

SkyAware Project Resource Matrix

This document lists all essential internal (keys/credentials) and external (APIs/documentation) resources required for the project. Every team member is responsible for securing their assigned resources before the start of the hackathon.

I. Global Resources (All Team Members)

Resource	Type	Notes	Delegation	Status
NASA Earthdata Login (EDL)	Credential	MANDATORY. Needed for accessing TEMPO data, Earthdata Search, and Harmony.	All Team Members	<input type="checkbox"/>
GCP Project & Credentials	Credential	Project ID, Service Account Key (for backend), and billing status.	Sawaneh (Creation), Ebrima (Oversight)	<input type="checkbox"/>
Final API Contract	Internal Doc	The agreed-upon JSON schema for /api/current_aqi, /api/forecast, /api/tempo_grid.	All Team Members	<input type="checkbox"/>
Final Educational Content	Internal Doc	The approved text for the /learn page and health advice mappings.	Ebrima, Hawa	<input type="checkbox"/>

II. Role-Specific Resource Allocation



AI/ML Engineer: Omar (TEMPO Data Processing & ML)

Resource	Type	Purpose	How to Access / Obtain
TEMPO Near Real-Time Data (NO₂/O₃)	NASA Data	Core satellite air quality measurement data for map overlay and ML.	Earthdata Search →to→Filter by "TEMPO"→to→Identify L2/L3 NRT Product →to→Use Harmony for subsetting/transformation.
harmony-py	Python Library	Programmatic access client to request and transform TEMPO data via NASA Harmony services.	Search for "harmony-py documentation."

Xarray / NetCDF4 / Pandas	Python Libraries	Tools for reading and manipulating the complex TEMPO data file formats.	Standard Python pip install or conda install.
MERRA-2 PBL Height	NASA Data	(OPTIONAL/ADVANCED) Reanalysis data for Planetary Boundary Layer (PBL) height, a critical input for better ML forecasting.	Search "MERRA-2 PBL Earthdata."
XGBoost / Scikit-learn	Python Libraries	Tools for training and evaluating the AQI forecasting model.	Standard Python pip install.



Senior Backend Developer: Sawaneh (GCP Architecture & Node.js API)

Resource	Type	Purpose	Who to Ask
GCP Cloud Run Documentation	Tech Doc	Deployment of the Node.js API and configuration settings (e.g., environment variables).	Start with the official Google Cloud documentation.
GCP Cloud Functions Documentation	Tech Doc	Configuring the scheduled Python job (managed by Omar) to process TEMPO data.	Google Cloud documentation on functions and scheduling.
GCP Cloud Storage Client (Node.js)	Node.js Library	Allowing the Node.js API to read the processed GeoJSON/Raster link from the storage bucket.	Search for official "Node.js Cloud Storage client."
Node.js (Express/Hapi) Documentation	Tech Doc	Framework for building the core API endpoints.	Standard web documentation.
TEMPO GeoJSON/Raster Link	Data Output	The direct URL of the latest processed data file on Cloud Storage.	Omar (AI/ML) is responsible for creating and sharing this URL structure.



Full Stack Developer: Hassan (Ground Data Ingestion & ML Data Prep)

Resource	Type	Purpose	How to Access / Obtain
EPA AirNow API Key	Credential	Real-time AQI ground station measurements for validation and the ML model.	Register on the EPA AirNow site →\to→Get key (as assigned).
OpenAQ API	External API	(OPTIONAL/BACKUP) Alternative source for global air quality ground data.	Search for "OpenAQ API Documentation."
OpenWeatherMap API Key	Credential	Real-time and forecast meteorological data (Temp, Wind, Humidity) for the ML model.	Register on OpenWeatherMap site→\to→Get key (as assigned).
AirNow / OpenWeatherMap Documentation	API Doc	Understanding request parameters and response data structures for integration.	Consult official developer portals.
MERRA-2 Temperature / Wind Data	NASA Data	(OPTIONAL/ADVANCED) Reanalysis data for building a more robust historical ML training set.	Search "MERRA-2 Earthdata" →\to→Use Earthdata Search to locate data.



Senior Frontend Developer: Saul Zayn (Next.js & Map Visualization)

Resource	Type	Purpose	Who to Ask
Mapbox GL JS / React-Map-GL	JS Libraries	Core library for rendering the interactive map interface.	Standard JavaScript documentation.
Mapbox API Key	Credential	Allows for loading base map tiles and custom layers.	Register on the Mapbox website →\to→Get key (as assigned).

Deck.gl	JS Library	(OPTIONAL/ADVANCED) High-performance visualization library for rendering large vector datasets (e.g., TEMPO GeoJSON) efficiently.	Standard JavaScript documentation.
Next.js Documentation	Tech Doc	Guidance on data fetching best practices (getServerSideProps, API routes) and component structure.	Official Next.js website.
TEMPO Map Color Scale	Internal Doc	The range of colors and corresponding AQI values to use for the map overlay visualization.	Omar (for min/max values) →\to→ Ebrima (for color choices).



Team Lead/Support: Ebrima S. Jallow (Coordination & Content)

Resource	Type	Purpose	How to Access / Obtain
EPA AQI Technical Assistance Document	Scientific Doc	CRITICAL: Provides the exact formulas and breakpoints for converting pollutant concentrations ($\mu\text{g}/\text{m}^3$ or mol/cm^2) to the final 0-500 AQI number.	Search for "EPA Air Quality Index Conversion Formula."
World Health Organization (WHO) Air Pollution	Background Info	Context and data on the global health crisis caused by air pollution (for the pitch narrative).	Use the link provided in the challenge resources.
TEMPO Mission Website	Background Info	Details on the mission, its capabilities, and high-level science goals (for the pitch narrative).	Use the link provided in the challenge resources.
Team Project Board	Internal Tool	Used to track progress, assign tasks, and identify blockers.	Set up on GitHub Projects, Trello, or a similar platform.



Support / Content: Hawa Cham (QA & Educational Content)

Resource	Type	Purpose	Who to Ask
TEMPO/NASA Branding Guidelines	Design Info	Ensuring the use of logos, colors, and citation formats is appropriate for the challenge.	Search for "NASA Communications Guidelines."
Air Quality Health Impacts	Scientific Doc	Information on how NO ₂ , O ₃ , and PM _{2.5} affect the body (for the educational content).	WHO and CDC websites are good sources.
Final JSON Data Output	Internal Output	The live data being served by the API.	Sawaneh (Backend) - to manually test the API endpoint responses.
Repository Access (Read/Write)	Credential	To make direct edits to the README.md and the content of the /learn page.	Ebrima (Team Lead).