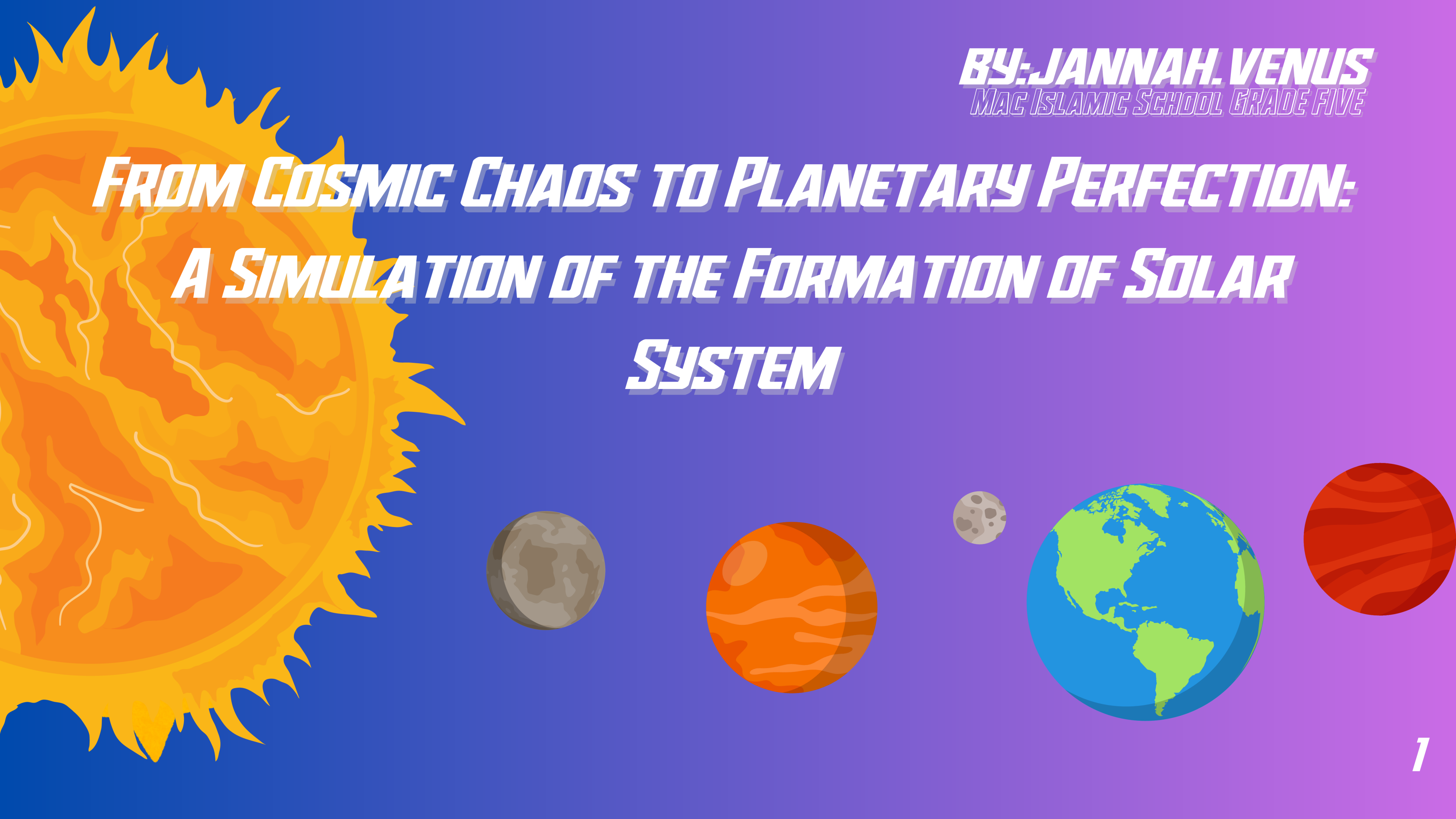


BY: JANNAH. VENUS
MAC ISLAMIC SCHOOL GRADE FIVE

FROM COSMIC CHAOS TO PLANETARY PERFECTION: A SIMULATION OF THE FORMATION OF SOLAR SYSTEM





QUESTION:

Can I simulate the creation of the solar system using household items?

HYPOTHESIS:

If a balloon filled with water, beads, and glitter is spun and manipulated to simulate the effects of gravity and motion, then it will demonstrate the process of the solar system's formation, showing how materials clump together to form planets and other celestial bodies due to centripetal force and gravitational-like attraction.

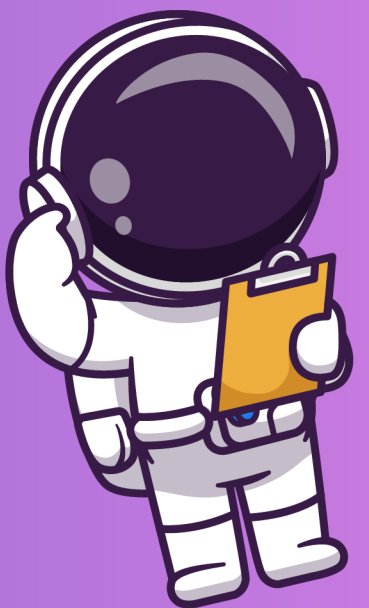
RESEARCH:

The universe started about 13.8 Billion years ago with a big explosion called the Big Bang. This created everything in space, including stars, planets and galaxies.

Our solar system formed about 4.6 Billion years ago from a huge cloud of gas and dust.

The Sun (Sol) formed in the middle, and the rest of the gas and dust came together to make planets, moons and asteroids.

One of these asteroids is Bennu. Scientists study Bennu because it is very old and might have clues about how the solar system and even life began. In 2020, NASA's Osiris-REX Spacecraft took a piece of Bennu to study on Earth.



VARIABLES:

Controlled Variables :

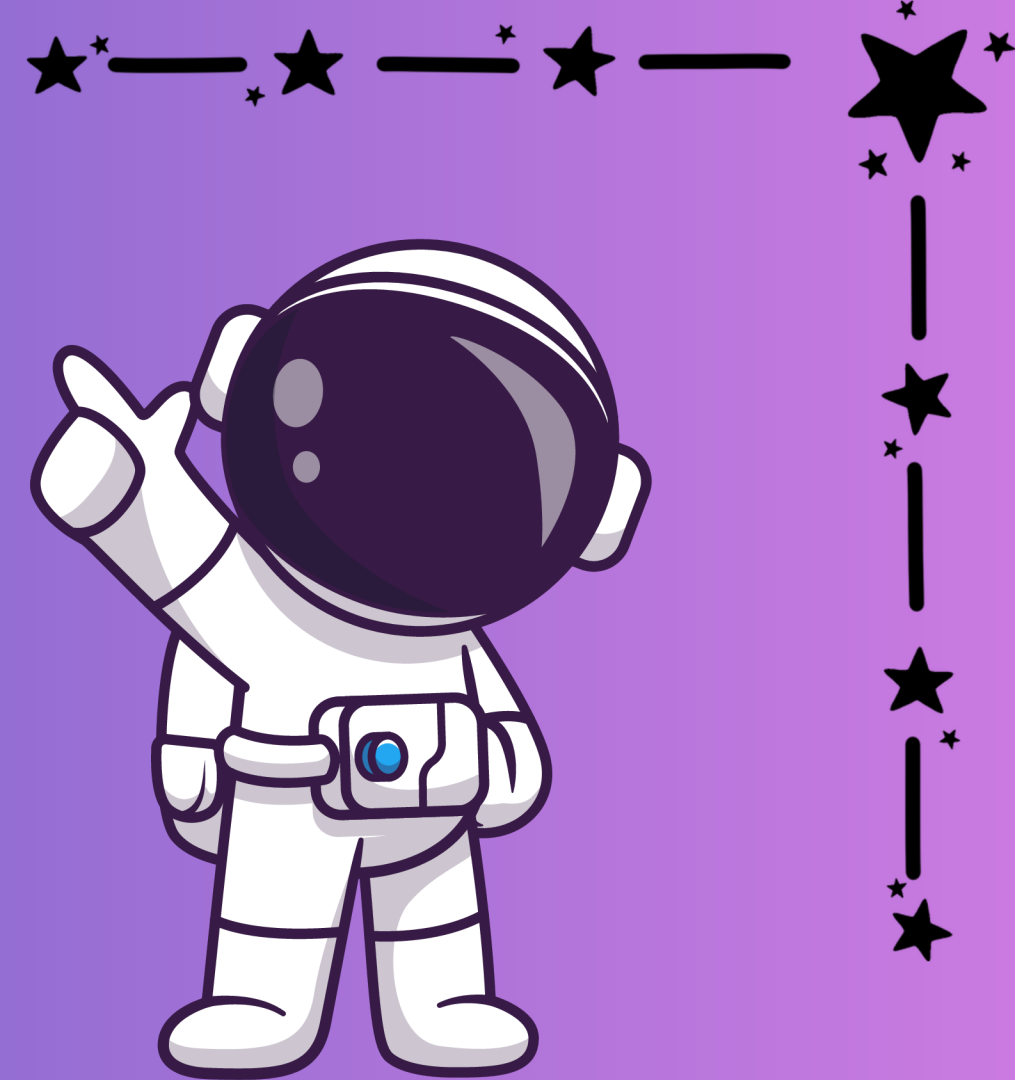
- The type of balloon used
- One teaspoon of beads
- One teaspoon of glitter
- 30 pieces of aluminum confetti

Independent Variables :

- In attempts one and two, used 500 ml of water inside balloons
- In attempt three used 1000 ml of water inside balloon
- Changing the rotation speed of the cordless drill with the water balloon attached

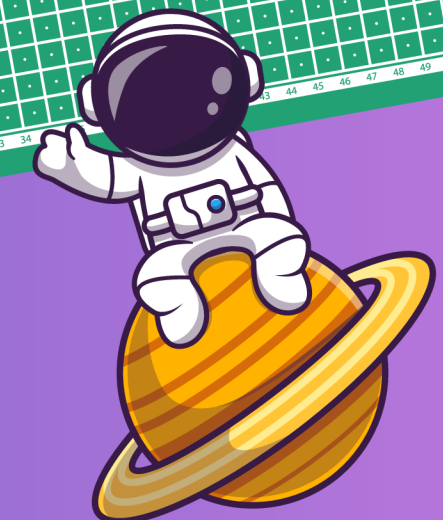
Dependent Variables :

- The observation of whether the attached water balloon would hold a consistent and stable shape while rotating



MATERIALS:

- ★ Cordless Drill (Young Star)
- ★ Duct Tape
- ★ Beads
- ★ Glitter
- ★ Aluminum Confetti
- ★ Measuring Spoons
- ★ Transparent Balloons
- ★ Balloon Arrangement Stem
- ★ Water



PROCEDURE:

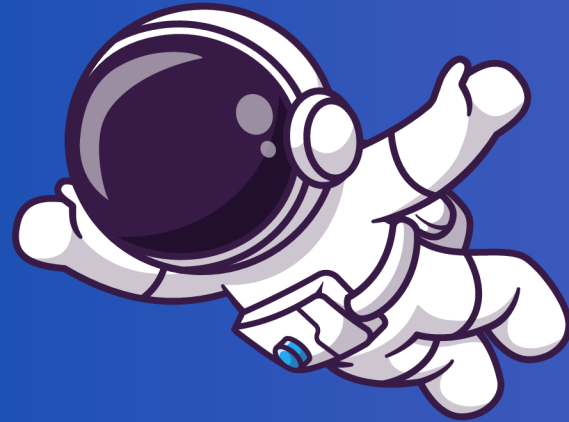
My procedure is to fill the balloon with some breads, glitter and aluminum confetti, then to add water and to tie the end with rubber band.

Then I attached the water balloon on the drill using duct tape and a balloon arrangement stem.

Then find the sufficient speed and start to increase it slowly. Once the right speed is found, I let it spin while touching the bottom of the utility sink. for stability.

I make sure to spin the water balloon until it starts to flatten and create a disk-like shape.





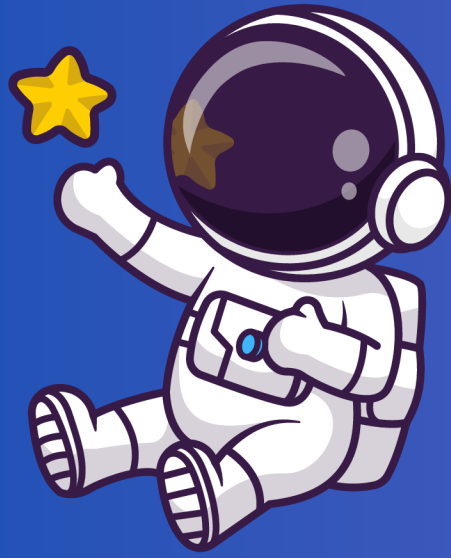
OBSERVATIONS:

I did two attempts that failed because there was not enough water inside the balloons.

Therefore I did another attempt this time with more water than the first and second attempt.

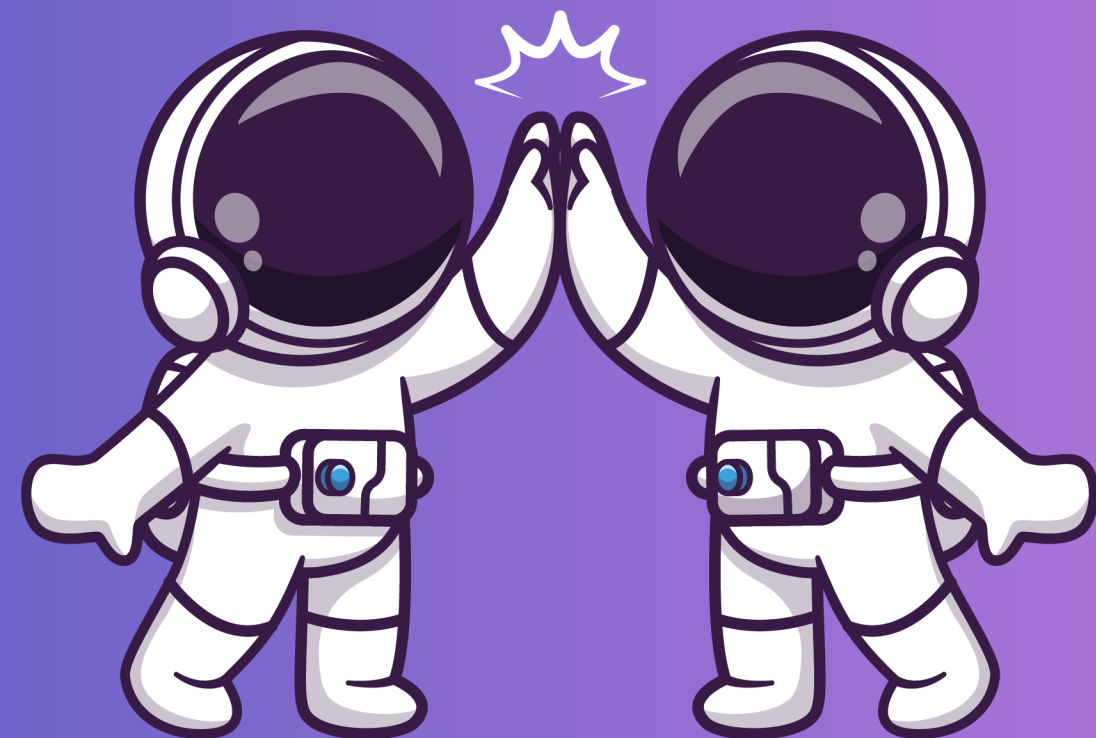
This made the balloon more spherical making the spinning action on the drill more stable.

When I observed the rotation it flattened the water balloon creating a disc like shape.



ANALYSIS:

Inside the water balloon the beads, aluminum confetti, and glitter were thrown or cast to the edges of the flattened balloon creating a similar effect to the formation of the bodies in a solar system.



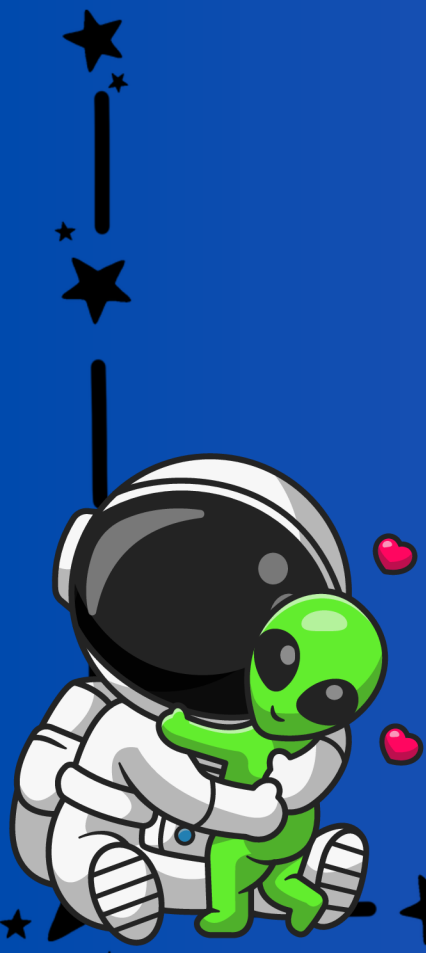
CONCLUSION:

My simulation with the water filled balloon was very basic and the balloon did eventually burst due to the forces acting upon it.

I did see the glitter beads and confetti start to spread out as the balloon became more of a disc shape.

I can conclude that on a larger scale like that of the solar system a protoplanetary disc of rotating gas and dust would start to create the conditions for planets to form.

To better explain this we must think of the cordless drill that I used to be the analog for a young star at the center of the protoplanetary disc.





THANK
YOU!

