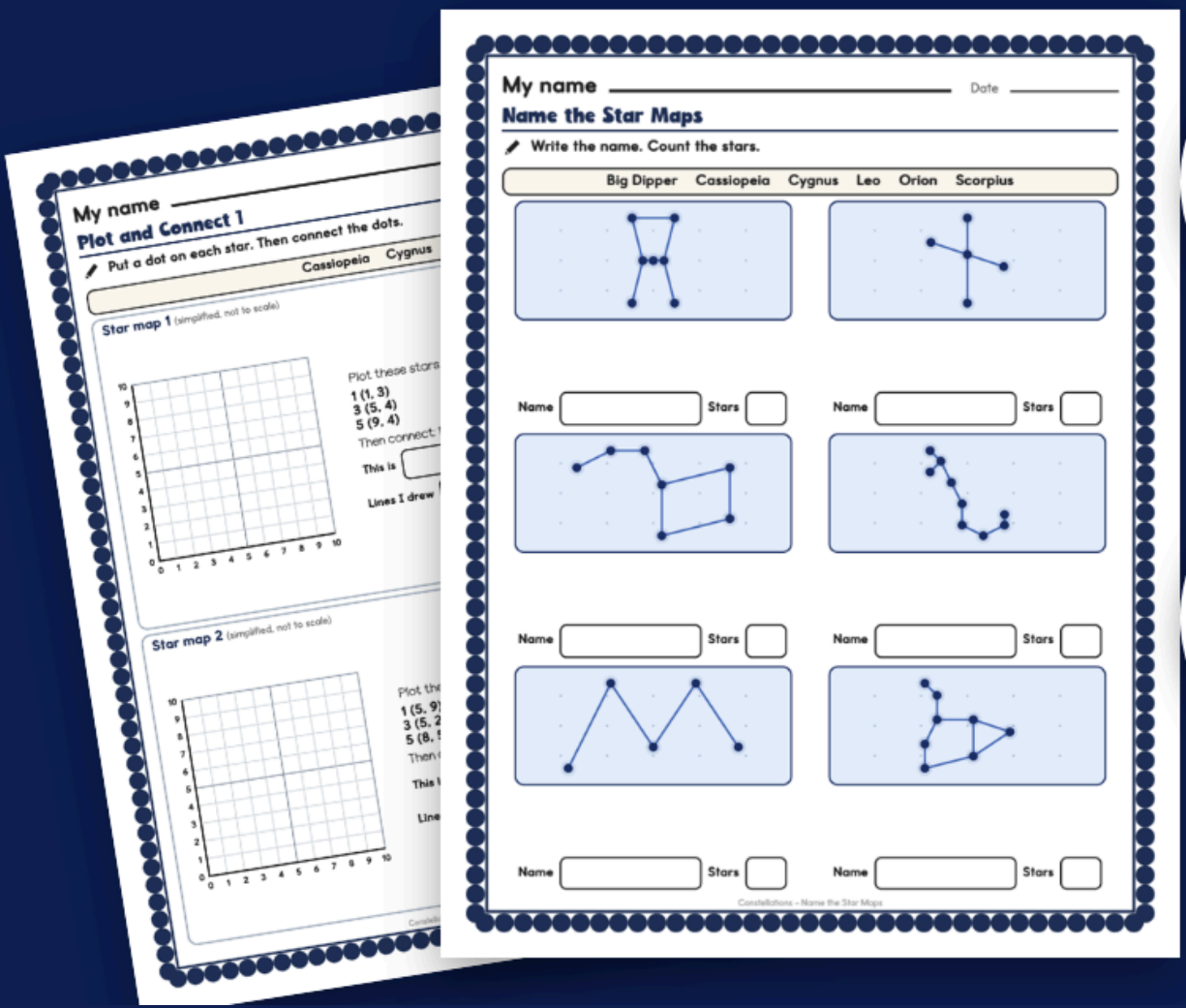
CONSTELLATIONS WORKSHEETS

STAR MAPS • SEASONS • EARTH'S MOTION
GRADES 5-8



43 PAGES

154 ITEMS

Bright Path Sped

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This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- Every name line, answer box, check box and ruled box on the student pages is a type-in field, and so are the tracker and the other record pages. You can also print any page and write by hand.
- It works offline, with no account needed.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart and the grids stay square. Earth's spin is blue, Earth's orbit is purple and constellation patterns are gold, and every box also carries the words, so a black and white copy reads too.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder.

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PREVIEW

Teacher Notes

The parts of a student page, the page types in order, and a few teaching notes.

The parts of a page

- **The color code.** Earth's spin is blue, Earth's orbit is purple and constellation patterns are gold on the readings, the sort mats and the keys.
- **The answer box.** A bordered box. Click it to type, or print and write in it.
- **The check box.** Spin or orbit, true or false, all year or some seasons, and the quiz choices.
- **The ruled work box.** Lines 0.34 inch apart, one idea to a line.
- **The grids.** Print the plot and graph pages at 100 percent so the squares stay square. Students plot in pencil.
- **The cut lines.** Mats 1 and 2: 6 pieces in 3 across by 2 down, each 2.4 by 1.46 inches. Mat 3: 10 pieces, 5 across by 2 down, each 1.46 by 1.15 inches. Edge to edge.

Page type	What it looks like	What the student does
Six Star Patterns; Sky Words	2 pages, 6 items	Six star maps with name, shape and season, then six words to match.
Read: four short readings	4 pages, 20 items	Constellations, spin, orbit, why the sky changes; choose or write.
Plot and Connect 1 and 2; Read the Grid	3 pages, 20 items	Plot 24 stars from coordinates and connect them; read the coordinates of ten stars.
Name the Star Maps	1 page, 12 items	Name each of six maps and count its stars.
Worked Example; Seasons; Always Up	3 pages, 17 items	Find the night side on the orbit; circumpolar or not.
Spin or Orbit?	1 page, 8 items	Decide which motion explains each statement.
Read the Data Table; Graph the Data	2 pages, 17 items	Rise times that shift 4 minutes a night; two graphs to plot.
Fix It; Claim, Evidence, Reasoning	3 pages, 17 items	True or false; four short scenarios with invented numbers.
Quiz; Short Answer	2 pages, 15 items	Ten choices, then five written answers.

One step up, marked by a shape

- **Circle.** Spin or Orbit? (page 18): statements in a sentence, with a clue line.

Teaching notes

- Say it every day: **spin is a day, orbit is a year.** The night side of Earth faces a different part of the sky as Earth moves along its orbit.
- The star maps are simplified shapes on a 0 to 10 grid, not to scale. Show a real sky chart or planetarium program alongside them. Sky facts here are for the northern hemisphere.
- Evening constellations are listed by the season you can see them high in the evening. Cygnus is high from late summer into fall; the key accepts fall.
- Name origins are one line each. Add stories from your own curriculum if you like. All observation numbers are invented for practice.

PREVIEW

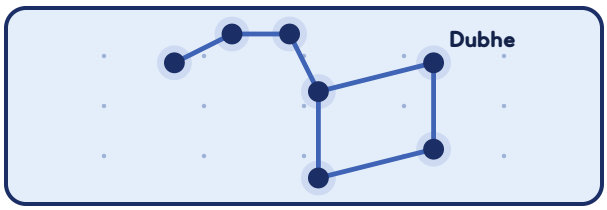
Preview - Bright Path Sped

My name _____ Date _____

Six Star Patterns

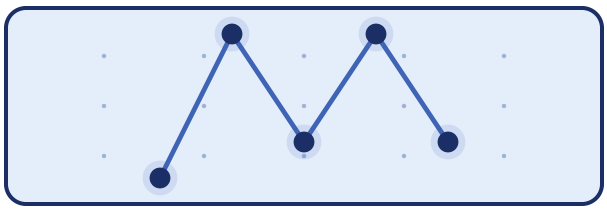
Look at the six star maps. Keep this page next to you.

These maps are simplified and not to scale.



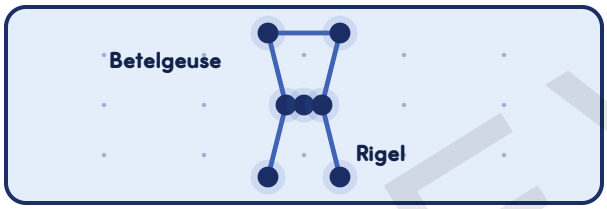
BIG DIPPER

Name: Part of Ursa Major, which is Latin for Great Bear.
Find it: Seven stars: a bowl and a curved handle.
Seen: All year (it circles Polaris).



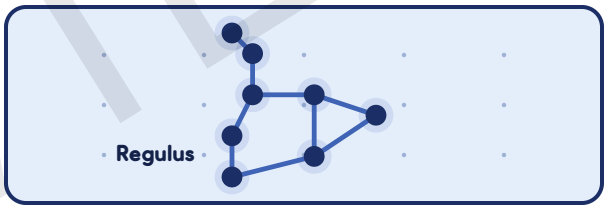
CASSIOPEIA

Name: Named long ago for a queen in an old Greek story.
Find it: Five stars in a W or an M.
Seen: All year (it circles Polaris).



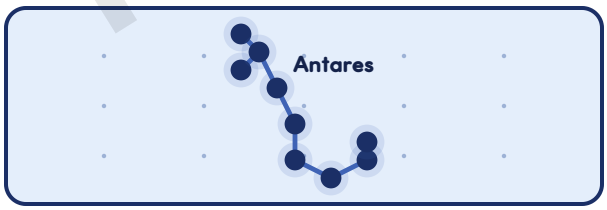
ORION

Name: Named long ago for a hunter in old Greek stories.
Find it: Three stars in a row make the belt.
Seen: Winter evenings.



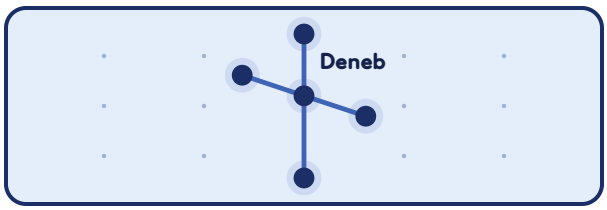
LEO

Name: Leo is Latin for lion.
Find it: A backward question mark and a triangle.
Seen: Spring evenings.



SCORPIUS

Name: Scorpius is Latin for scorpion.
Find it: A red star, claws and a long curved tail.
Seen: Summer evenings.



CYGNUS

Name: Cygnus is Latin for swan.
Find it: A cross: one long line and one short line.
Seen: Late summer and fall evenings.

PREVIEW

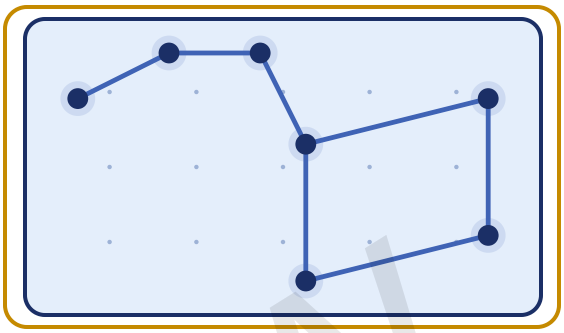
Preview - Bright Path Sped

My name _____ Date _____

Read: What Is a Constellation?

Read. Then answer the questions.

A constellation is a group of stars that people have connected into a pattern, like a dot-to-dot picture in the sky. The patterns were named long ago. The stars in a pattern look close together, but they are not. Some are many times farther from Earth than others. Today, astronomers divide the whole sky into 88 constellations, and every star belongs to one of them. A star map shows each star as a dot and draws lines to show the pattern.



1. What is a constellation?

☐ **a planet that moves** ☐ **a pattern of stars people connect** ☐ **one very large star**

2. On a star map, what does each dot show?

☐ **a star** ☐ **a planet** ☐ **a cloud**

3. Into how many constellations do astronomers divide the sky?

☐ **8** ☐ **880** ☐ **88**

4. Why do the stars in a pattern look close together?

_____

5. What do the lines on a star map show?

_____

PREVIEW

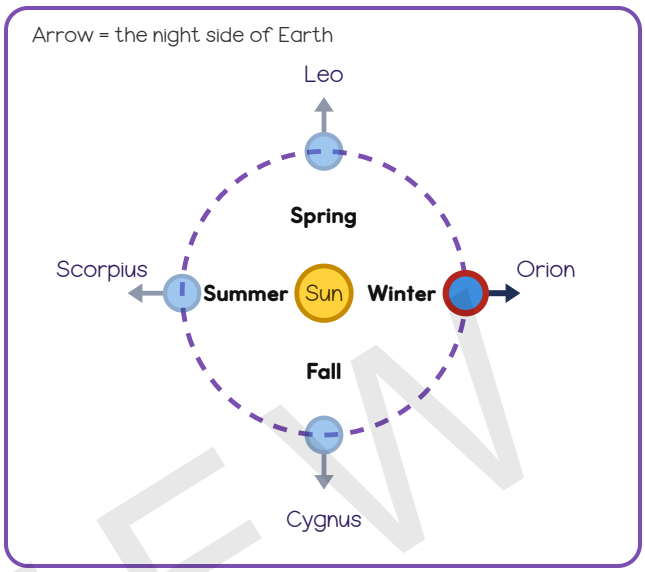
Preview - Bright Path Sped

My name _____ Date _____

Read: Earth's Orbit

Read. Then answer the questions.

Earth also moves along a path around the Sun called its orbit. One trip around takes about 365 days, which is one year. Earth keeps spinning the whole time it orbits. A trip is a full circle, 360 degrees, and a year has 12 months, so Earth moves about 30 degrees along its orbit each month. Because Earth is in a different place on its orbit each month, its night side faces a different part of the sky.



1 What is an orbit?

☐ **a path around the Sun** ☐ **a kind of star** ☐ **a spin on an axis**

2 How long is one trip around the Sun?

☐ **one day** ☐ **one year** ☐ **one month**

3 About how many degrees does Earth move along its orbit each month?

☐ **15** ☐ **90** ☐ **30**

4 Does Earth stop spinning while it orbits?

_____

5 What changes about the night sky as Earth moves along its orbit?

_____

PREVIEW

Preview - Bright Path Sped

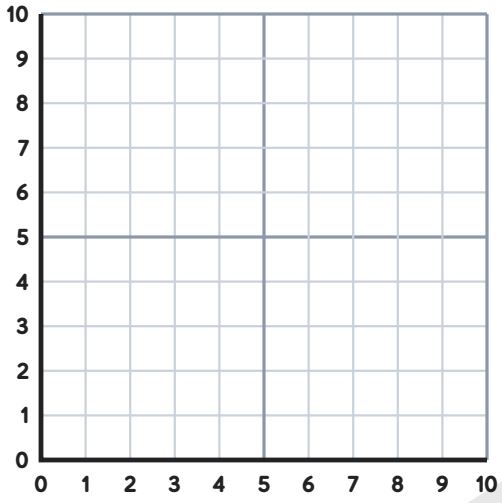
My name _____ Date _____

Plot and Connect 2

Put a dot on each star. Then connect the dots.

Big Dipper Orion

Star map 3 (simplified, not to scale)



Plot these stars. Put a dot at each spot.

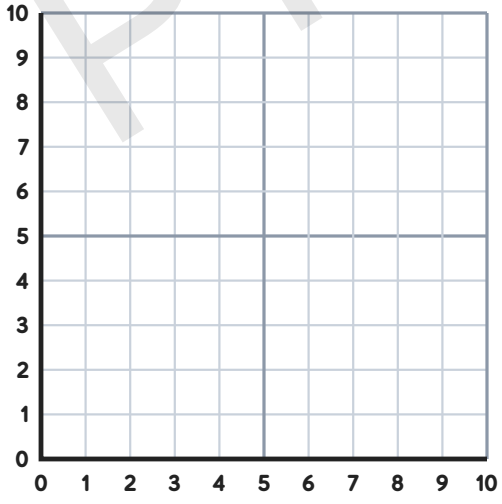
1 (0, 6)
2 (2, 7)
3 (4, 7)
4 (5, 5)
5 (9, 6)
6 (9, 3)
7 (5, 2)

Then connect: 1 to 2, 2 to 3, 3 to 4, 4 to 5, 5 to 6, 6 to 7, 7 to 4.

This is _____

Lines I drew _____

Star map 4 (simplified, not to scale)



Plot these stars. Put a dot at each spot.

1 (3, 9)
2 (7, 9)
3 (4, 5)
4 (5, 5)
5 (6, 5)
6 (3, 1)
7 (7, 1)

Then connect: 1 to 3, 2 to 5, 3 to 4, 4 to 5, 3 to 6, 5 to 7, 1 to 2.

This is _____

Lines I drew _____

PREVIEW

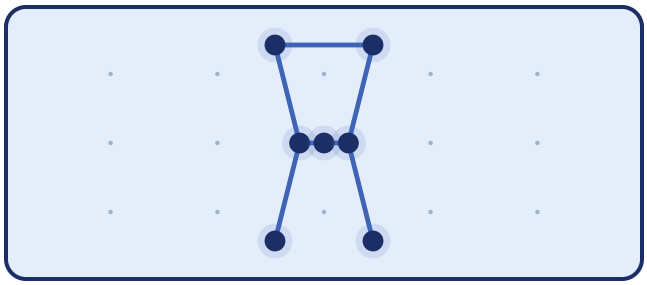
Preview - Bright Path Sped

My name _____ Date _____

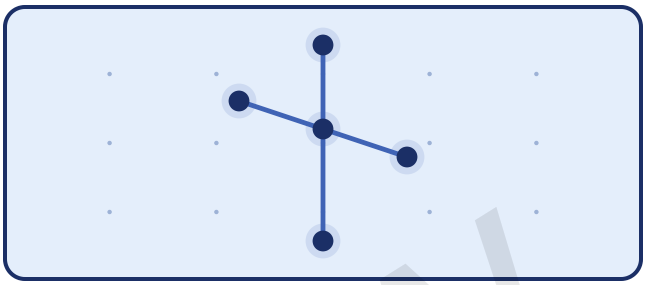
Name the Star Maps

Write the name. Count the stars.

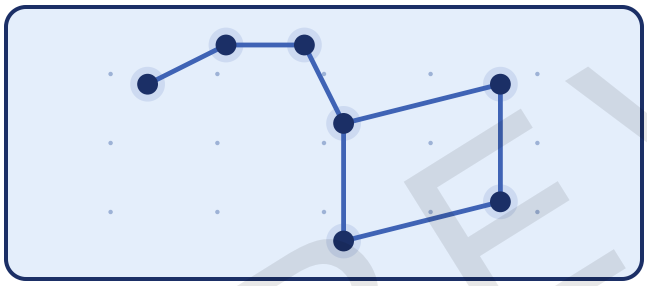
Big Dipper Cassiopeia Cygnus Leo Orion Scorpius



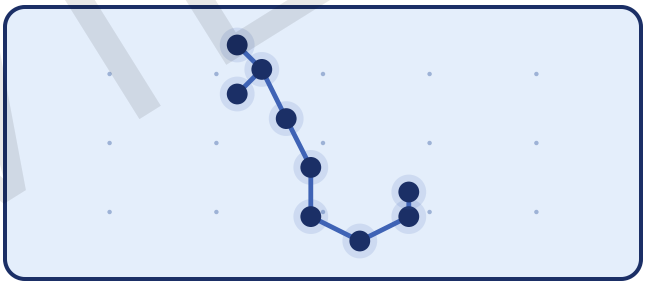
Name _____ Stars ____



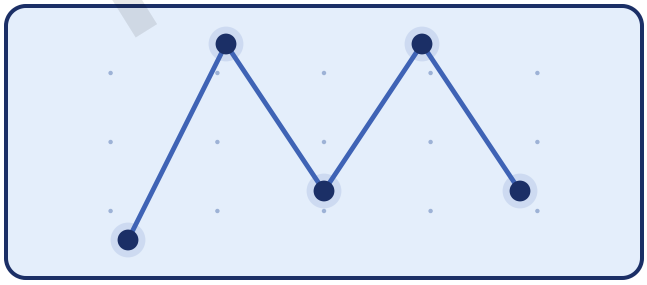
Name _____ Stars ____



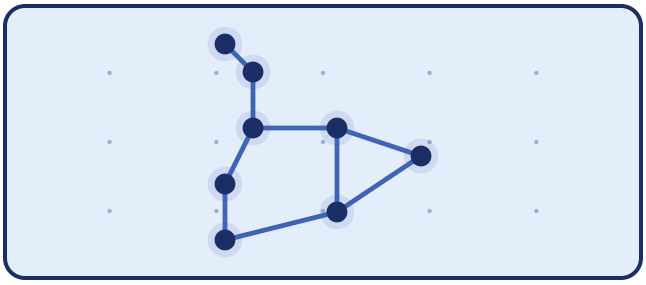
Name _____ Stars ____



Name _____ Stars ____



Name _____ Stars ____



Name _____ Stars ____

Name _____ Stars ____

PREVIEW

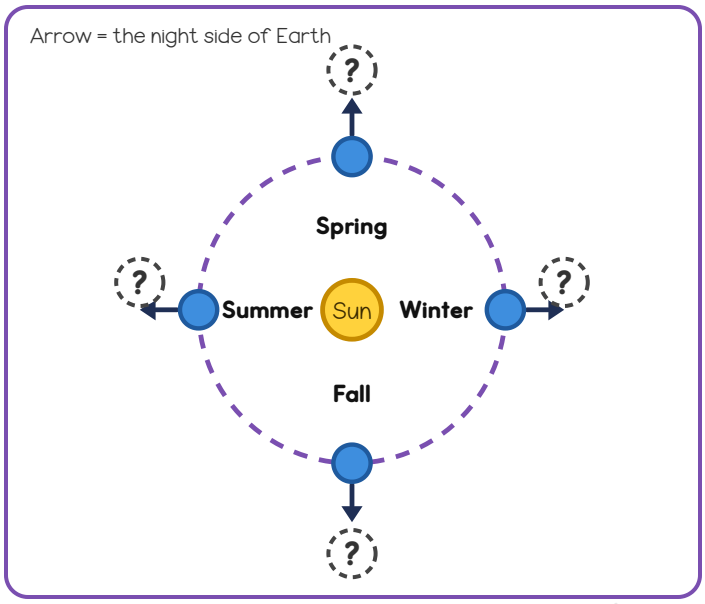
Preview - Bright Path Sped

My name _____ Date _____

Seasons and the Sky

Find the night side. Write the constellation.

Big Dipper	Cassiopeia	Cygnus	Leo	Orion	Scorpius



Season	The night side faces...
Winter	
Spring	
Summer	
Fall	

How many months does Earth take to go halfway around its orbit?

Each month Earth moves about 30 degrees. How many degrees is that in 3 months?

Why can you not see Orion on a summer evening?

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Spin or Orbit?

Check one box for each one. Write how you know.

Is it about Earth's spin, which takes a day, or Earth's orbit, which takes a year?

1. One full turn takes about one day.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

2. Winter, spring, summer and fall each show different evening constellations.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

3. Stars seem to rise in the east and set in the west.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

4. One full trip takes about 365 days.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

5. Orion is high in the evening in winter but not in summer.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

6. The Sun seems to rise in the morning.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

7. The Big Dipper seems to circle Polaris during one night.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

8. Earth moves about 30 degrees of its path each month.

☐ **Earth spins** ☐ **Earth orbits** **I know because** _____

PREVIEW

My name _____ Date _____

Fix It

Is it true or false? Fix each false one.

Some of these are true. Some have a mistake. Rewrite each false one so it is true.

1. Earth spins on its axis once about every day (one day). ☐ true ☐ false

   If false, fix it: _____

2. The stars seem to move across the sky because the stars travel around Earth. ☐ true ☐ false

   If false, fix it: _____

3. All the stars in a constellation are the same distance from Earth. ☐ true ☐ false

   If false, fix it: _____

4. We see different constellations in different seasons because Earth moves along its orbit. ☐ true ☐ false

   If false, fix it: _____

5. Polaris seems to cross the sky as fast as the other stars. ☐ true ☐ false

   If false, fix it: _____

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Claim, Evidence, Reasoning 2

Read the facts. Write your claim, evidence and reasoning.

The rising star (invented numbers)

A star rises at 9:00 pm on October 1. It rises 4 minutes earlier each night. After 30 nights, what time does it rise?

Claim

Evidence: use the numbers

Reasoning: why does the evidence fit the claim?

Always up, or not? (invented numbers)

A student writes down the months he can see each pattern in the evening sky from a northern state. Cassiopeia: 12 of 12 months. Scorpius: 4 of 12 months. Which one is circumpolar?

Claim

Evidence: use the numbers

Reasoning: why does the evidence fit the claim?

PREVIEW

Preview - Bright Path Study

My name _____ Date _____

Short Answer

Answer each question in your own words.

Useful words **spin** **orbit** **axis** **Polaris** **season** **pattern** **night side**

1. Why do the stars seem to rise in the east and set in the west?

2. Explain why Orion can be seen in winter evenings but not in summer evenings.

3. What is a constellation, and why do the stars in one look close together?

4. Why can the Big Dipper be seen all year from far enough north?

5. Name the two ways Earth moves. Say how long each one takes.

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Cut and Sort 3

Cut out the pieces. Paste each one in its box.

Is it up all night, all year, or does it come and go with the seasons? Paste five pieces in each box.

Always Up stays up all night, all year	**Comes and Goes** changes with the seasons

PREVIEW

Cut on the dashed lines: one cut across and four down.

Cassiopeia	Orion	circles Polaris	Leo	seen every month
Scorpius	The Big Dipper	out of sight part of the year	never sets (far north)	Cygnus

Answer Key: Grid, Maps, Words and Spin or Orbit

Read the Grid: across first, then up. Map counts are the number of dots on the map. Accept a clue in the student's own words.

Leo page 13

Star	Spot	Name
A	(3, 2)	Regulus
B	(4, 6)	Algieba
C	(7, 6)	Zosma
D	(10, 5)	Denebola
E	(7, 3)	Chertan

Scorpius page 13

Star	Spot	Name
A	(3, 8)	Dschubba
B	(4, 6)	Antares
C	(5, 2)	unnamed star
D	(7, 1)	unnamed star
E	(9, 3)	Shaula

Name the Star Maps page 14

Map	Name	Stars
1	Orion	7
2	Cygnus	5
3	Big Dipper	7
4	Scorpius	9
5	Cassiopeia	5
6	Leo	8

Plot pages: name and lines pages 11 and 12

Map	Name	Lines
1	Cassiopeia	4
2	Cygnus	4
3	Big Dipper	7
4	Orion	7

Sky Words page 6

Word	Letter
Constellation	B
Rotation	E
Orbit	D
Axis	A
Circumpolar	F
Polaris	C

Spin or Orbit? page 18

#	Item	Type	A good clue
1	One full turn takes about one day.	Earth's Spin	one turn is one day
2	Winter, spring, summer and fall each show different evening constellations.	Earth's Orbit	the seasons come from the trip around the Sun
3	Stars seem to rise in the east and set in the west.	Earth's Spin	we turn past the stars
4	One full trip takes about 365 days.	Earth's Orbit	a year is one trip
5	Orion is high in the evening in winter but not in summer.	Earth's Orbit	the night side faces a new part of the sky
6	The Sun seems to rise in the morning.	Earth's Spin	day comes as Earth turns
7	The Big Dipper seems to circle Polaris during one night.	Earth's Spin	it turns about 15 degrees an hour
8	Earth moves about 30 degrees of its path each month.	Earth's Orbit	12 months make a full circle

PREVIEW

Answer Key: Data, Graphs, Fix It and Quiz

Every value was computed from the data on the student page. Accept a fixed sentence that says the same thing.

Read the Data Table page 19

Date	Nights	Rises	Min earlier
Oct 1	0	9:00 pm	0
Oct 6	5	8:40 pm	20
Oct 11	10	8:20 pm	40
Oct 16	15	8:00 pm	60
Oct 21	20	7:40 pm	80
Oct 26	25	7:20 pm	100
Oct 31	30	7:00 pm	120

Data table questions

Every 5 nights: **20** minutes earlier. By Oct 31: **2** hours earlier. Nov 10 (40 nights): **6:20 pm**. Why: Earth moves a little along its orbit each night, so the sky shifts and each star rises earlier.

Graph the Data

- **Graph 1 (Spin):** points (0, 0), (2, 30), (4, 60), (6, 90). At 3: **45**. At 5: **75**. Degrees each hour: **15**.
- **Graph 2 (Rise time):** points (0, 0), (10, 40), (20, 80), (30, 120). At 5: **20**. At 25: **100**. Minutes earlier each night: **4**.

The line is straight, so each hour or night adds the same amount.

Fix It page 21

#	Is it	Fixed sentence
1	true	-
2	false	The stars seem to move because Earth spins and we turn past them.
3	false	The stars in a constellation are at very different distances. They only look close together.
4	true	-
5	false	Polaris stays almost in one place, because it is almost straight above Earth's north axis. The other stars seem to circle it.

Quiz page 24

#	Answer
1	Earth's spin
2	one year
3	Orion
4	Scorpius
5	circles Polaris
6	15
7	Cassiopeia
8	at very different distances
9	Earth moves along its orbit
10	7

PREVIEW

Answer Key: Cut and Sort

In the sort keys, r1 c1 is the top left piece.

Cut and Sort 1 page 26

Piece	Piece shows	Box
r1 c1	one turn takes about one day	Earth's Spin
r1 c2	one trip takes about a year	Earth's Orbit
r1 c3	a group of stars with a name	Constellations
r2 c1	the Sun seems to rise and set	Earth's Spin
r2 c2	different patterns in each season	Earth's Orbit
r2 c3	dots and lines on a star map	Constellations

Cut and Sort 2 page 27

Piece	Piece shows	Box
r1 c1	star map of Scorpius	Summer
r1 c2	high in the evening in January	Winter
r1 c3	high in the evening in April	Spring
r2 c1	star map of Orion	Winter
r2 c2	star map of Leo	Spring
r2 c3	high in the evening in July	Summer

Cut and Sort 3 page 28

Piece	Piece shows	Box
r1 c1	Cassiopeia	Always Up
r1 c2	Orion	Comes and Goes
r1 c3	circles Polaris	Always Up
r1 c4	Leo	Comes and Goes
r1 c5	seen every month	Always Up
r2 c1	Scorpius	Comes and Goes
r2 c2	The Big Dipper	Always Up
r2 c3	out of sight part of the year	Comes and Goes
r2 c4	never sets (far north)	Always Up
r2 c5	Cygnus	Comes and Goes

Where to go after the quiz

- Missed the spin or orbit items: reread page 8 and page 9, then sort page 26 again.
- Missed the season items: redo the worked example (page 15) and sort page 27.
- Missed the circumpolar items: reread page 10 and sort page 28.
- Missed the plotting: redo a plot page (pages 11 and 12) with the key beside the grid.

Mistakes to listen for

- Saying the stars move across the sky: Earth spins and we turn past them.
- Saying the stars in a pattern are close together: they only look close.
- Mixing up the two motions: spin is a day, orbit is a year.

PREVIEW

Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

Page type	Covered since last note (Y/N)	Items right	Still blank
Words and readings			
Plot, grid and maps			
Seasons and the sky			
Spin or orbit			
Data, graphs and claims			
Sorts			

What I saw (observable, not a conclusion)

- Plotted ___ of ___ stars at the right spot without a prompt.
- Named spin or orbit correctly on ___ of ___ items.
- Used a number or a clue as evidence: yes / no / with a reminder.
- Used the star maps (page 5): yes / no / with a reminder.

Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

A filled-in line, for reference

"Chose spin or orbit on 6 of 8 items on Spin or Orbit without a prompt on 11/6. Next step: ask whether the statement is about a day or a year before choosing." That is the level of detail this page is built for. It matches the filled example on page 39.

PREVIEW

Maya's Tracker (Invented Student)

Maya T. is invented; nothing on this page describes a real student. The blank tracker is on page 35.

Student: Maya T. (an invented student)

Teacher: Mr. Okafor (invented)

Month: November

Page	Page type and set	Items	Right	Date	Notes
6	Sky Words	6	5	11/3	Mixed up axis and orbit
7	Read: What Is a Constellation?	5	5	11/4	-
8	Read: Earth Spins	5	-	-	-
9	Read: Earth's Orbit	5	-	-	-
10	Read: Why the Sky Changes	5	-	-	-
11	Plot and Connect 1	4	-	-	-
12	Plot and Connect 2	4	-	-	-
13	Read the Grid	12	-	-	-
14	Name the Star Maps	12	10	11/5	Counted one star too few on two maps
15	Worked Example	3	-	-	-
16	Seasons and the Sky	6	-	-	-
17	Always Up or Not?	8	-	-	-
18	Spin or Orbit?	8	6	11/6	Called two orbit items spin
19	Read the Data Table	11	9	11/10	Subtracted the times the wrong way
20	Graph the Data	6	-	-	-
21	Fix It	5	-	-	-
22	Claim, Evidence, Reasoning 1	6	-	-	-
23	Claim, Evidence, Reasoning 2	6	-	-	-
24	Quiz	10	-	-	-
25	Short Answer	5	-	-	-
26	Cut and Sort 1	6	5	11/12	One piece pasted in the wrong box
27	Cut and Sort 2	6	-	-	-
28	Cut and Sort 3	10	-	-	-

How to read it

Maya T. has done **6 of 23** scored pages and got **40 of 48** items right with no prompt. **1** page was all right and **5** carry a note. Every number comes from the table.

What the table points to

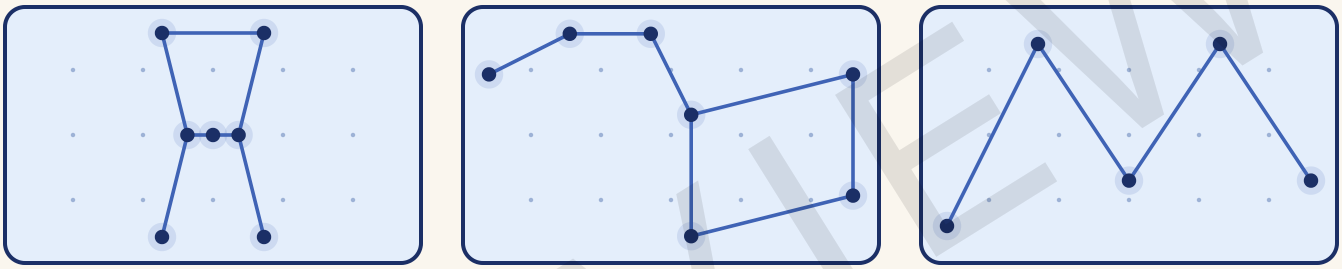
The lowest page is Spin or Orbit? (6 of 8). That is where the next practice goes. The 17 pages left blank are not tried yet, never wrong.

PREVIEW

Binder Cover

Slide this into the front of a binder. The divider tabs and a spine label to cut out are on the next page (page 42).

Science - Earth and Space



CONSTELLATIONS

Star Patterns, Seasons and Earth's Motion

Learn | **Practice** | **Check**

Teacher _____

Class or student _____

PREVIEW