Answer key for Handout M10-1: Fire and Soil

1. What 2 forms of heat transfer are able to move heat down into the soil? Conduction and radiation.

2. Write the definition of each term:
   a. Burn severity: the physical, biological, and ecological effects of a fire
   b. Vegetation burn severity: the effect of a fire on the vegetation
   c. Soil burn severity: the effect of a fire on the soil

3. Which photo shows a place that is likely to experience high soil burn severity? Why? The photo on the right (B) has a lot of large, heavy fuels. They would produce more heat and burn for longer time (once ignited) than the fuels in photo A.

4. Describe the soil burn severity in the photo on the right (B). Soil burn severity varies a lot. In some areas, the forest floor is unburned. Some areas are covered with black ash, and they have some large pieces of wood left. Other areas are covered with white ash. In some places, white ash is all that remains of large logs.

5. What places in the video will probably experience low soil burn severity? Why? Places without large fuels will probably experience low soil burn severity because the flames will pass through too quickly to transfer a lot of heat into the soil.

6. In the area behind the flaming front, where the fire has already passed through, what fuels are continuing to burn and produce heat? Large fuels like stumps and logs.

7. In the photo, circle and label an area likely to have:
   a. low soil burn severity
      Blue circle is an example: The fire burned around or under small trees without burning their foliage, and the ash is black.
   b. high soil burn severity
      Red circle is an example: The fallen logs have burned and the ash around them is white.

Photo by Michael Yager
8. What is likely to happen if it rains after a fire has removed all of the litter, duff, and plant cover from the soil? If there is no litter, duff, or plant cover to hold the soil in place, the soil is vulnerable to **erosion** (washing away), especially after heavy rains.

9. After a fire, what kinds of places are most likely to have severe erosion? **Areas on steep slopes** with **severely burned soils** are the most vulnerable to erosion.

10. In the photo, circle and label 3 areas:
   a. A place that is likely to have high soil burn severity
   b. A place that is likely to have low soil burn severity
   c. A place that is likely to have severe erosion

   Red circles (a) indicate areas that are likely to have high soil burn severity. Where they are on steep slopes (golden circle, c – and also steep areas within the “a” circles), they also have high risk of soil erosion. Blue circles (b) indicate areas that are likely to have low soil burn severity. In this picture it is difficult to tell if the green patches of forest are unburned or experienced a surface fire and have surviving trees in the canopy. These areas are at low risk for erosion because they are relatively flat and likely have something covering the forest floor (litter, duff, live plants). Most of the areas with blackened trees probably burned in crown fire; many of them have patches of both black ash and white ash on the ground, suggesting that they burned with a mixture of soil burn severities.