

Wildfires and Predictions (From Directed to Guided Discovery)

We will be using the Fire! activity to understand the wild fire.

We will use fractions and decimals and percents and averages to measure and report to each other in the form of a graph the results of an exploration of fires.

1. Go to the Fire! Activity: <http://www.shodor.org/interactivate/activities/fire1>

- Set the “probability of burning” to 0.
- Click anywhere in the forest. Watch what happens.
- What percent of the trees were burned?
- How many trees is that?
- Regrow the forest and start a new fire. Does the same thing happen? Why or why not? Repeat this several times. See if you can detect a pattern.

- Set the “probability of burning” to 1.
- Click anywhere in the forest. Watch what happens.
- What percent of the trees were burned?
- How many trees is that?
- Regrow the forest and start a new fire. Does the same thing happen? Why or why not? Repeat this several times. See if you can detect a pattern.

- Set the “probability of burning” to 3/6 or 1/2 or 0.5 (hit enter)
- Click anywhere in the forest. Watch what happens.
- What percent of the trees were burned?
- How many trees is that?
- Regrow the forest and start a new fire. Does the same thing happen? Why or why not? Repeat this several times. See if you can detect a pattern.

2. Now repeat the burning simulation at with the probability set to 0.5 at least 10 times and record your results.

- What is the AVERAGE percentage of trees burned?
- What is the AVERAGE number of trees that burned?

- What is the AVERAGE number of iterations (steps) the fire burned?

Fire Exploration as a Group Activity:

Exploration 1: Average percent of trees burned at probability = 0.500

Run	Percent trees burned	Iterations
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Average		

Exploration 2 Average percent of trees burned at probability = _____(Fraction)

= _____(Decimal)

Run	Percent trees burned	Iterations
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Average		

Investigating the role of **DENSITY** and **SIZE** on **PERCOLATION**

Using <http://www.shodor.org/interactivate/activities/ABetterFire/> as your computational laboratory, with 2 or three classmates, organize a scientific investigation to answer these questions:

1. How does forest density affect the probability that a fire that starts at one edge of a forest will *percolate*, that is, reach the opposing side?
2. What effect does the size of the forest have on your answer to question 1 above?
3. What is the effect of wind on your results from investigating questions 1 and 2 above?