Activity #3 – Santa's Sleigh Design Challenge

The objective of this activity is to design a sleigh that Santa can use to deliver gifts on the moon.

Materials:

1. Various craft supplies (cardboard, paper, glue, tape, scissors, markers, etc.)
2. Small toy reindeer (for the "reindeer" astronauts)
3. Small gift items (for payload)
4. Small boxes or containers (for the gifts)
5. Aluminum foil
6. Straws or popsicle sticks
7. Cotton balls (for "lunar clouds")
8. Optional: LED lights for "moonlight" effect

Introduction (5 minutes):

First explain the Santa's Sleigh design challenge to your students. Remind your students that Santa needs a special sleigh to deliver gifts on the moon, where there is no atmosphere and lower gravity. Emphasize the need for a sleigh design that can withstand the unique conditions and environment on the moon.

Research (10 minutes):

Encourage students to think about the challenges Santa might face on the moon (e.g., lack of air for reindeer to fly, lower gravity, etc.). Discuss basic concepts of space travel and moon conditions.

Design (20 minutes):

Students can now start designing their sleighs using the provided materials. They should consider factors like weight distribution, stability, and the ability to carry gifts. Emphasize creativity and problem-solving.

Build (30 minutes):

Allow time for students to build their sleighs. Circulate around the room to answer questions and offer guidance. Encourage teams to test and iterate on their designs.

Test and Improve (15 minutes):

After the initial build phase, each team tests their sleigh. Consider factors like how well it moves on a simulated moon surface (smooth floor), its ability to carry gifts, and overall stability. Teams can then make improvements based on their observations.

Show and Tell (15 minutes):

Each team presents their sleigh to the group, explaining the design choices they made and how their sleigh addresses the challenges of delivering gifts on the moon.

Reflection (10 minutes):

Facilitate a discussion on what worked well in each design, what challenges were faced, and how the teams overcame them. Emphasize the importance of creativity, teamwork, and problem-solving in STEM.

This activity incorporates STEM concepts but also encourages teamwork, critical thinking, and a sense of humor in imagining Santa's moon adventure.