Handout M05-1: Matchstick Forest Answer Key.

1. **Experimental question:** What is the effect of stand density on fire spread?

2. **Potential hypotheses:**
   - Fire will spread more easily through a dense stand than through an open stand.
   - Fire will spread easily through clumps of trees but will not spread easily through big openings between clumps.
   - If a clump of trees is uphill from a burning clump, it will ignite more easily than if it is downhill than the burning clump.

3. **Measurements needed:**
   - duration of burning
   - maximum flame height
   - number of matches burned…

   Calculations needed, if any:
   - Percentage of trees burned
   - Duration of burning if measured with a start time and an end time. Not needed if measured with a stopwatch.

   How do you plan to ignite – from the top, side, or bottom row of matches?
   Bottom row of matches

4. Obtain from ***M05_MatchstickForestExperimentDesigns.pptx***, Slide 2 or 3. Obtain data from each team.

After all experiments are done, answer the following:

5. Review your hypothesis (Question 2 above). Based on your observations, do you think your hypothesis was correct? If not, write a better one ….

6. Write a paragraph that answers Question 1 above. Show how the results of your experiments demonstrate your answer. Use your understanding of the heat plume and the Fire Triangle to explain. Fires spread faster and burn more completely in dense standing fuels (like the boards with 49 matches) because heat and flames are more likely to reach nearby fuels. This is especially true when dense fuels are standing uphill from the burning fuels, because heat is rising convectively and heating the unburned fuels.