**Lower Elementary:**

*Question:* There are 100 green leaves on a tree. Half of them turn orange one day, and half of the remaining green leaves turn orange the next day. How many leaves of each color are there now?

**Upper Elementary:**

*Question:* There are 1,024 leaves on a tree. On the first day, half of the leaves fall to the ground. Each day that follows, half of the remaining leaves fall to the ground. On what day will there be only 1 leaf left on the tree?

**Middle School:**

*Question:* One turkey weighs 14 pounds and 12 ounces, and another turkey weighs 15 pounds and 4 ounces. What fractional part of the total weight of both turkeys is the lighter turkey?

**Algebra and Up:**

*Question:* There is an 0.5% chance of snow in Seattle and a 75.5% chance of snow in New York. What is the percent chance that it will snow in either Seattle or New York, but not both?

**Lower Elementary:**

*Question:* There are 100 green leaves on a tree. Half of them turn orange one day, and half of the remaining green leaves turn orange the next day. How many leaves of each color are there now?

*Answer:* 75 orange leaves and 25 green leaves

*Solution:* The first day, half of 100 = 50 leaves turn orange. The second day, half of 50 = 25 leaves turn orange. So, now there are 50 + 25 = 75 orange leaves. The remaining 25 leaves are still green.

**Upper Elementary:**

*Question:* There are 1,024 leaves on a tree. On the first day, half of the leaves fall to the ground. Each day that follows, half of the remaining leaves fall to the ground. On what day will there be only 1 leaf left on the tree?

*Answer:* the tenth day

*Solution:* To solve this problem, we find the number of times we need to halve the leaves in order to get down to 1. On the first day, half of 1,024 = 512 stay on the tree. If we continue the process, we find that 256 are left on the tree the second day, 128 the third day, 64 the fourth day, 32 the fifth day, 16 the sixth day, 8 the seventh day, 4 the eighth day, 2 the ninth day, and only 1 leaf left on the tree the tenth day.

**Middle School:**

*Question:* One turkey weighs 14 pounds and 12 ounces, and another turkey weighs 15 pounds and 4 ounces. What fractional part of the total weight of both turkeys is the lighter turkey?

*Answer:* 59/120

*Solution:* A pound is 16 ounces. So, the lighter turkey weighs 14 × 16 + 12 = 236 ounces. The heavier turkey weighs 15 × 16 + 4 = 244 ounces. So, the turkeys weigh 236 + 244 = 480 ounces in total. As a fraction, the lighter turkey weighs 236/480 of the total weight of both turkeys. We can reduce the fraction by dividing both the numerator and denominator by 4 to get 59/120.

**Algebra and Up:**

*Question:* There is an 0.5% chance of snow in Seattle and a 75.5% chance of snow in New York. What is the percent chance that it will snow in either Seattle or New York, but not both?

*Answer:* 75.245%

*Solution:* The chance of snow falling in either place but not both is the sum of the probability it’ll happen in each place minus the probability it’ll happen in both places. The sum of the probabilities that snow will fall in each location is 0.5% + 75.5% = 76%. The probability that snow will fall in both places is twice the product of each location’s probability of snow, which is 2 × 0.5% × 75.5% = 0.755%. So, the probability of snow falling in either place, but not in both, is 76% – 0.755% = 75.245%.