksheet —

Grade 1 Worksheet: Food from Plants and Animals

Title: Where Does Our Food Come From?

Download Worksheet as PDF

tmpyp_0ip54.pdf4.9 KB

Flag

1. Create Differentiated Materials – Worksheet PDF

Grade 1 Worksheet: Food from Plants and Animals

Title: Where Does Our Food Come From?

Instructions: Draw a line from the food to its source.

Plant (Picture of a plant):

- Apple (Picture of an apple)
- Carrot (Picture of a carrot)
- Wheat (Picture of wheat)
- Rice (Picture of rice)

Animal (Picture of a cow and chicken):

- Milk (Picture of milk)
- Eggs (Picture of eggs)
- Meat (Picture of a piece of meat)

Grade 2 Worksheet: Matching Food Sources

Title: Food Source Match-Up

Instructions: Match the food item to its source by drawing a line.

Food Items:

- Apple
- Milk
- Chicken
- Rice
- Carrot
- Eggs
- Wheat
- Steak

Sources:

- Plant
- Animal
- Cow
- Chicken
- Wheat Plant
- Rice Plant

Grade 3 Worksheet: Identifying Food Sources and Explaining

Title: Food Investigators

Instructions: Write "Plant" or "Animal" next to each food item. Then, choose two plant foods and two animal foods and explain why they are helpful for our bodies.

Food Items:

- Lettuce
- Cheese
- Pork
- Banana
- Yogurt
- Broccoli
- Fish
- Grapes

Explanation:

_____ is helpful because _____

_____ is helpful because _____

_____ is helpful because _____

_____ is helpful because _____

Grade 4 Worksheet: Analyzing Food Sources and Their Importance

Title: Food Source Detective

Instructions: Complete the table below. For each food item, identify the source (plant or animal), and explain its benefits to our bodies. Then, suggest another food from the same source with similar benefits.

Food Item	Source (Plant/Animal)	Benefits	Similar Food
Milk	Animal	Provides calcium and protein for strong bones and muscles.	Cheese
Eggs	Animal	Rich in protein and healthy fats.	Chicken
Spinach	Plant	Contains iron and vitamins for blood health.	Kale
Wheat	Plant	Source of carbohydrates for energy.	Rice

Bonus Question: Imagine you only had access to plants OR animals for food. Which would you choose and why? Explain the challenges of only having that one food source.

1. Create Differentiated Materials

Upload a textbook image and get differentiated worksheets for Grades 1–4. The assistant auto-detects language and works offline if needed.

Upload textbook page

நாடு

பக்கத்து நாடு

கருணை உடையவர்

வாழ்த்து

ஆடு கடும் இடம்

ஆலமரம்

உயிர்

தயார் செய்தல்

எளிமையான

நினைக்கும்

எனக்குள்

ஒலையால் முடையப்பட்ட சிறு கூடை

பழுத்து

தகர்த்து

பக்க அடுப்பு

2. அண்ணல்

3. ஆசி

4. ஆட்டாந்தொழு

5. ஆல்

6. ஆவி

7. ஆயத்தப்படுத்துதல்

8. இலகுவான

9. எண்ணும்

10. என்னில்

11. ஒலையக்கொட்டான்

12. கனிந்து

13. முறியடித்து

14. கொடியடுப்பு

Generated Worksheets

Online Mode

Detected Language: Tamil

--- Extracted Text ---

3. ஆசி

அண்டை நாடு

2. அண்ணல்

4. ஆட்டாந்தொழு

பக்கத்து நாடு

கருணை உடையவர்

வாழ்த்து

ஆடு கடும் இடம்

5. ஆல்

ஆலமரம்

6. ஆவி

உயிர்

7. ஆயத்தப்படுத்துதல்

தயார் செய்தல்

8. இலகுவான

9. எண்ணும்

Clear

Submit

2. Generate Hyper-Local Content – Text Input

Sahayak- AI Teaching Assistant (Text & Audio)

Input Type



Text



Audio

Type your message

मला मराठीत चौथीचा विषय द्या.

Chatbot

वेगवेगळ्या प्रकारच्या मातीचे वर्णन करण्यासाठी शेतकऱ्यांबद्दल मराठीत एक कथा तयार करा.

मला तुमच्या विनंतीनुसार शेतकऱ्यांबद्दल एक कथा तयार करायची आहे, त्यासाठी मला इयत्ता आणि भाषेची माहिती द्या.

मला मराठीत चौथीचा विषय द्या.

ठीक आहे, मी इयत्ता चौथीच्या विद्यार्थ्यांसाठी शेतकऱ्यांबद्दलची मातीची माहिती देणारी मराठी कथा तयार केली आहे.

कथेचे नाव: मातीची किमया

विदर्भातील एका छोट्याशा गावात 'शिवणी' नावाच्या शाळेतील चार मित्र - राम, राधा, सायली आणि अर्जुन - एकत्र शिकत होते. दिवाळीच्या सुरुवातीमध्ये, शाळेने एक प्रकल्प दिला होता - 'आपल्या परिसरातील माती' मलांना मातीचे प्रकार शोधायचे होते आणि त्या मातीमध्ये कोणती पिके चांगली येतात हे शेतकऱ्यांकडून जाणून घ्यायचे होते.

Send

2. Generate Hyper-Local Content



3. Act as an Instant Knowledge Base:

Instant Knowledge Buddy

Ask by typing or speaking. Get a simple explanation with an analogy in your local language.

Type your question (optional)

What is meant by pneumovultramicroscopicibovincanococci?

Or record your question (optional)

Drop Audio Here
or
Click to Upload

Choose Language

Tamil

Clear

Submit

Final Question (Transcribed or Typed)

What is meant by pneumovultramicroscopicibovincanococci?

Simple Explanation

சரி, நான் இந்தப் பெரிய வார்த்தையைப் பார்த்துக் கண்டேன். pneumovultramicroscopicibovincanococci என்பது (தமிழிலே) வாயுமயக்கிரமங்களைக் கொண்டிருக்கின்ற பல்படிவமான நுண்ணுயிர் என்று பொருள். பல்படிவமானது இதைச் சிலன்ச் சிலன் துண்டுகளாகப் பிரிக்கப்பார்க்கலாம்.

உட்கட்டுப் பிடிச்சமான வெகோ விளையாட்டு துணுக்குத்து எப்படியும். துண்டுகள் சிலன்ச் சிலன் வெகோ துண்டுகளாகச் சேர்த்துக்கொள் பெரிய பெரியபயன்தெடுக்கலாம் உலுங்குதுறாம் இல்லையா? இந்த வார்த்தையும் அப்படித்தான். பல் சிலன் வார்த்தைகள் சேர்த்துதுறாம்.

"விவியோ" என்றால் துண்டாயிரல் என்பதற்குப் பட்டம். "சிலிவோ" என்றால் சிலிக்கா என்ற துணிதான். "வாய்மகோ" என்றால் எரிமலை. "கோலிவோசில்" என்றால் துண்டாயிரல் தான் படிக்க ஏற்படுதுறாம்.

இப்போ எல்லாத்தையும் சேர்த்துப் பார்க்கலாம். எரிமலை வெடிக்கும்போது வெளியேறும் சிலிக்கா துண்டுகள் வெகோ துண்டுகளாகச் சேர்த்துக்கொள் தான் பார்த்து முடியும் கொஞ்சம் துண்டாயிரல் ஏற்படுதுறாம் இது. சிலிக்கா தான் துண்டாயிரல் படிக்க, தொண்டுகள் அப்படித்தான்.

கல் உட்கட்டும் தொழிலாளர்களுக்கும் மான் அஞ்சுவோருக்கும் இந்த நேரம் வர எப்படி அறிதம். அதுதான் தான் பாதுகாப்பா முக்கியம் அனியதுறம் தொண்டுகள்.

புரிந்ததா? தொண்டுகள் பெரிய வார்த்தையாக இருந்தாலும், சிலன்ச் சிலன் துண்டாயிரல் பார்த்து அறிதம் புரிந்ததும் வெகோ மாற்றி தான்.

Wave the Answer

0:04 1:06

Flag

Use Via API Built with Studio Settings

4. Design Visual Aids

Auto-Generated Caption:

a cartoon landscape with rain and clouds

Mermaid.js Code for Diagram

```
graph LR
    A((Sun)) --> B((Ocean))
    B --> C((Clouds))
    C --> D((Rain))
    D --> B
```

Ready to draw or print!

Sahayak: Blackboard Drawing Assistant

Enter the diagram topic or description:

Draw the water cycle with sun, ocean, clouds, rain, and arrows

- ☒ Generate AI sketch using Hugging Face SDXL?
- ☒ Generate structured diagram using Mermaid.js?

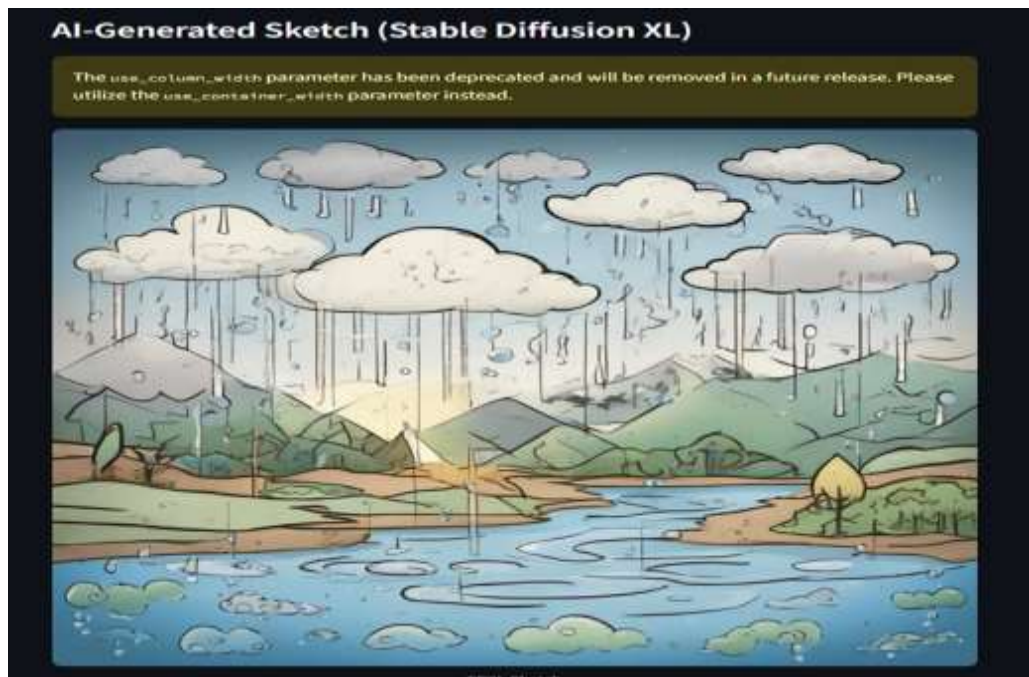
[Generate Drawing Instructions](#)

Drawing Instructions:

```
--Instructions:-- Draw a black and white diagram of the water cycle.

1. --Sun:-- Draw a circle in the top right corner for the sun.
2. --Ocean:-- Draw a wavy line across the bottom for the ocean.
3. --Clouds:-- Draw several cloud shapes above the ocean.
4. --Rain:-- Draw downward pointing arrows from the clouds representing rain.
5. --Arrows:-- Draw curved arrows pointing upwards from the ocean to the clouds (e
```

4. Design Visual Aids



Google Cloud

PRESENTS

Agentic AI Day

Build the next generation of intelligent agents

Powered by  H2S

Thank you!