Using Match Stick Arrays to Analyze Forest Fire Propagation Along a Slope[1] ABIGAIL AMBROSE, NIKLAS MANZ, College of Wooster — The effect of a forest floor slope θ on the propagation speed v of forest fires was experimentally analyzed using physical, 3D-printed models with match stick arrays to represent the trees. Various models for three specific distance conditions between neighboring match heads were created. In each model type the distance between the match heads Δd is kept constant along the horizontal (x-model), along the vertical (z-model), and along the slope (r-model). For all three models, the slope-speed relationship $v(\theta)$ along the incline for both, the upward and downward propagation of the fire fronts was determined by measuring the time the front needed to propagate through the length of the model. Each model was best fit with a different mathematical function: the x-model with an exponential curve, the z-model with a quadratic curve, and the r-model with a straight line.

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