



Name: \_\_\_\_\_

Class: \_\_\_\_\_ Date: \_\_\_\_\_

# Design Thinking

*An extension of "A Singaporean space project"*

National Day is a good time to celebrate innovation in Singapore, and who better to salute this year than IN.Genius. IN.Genius is a small, home-grown company that is striving to be the first in Singapore to go to near space. Read "**Singaporean space project**" (page 14, *What's Up* July 2018) to learn more about their exciting project. Join us at *What's Up* to wish them the very best in their endeavor!

## INSTRUCTIONS

1. Travel to near space poses many challenges. Some of these challenges, and the innovative solutions employed to overcome them, are listed below. But, they are scrambled.
2. In groups of around four students, unscramble the *italicized* sentences below and rewrite them correctly on the reverse of this sheet.

### Challenge 1

Saliva and blood boils at 37°C, past the Armstrong Line which is 20km, or more than 65 500ft, above sea-level.

*the / the higher / fluids / capsule / to / spacesuit / temperature / and / the / pressure, / to / at / boil / the rarer / space, / pressure. / and / because / atmosphere / in / low / fluid / a / pressurised / boiling / was / altitude, / from / pressure / at / easily / pressure / the lower / around / a / low / the / body / hence / So, / 28°C. / atmospheric / This / the / near / temperatures. / designed / keep / and / optimum / the / is / the more / The / can / lower / prevent*

### Challenge 2

Rockets have a high risk of exploding because of the fuel they carry. Aircrafts and satellites are not suitable for near-space travel. The highest a Concorde could fly was up to 60,000ft.

*climb. / to / aircraft / Beyond / descend / certain / to / to / help / a / balloon / because / it / space / safely / of / engines / drag. / designed / a / above / float / level, / up / atmospheric / orbits / they / sea / to / parachute / lose / cannot / a / and / Below / 100km / enough / to / thrust / altitude, / near / earth. / / So, / rapidly / altitude / produce / satellites'*

### Challenge 3

Though hydrogen is the lightest gas on earth, it is dangerous as it burns easily with oxygen and explodes.

*dense / in / hence / is / the / gas / is / instead. / as / air. / So, / balloons / inert / than / an / space / and / rises / helium / less / It / in / not / considerably / Helium / does / it / easily / burn. / used*

### Challenge 4

Normal balloons deflate as they rise.

*temperature / balloons / overcome / are / them / Changes / in / provides / space-grade / causes / problem / do / and / ride. / deflate. / deflate / These / and / used. / gradual / atmospheric / not / and / smooth / pressure / this / to / a / To*