

## Teacher's Key to Handout H11-2. Are inversions connected to smoke?

1. These words describe air circulation at the earth's surface:

Unstable

Mixing

Stagnant

Still

Stable

Turbulent

Copy each word into one of the boxes below:

### Normal conditions

Unstable, Mixing, Turbulent

### Inversion conditions

Stagnant, Still, Stable

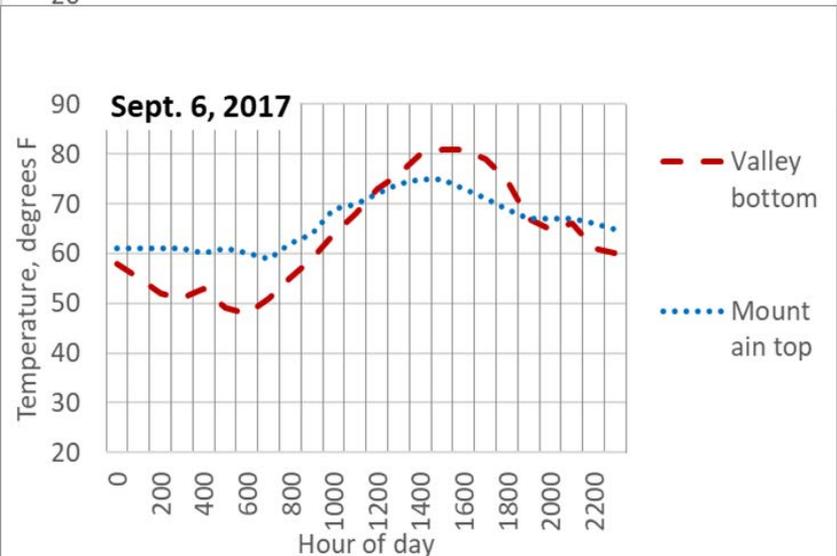
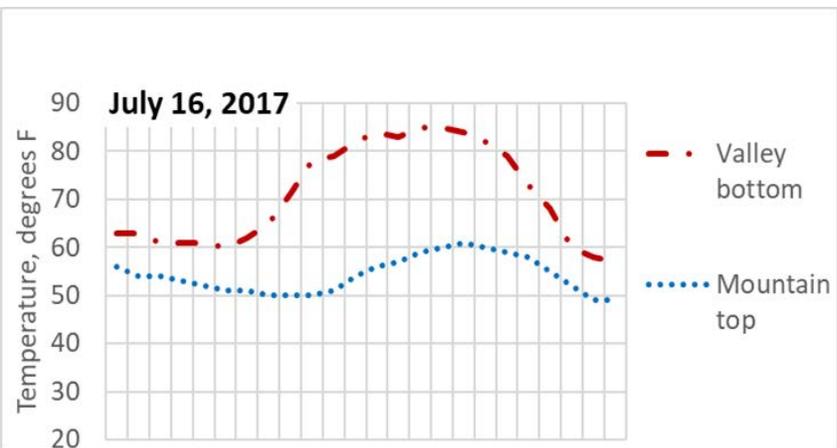
These graphs show temperatures every hour during 2 days while the Lolo Peak Fire was burning. Red dashed lines show data from the Missoula airport, a **valley-bottom** location at 3192 ft. Blue dotted lines show data from Point 6, a **mountain top** location at 7920 ft.

2. On July 16, was the valley bottom ever cooler than the mountain top? No. If yes, for about how many hours? Not applicable

3. On Sept. 6, was the valley bottom ever cooler than the mountain top? Yes. If yes, for about how many hours? For about 16 hours, from midnight until noon and from about 20:00 to midnight.

4. Which day had normal air circulation? July 16.

5. Which day had inversion conditions? September 6.



This graph shows the number of hours in each day during the Lolo Peak Fire when the valley bottom was cooler than the mountain top for at least 1 hour. The Lolo Peak Fire was not the only one in the area during the summer of 2017, but it was the one closest to these weather recording stations.

6. How many days during the fire had at least 1 hour when the temperature in the valley was cooler than at the mountain top? 35 days.
7. How many days during the fire had inversion conditions for at least part of the day? The same - 35 days.
8. Which day had the longest-lasting inversion? September 6. How long did it last? 16 hours.
9. Find 1 week during the fire when you would expect a lot of smoke in the valley because of inversion conditions. Label that week "SMOKY." The week of September 3-9 has the most hours of inversion, plus inversion on every day but one, so that's a good candidate. So is the previous week.
10. Find 1 week when you would expect the air to be very clear of smoke because there were no inversions. Label that week "CLEAN AIR." There are several good candidates. The week of September 17-23 had no inversions, so that's a good choice. So is the week of August 13, which only had 2 hours of inversion – and only on 1 day.

