CUBE Kishore Bharati Assistantship Report April 2025 (Monthly)

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During April 2025, I joined 17 out of 30 days.

A) Developing Context to Curriculum by addressing Simple questions

1. Understanding Homemade Acid-Base Indicators - The discussion focused on how Cubists created acid-base indicators at their HomeLabs using natural materials like hibiscus petals. This activity helped explore basic chemistry concepts, how certain plant pigments change color based on pH. Hibiscus, rich in anthocyanins, showed visible color change when exposed to acids and bases, making it a good natural indicator.

2. Understanding the Floral Dip Method and Cardamine Studies - The discussion focused on the floral dip method used in plant transformation, particularly in *Cardamine*, a model plant related to *Arabidopsis*. Cubists discussed how this method differs from tissue culture and the advantage of using simpler techniques like floral dipping for introducing genetic material. There was also emphasis on identifying *Cardamine* based on leaf architecture and locating it in HomeLabs. Alongside this, Cubists explored butterfly ecology by identifying the host plant of the Psyche butterfly and nearby nectar sources, such as a reddish-colored plant. We also revisited genetically modified organisms (GMOs), citing Bt Cotton and experiments aimed at altering flower color, connecting the conversation back to plant genetics.

3. Understanding Microbiology at Home - The discussion focused on simple microbiology experiments done in HomeLabs. Cubists like Enas and Batul cultured curd bacteria using boiled potato slices as a medium. This experiment helped in understanding bacterial growth under aerobic and anaerobic conditions. The size, shape, and behavior of colonies were observed and compared.

4. Understanding Fruit Fly Behavior and Genetics - The discussion focused on diverse research being done with *Drosophila melanogaster* (fruit flies). Ayana led discussions on food preference tests and how these might relate to the flies' sleep-wake cycles, linking behavior with internal circadian rhythms. Batul shared long-term observations from her 19th generation flies, while

Akanksha discussed her mutant (park gene) lines and how these affect brain function. Cubists also prepared different growth media (BRSV, TRSV) and discussed key ingredients like yeast and yeast extract. Additional conversations included goof-ups during media prep, preservation of cultures, osmosis and diffusion, and even transposons (jumping genes) in the context of fly genetics.

5. Understanding Moina macrocopa (JSK 1) and Aquatic Studies - The discussion focused on *Moina macrocopa*, a small aquatic organism studied by Cubists as part of home lab biodiversity exploration. Comparisons were made between Moina and Daphnia, highlighting differences in morphology and movement. The topic of water dechlorination was discussed, which is crucial for safely maintaining aquatic life in artificial settings. The session also touched on Barbara McClintock's idea of "feeling for the organism," encouraging intuitive science alongside observation. Kajal's discovery of *Moina macrocopa* JSK1 was highlighted as an important step in student-led biodiversity research. Cubists from CHM College also began joining the discussion, expanding the collaborative network.

B) Citizen Science Projects

1. Understanding Mango Flowering in Different Regions - The discussion focused on comparing mango flowering patterns in different geographic regions, particularly Australia and India. Observations were shared from Mumbai (Pedder Road) and Ranchi, Jharkhand. For example, 90% of mango trees (n=10) reported flowering in Mumbai, while around 53% had started fruiting in Ranchi (7 out of 13 trees). This sparked conversations on flowering percentages, seasonal variation, and how data collection from different regions could help us understand larger climate-related patterns in mango production.

2. Understanding Nail Growth Patterns - The discussion focused on a simple but intriguing study on how nail growth varies with age and gender. Data was collected by Bhagwati Sahu at Chaitanya College, Pamgarh, showing ongoing citizen science involvement.

C) Homelab updates

Further plans - Culturing and Maintaining Chlorohydra and Moina in Homelab.