Thermometer Accuracy

Need 3 groups

* Time Keeper
* Recorder of data (time and temperature of thermometer)
* Volunteer from each group to do: (a) chew gum vigorously (2 minutes) (b) drink cold water (swish around in mouth, drink for about 2 minutes) (c) do jumping jacks (2 minutes)
* Person to shake thermometer until reading is below 94 degrees – this will be your initial condition,(shake for about 1-2 minutes) – do this while volunteers are doing their activities in bullet 3

Equation to use:

 

 T – temperature of person’s body

 t – time (you choose appropriate units)

 - Temperature constant (typically room temperature - but for this experiment, it will be the stabilized body temp - I.E. What is the end temperature of the body after performing an activity)

 k – proportional constant

Experiment:

* For 2 minutes, volunteers perform activity AND another group member shakes thermometer
* When time keeper calls “Time” – read thermometer and record temp (this will be initial temperature at time 0)
* Insert thermometer in mouth of volunteer who performed activity (do not talk with thermometer in mouth)
* After 30 seconds – record temperature of thermometer (while it is in the mouth) – repeat this process each 30 seconds for at least 4 minutes in total.
* How long until the temperature stabilized?

Now – use the differential equation above and solve it. You will need to determine the k constant, too.

According to your differential equation, how long until the temperature stabilized?

In other words, how long does the thermometer need to stay under the tongue to get an accurate reading of your body temperature?