Mixing Word Problems

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1. How many kgs of soil containing 20% nitrogen must be added to 5kg of soil containing 10% nitrogen so that the resulting mix of soil contains 15% nitrogen?

2. The purity of gold is measured in carats (out of 24). 24 carat gold is 100% pure gold. 12 carat gold is in fact only 50% pure gold, plus 50% other metals.
How many grams of 24 carat gold must be added to 60 grams of 12 carat gold, so that the final alloy is 15 carat gold.

3. Betty would like an alloy that is 40% copper. She has 100g of an alloy that is 20% copper which must all be used. How much of an alloy with 70% copper content must she use; to the nearest gram?

4. How many ounces of pure water must you add to 50 ounces of a 15% saline solution to bring the salt content down to just 10%?

5. A particular alloy is made up of silver and gold. The silver costs €8 / g and gold costs €40 / g. A jeweller wants a piece that weighs 50 grams and is worth €30 / g .

   i. Write equations in "x" and "y" that describes the price of the alloy.

   ii. Solve for the weight of each metal in the alloy to the nearest gram.

6. A biologist has petri dishes made up of bacteria samples. Petri dishes labled Sample A are made up of 40% bacteria. Petri dishes labled Sample B are made up of 60% bacteria. 30 of these samples are mixed, and the resulting mix has 52% bacteria. Calculate how many each of Sample A and Sample B were selected.

7. A scientist needs 10 litres of a 15% acid solution for a particular lab test. Unfortunately, the supplier only has 10% and 30% acid solutions in stock, so the scientist decides to mix these himself. How many litres of each solution does he need?

8. An apple is 84% water and an orange is 87% water. Scientists want to create 2kg of a hybrid superfruit, an 'orapple', that is 86% water. How many grams of each fruit should they use?