The preparation of 2-hydroxybenzoic acid - student sheet

Introduction
Many organic compounds are found in plants. 2-Hydroxybenzoic acid (salicylic acid) can be made from methyl 2-hydroxybenzoate which is obtained as oil of wintergreen by distillation from the leaves of Gaultheriae procunbers.

Oil of wintergreen is 98% methyl 2-hydroxybenzoate. This oil can be hydrolysed by boiling with aqueous sodium hydroxide for about 30 minutes. The reaction produces sodium 2-hydroxybenzoate which can be converted into 2-hydroxybenzoic acid by adding hydrochloric acid.

The process has three main stages:
1. Heating the oil of wintergreen with aqueous sodium hydroxide. The reaction is quite slow. You need to heat the mixture for 30 minutes without letting the water, or the oil of wintergreen, or the product evaporate. Remember that one of the products, methanol, is flammable so you cannot heat the flask with a naked flame.
2. Converting the reaction product into the free acid; and
3. Separating the product from the reaction mixture and drying it.

Stage 1
Set up apparatus suitable for heating about 30 cm³ of reaction mixture using a water bath. Use a condenser to prevent any volatile liquids escaping. Get your apparatus checked by your teacher before you start the reaction. Put on your eye protection.

Put 2 g of oil of wintergreen into your flask and add 25 cm³ of 2 mol dm⁻³ sodium hydroxide (CARE!). Aqueous sodium hydroxide is particularly prone to bumping so you will need some anti-bumping granules. Then heat over a boiling water bath for 30 minutes.

While the mixture cools make a list of the possible compounds present in the mixture

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**Stage 2**
Pour the mixture into a small beaker surrounded by a mixture of ice and water. Add concentrated hydrochloric acid (CARE!) to the mixture dropwise until it is just acidic, stirring all the time. Why do you need to keep the mixture cool during this process?

**Stage 3**
Filter the product using a Buchner funnel and suction apparatus. Wash the product with a little ice cold water and transfer it to a weighed watch glass. Allow to dry overnight.

**Results**
Include the answers to the following questions in your write up.

1. How can you tell from observing the process that a new substance has been formed in the reaction?
2. What has happened to the methanol formed in the reaction?
3. What is oil of wintergreen used for nowadays?
4. What mass of product was formed from 2 g of oil of wintergreen?
5. What percentage yield is this?