Rotation of the Earth

A. Fill in the Blanks

1. The side of the Earth facing the Sun experiences _____, while the side facing away experiences night.
2. The Earth's rotation is responsible for the daily cycle of _____ and _____.
3. The speed of rotation is fastest at the Earth's _____.
4. The Earth's axis is tilted at an angle of approximately _____ degrees.
5. The apparent deflection of moving objects due to the Earth's spin is called the _____ effect.

B. Match the Following;

Match the term in Column A with the best description in Column B.

Column A	Column B
1. Rotation	A. The path of an object around another object; causes the year.
2. Axis	B. The imaginary line that the Earth spins on.
3. 24 Hours	C. The spinning of a planet on its axis; causes day and night.
4. Revolution	D. The time it takes for the Earth to complete one rotation.
5. Coriolis Effect	E. The apparent curving of paths of moving objects due to rotation.

C. Practice Problems

Think a little deeper about the concepts of rotation.

1. Explain why the Sun appears to rise in the east and set in the west.
2. What is the fundamental difference between Earth's rotation and its revolution?
3. If it is noon in your city (meaning the Sun is at its highest point), what part of the Earth is experiencing midnight?

4. The Earth rotates 360 degrees in 24 hours. How many degrees does the Earth rotate in just one hour? (Show your calculation).
5. Why don't we feel the Earth spinning at over 1,600 km/h (at the equator)?
6. What is the "Circle of Illumination"?
7. Does a person standing at the North Pole and a person standing on the Equator travel at the same speed due to Earth's rotation? Explain your answer.
8. If the Earth suddenly started rotating twice as fast, how would the length of a day and a night be affected?
9. Besides the Sun, name two other celestial bodies whose apparent movement across our sky is caused by the Earth's rotation.
10. What causes the slight bulge at the Earth's equator and the flattening at the poles?

D. Warm-up Questions

Answer these quick questions to get your brain spinning!

1. What is the scientific term for the spinning of the Earth on its axis?
2. How long does it take for the Earth to complete one full rotation?
3. What is the main, observable effect of the Earth's rotation that we experience every day?
4. What is the imaginary line passing through the North and South Poles that the Earth spins on?
5. In which direction does the Earth rotate? (e.g., North to South, East to West)

E. Challenge Questions

Apply your knowledge to solve these tricky questions.

1. In the Northern Hemisphere, large-scale weather systems (like hurricanes) spin counter-clockwise. In the Southern Hemisphere, they spin clockwise. What is this phenomenon called, and how is it related to Earth's rotation?
2. If the Earth's axis was not tilted (i.e., it was perfectly perpendicular to its orbital plane), would we still have day and night? Would we still have seasons? Explain both parts of your answer.
3. A satellite in a "geostationary orbit" appears to stay in the exact same spot in the sky. How must its orbital speed and direction relate to the Earth's rotation for this to be possible?
4. Imagine you are standing at the South Pole during its winter. Describe the "day" and "night" cycle you would experience over a 24-hour period.
5. If the Earth stopped rotating but continued to revolve around the Sun, what would a "day" and "year" be like?

F. Word Problems & Application

Connect rotation to real-world scenarios.

1. An astronomer in California wants to observe a star that is directly overhead at midnight. An astronomer in Italy wants to observe the same star. Will she also look for it at midnight local time? Why or why not?
2. You are facing east watching the beautiful sunrise. To your left is North. Is the Earth spinning towards you or away from you?
3. A long-distance flight from New York to Paris is scheduled to take 7 hours. The flight leaves at 8 PM New York time. Due to time zones created by Earth's rotation, will the local time in Paris be 3 AM upon arrival? Explain.
4. You and a friend are on opposite sides of the Earth. You call them on the phone and say, "Good morning! The sun is just rising". What will your friend likely say back to you about the time of day where they are?
5. Ancient civilizations used sundials to tell time. Briefly explain how a sundial is a direct application of understanding the Earth's rotation.

G. True or False

1. The Earth's rotation is the reason we have different seasons. _____
2. The Sun actually rises in the east and sets in the west. _____
3. Every location on Earth experiences exactly 12 hours of day and 12 hours of night. _____
4. The Earth rotates from East to West. _____
5. If you are at the North Pole, you are essentially just spinning in a circle, not traveling a long distance. _____