Chemistry Investigation

I will be investigating the question: “why do puddles disappear so quickly”
I’m going to vary the size of a puddle to see if puddles disappear quicker with a larger surface area.

The apparatus that I will require are:

- Safety Goggles
- Boiled water straight from a kettle (100 ºc)
- A Water Measurer
- A Stop Watch
- A Petri Dish
- A Beaker
- A Boiling tube

I will keep all of the factors of the investigation the same, to make it a fair test, this includes:

- The same amount of water in each container
- The same amount of time the containers are left for
- The same water temperature
- The same room temperature

I will first put on the safety goggles, as the investigation requires the handling of boiling water. I will then boil the water to 100ºc, and then pour 30ml using the water measurer into either the Petri Dish, Beaker or Boiling tube and leave the container for a period of 10 minutes using the stopwatch.

After 10 minutes, I will pour the remaining water carefully back into the water measurer to and see if evaporation has taken place, if it has, the amount of water would be lower. I will repeat this so every container has 3 readings. The reason for not doing all 3 containers at the same time, is that the 3 stopwatches would have to start exactly as the water has been poured and the temperature of the water could decrease by the time all 3 containers have been filled, which would give inaccurate results.

I predict that because the petri dish has a larger surface area than the boiling tube and beaker, evaporation would take place quicker. The scientific explanation for this is that the water particles that are vibrating fast due to the high temperature and are escaping into the air. With a large surface area, this would be quicker as the particles can easily escape, with a small surface area the particles are closer together, which means they would take longer to change state from liquid into gas. As quoted by Encarta Encyclopedia:
At temperatures below the boiling point, individual particl es approaching the surface with above-average speed may have enough energy to escape from the surface and pass into the space above as gas particles.

After carrying out the practical experiment, I recorded the results and worked out an average, both of which are displayed in the following tables:

PETRI DISH	
1st try	26ml left
2nd try	27ml left
3rd try	27ml left
Average	**26ml**

BEAKER	
1st try	28ml left
2nd try	28ml left
3rd try	29ml left
Average	**28ml**

BOILING TUBE	
1st try	29ml left
2nd try	30ml left
3rd try	30ml left
Average	**30ml**

By looking at the tables above, I can tell that the water in the petri dish evaporated the most, losing an average of 4ml, and then the beaker with an average of 2ml lost. Last is the boiling tube that, on average didn't lose any water.

With each container, there is always a same result twice and the difference between the 3 results is always 1ml, this shows that the experiment was accurately done.

To prove my results, I have presented them in a graph (next page).
The graph shows that the water in the boiling tube took the longest time to evaporate and the water in the petri dish took the shortest time, this also occurs when an average of each container is made.

The results give the conclusion that the larger the surface area, the quicker the evaporation process will take place. In the boiling tube, although the water particles are vibrating fast due to the boiling water, they are so tightly packed due to the shape of the tub e and its surface area, they are being released at a slower rate than the water particles in the petri dish that has a larger surface area, so the particles can easily escape. This also supports my prediction that the larger the surface area, the quicker t he liquid will change into gas.

I think that because the results for each container were always 1ml difference if not the same, they prove that I have carried out the experiment accurately and that they are very reliable.

To improve the experiment further more I could: leave the water for a longer period of time, keep the temperature of the water always the same (using a Bunsen Burner) and use larger or smaller amounts of water. I could even carry out the experiment with different room temperatures, to see if the process would take place at a different rate.