Answer Guidelines for Handout E11-1. From cone to forest

Use the class's data to estimate how many baby lodgepole pine trees you might find in a forest the summer after a crown fire:

Suppose we have a small lodgepole pine forest near our school. It is about as big as a football field. It contains 500 trees, and most of the trees produce serotinous cones.

1. Suppose the **median number of filled seeds per cone** in our forest is the same as what we observed in class: _____ **seeds/cone.**

2. Suppose each of the trees in our forest produces about 800 cones in a typical year. **How many filled seeds is it likely to produce in 1 year?** Multiply the median from the class's data * 800. Example: If the median was 6 filled seeds/cone: 6 filled seeds/cone * 800 cones/tree = 4,800 seeds/tree in 1 year

3. Suppose most of the cones and their seeds stay healthy for at least 20 years. This means that they contain embryos that can grow into healthy trees. The stored seeds are called a seed bank. **How many seeds are in an average tree's seed bank?** Multiply the answer from (2) * 20. Example: 4,800 seeds/tree/year * 20 years = at least 96,000 seeds in that tree's seed bank

4. Recall that our small forest has 500 lodgepole pines in it. **How many seeds are in the seed bank for the whole forest?** Multiply the answer for (3) * 500. Example: 96,000 seeds/tree * 500 trees = 48,000,000 seeds in the forest's seed bank

5. Suppose a crown fire burns through our little forest, releasing about half of the seeds in its seed bank. **How many seeds fall to the ground**? Divide the answer for (4) by 2. Example: 48,000,000 seeds in the forest's seedbank/2 = 24,000,000 seeds on the ground

6. Suppose about 1/3 of the seeds that fall to the ground produce baby lodgepole pines the next spring. **How many baby trees will be in our football-field-sized forest?** Divide the answer for (5) by 3. Example: 24,000,000 seeds on the ground/3 = 8,000,000 baby trees!