Teacher Notes

Unit 6 · Stars, Constellations & Galaxies · 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	Life of a Star	★/★★	30 min	Scissors, glue.
4	Connect the Dots	★	25 min	Pencil; red and blue pencils.
5	Light & Distance	★★/★★★	35 min	Calculator.
6	Star Colors	★★	30 min	Colored pencils.
7	Galaxy Zoo	★/★★	25 min	Pencil.
8	Word Search	★	20 min	No accents.
9	Memory Game	★	25 min + play	Scissors.
10	Star Chart	★★★	35 min	Pencil, ruler.
11	Code Breakers	★★	25 min	Pencil.
12	Pinhole Planetarium	★/★★	45 min	Tube or cup, pin, black paper, flashlight. Outdoors for hand measuring.
13	Create a Constellation	★/★★	30 min	Pencil.
14	Black Holes	★★/★★★	30 min	Reading.
15	Unit Review	★–★★★	25 min	Quiz out of 20 points.
16	Mission Log	★	10 min	Self-assessment.

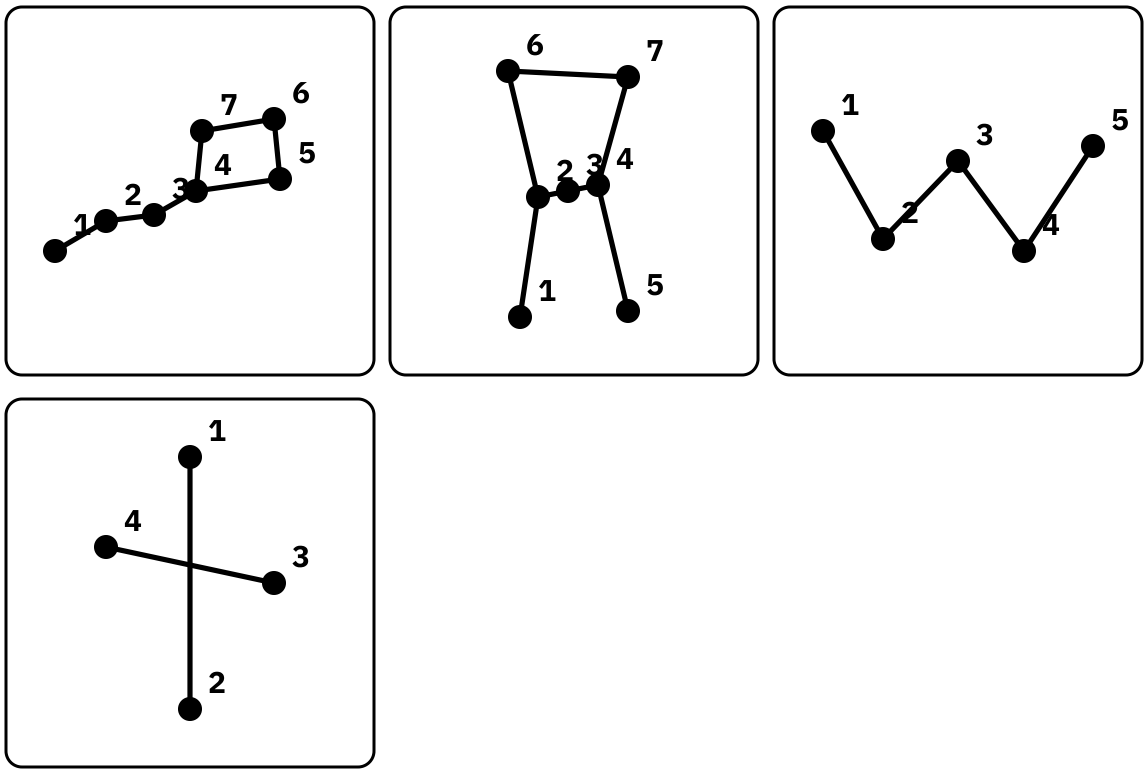
Distances are rounded. Light-year = 5.878 trillion miles.

Pages 2–7

Page 3

Path 1: 1. **A cloud of gas and dust (nebula)** · 2. **A protostar: the cloud collapses and heats up** · 3. **A main-sequence star burns hydrogen for billions of years** · 4. **A red giant swells up as hydrogen runs out** · 5. **A planetary nebula: the outer layers drift away** · 6. **A white dwarf: a hot, tiny core that slowly cools**
Path 2: 1. **A cloud of gas and dust (nebula)** · 2. **A protostar: the cloud collapses and heats up** · 3. **A massive star shines blue-white and burns fast** · 4. **A red supergiant swells to hundreds of times the Sun** · 5. **A supernova: the star explodes!** · 6. **A neutron star or a black hole is left behind**
1) **Nebula → protostar**. 2) **5.4**.

Page 4



Page 5

1) **499.2 s** (**8.3 min**). 2) **1.3 s**. 3) **8.6**; **age 2 (11 – 8.6 ≈ 2.4)**. 4) **24,922,720,000,000** miles ≈ **24.9**. 5) 24,922,720,000,000 ÷ 36,373 = **685,198,361** h; **78,165** years. 6) **3,127** generations. Number line order: **Sun, Proxima, Sirius, Vega, Betelgeuse**.

Page 6

Sun: **G** · Rigel: **B** · Betelgeuse: **M** · Sirius: **A** · Aldebaran: **K** · Proxima Centauri: **M** · Spica: **B** · Procyon: **F**. 2) **Cooler**.

Page 7

A: **Barred spiral** (**3**) · B: **Elliptical** (**1**) · C: **Irregular** (**4**) · D: **Spiral** (**2**). 2) **0.52** (**≈ ½**). 3) **4,545**.

Pages 8–11

Page 8 · Word search



Page 10 · Star chart

Brightness	O	B	A	F	G	K	M
Brilliant		● **Rigel**					● **Betelgeuse**
High		● **Spica**				● **Aldebaran**	
Medium			● **Altair**		● **Sun**		
Low							
Dim			● **Sirius B**				● **Proxima**

1) **Betelgeuse, Rigel (and Spica / Aldebaran): giants; Sirius B: white dwarf**. 2) **huge**; **small**.

Page 11 · Ciphers

1) **STARS ARE SUNS**. 2) **THE MILKY WAY HAS BILLIONS OF STARS**.

Pages 12–15

Pages 12–14

Open answers for pages 12 and 13. Page 14: 1) a T, b F, c T. 2) Not even light can escape it. 3) Examples: look at its effects, use special telescopes.

Page 15 · Review (20 points)

1. light-year C, constellation B, galaxy D, supernova A (4). 2. **blue, yellow, orange, red** (2). 3. **20** (2). 4. **STAR** (2). 5. **nebula, protostar, main sequence, red giant, white dwarf** (3). 6. **The Sun is a star** (3). 7–8. Open answers (2 points each).