Teacher Notes

Unit 3 · Giant Planets · 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; color the Saturn picture.
3	Giants to Scale	★/★★	25 min	Ruler; print at 100% so the circles are true size.
4	Math Lab 1	★★/★★★	35 min	Calculator. Light travel time and wind bar graph.
5	Crossword	★★	20 min	No accents in puzzle words.
6	Saturn's Rings	★/★★★	30 min	Colored pencils. ★★★ item: ratio of width to thickness.
7	Logic Grid	★★/★★★	25 min	Pencil; solution is unique.
8	Moons of Jupiter cards	★	20 min + play	Scissors.
9	Math Lab 2	★★	30 min	Calculator; bar graph.
10	Gas vs Ice Giants	★★	20 min	Scissors, glue (optional).
11	Giant Planet Labs	★★	45 min	Tall glass, corn syrup or honey, dish soap, colored water, oil; paper strip, pencil, tape. Adult supervision for younger students.
12	Jupiter: Read, Color & Decide	★/★★	30 min	Colored pencils.
13	Board Game	★	30 min + play	Scissors, glue, coin tokens.
14	Create	★	30 min	Colored pencils.
15	Unit Review	★–★★★	25 min	Quiz out of 20 points.
16	Mission Log	★	10 min	Self-assessment.

Figures are rounded. Wind speeds are approximate maximums. The Great Red Spot has been shrinking in recent decades.

Pages 2–9

Page 3 · Scale

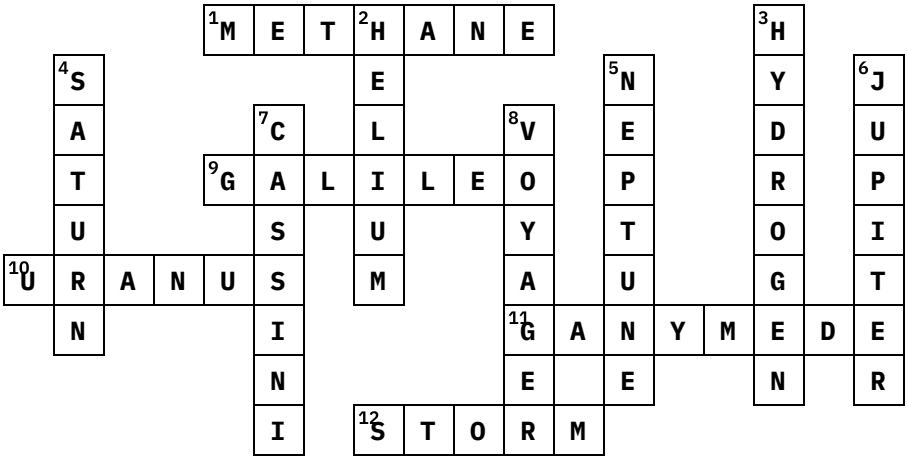
1) **3.5 in** ; **2.9 in** . 2) 86,881 ÷ 7,918 = **11.0** . 3) **Uranus and Neptune** .

Page 4 · Math Lab 1

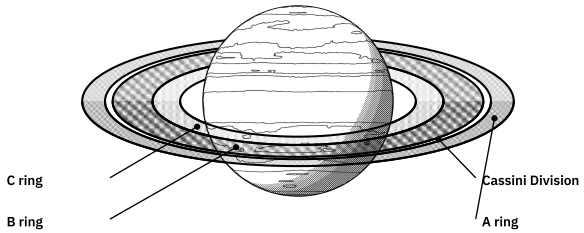
	Jupiter	Saturn	Uranus	Neptune
Earths wide	**11.0**	**9.1**	**4.0**	**3.9**
Sunlight (min)	**43 (43 min)**	**79 (1 h 19 min)**	**160 (2 h 40 min)**	**250 (4 h 10 min)**

1) 250 ÷ 8 = **31.3** . 2) **Neptune** ; 1,200 ÷ 160 = **7.5** . 3) 1,100 × 3 = **3,300** miles. ★★★ **318 lb** ; **95 lb** .

Page 5 · Crossword



Page 6 · Rings



A **C ring** , B **B ring** , C **Cassini Division** , D **A ring** . 1) 175,000 × 5,280 = **924,000,000 ft** . ★★★ 924,000,000 ÷ 30 = **30.8 million** ; 0.004 in × 30,800,000 = **123,200 in** ≈ **10,267 ft** (about 2 miles).

Pages 7–15

Page 7 · Logic grid

Ana: **Jupiter** · Ben: **Neptune** · Cara: **Saturn** · Dev: **Uranus**. Riddles: **Jupiter**, **Saturn**, **Neptune**.

Page 9 · Years & Ages

1) **165**; **2011**. 2) Jupiter **1.00** · Saturn **0.41** · Uranus **0.14** · Neptune **0.07**. 3) 24 ÷ 10 = **2.4**. 4) Fast spinning makes the equator move fastest, so it bulges outward.

Page 10 · Venn

Letter	Fact	Where
A	Includes the two biggest planets	Gas giants
B	Much bigger than Earth	Both
C	Has rings	Both
D	Has no solid surface	Both
E	Has many moons	Both
F	Made mostly of hydrogen and helium	Gas giants
G	Includes Uranus and Neptune	Ice giants
H	Methane gives it a blue-green color	Ice giants
I	Spins in less than 20 hours	Both
J	Contains lots of water, ammonia and methane	Ice giants

Page 11 · Labs

1) **syrup, soap, water, oil** (bottom to top). 2) **A dense core of rock and metal (scientists believe)**. B) 74,900 – 67,600 = **7,300 mi**.

Page 12 · Jupiter

T · **F** · **T** · **F**. 1) **Jupiter has no ground to slow the storm**.

Page 15 · Review (20 points)

1. **Gas: Jupiter, Saturn; Ice: Uranus, Neptune** (2). 2. J **D**, S **C**, U **B**, N **A** (4). 3. 2,793,000,000 ÷ 186,282 ÷ 60 = **250 min** (2). 4. **Galileo**, **1610** (2). 5. **F**, **T**, **F** — Saturn would float (3). 6. **Methane absorbs red light** (2). 7. Rings with a label (2). 8. **No: no solid surface** (3).