Teacher Notes

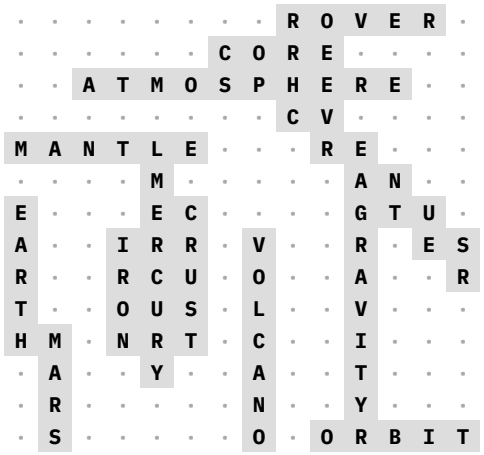
Unit 2 · Rocky Planets · Ages 9–14 · about 4–6 hours of activities. The unit is built so any single page works on its own. Mix levels freely: ★ Explorer (ages 9–10), ★★ Navigator (11–12), ★★★ Commander (13–14).

Page	Activity	Level	Time	Materials / notes
2	Mission Briefing	★	15 min	Read aloud or independently; students color the planets as they read.
3	Word Search	★	15 min	Bonus sentences are ★★.
4	Crossword	★★	20 min	Uses only unit vocabulary.
5	Scrambled & Missing Words	★/★★	25 min	Section C is ★★.
6	Math Lab 1 · Scale	★★ (★★★)	25 min	Ruler; print at 100% so the circles are true size. Calculator allowed.
7	Math Lab 2 · Weight & Jump	★★	25 min	Calculator allowed. Bar graph practice.
8	Math Lab 3 · Days, Years & Ages	★★★	30 min	Calculator. Division with decimals.
9	Hot, Cold & Inside Earth	★★★	30 min	Colored pencils; °F = °C × 9 ÷ 5 + 32.
10	Color by Number	★	25 min	Colored pencils: black, light orange, brown, white (leave blank), gray, yellow.
11	Maze & Sudoku	★/★★	20 min	Pencil.
12	Secret Messages	★★/★★★	25 min	Patterns and logic.
13	Compare & Contrast	★★	20 min	Scissors, glue (optional).
14	Trading Cards	★	20 min + play	Scissors; thick paper if you like.
15	Crater Lab	★★	40 min	Pan, flour, cocoa, 2 balls, ruler. Adult supervision for younger students.
16	Create	★	30 min	Crayons or colored pencils.
17	Unit Review	★–★★★	25 min	Use as a quiz; score out of 20 (see key).
18	Mission Log	★	10 min	Self-assessment.

Data notes: figures are rounded. Gravity is shown relative to Earth. Venus's day (243 Earth days) is its rotation period; Mercury's 176 days is sunrise to sunrise.

Pages 2–5 · Words

Page 3 · Word search solution



Page 4 · Crossword solution



Page 5 · Unscramble

1. MERCURY 2. VENUS 3. MARS 4. CRATER 5. ROVER 6. ORBIT 7. MANTLE 8. GRAVITY

Fill in the blanks: Venus, atmosphere, greenhouse, Red, rover, crater. Which planet am I? 1 **Mars** · 2 **Mercury** · 3 **Venus** · 4 **Earth**

Spot the mistake

1. Mercury is the smallest rocky planet. 2. Venus is the hottest; its thick atmosphere traps heat. 3. Mars has two tiny moons. 4. An Earth year is about 365 days (88 days is Mercury).

Pages 6–8 · Math Labs

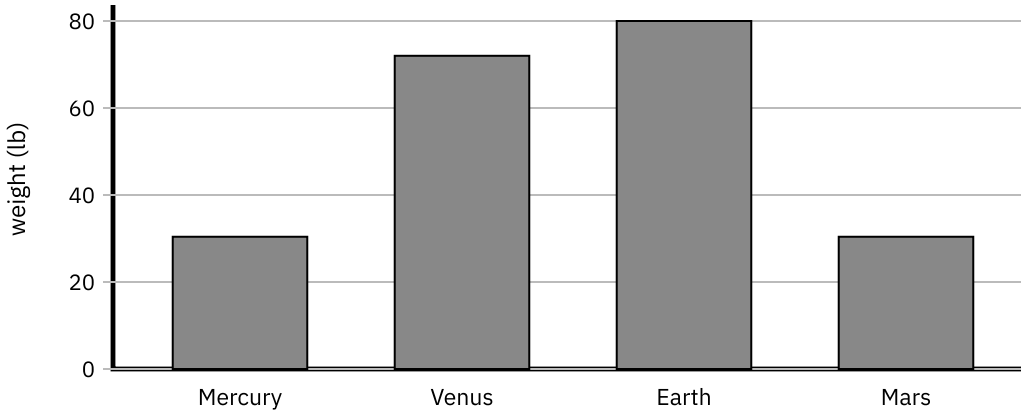
Math Lab 1 · Scale

Model widths: Mercury **0.6 in** · Venus **1.5 in** · Earth **1.6 in** · Mars **0.8 in**. (1) Largest: **Earth**; smallest: **Mercury**. (2) 7,918 − 3,032 = **4,886 miles**. (3) 7,918 ÷ 4,212 ≈ 1.9 → **about 2**. ★★★: 24,901 ÷ 60 = **415 hours** ≈ **17.3 days**.

Math Lab 2 · Weight & Jump (80 lb, 2 ft)

	Mercury	Venus	Earth	Mars
Weight (lb)	**30.4**	**72.0**	**80.0**	**30.4**
Jump (ft)	**5.3**	**2.2**	**2.0**	**5.3**

Graph: bars at 30.4, 72.0, 80.0, 30.4 lb. (1) 2,200 × 0.38 = **836 lb**. (2) 300 × 0.38 = **114 lb**. (3) **Mercury and Mars** (both 0.38 g). (4) 3 ÷ 0.38 = **7.9 ft**.



Math Lab 3 · Days, Years & Ages

(1) 365 ÷ 88 = **4.1**. (2) Age 12: Mercury **49.8**, Venus **19.5**, Earth **12**, Mars **6.4** (own age: multiply by 365 ÷ year). (3) 243 − 225 = **18 days**. (4) 176 ÷ 88 = **2 times**. (5) 33,900,000 ÷ 25,000 = **1,356 hours** ÷ 24 = **56.5 days**. (6) 687 ÷ 365 = **1.9 Earth years**. (7) Shortest: **Mercury**; longest: **Mars** (farther planets travel a longer path, more slowly).

Pages 9–13 · Science & Logic

Page 9 · Temperatures

Place	°C	°F
Mercury, daytime	430	**806 °F**
Mercury, nighttime	-180	**-292 °F**
Venus, surface	465	**869 °F**
Earth, average	15	**59 °F**
Mars, average	-63	**-81 °F**

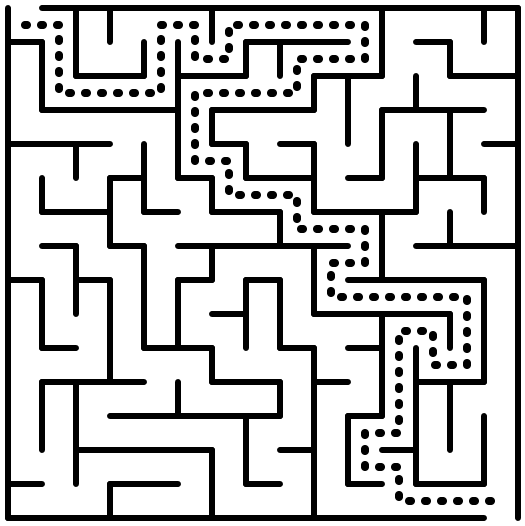
(1) 806 – (-292) = **1,098 °F**. (2) 869 – 59 = **810 °F**. **Inside Earth:** A **Inner core**, B **Outer core**, C **Mantle**, D **Crust**. ★★★ 20 + 1,800 + 1,400 + 760 = **3,980 mi**; difference from 3,959 = **21 mi**.

Page 10 · Color by number

9 – 8 = **1** Black · 12 ÷ 6 = **2** Light orange · 5 – 2 = **3** Brown · 2 × 2 = **4** White · 20 ÷ 4 = **5** Gray · 3 + 3 = **6** Yellow

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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1	1	1	1	1	1	6	1	1	1	1	6	1	1	1	1	1	1	1	1

Page 11 · Maze



Sudoku

Me	**Ve**	**Ma**	**Ea**
Ma	**Ea**	Me	**Ve**
Ea	**Ma**	Ve	**Me**
Ve	Me	**Ea**	**Ma**

Pages 12–18 · Codes, Compare & Review

Page 12 · Secret messages

A: **WATER ONCE FLOWED ON MARS** (shift 5). B: **THE ROVER FOUND ROCKS FROM AN ANCIENT RIVER** (shift 7).

Page 13 · Venn diagram

Letter	Fact	Where
A	Has polar ice caps	Both
B	Is a rocky planet	Both
C	Has seasons	Both
D	Has volcanoes (active or extinct)	Both
E	Has liquid water on its surface	Earth only
F	Has clouds in its atmosphere	Both
G	Has one large moon	Earth only
H	A day lasts about 24 hours	Both
I	Average temperature is far below freezing	Mars only
J	Only robots have visited so far	Mars only
K	Atmosphere is mostly nitrogen and oxygen	Earth only
L	Has two tiny moons	Mars only

Page 15 · Crater lab

Expected: higher drops and larger balls make wider craters and more splash rays. Mercury and the Moon keep their craters because they have almost no air, water or life to erase them; Earth's weather, water, plants and moving crust wear craters away.

Page 17 · Review (20 points)

1. Mercury **B**, Venus **D**, Earth **A**, Mars **C** (4). 2. **Mercury → Venus → Earth → Mars** (2). 3. a **T**; b **T**; c **F — craters are made by impacts**; d **F — Mars gravity is weaker, 0.38 g** (4). 4. **Jupiter — it is a gas giant, not rocky** (2). 5. **38 lb** (2). 6. **Thick carbon-dioxide atmosphere traps heat (greenhouse effect)** (2). 7. **Crust, mantle, core** (2). 8. Open answer: 2 facts + a reason (2 pts).

Pages 16 and 18 are open-ended: assess creativity and use of facts from the unit.