New York
High School

Standard 4

Key Idea 1 The Earth and celestial phenomena can be described by principles of relative motion and perspective.

Performance Indicator 1.1

Explain complex phenomena, such as tides, variations in day length, solar insolation, apparent motion of the planets, and annual traverse of the constellations.

	Starry Night Lesson Plans *In order of relevance*			
1.1a Most objects in the solar system are in regular and predictable motion.				
These motions explain such phenomena as the day, the year, seasons, phases of the moon, eclipses, and tides.	A1-A5			
Gravity influences the motions of celestial objects. The force of gravity between two objects in the universe depends on their masses and the distance between them.	C2			
1.1b Nine planets move around the Sun in nearly circular orbits.	C2			
The orbit of each planet is an ellipse with the Sun located at one of the foci.	C2	B1-B2		
Earth is orbited by one moon and many artificial satellites.	C1	A5	C3	I1
1.1c Earth's coordinate system of latitude and longitude, with the equator and prime meridian as reference lines, is based upon Earth's rotation and our observation of the Sun and stars.	E4	E3	E1	
1.1d Earth rotates on an imaginary axis at a rate of 15 degrees per hour. To people on Earth, this turning of the planet makes it seem as though the Sun, the moon, and the stars are moving around Earth once a day. Rotation provides a basis for our system of local time; meridians of longitude are the basis for time zones.	A1	E1	E3	E4
1.1f Earth's changing position with regard to the Sun and the moon has noticeable effects.	A1-A5			
Earth revolves around the Sun with its rotational axis tilted at 23.5 degrees to a line perpendicular to the plane of its orbit, with the North Pole aligned with Polaris.	A2			
During Earth's one-year period of revolution, the tilt of its axis results in changes in the angle of incidence of the Sun's rays at a given latitude; these changes cause variation in the heating of the surface. This produces seasonal variation in weather.	A2			
1.1g Seasonal changes in the apparent positions of constellations provide evidence of Earth's revolution.	E3	E4		
1.1h The Sun's apparent path through the sky varies with latitude and season.	A2	E3	E4	
1.1i Approximately 70 percent of Earth's surface is covered by a relatively thin layer of water, which responds to the gravitational attraction of the moon and the Sun with a daily cycle of high and low tides.	A3			

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In order of relevance

Performance Indicator 1.2
Describe current theories about the origin of the universe and solar system.

1.2a The universe is vast and estimated to be over ten billion years old. The current theory is that the universe was created from an explosion called the Big Bang. Evidence for this theory includes:	H1-H3	I3	
Cosmic background radiation	H3		
A red-shift (the Doppler effect) in the light from very distant galaxies.	H3	I3	
1.2b Stars form when gravity causes clouds of molecules to contract until nuclear fusion of light elements into heavier ones occurs. Fusion releases great amounts of energy over millions of years.	F3	G2	G3
The stars differ from each other in size, temperature, and age.	G2		
Our Sun is a medium-sized star within a spiral galaxy of stars known as the Milky Way. Our galaxy contains billions of stars, and the universe contains billions of such galaxies.	G2	H1	H2
1.2c Our solar system formed about five billion years ago from a giant cloud of gas and debris. Gravity caused Earth and the other planets to become layered according to density differences in their materials.	F3	C1	B1-B2
The characteristics of the planets of the solar system are affected by each planet's location in relationship to the Sun.	C1-C4	B2	
The terrestrial planets are small, rocky, and dense. The Jovian planets are large, gaseous, and of low density.	C1-C4		
1.2d Asteroids, comets, and meteors are components of our solar system.	D1-D3		
Impact craters can be identified in Earth's crust.	D3		