



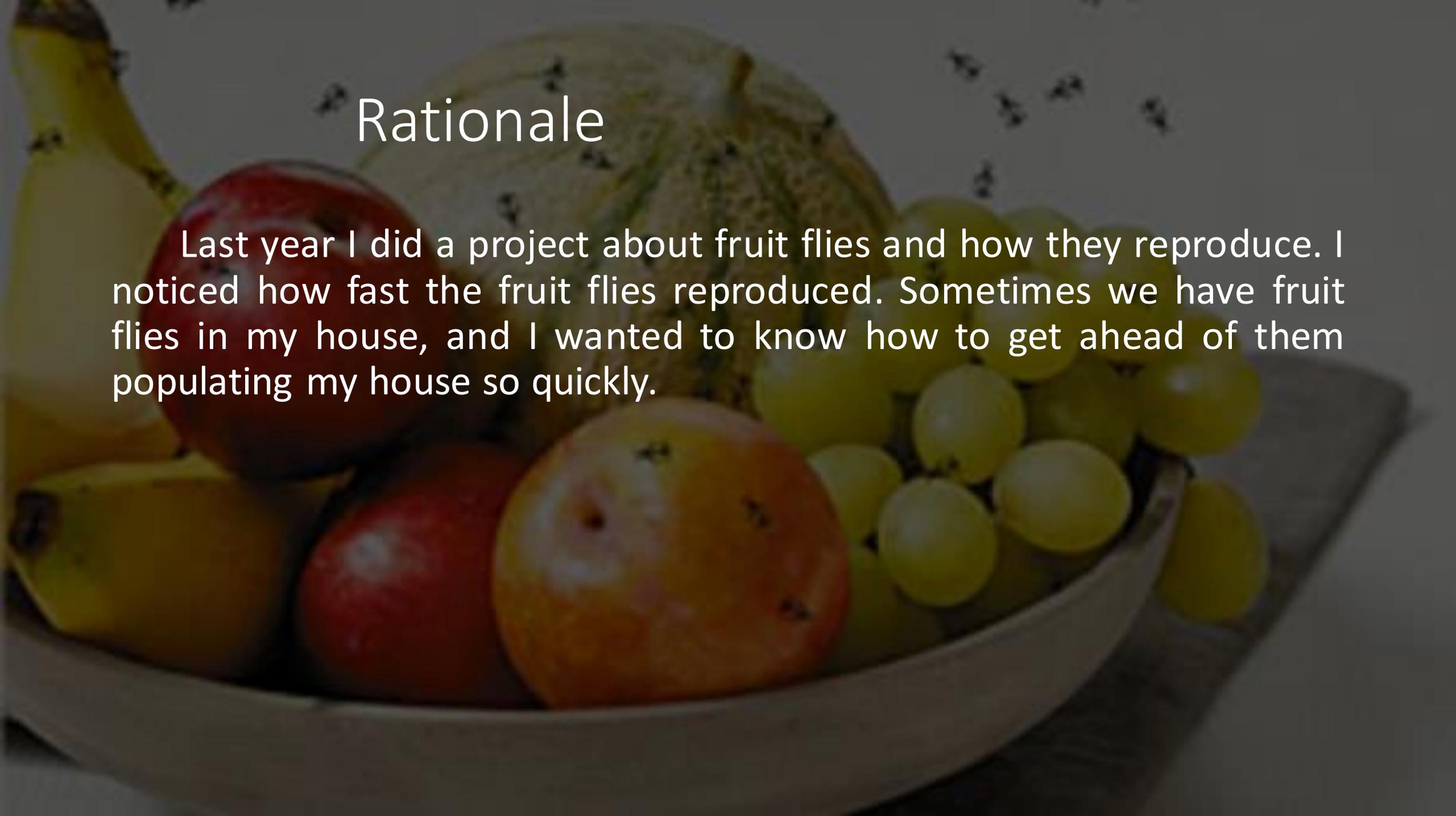
# Fruit Fly Trap

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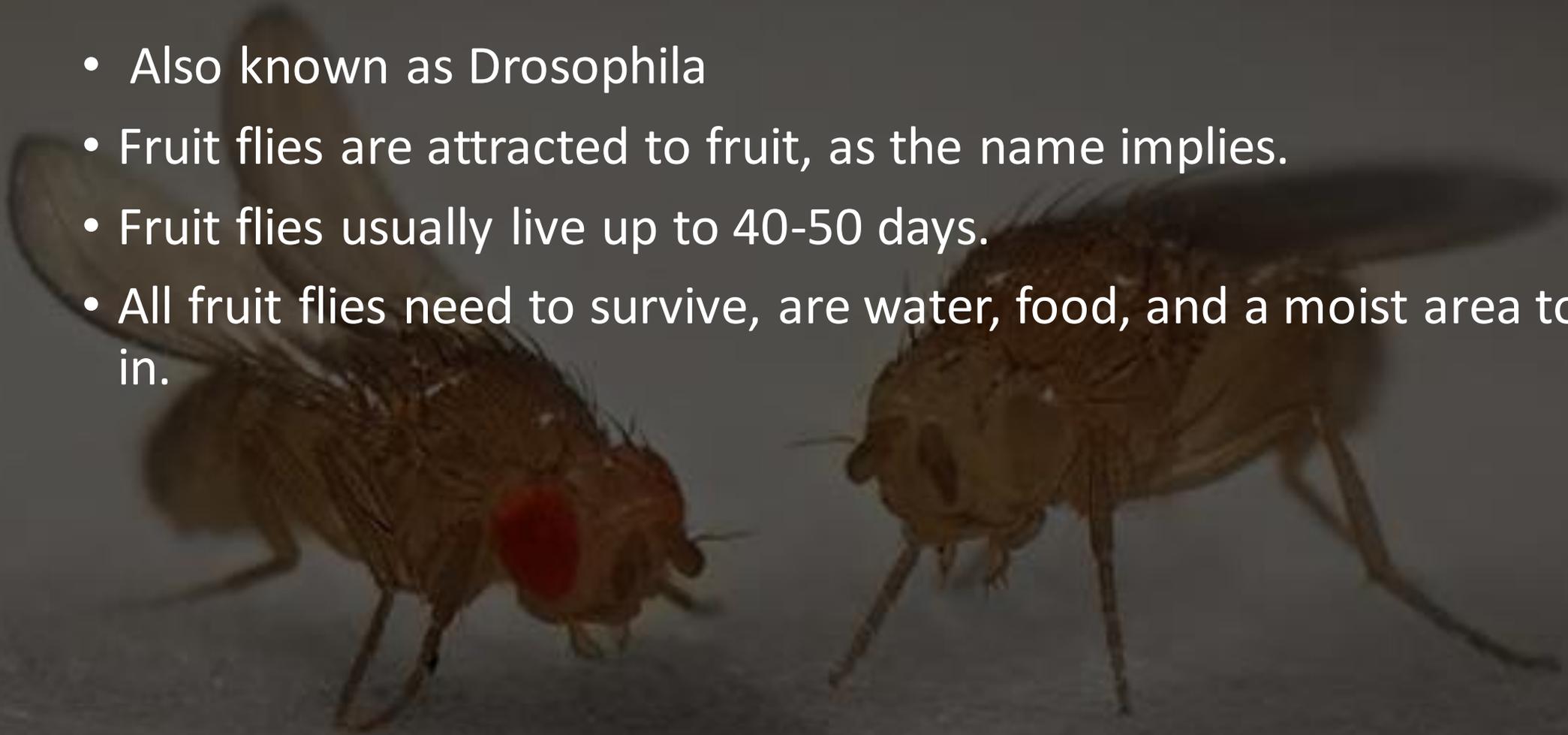
A photograph of a white bowl filled with various fruits, including bananas, apples, and grapes. Numerous small, dark fruit flies are visible, swarming over the fruit and the bowl. The image is dimly lit, with the text overlaid in white.

# Rationale

Last year I did a project about fruit flies and how they reproduce. I noticed how fast the fruit flies reproduced. Sometimes we have fruit flies in my house, and I wanted to know how to get ahead of them populating my house so quickly.

# What are Fruit Flies?

- Also known as Drosophila
- Fruit flies are attracted to fruit, as the name implies.
- Fruit flies usually live up to 40-50 days.
- All fruit flies need to survive, are water, food, and a moist area to live in.

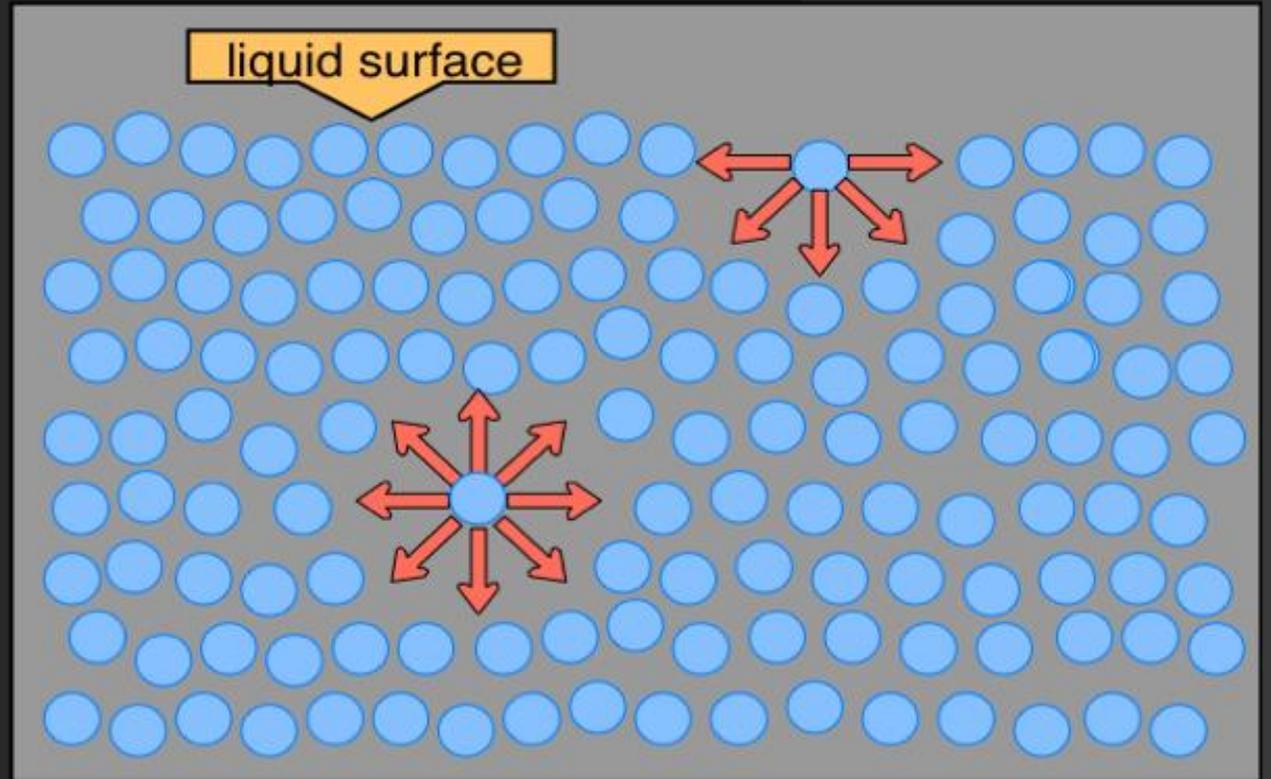


# Why is Apple Cider Vinegar Used to Attract Fruit Flies?

- Fruit flies are attracted to the carbon dioxide that comes from any type of organic material, like an overly ripe fruit.
- Apple cider vinegar has a strong sweet odor that leads the fruit flies into the trap because they think its overly ripe fruit.

# Why is Dish Soap Used to Trap Fruit Flies?

- Soap molecules are made of long chains of carbon and hydrogen atoms.
- The soap molecules lower the surface tension.
- The dish detergent decreases the vinegar's surface tension so that when a fruit fly touches the surface, it immediately sinks into the vinegar and drowns.



# Hypothesis

My hypothesis is that there will be a direct relationship between the amount of soap in the trap mixture and the number of fruit flies that are caught. As more soap is added, the surface tension of the vinegar mixture will decrease, causing more fruit flies to be caught in the trap. If there is not enough soap, the fruit flies might be attracted to the apple cider vinegar but be able to escape because the surface tension was not reduced enough.

# Investigative Design

- Independent Variable: Amount of soap in the mixture
  - Experimental Groups: 1 mL of soap, 0.5 mL of soap, and 0.25 mL of soap
  - Control Group: Pure apple cider vinegar (no soap added)
- Dependent Variable: Number of fruit flies caught in each cup

# Constants

Size of the trap – The size of the trap must be the same, especially the size of the opening. If the opening is smaller, then fewer fruit flies might be able to access the trap at one time.

Amount of vinegar- The vinegar is being used to attract the fruit flies. If there is more, then the odor might be stronger.

Type of soap- Different dish soaps might affect the surface tension differently.

Location of trap in container- The flies will have equal access to the traps.

Food (that includes water) and space- Fruit flies need these things to survive and be healthy and no fly will have an environmental advantage.

# Materials

- Fruit Flies
- Disposable mini cups
- Plastic container
- Dawn dish soap
- Apple cider vinegar
- Napkins
- Fly nap
- Wands
- Scissors
- ISEF form 7 (continuation form)



# Procedure

1. Cut cups to desired size.
2. Put the plastic cups in the container.
3. Pour the dish soap and the apple cider vinegar mixture into the plastic cups.
4. Put the fruit flies in the container with the apple cider vinegar and dish soap mixture.
5. After four days, anesthetize the flies.
6. While the flies are asleep, count how many flies died in each cup.

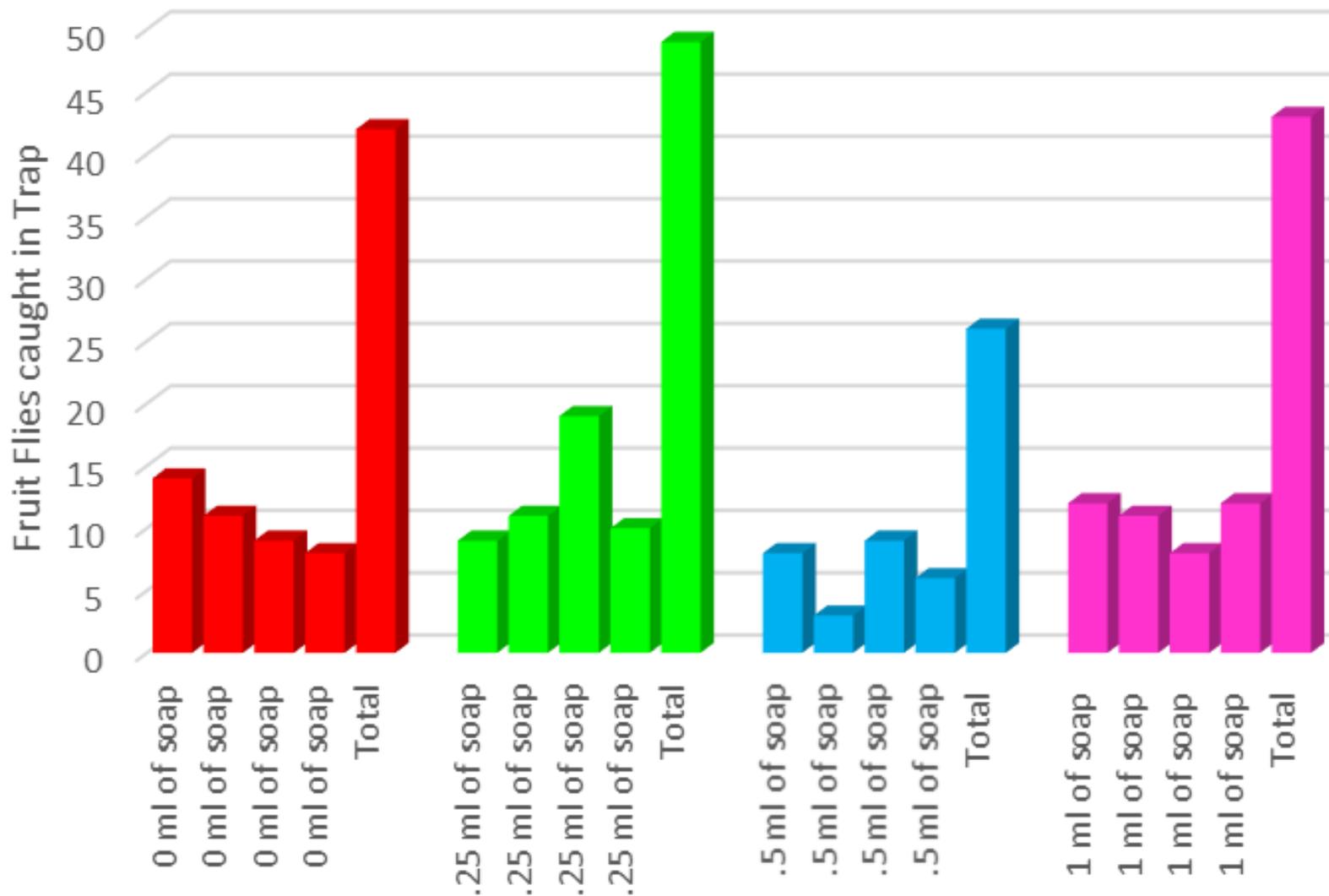


# Results

- The cups with 0 ml of soap caught 42 flies (Control).
- The cups with .25 ml of soap caught 49 flies.
- The cups with .50 ml of soap caught 26 flies.
- The cups with 1 ml of soap caught 43 flies.



## Fruit Flies Caught vs Amount of Soap in Trap



## Data Analysis

- There was no general pattern between the amount of soap and the amount of fruit flies caught.
- .25 mL of soap had the most and .5 mL had the least.
- There was a lot of variation in the number of flies caught in the different traps with the same amount of soap.

# Other Observations

- The fruit flies didn't move very much. They stayed near where I dropped them in for the first two days and then started moving out.
- They all tended to move towards the same corner
- Slight differences in heat, moisture, or an unlevelled surface may have caused them to move that way.
  - This may explain why the traps on one side of the container had more flies than the traps on the other side.
  - Many flies would stay on the rim of the trap. Eventually they often fell in. I did not observe any flies able to touch the liquid and then escape.
- The main function of the soap was to reduce the surface tension of the mixture so the flies would fall in. However, the flies fell in the control just as easily as those with soap. Therefore, soap was not needed to make the trap function and the results were random based on the trap the fly climbed into.

## Conclusion

My hypothesis that increasing the amount of soap in the trap would increase the number of flies caught was not supported. The results were random and there was no consistent pattern between amount of soap and the amount of flies caught.



# Investigative design analysis

## Improved

- Keep the temperature and moisture constant- My experiment was conducted in a room that had a heater and different openings like doors and windows. A control would be helpful to reduce the influence on fly behavior.
- Use fruit flies with wings- There is a chance that fruit flies with wings would be able to escape some of the traps and the effectiveness of the concentration of soap would be more evident.
- More fruit flies- the more fruit flies available, the effects of the random behaviors of the fruit flies would be reduced.



# Why I changed the project

- Fruit flies arrived and they were not viable. I found out that I could buy wingless fruit flies so I decided to utilize those.

# Sources

- <https://www.thespruce.com/get-rid-of-fruit-flies-1388144>
- <https://www.orkin.com/flies/fruit-fly/apple-cider-vinegar-traps>
- <https://www.thekitchn.com/diy-fruit-fly-traps-22942130>

Thank you for your attention,  
any questions?