

## Joshua Feld Science Exhibition

**Purpose Question:** Which kills more bacteria, hand or dish soap?

**Title:** Hand or Dish Soap?

**Inquiry:** Which kills more bacteria, hand or dish soap?

### **Variables:**

Independent Variable- What is changed: The type of soap.

Dependant Variable- What I observe: How much bacteria each soap kills.

Control Variable- Everything that is the same during all the trials: The Amount of soap I used and where I got the bacteria, the bottom of my shoe.

**Hypothesis:** If I test which one kills more bacteria, hand or dish soap then hand soap will kill more bacteria because I think that since human hands have more bacteria than dishes the hand soap will have to be “stronger”.

**Materials:** Dish soap, hand soap, petri dish, q-tip, agar gel, incubator

### **Procedure:**

1. First I will Swab the shoe.
2. Then I will rub the swab in the petri dish.
3. Then I will repeat steps 1 and 2 two more times.
4. After this I will put the two petri dishes under an incubator for 12-48 hours.
5. Then I will put some dish soap on one sample and hand soap on another.
6. After this I will make observations.

**Observations:**

**Day 1 Observations**      48 Hours      **1-7-16**

Hand Soap Dish

Sample 1	12 colonies, white/beige, one is yellow, round, growing very close to each other
Sample 2	12 Colonies, white/beige, most are very small and round
Sample 3	13 colonies, white/beige, growing in one area all together, most are round

Dish Soap Dish

Sample 1	4 colonies, white/beige, very big
Sample 2	4 colonies, white/beige, medium sized, one is growing away from other colonies
Sample 3	5 colonies, white/beige, some are medium sized, some are small, close colonies

**Day 2 Observations**      154 Hours      **1-11-16**

Hand Soap Dish

Sample 1	12 colonies, some are black, some are yellow, all medium sized
Sample 2	7 colonies, all yellow, most are medium to small sized, one is a humongous splatter
Sample 3	6 colonies, most are black, 2 are yellow, most are big to medium sized

Dish Soap Dish

Sample 1	2 colonies, kind of yellow, medium sized, all connected into one big splatter
Sample 2	4 colonies, one is a light yellow, others are black and dark yellow, one is apart from others

Sample 3 AN EXTRA COLONY GREW UNDER NAME ON PETRI DISH	3 colonies, fairly close to each other, all black and dark yellow, arranged in a triangle
--	---

**Day 3 Observations**      178 Hours      **1-12-16**

Hand Soap Dish

Sample 1	12 colonies, most are either dark yellow or dark brown, one is clear, all are medium sized,
Sample 2	7 colonies, one is a humongous splatter, most are yellow, one is orange, some have some fuzzy looking "substance" around them
Sample 3	7 colonies, most are dark brown, one is light beige, the other is dark beige, all are different sizes, growing in two different groups

**Killers**

Day 1 Observations

24 Hours      **1-12-16**

Sample 1 (Hand Soap)	Nothing
Sample 2 (Dish Soap)	Nothing
Sample 3 (Control)	10 Colonies, all are small to medium sized, most are either light beige or white, some are growing away from others

Day 2 Observations

48 Hours      **1-14-16**

Sample 1	No Bacteria at all
Sample 2	Maybe 3 colonies (one of them is really spread out), white/beige
Sample 3	9 colonies, some are white, some are beige, most are medium to small sized

## **Analysis/Conclusion**

Real World App- Now when I am cleaning I will lean more towards using hand soap.

Hypothesis- In the end my hypothesis was correct, the hand soap prevented more bacteria from growing. This was my hypothesis because I think that human hands have to be very dirty after a day of work so the hand soap has to be very strong, where dish soap does not need to be as strong because dishes are not as dirty as human hands.

Errors- I was sick for one week of school and missed chances to make some observations, I had to miss day 3 observations for dish soap.

Now when I am cleaning I will lean more towards using hand soap. Throughout the experiment so little bacteria grew in the areas where I used hand soap, at one point it was very clear to me that my hypothesis was correct. In the end it was surprising to me that there was not one mistake in my experiment.