

ModellIt! Teacher Guide

G05-L01: When Trees Become Matches

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

Grade Level	5th Grade
NGSS Standard	5-ESS2-1
Time	40-45 minutes (can split across 2 days)
Materials	Student devices with ModellIt access
Prep Required	None — lesson is self-contained

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

LEVER FRAMEWORK ALIGNMENT

Activity	LEVER Phase	Time	What Students Do
Activity 1	LOCATE	8-10 min	Sort and add components
Activity 2	ESTABLISH	8-10 min	Connect with arrows (+/-)
Activity 3	VISUALIZE & EVALUATE	10-12 min	Run simulations, analyze graphs
Activity 4	REVISE & EXTEND	10-15 min	Research and expand model

ANSWER KEY

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 Results:

- Drought (Rainfall OFF): Dry Vegetation ↑, Fire Spread ↑
- Wind ON: Fire Spread ↑↑
- Worst conditions: No rain + High wind

FACILITATION TIPS

Activity 1: Let students explore. Ask: 'Which ones can we control?'

Activity 2: Guide with: 'When this goes UP, does that go UP or DOWN?'

Activity 3: Let students 'break' the model — turn things on/off. This is where insight happens!

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

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 the water cycle?"
- "If you were a firefighter, where would you position BEFORE fire season?"

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.

DIFFERENTIATION

Support	Pre-label some relationships; use sentence starters
Challenge	Add 3+ research components; calculate fire risk percentages
ELL	Visual vocabulary cards; pair with English-proficient partner

STEM CHALLENGE: FIREBREAK ENGINEERS

A simple, no-prep engineering challenge that extends the model.

- Students design firebreak placements to protect a community
- Connects directly to their model (reducing Dry Vegetation)
- Can be completed in 10-15 minutes
- Optional extension: Add 'Firebreaks' component to ModelIt