Teacher Notes

Unit 8 · Astronaut Life · Ages 9–14. Each page works on its own. Mix levels freely: ★ Explorer (ages 9–10), ★★ Navigator (11–12), ★★★ Commander (13–14). Figures are rounded; gravity is shown relative to Earth.

Page	Activity	Level	Time	Materials / notes
2	Mission Briefing	★	15 min	Read aloud.
3	Label the Spacesuit	★/★★	20 min	Pencil.
4	A Day on the Station	★★	30 min	Colored pencils, calculator.
5	Weight on Other Worlds	★★/★★★	35 min	Calculator.
6	Pack the Food Box	★★/★★★	30 min	Calculator; several solutions exist.
7	Spacewalk Maze	★/★★	15 min	Pencil.
8	Word Scramble	★	20 min	Pencil.
9	Crew Sudoku	★/★★★	30 min	Pencil.
10	Bones in Space	★★/★★★	35 min	Pencil, ruler.
11	Scenario Cards	★	25 min + play	Scissors; play in a group.
12	Falling Water Lab	★★	30 min	Bottle, nail (adult), sink. Do over a sink or outdoors.
13	Reading: Spacewalk	★★	30 min	Reading comprehension.
14	Patch & Letter	★/★★	40 min	Colored pencils.
15	Unit Review	★–★★★	25 min	Quiz out of 20 points.
16	Mission Log	★	10 min	Self-assessment.

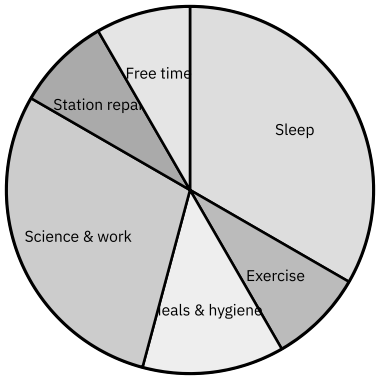
Weights shown are approximate; gravity values are relative to Earth. Bone loss is a simplified model.

Pages 2–6

Page 3

A **Helmet with a gold sun visor** · B **Life-support backpack** · C **Chest control panel** · D **Gloves with fingertip heaters** · E **Layers** · F **Boots**. Jobs: 1 → **D** · 2 → **A** · 3 → **F** · 4 → **C** · 5 → **B** · 6 → **E**.

Page 4



1) **24** hours; **15** °; Sleep **120°**, Exercise **30°**, Meals & hygiene **45°**, Science & work **105°**, Station repairs **30°**, Free time **30°**. 2) **33.3 %**; **29.2 %**. 3) 8 h = 480 min ÷ 90 = **5** (about 5).

Page 5

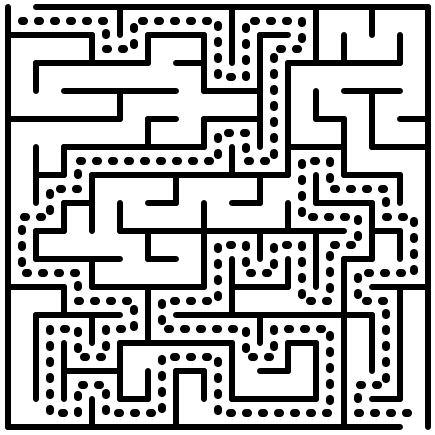
Moon: **26.4 lb** · Mercury: **60.8 lb** · Mars: **60.8 lb** · Venus: **145.6 lb** · Saturn: **171.2 lb** · Jupiter: **404.8 lb**. 1) **Moon**; **Jupiter**. 2) **49.5 lb**.

Page 6

One best solution: **Oatmeal pouch**, **Scrambled eggs**, **Tortilla**, **Peanut butter packet**, **Trail mix**, **Beef jerky**, **Chicken & rice**, **Mac & cheese**, **Granola bar** = **18.0 oz**, **2070 kcal**. 3) **166.7 cal/oz** → **Peanut butter packet**.

Pages 7–9

Page 7 · Maze



1) 119 × 4 × 2 = **952** s.

Page 8

1. **ASTRONAUT** · 2. **GRAVITY** · 3. **HELMET** · 4. **TETHER** · 5. **CAPSULE** · 6. **WEIGHTLESS** · 7. **EXERCISE** · 8. **STATION** · 9. **MISSION** · 10. **TRAINING**. Hidden word: **AGHTCWESMT**.

Page 9 · Sudoku

P	**H**	**B**	**G**
G	B	H	P
B	G	**P**	**H**
H	P	G	**B**

Sc	Pi	**En**	**Dr**	Co	**Ge**
Ge	Co	**Dr**	**Pi**	**Sc**	En
Pi	En	Sc	**Ge**	Dr	Co
Dr	Ge	**Co**	**Sc**	**En**	Pi
En	Sc	Ge	Co	Pi	**Dr**
Co	Dr	**Pi**	**En**	**Ge**	**Sc**

Pages 10–15

Page 10

0: **0 %** · 1: **1.2 %** · 2: **2.4 %** · 3: **3.6 %** · 4: **4.8 %** · 5: **6 %**. 3) **36 %**.

Page 11 · Scenario cards

1. **B** Put on masks, tell Mission Control and look for the source.
2. **B** Stay tethered and tell your crewmate and Mission Control.
3. **A** Move slowly, rest and tell the flight doctor.
4. **B** Follow the checklist and try the backup radio.
5. **B** Catch it with a towel or sip it with a straw.
6. **B** Zip into a sleeping bag fixed to the wall.
7. **B** Bones and muscles weaken: return to your 2 hours a day.
8. **B** Sit and let the recovery team help you: gravity is back!

Page 12

The stream stops (or nearly) while the bottle is falling. Explanation: both fall together, as an orbiting astronaut and the station do.

Page 13

1) **To remove nitrogen from the blood and avoid decompression problems**. 2) **To keep her from floating away**. 3) **390** min. 4) **113,750** mi. 5) **F** **T** **F**.

Page 15 · Review (20 points)

1. EVA C, microgravity D, tether A, airlock B (4). 2. **Because they are in free fall around Earth** (2). 3. **45.6** (2). 4. **To keep bones and muscles strong** (2). 5. **Put on the suit, breathe pure oxygen, check the seals, open the hatch** (3). 6. **B** (3). 7–8. Open answers (2 points each).