Teacher's Guide

G05-L01: When Trees Become Matches

California's Burning Season and the Earth Systems That Fuel It

Grade	5th
NGSS Standard	5-ESS2-1
Time	40-45 minutes (or split across 2 days)
Materials	Student devices with ModelIt access

LESSON PURPOSE

This lesson serves as a **HOOK** for Earth systems inquiry. Students build a simple cause-and-effect model, then identify gaps that drive further research. It's designed to drop into existing curriculum with minimal prep.

LEARNING OBJECTIVES

- Model how lack of rainfall affects vegetation
- Trace cause-and-effect relationships between drought and fire conditions
- Explain how Earth systems (atmosphere, biosphere, hydrosphere) interact
- Predict what happens when one part of the system changes

PACING GUIDE

Activity	LEVER Phase	Time
Activity 1: Build Your Fire System	LOCATE	8-10 min
Activity 2: Connect the Relationships	ESTABLISH	8-10 min
Activity 3: Run Your Fire Model	VISUALIZE & EVALUATE	10-12 min
Activity 4: Play, Research, Expand	REVISE & EXTEND	10-15 min

COMMON MISCONCEPTIONS

"Fires are caused by bad people" → Most are human-caused, but conditions must be right. Without dry fuel, fires don't spread.

"More firefighters = no fires" → Firefighters respond, but conditions (drought, wind) determine severity.

"Climate doesn't affect fires" → Fire season has lengthened significantly due to climate patterns.

FACILITATION TIPS

Activity 1: Let students explore the interface. Don't over-explain.

Activity 2: Ask "When this goes up, what happens to that?" to guide +/– decisions.

Activity 3: Give time for students to "break" the model — turn things on/off. This is where insight happens.

Activity 4: Don't give answers. Ask questions. Let curiosity drive.

DISCUSSION PROMPTS

- "Why does California burn at the same time every year?"
- "What would need to change to prevent these fires?"
- "How is this connected to what we learned about the water cycle?"
- "If you were a firefighter, where would you want to be positioned BEFORE fire season?"

ANSWER KEY

Vocabulary Matching:

Drought = B, Atmosphere = C, Biosphere = A, Vegetation = E, Hydrosphere = D

Component Sorting:

EXTERNAL: Rainfall, Wind

INTERNAL: Dry Vegetation, Fire Spread

Relationships:

- Rainfall → Dry Vegetation = NEGATIVE (more rain = less dry plants)
- Dry Vegetation → Fire Spread = POSITIVE (more fuel = more fire)
- Wind → Fire Spread = POSITIVE (more wind = fire spreads faster)

Simulation Observations:

When Rainfall OFF: Dry Vegetation goes UP, Fire Spread goes UP

When Wind ON: Fire Spread goes UP

Worst conditions: No rain + High wind

DIFFERENTIATION

Support	Pre-label relationships; use sentence starters for explanations
Challenge	Add 3+ components; research actual fire risk percentages
ELL	Provide visual vocabulary cards; pair with English-proficient partner

EXTENSION CONNECTIONS

- **Water Cycle Unit:** Drought as part of larger pattern
- **Human Impact:** Adding humans/power lines to model
- **Climate Change:** Researching how fire season has changed over decades