Asian Try Zero-G 2022 Experiment Proposal Form (Attachment-3)

Sample

(for office use only)

1. Applicant Information

Category (1 or2):	2
Nationality:	Japan
Name: <Name of the representative if it is a group application>	Hanako Tsukuba
Age:	14
Gender (M/F/X):	F
School:	Southern Ibaraki Junior High School
Major (if applicable):	
e-mail:	hanako.tsukuba@jaxa.jp
Attach My/Group photo (if you wish to participate in the photo session. The image/picture will be open to the public and broadcast.)	

Member List for a group application if applicable

Name (Age) Add lines here as needed.	Name	Age
	Jiro Ibaraki	14
	Sakura Ibaraki	12

☒   I agree to the Terms and Conditions indicated in the Asian Try Zero-G 2022 Entry Guideline

☒   I am not from the EU and do not live in the EU,

☐   I reside or am from the EU and agree to GDPR in Entry Guideline (check if applicable)
    *Check is needed to send proposal, if applicable.

2. Experiment Information.

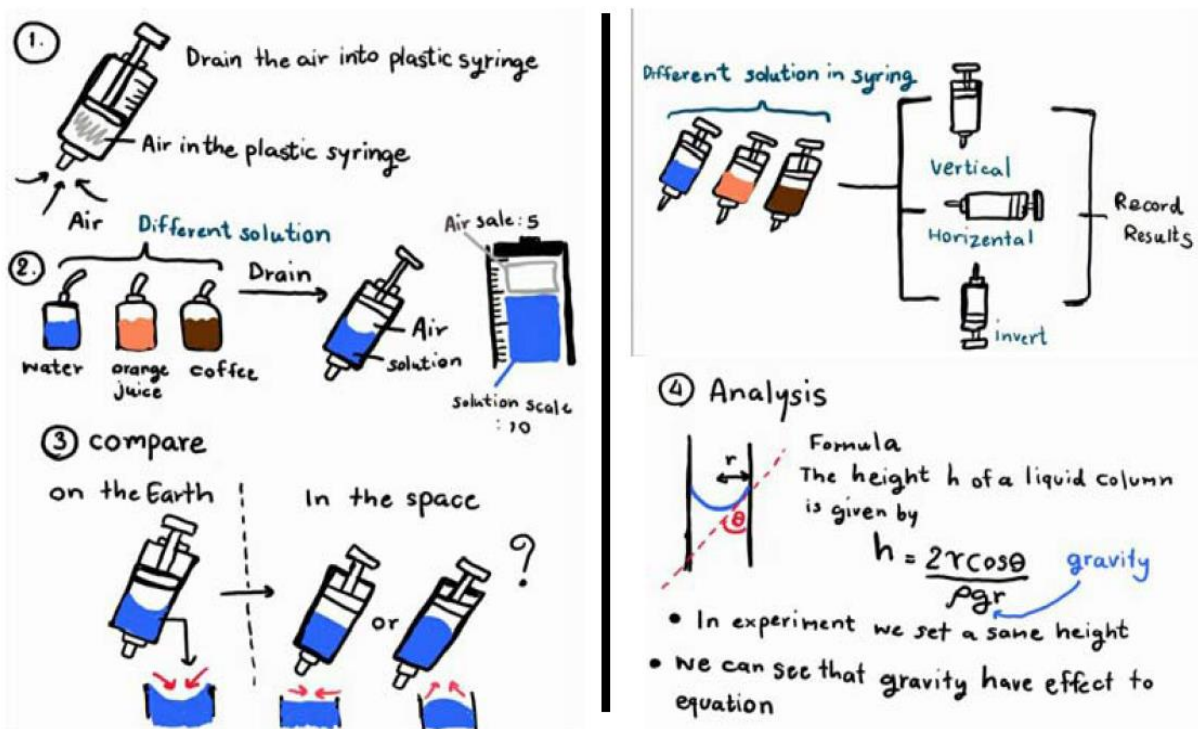## 1. Activity

- Name of Experiment

Capillary in Zero gravity

2. Hypothesis and Theory

- Hypothesis

Surface tension is the force which makes fluid surface acquired the least area possible. Its direction is parallel with fluid surface and perpendicular with the edge of surface is act by force in any direction. In molecules at the surface is act by force in only under direction. So, that made fluid have surface force act into center. We can see it normally in daily life when we drain water into tube. Then, water surface is concave down because water in tube have surface tension with surface adhesion force and cohesion force. It's call capillary action. And gravity is also one of variable that can affect to capitally action. So, I think that if we drain water into a small tube such as plastic syringe and then observe it in zero gravity condition how difference of surface by compare with a syringe in normal gravity condition.

- Schematic Model

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- **Mathematical and Theoretical Hypothesis**
  (Optional for Category 1 and required for Category 2)

The height of liquid column is given by

$$h = 2\gamma \cos\theta / r\rho g$$

we can apply this equation to find θ

γ is the liquid-air surface tension (energy/area)

θ is the contact angle

ρ is the density of liquid (mass/volume)

g is acceleration due to gravity (length/time^2)

r is radius of tube (length)

3. Verification Methods and Procedures

- **Verification Methods**

Compare and analysis syringe in zero gravity condition and compare contact angle(θ) from equation with contact angle from experiment.

- **Step by step procedures and their expected time with each procedure**

1. Drain air into three syringes to 5 ml scale (1 min)

2. Drain water or other liquids into syringes to 10 ml scale (3 min)

3. Observe them and take photos and videos (6 min)

4. Measure contact angle and compare with syringe in normal condition (activity on ground)

Estimated crew time: total 10 minutes

If I have to use one syringe, please repeat step 1-3. It will take more time.

4. Tools and Items

- **Tools and Items required**

Still camera (1) and video camera (1), 50 ml syringes (3),

Water (20 ml), Orange juice (20 ml), Coffee (20 ml)