

# **Modellit!**

## **Printable Activity Pack**

### **When Trees Become Matches**

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

[IMAGE: California hills with wildfire smoke]

## TABLE OF CONTENTS

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Scoring Rubric
2. Anecdotal Notes Sheet
3. Model Recording Page
4. Simulation Observations
5. Research & Extend
6. STEM Challenge: Firebreak Engineers
7. STEM Challenge: Teacher Notes

## SCORING RUBRIC

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

Criteria	4-Extending	3-Proficient	2-Developing	1-Beginning
Model Construction	Builds model + extra components	Builds and labels all parts	Most parts there, some missing	Model incomplete or incorrect
Connections (Arrows)	All arrows + extra correct	All required arrows correct	Some arrows missing/incorrect	Few or no correct arrows
Simulation Use	Runs several tests, explains results	Runs simulation, basic explanation	Runs with help, unclear explanation	Cannot run or explain
Participation	On task, asks questions, helps	On task, follows directions	Sometimes off task, needs reminders	Rarely participates

**Total Score:** \_\_\_\_\_

14-16 = Extending | 10-13 = Proficient | 7-9 = Developing | 4-6 = Beginning

# ANECDOTAL NOTES SHEET

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Unit: When Trees Become Matches (Earth Systems)

### Verbal Reasoning:

---

---

### Concept Cognition:

---

---

### Peer Collaboration:

---

---

### Checklist:

- Used Graph Panel correctly
- Ran simulation with different scenarios
- Identified cause-effect flow
- Asked questions or made real-world links
- Added research-based component

### Additional Notes:

# MODEL RECORDING PAGE

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Draw your completed model below. Include all components and arrows.**

Label each connection as + (positive) or – (negative).

*Draw your fire system model here*

**List your components:**

EXTERNAL (can't control):

1. \_\_\_\_\_
2. \_\_\_\_\_

INTERNAL (changes based on other things):

1. \_\_\_\_\_
2. \_\_\_\_\_

# SIMULATION OBSERVATIONS

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

## BASELINE TEST (Everything ON)

What happens when the simulation runs normally?

---

---

## DROUGHT TEST (Rainfall OFF)

When I turned OFF Rainfall, this happened:

- Dry Vegetation: went UP / went DOWN / stayed same
- Fire Spread: went UP / went DOWN / stayed same

## WIND TEST (Wind ON)

When I turned ON Wind (Santa Ana winds), this happened:

- Fire Spread: went UP / went DOWN / stayed same

## WORST CONDITIONS

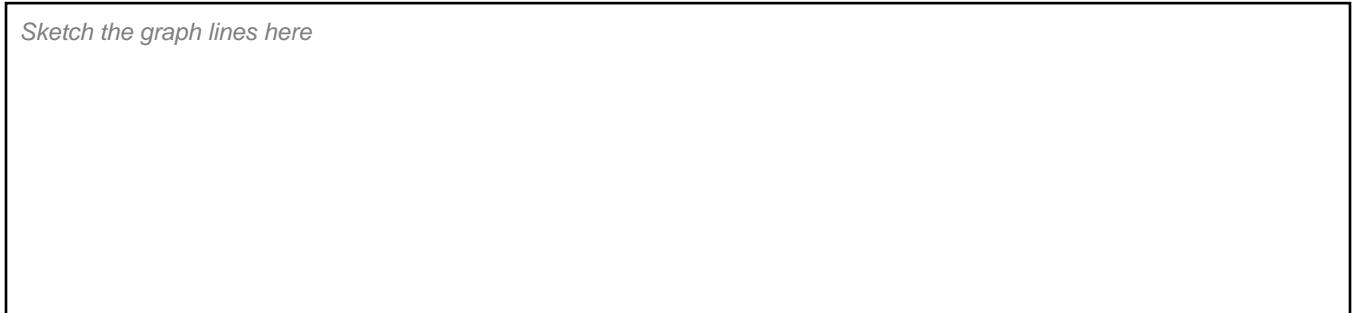
The WORST fire conditions in my model are when:

---

---

Sketch what your graph looked like:

*Sketch the graph lines here*



## RESEARCH & EXTEND

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

**What's MISSING from your model? Research one new component!**

NEW COMPONENT I want to add: \_\_\_\_\_

Is it EXTERNAL or INTERNAL? (circle one)

What does it connect to? \_\_\_\_\_

Is the relationship POSITIVE (+) or NEGATIVE (-)? \_\_\_\_\_

Why? Explain your reasoning:

---

---

---

After adding it, my simulation showed:

---

---

---

## REFLECTION

Explain why California has wildfires every year (use your model!):

---

---

---

---

Which Earth systems interact to create fire conditions? (circle all)

ATMOSPHERE    BIOSPHERE    HYDROSPHERE    GEOSPHERE

# STEM CHALLENGE: FIREBREAK ENGINEERS

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

## THE CHALLENGE

Firefighters create FIREBREAKS — gaps in vegetation that stop fire spread.

Your mission: Design a firebreak plan for a California community!

### SCENARIO:

A small town is surrounded by dry brush and trees. Based on your model, you know that DRY VEGETATION + WIND = major fire spread. Where would you put firebreaks to protect the town?

### YOUR FIREBREAK PLAN:

*Draw a simple map showing: Town (square) + Trees (circles) + Your firebreaks (lines)*

### Explain your design:

Why did you put firebreaks in those locations?

---

---

---

### Connection to your model:

How does your firebreak affect the FIRE SPREAD component?

---

---

# STEM CHALLENGE: TEACHER NOTES

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

## FIREBREAK ENGINEERS

### **Big Idea:**

Firebreaks work by removing FUEL from the fire system. Students apply their model understanding to a real-world engineering solution.

### **Materials Needed:**

- Paper and pencil (already provided in activity pack)
- Optional: colored pencils for map drawing
- NO PREP REQUIRED!

### **Implementation:**

1. Review the model: Dry Vegetation → Fire Spread
2. Introduce firebreaks as 'removing the fuel'
3. Students design individually or in pairs (10-15 min)
4. Share designs — discuss trade-offs

### **Discussion Questions:**

- Why can't we just remove ALL vegetation?
- Where do real firefighters put firebreaks?
- How does WIND affect where firebreaks should go?

### **Connection Made:**

"If we reduce DRY VEGETATION in key areas, we BREAK the chain that leads to FIRE SPREAD — just like our model showed!"

### **Optional Extension:**

Add 'Firebreaks' as a new component in ModelIt with a NEGATIVE relationship to Fire Spread. Run the simulation to see the effect!