**Unit Title: Remote Sensing in Agriculture**

**Grade Level:** High School (Grades 9-12)  
**Duration:** 3 Weeks (5 class periods per week)

**Unit Objectives:**

By the end of the unit, students will:  
✅ Understand the basics of remote sensing and its role in agriculture.  
✅ Identify different remote sensing technologies (satellites, drones, sensors).  
✅ Analyze real-world remote sensing data for agricultural decision-making.  
✅ Conduct hands-on activities with remote sensing tools or simulations.  
✅ Explore careers in precision agriculture and sustainability.

**Week 1: Introduction to Remote Sensing & Its Applications**

📌 **Topics Covered:**

* What is remote sensing? (Definition, history, and importance)
* Types of remote sensing: **Passive vs. Active**
* Key technologies: **Satellites, drones, ground-based sensors**
* Major applications in agriculture: **Crop health, soil moisture, pest detection, yield estimation**

📌 **Activities:**

* **Engagement Activity:** Show real-world satellite images of fields & discuss what students observe.
* **Think-Pair-Share:** How do farmers currently monitor crops? What challenges exist?
* **Video Discussion:** Watch a short video on remote sensing in precision agriculture.
* **Mini Research Task:** Students investigate a real-world case of remote sensing in farming & present their findings.

**Week 2: Understanding & Analyzing Remote Sensing Data**

📌 **Topics Covered:**

* How do satellites & drones capture agricultural data?
* Key **vegetation indices**: NDVI (Normalized Difference Vegetation Index), EVI, and others
* How farmers use this data to make decisions
* Introduction to **GIS (Geographic Information Systems) & mapping**

📌 **Activities:**

* **NDVI Hands-On Activity:** Analyze NDVI images of crops using online tools (e.g., Sentinel Hub, Google Earth Engine).
* **Data Analysis Challenge:** Students interpret real or simulated crop health data & make recommendations.
* **Mapping Workshop:** Use Google Earth or ArcGIS to visualize agricultural landscapes.
* **Guest Speaker (Optional):** Invite a local precision ag specialist or agronomist.

**Week 3: Hands-on Applications & Future of Remote Sensing**

📌 **Topics Covered:**

* Drones in agriculture: How are they used?
* Advancements in AI & machine learning for crop monitoring
* Sustainability & environmental impacts of remote sensing
* Future careers in **precision agriculture & AgTech**

📌 **Activities:**

* **Drone Mapping Simulation:** Explore drone flight planning tools or watch a live drone demo (if possible).
* **Precision Agriculture Case Study:** Students work in teams to solve a real-world farming problem using remote sensing data.
* **Final Project:**
  + Option 1: **Design a farm monitoring plan** using remote sensing tools.
  + Option 2: **Create a research poster** on an emerging remote sensing technology.
* **Unit Reflection & Discussion:** How can remote sensing improve food production and sustainability?

**Assessment & Evaluation**

✅ Participation in discussions and activities  
✅ NDVI analysis & data interpretation challenge  
✅ Mapping exercise and case study  
✅ Final project presentation