

MATERIALS

The following is a suggested list of materials needed to complete this challenge. The quantity will depend on the number of students participating. Alternatives can be used if necessary.

- Digital scale or balance (1)
- Vacuum pump (1)
- Vacuum jar (1)
- Rulers (1 per team)
- Large marshmallows (several per team to serve as test pilots/astronauts)
- General building supplies for teams to assemble their pressure suits. These could include:



aluminum foil	empty paper towel/toilet	plastic wrap
balloons	paper tubes	craft sticks or tongue
skewers or stirrers	glue sticks	depressors
binder clips	mini foil pie plates	rubber bands
bubble wrap	modeling clay	scissors
buttons or beads	paper bags	staplers and staples
cardboard or cardstock	paper clips	straws
clothespins	pennies	string
cloth	pipe cleaners	masking, electrical,
coffee filters	plastic cups	transparent and duct
cotton balls	plastic eggs	tapes

Pre-Activity Set-Up:

- Select a vacuum pump you will use for the challenge. You may use a food saver vacuum, or a tube beaker with stopper and syringe as an alternative. Be sure the system is safe and in good working condition.
- Determine a unit cost for each of the materials available. Based on these unit costs, decide the maximum budget each team has to design their model. This value can be raised (budget increase) or lowered (budget cut) to adjust the level of challenge difficulty. Teams should itemize their budget using the Budget Planning Worksheet on page 37.