TOEFL Listening Lesson 30

Setting: A college-level *Meteorology* class.

Questions

1. What is the main purpose of the lecture?

A. To explain how hurricanes are formed

B. To describe the structure of Earth’s atmosphere

C. To clarify the nature and effects of the Coriolis effect

D. To compare weather systems in different hemispheres

C. Because of gravitational variations on Earth’s surface

D. Due to friction between atmospheric layers

3. What happens to wind movement in the Northern Hemisphere because of the Coriolis effect?

A. It moves in straight lines from high to low pressure

B. It deflects to the left and causes clockwise rotation

C. It deflects to the right and causes counterclockwise rotation

D. It spirals toward the poles in a zigzag pattern

4. Why don’t cyclones form at the equator, according to the lecture?

A. Temperatures are too high for cyclone development

B. There is too little atmospheric moisture

C. The Coriolis effect is too weak at the equator

D. Winds blow too strongly in the opposite direction

5. What does the professor imply about the myth that the Coriolis effect determines the direction water drains in a sink?

Script

Professor:

Good morning, everyone. Today we're going to discuss the Coriolis effect, a fundamental concept in meteorology that helps explain why air and ocean currents move the way they do on Earth. It's one of those invisible forces that you can't see directly, but its influence is widespread—affecting everything from wind patterns to hurricanes and even airplane flight paths.

Let's begin with the basic idea: what is the Coriolis effect? In simple terms, it's the apparent deflection of moving objects—like air masses or

Imagine standing on a spinning carousel and trying to toss a ball to someone directly across from you. Because you and the platform are spinning, the ball doesn't travel in a straight line from your perspective. Instead, it curves. That curving motion is what we call the Coriolis effect.

Now, let's talk about how this applies to Earth's atmosphere. Earth rotates from west to east, completing one full rotation every 24 hours. Due to this rotation, the Coriolis effect causes moving air to be deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. This deflection isn't very noticeable on small scales—say, a person throwing a baseball—but becomes very significant when we consider large-scale atmospheric phenomena like trade winds, jet streams, and cyclones.

For example, in the tropics near the equator, warm air rises, creating an area of low pressure. Air from higher latitudes moves in to replace it, but as it does, the Coriolis effect causes this air to deflect. In the Northern Hemisphere, the air veers to the right, resulting in the trade winds that blow from the northeast to the southwest. In the Southern Hemisphere, the opposite occurs—winds are deflected to the left, creating southeast trade winds.

from the center, rotate in the opposite direction due to the same principles.

It's important to note that the Coriolis effect increases with latitude—it's weakest at the equator and strongest at the poles. This is why tropical cyclones don't form right at the equator: the Coriolis force there is too weak to initiate the rotation needed for cyclone development. They tend to form several degrees away from the equator, where the effect is just strong enough to start the spinning motion.

You might wonder if the Coriolis effect affects things like the direction water swirls when you drain a sink. That's a common myth. The scale of motion in a sink or toilet is so small that other factors like the shape of the basin and the angle at which the water enters dominate the flow. The Coriolis effect simply isn't strong enough at such small scales to influence the direction of water drainage.

Now, let's consider airplane and missile trajectories. Long-range projectiles and aircraft must account for the Coriolis effect in their navigation. If a pilot wants to fly due north in the Northern Hemisphere, they can't just point the plane straight north. If they did, the plane would gradually drift eastward due to the Earth rotating beneath it. So, they must slightly adjust the heading to compensate for the deflection caused by the Coriolis effect.

winds curve, helping to create the complex and dynamic atmosphere we observe.

Understanding the Coriolis effect is crucial not only for meteorologists but also for oceanographers, climate scientists, and even aviation experts. It's one of the many subtle ways our spinning planet influences the natural world.

Next time, we'll look at jet streams and how they tie into what we've discussed today. But for now, be sure to review your notes on rotational motion and pressure gradients—they're key to grasping the next layer of atmospheric dynamics.

Answers

1. What is the main purpose of the lecture?

✅ **Correct answer:** C. To clarify the nature and effects of the Coriolis effect

2. According to the professor, why does the Coriolis effect occur?

✅ **Correct answer:** B. Due to Earth's rotation influencing moving objects

4. Why don't cyclones form at the equator, according to the lecture?

✅ **Correct answer:** C. The Coriolis effect is too weak at the equator

5. What does the professor imply about the myth that the Coriolis effect determines the direction water drains in a sink?

✅ **Correct answer:** C. It is inaccurate because other factors dominate at small scales