

Engineering Team Directives

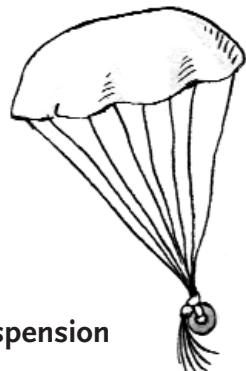
Variable A: Surface Area

Your team will test the effects of surface area on descent rate. Your specifications will be:

Parachute 1: 18-cm canopy. Use the compass to draw an 18-cm circle on your canopy. Cut it out and mark eight equidistant points 2 cm from the circle's edge. Cut eight suspension lines 35 cm long and attach to canopy according to the instructions below. Mark and tie off at 25 cm. Attach one washer as described below.

Parachute 2: 27-cm canopy. Use the compass to draw a 27-cm circle on your canopy. Cut it out and mark eight equidistant points 2 cm from the circle's edge. Cut eight suspension lines 48 cm long and attach to canopy. Mark and tie off at 38 cm. Attach one washer.

Parachute 3: 36-cm canopy. No canopy changes necessary. Cut eight suspension lines 60 cm long and attach to canopy. Mark and tie off at 50 cm. Attach one washer.



Variable B: Canopy Material

Your team will test the effects of canopy material on descent rate. Your parachute specifications will be:

Parachute 1: 36-cm canopy made out of the plastic trash bag. Attach eight 60-cm suspension lines to canopy according to the instructions below. Mark and tie off at 50 cm. Attach one washer as described below.

Parachute 2: 36-cm canopy made out of the plastic grocery bag. Attach eight 60-cm suspension lines to canopy. Mark and tie off at 50 cm. Attach one washer.

Parachute 3: 36-cm canopy made of the tissue paper. Attach eight 60-cm suspension lines to canopy. Mark and tie off at 50 cm. Attach one washer.

Variable C: Suspension Line Length

Your team will test the effects of suspension line length on descent rate. Your specifications will be:

Parachute 1: 15-cm lines. Cut eight lines 25 cm long and attach to canopy according to the instructions below. Mark and tie off at 15 cm. Attach one washer as described below.

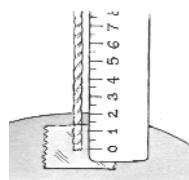
Parachute 2: 25-cm lines. Cut eight lines 35 cm long and attach to canopy. Mark and tie off at 25 cm. Attach one washer.

Parachute 3: 50-cm lines. Cut eight lines 60 cm long and attach to canopy. Mark and tie off at 50 cm. Attach one washer.

ALL TEAMS

Attaching Suspension Lines

For each line, touch the end of the string to the mark you made 2 cm from the edge of the canopy. Attach each line to the canopy with a 3-cm piece of tape. Start from the *top of the string*, where it is taped to the canopy, when measuring the length where you will mark to tie off. Do not stretch the string as you are measuring it.



Adding Payload

Bring your lines together where they have been marked and tie a half knot with the lines so that the marked areas all appear in the same place on the outside of the knot. Add your washer payload and tie another half knot over the washer. Tighten the knot. Trim the remaining strings to 5 cm. Your parachute is ready to launch!

