Experiment 2 – Handwashing technique test

Summary :

Microbes can transfer to your hands from dirty surfaces, this is why handwashing is so important. But microbes are so small you cannot see if you have removed them all when you wash your hands, so how do you know if your handwashing technique is good? In this experiment we will test your handwashing technique and try to discover if it can be improved.

Learning objectives :

1. Use basic technique and material to understand how good your handwashing technique is.
2. Understand why good handwashing technique is important.
3. Understand what would make your handwashing routine more effective.

Materials :

There are two different approaches to this experiment. The “basic” experiment (method 1) is easiest; the materials can be purchased at any supermarket. The advanced experiment (method 2) requires more specialist materials (easily available online) but will limit “cheating” and produces clearer results.

Method 1 (basic) materials (*optional items in italics*):

- Acrylic paint *(Peinture acrylique)*
- Water *(Eau)*
- Sink or bowl (large enough to wash hands) *(Evier ou bassine (suffisamment grand(e)pour se laver les mains))*
- Towels for drying hands *(Essuis-main/serviette/torchon)*
- *Soap (savon)*
- *Hand gel (gel hydroalcoolique)*
- *Thermometer (thermometer)*
- *Timer (minuteur)*
- *Nail brush/sponge/cloth (petite brosse/éponge/chiffon)*

Method 2 (advanced) materials (*optional items in italics*):

- Gel or lotion containing ultraviolet particles (for example Glo Germ or Glitter bug)
- A ultraviolet torch or light source
- Water
- Sink or bowl (large enough to wash hands)
- Towels for drying hands
- *Soap*
- *Hand gel*
- *Thermometer*
- *Timer*
- *Nail brush/sponge/cloth*

Method :

1. Create a results table (example on next page) with the students and predict which method will be the most effective at cleaning hands.
    a. This will also allow discussion of student's current handwashing methods and highlighting any recommended handwashing techniques.
    b. To make the experiment "more scientific" set criteria timing hand wash time, defining the number of times hands will be rubbed together or how hands will be rubbed together.
2. Fully cover the hands and wrists with acrylic paint (or UV gel/lotion) and allow to fully dry
3. If using acrylic paint blindfold students or ask them to close eyes before washing hands
    a. This means they cannot easily see how much paint has been washed away
4. Wash the hands following the specified method(s)
    a. Thermometers can be used to measure the temperature of the water (for example if testing if hot, warm, or cold water)
    b. Timers can be used to record handwashing time.
    c. Soap, hand gel and nail brushes/sponges/cloths can also be used to see if they give cleaner hands
5. Once the hands are washed pat dry with a towel and inspect for areas of paint/lotion which are remaining
    a. If using UV gel/lotion use the UV torch. Working in a darker area (for example standing in a cupboard, or lowering the room lights and blinds) allows the UV to show up better.

Example results table

Hand wash method	Predicted effectiveness OR "rank" (1 = most effective method)	Actual effectiveness OR "rank"
Dipping hands in cold water only (no rubbing)	5	4
Soap and warm water (rub hands together)	4	3
Hand gel only (rub hands together)	1	5
Soap, nail brush and cold water (rub hands together)	3	2
Two minute hand wash following guidelines	2	1

Useful resources

European handwashing guidelines: https://www.ecdc.europa.eu/en/publications-data/poster-effective-hand-washing

UV lotion and torches can be bought together as a kit if required. Several websites in the UK sell them, including Amazon.com. Local university biology departments or secondary schools may also have UV lights which can be borrowed. Check all UV lights are safe for use on skin before use.

Student's paper

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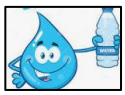
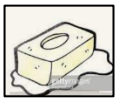
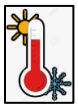
Materials

I will need:

- **Acrylic paint** 
- **Water** 
- **Sink or bowl** (large enough to wash hands) 
- **Towels for drying hands** 
- **Soap** 
- **Hand gel** 
- **Thermometer** 
- **Timer** 
- **Nail brush/sponge/cloth**  

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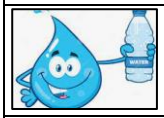	……
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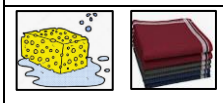	……

Method

1. Predict which method will be the most effective at cleaning hands.

A) Handwashing methods and handwashing techniques.

B) To make the experiment "more scientific" set criteria timing hand wash time, defining the number of times hands will be rubbed together or how hands will be rubbed together.

2. Fully cover the hands and wrists with acrylic paint (or UV gel/lotion) and allow to fully dry

3. If using acrylic paint, close your eyes before washing hands

4. Wash the hands following the specified method(s):
   A) Thermometers can be used to measure the temperature of the water (for example if testing if hot, warm, or cold water)
   B) Timers can be used to record handwashing time.
   C) Soap, hand gel and nail brushes/sponges/cloths can also be used to see if they give cleaner hands

5. Once the hands are washed pat dry with a towel and inspect for areas of paint/lotion which are remaining
   A) If using UV gel/lotion use the UV torch. Working in a darker area allows the UV to show up better.

Results table

Hand wash method		Predicted effectiveness OR "rank" 1 = most effective method 5 = bad effective method	Actual effectiveness OR "rank"
Dipping hands in cold water only (no rubbing)			
Soap and **warm water** (rub hands together)			
Hand gel only (rub hands together)			
Soap, nail brush and cold water (rub hands together)			
Two minute hand wash following guidelines