

## JUST-RIGHT Teacher Script

*“Just Right” Star Type:* Among billions of stars, the sun is classified as a **G2V** or yellow dwarf. (G2 indicates its surface temperature and V identifies that the sun generates its energy by nuclear fusion of hydrogen nuclei into helium.) If the sun were larger or smaller, or hotter or colder, life on earth would be impossible. The sun’s size, heat, and brightness are “just right!”

*“Just Right” Distance:* Earth is **93,000,000** miles from the sun. If the earth were any closer to the sun, our atmosphere would burn away and the oceans would dry up. If earth were further away from the sun, our oceans would freeze over and everything alive would soon die. Earth’s distance from the sun is “just right!”

*“Just Right” Tilt:* Earth stays tilted at **23.5** degrees from a true north/south axis. Due to this tilt, as the earth revolves around the sun, sunlight shines directly on different parts of the earth at different times of the year. When the temperature is hot in some places, it is cold in others. The earth’s tilt causes weather variations that result in our seasons. Without the tilt, some parts of our planet would always be scorching hot and others would always be bone-chilling cold. Earth’s tilt on its axis is “just right!”

*“Just Right” Size & Weight:* The earth is very heavy or dense. This density causes our gravity that pulls everything down to the surface. If its size and weight were much less, then gravity would be too weak to pull rain from the clouds. Also, strong winds would blow everything around.

If earth’s size and weight were much more, even a short walk would be exhausting. Also, gases that are harmful to breathe (such as ammonia and methane) would stay on the ground instead of rising through the atmosphere into space. Earth’s size and weight is “just right!” An **apple** image represents perfect gravity.

*“Just Right” Magnetic Field:* The earth’s core and mantle contain huge amounts of molten iron. Scientists theorize that the movement of this hot liquid causes convection currents that produce a magnetic field. In any case, earth is highly magnetic and has a strong magnetic force field surrounding it. That’s why a compass works—no matter where we are on earth.

The earth’s magnetic force field repels harmful “solar wind” particles that would otherwise destroy us. (People who live in the far north can sometimes see this magnetic field in action. As the solar wind particles collide with gases in the earth’s atmosphere, they produce beautiful colors in the night sky—the aurora borealis.) Earth’s magnetic field is “just right!” A **magnet** image represents earth’s protective magnetic field.

*“Just Right” Rotation:* The earth spins on its axis every **24** hours. If it moved much faster, extreme weather patterns would occur—including frequent, intense hurricanes. If it moved much slower, days and nights would be so long that the earth’s heating and cooling cycles would make life very difficult. Earth’s rotation is “just right!”

*“Just Right” Atmosphere:* The earth’s atmosphere is unique—and essential to life. This **800-mile-wide** vapor surrounds the earth and acts like a greenhouse, keeping our planet from becoming too hot or too cold. Some planets in our solar system have atmospheres that contain poisonous gases. But Earth’s atmosphere is made up primarily of nitrogen and oxygen—that we breathe every day to stay alive.

Earth’s atmosphere also acts as a shield to protect us from meteorites. Thousands of space rocks enter the earth’s atmosphere every hour, but almost all of them burn up when they contact our thick atmosphere. We call them “shooting stars.” Earth’s atmosphere is “just right!” A **meteorite** image represents earth’s protective atmosphere.