

Team Members _____


BALLOON ASTRONAUT CHALLENGE

Design an outfit that will protect a balloon astronaut from effects of being hit by small space debris moving at high speeds.

| Material | Cost/piece | Total |
|----------------|------------|-------|
| Felt | 10 | |
| Foil | 7 | |
| Paper, orange | 3 | |
| Paper, tissue | 2 | |
| Paper, towel | 7 | |
| Plastic, clear | 3 | |
| Plastic, brown | 5 | |
| Rubber Band | 5 | |
| String | 5 | |
| Straw | 15 | |
| Styrofoam | 15 | |

Put a **✓** in the box when the design meets the following constraints:

- Protective wear must fit snugly on the astronaut.
- No adhesives may be used.
- Use at least 3 different materials.
- Maximum of four layers may be used.
- Must be flexible.
- No material may be used more than once.
- Material may be cut.
- Total cost must be 30 or less.



When testing, think about:

- If a layer is pierced, why? Test to find out.
- Can the design be changed or can the materials be redesigned? Test to find out.
- Would taking off/adding other layers or materials be helpful? Test to find out.
- What will happen if the nail is more massive? Test to find out.
- What will happen if the nail is dropped from a greater height? Test to find out.

What is the weight _____ g and length _____ cm of the last nail that DID NOT pop the balloon astronaut?