



Day & Night Spinner

Mission: Mission Control needs to call astronauts' families in Indiana, London, and Tokyo, but it is always a different time somewhere! Spin Earth to figure out how rotation creates day, night, and time zones.

Big question: How does Earth's rotation cause day and night?

★ Warm-up: True or false?

Write T or F. Fix each false one.

The Sun goes around Earth once a day. ✓ **False: Earth spins once a day.**

When it is day in Indiana, it is day everywhere. ✓ **False: the far side of Earth has night.**

Key vocabulary

Axis	An imaginary line through the North and South Poles that Earth spins around.
Rotation	One full spin of Earth on its axis (24 hours).
Sunrise / sunset	When a place turns into or out of the Sun's light.
Time zone	A region where everyone uses the same clock time.

1 Box 1

Find noon in Indiana

In the simulator: Spin until it is **12:00 PM (noon)** in Indiana.

Where is Indiana pointing at noon?

☐ Straight at the Sun ☐ Straight away from the Sun ☐ At the North Pole

✓ **Straight at the Sun**

Find midnight

In the simulator: Spin until it is **12:00 AM (midnight)** in Indiana.

How many hours did it take to go from noon to midnight?

Answer: _____ hours ✓ **12**

2 Box 2

Time around the world

Read Indiana and Tokyo's times.

Moment	Indiana has	Tokyo has
Indiana noon	night	night
Indiana midnight	night	night

3 Box 3

Why different times?

When it is noon in Indiana, it is nighttime in Tokyo. Why?

☐ Tokyo is on the side of Earth facing away from the Sun ☐ Tokyo is closer to the Moon

☐ The Sun turns off over Asia ☐ Tokyo spins slower

✓ **Tokyo is on the side of Earth facing away from the Sun**

4 Box 4

Sunrise direction

In the simulator: Spin until it is **sunrise** (6:00 AM) in Indiana.

At sunrise, Indiana is turning from night into day. Which way is Earth spinning (seen from above the North Pole)?

☐ Counterclockwise ☐ Clockwise ☐ It does not spin

✓ **Counterclockwise**

5 Box 5

Plan the call

Tokyo is 14 hours ahead of Indiana. If it is 7:00 PM in Indiana, what hour is it in Tokyo the next morning? (Type the hour, like 9.)

Answer: _____ AM ✓ **9**

Show your thinking:

Legend: faster spin Legend only

If Earth spun twice as fast, how long would one day-and-night cycle last?

☐ 12 hours ☐ 48 hours ☐ 24 hours ☐ 6 hours

✓ **12 hours**

6 Box 6

Explain it

Explain how Earth's rotation causes day and night. Use the words rotate and Sun.

Look for: Uses rotate/spin; Mentions the Sun's light; Explains facing toward / away
Model: Earth rotates on its axis once every 24 hours. The side facing the Sun has day, and the side facing away has night. As Earth spins, places take turns in the light.



Exit ticket: answer the big question in your own words

How does Earth's rotation cause day and night?

Look for: Earth spins on its axis once every 24 hours. The half facing the Sun has day; the half facing away has night. Because Earth rotates, places take turns facing the Sun, which is why it is daytime in Indiana while it is nighttime in Tokyo.



Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	12T-E
 Investigator	THN-I

 Watch for these misconceptions

- "Seasons happen because Earth is closer to the Sun in summer." It is the tilt, not the distance.
- "Earth's shadow causes Moon phases." Phases come from our viewing angle of the lit half. Earth's shadow causes lunar eclipses.
- "The Sun moves across the sky." The Sun only appears to move because Earth rotates.