

Core Science Fast Facts-First Quarter

Unit One: Introduction to Science and Matter

1. A **quantitative observation** is an observation that uses measurements and numbers.
2. A **qualitative observation** is an observation that describes.
3. **Independent variable (IV)** is the variable that is changed on purpose in the experiment.
4. **Dependent variable (DV)** is the variable that is measured in the experiment. It changes as a result.
5. **Constants** are the things that stay the same in the experiment.
6. The **control** is your standard for comparison-it is what is most like "normal" conditions
7. Drawing conclusions based on reasoning and past experiences is an **inference**. An inference allows us to make sense of our surroundings.
8. Grouping items into like categories is **classification**.
9. **Scientific method** is the logical process of solving problems.
10. **Hypotheses** are formed from past observations and inferences, link cause and effect, and are stated in if/then statements (where your "if" is the cause and your "then" is the effect).
11. **Analysis** is the process of collecting and interpreting data.
12. A **line graph** is used to show change over time.
13. A **bar graph** is used to compare items collected by counting.
14. The **x-axis** (horizontal) always has the independent variable.
15. The **y-axis** (vertical) always has the dependent variable.
16. There are three main parts to a **conclusion**. The first part states whether your results supported your hypothesis and restate the hypothesis. Second part restates your results. The third part is your inference.
17. In a **solid**, molecules are packed together very tightly. Solids have definite shape and volume.
18. In a **liquid**, molecules can slide past each other and are held together loosely. Liquids have definite volume, but no definite shape.
19. In a **gas**, molecules are very far apart and can move in all directions. In a gas, there is no definite shape or volume.
20. **Plasma** rarely exists on Earth, but it is the most common form of matter in the universe. Extremely high temperatures.
21. **Mass** is the amount of matter in an object. A balance is used to measure mass. The base metric unit for mass is gram.
22. **Weight** is the gravitational force exerted on an object by Earth.
23. **Volume** is the amount of space an object takes up. Liquid volume can be measured using a beaker or graduated cylinder. The base metric unit for volume is liter.
24. To find the **volume of a regular solid** (square or rectangular), multiply the length times the width times the height. Unit will be cubed.
25. To find the **volume of an irregular solid**, use a graduated cylinder or beaker to use the water displacement method.
26. Use a ruler or a meter stick to find **length or distance**. The base metric unit for length is meter.
27. To find **temperature**, use a thermometer and degrees Celsius.
28. The prefix **kilo** means 1000 units. Add it to base metric units when referring to large measurements.

29. The prefix **milli** means 1/1000 units. Add it to a base metric unit when referring to small measurements.
30. When reading a graduated cylinder, read the U-shaped line called the **meniscus**.
31. A **physical property** is a characteristic that helps you identify an object and that can be observed without changing the object. Examples include the color of something, state of matter, smell, taste, size, shape etc.
32. A **chemical property** is a characteristic that determines how a substance will react with another substance. Examples include ability to burn, reaction with water, reaction with oxygen, reaction with acid.
33. A **physical change** is any change in a substance that does not change the chemical properties of the substance. Examples include any phase change (melting, boiling, evaporating, etc.), sharpening a pencil, cutting paper, dissolving sugar in water, etc. It is still the same substance even though it might look different.
34. A **chemical change** is any change in matter in which one substance is changed into another substance with new properties. Examples include rusting, baking, rotting. A new substance with new properties has been created.
35. An **atom** is the smallest unit of an element that still has properties of the element.
36. **Protons** are positive subatomic particles found inside the atom's nucleus.
37. **Neutrons** are neutral subatomic particles found inside the atom's nucleus.
38. **Electrons** are negative subatomic particles found in the electron cloud.
39. **Atomic number** is always equal to the number of protons.
40. **Mass number** is equal to the number of protons plus neutrons.
41. In a **neutral atom**, the number of protons is equal to the number of electrons.
42. Most of an **atom's mass** is inside the nucleus. The rest of the atom is mainly empty space.
43. **John Dalton** theorized that there was nothing smaller than the atom. He also said that atom was a solid sphere.
44. **JJ Thompson** theorized that there were smaller particles than the atom-electrons. His model had a solid sphere with negative particles evenly spread out.
45. **Rutherford** did a gold foil experiment which showed that most of an atom's mass is inside the nucleus and the rest of the atom is empty space.
46. **Bohr** theorized that electrons orbit the nucleus in energy levels like the planets orbit the sun. He said that the first energy level could hold 2 electrons; the second level could hold 8, the third 18, and the fourth 32.
47. **Compounds** are two or more substances chemically combined. They are represented by chemical formulas and must be in exact ratios.
48. **Elements** can not be broken down into anything simpler. They are all listed on the Periodic Table and each element is represented by a chemical symbol.
49. **Mixtures** are two or more substances physically combined.
50. **Reactants** are the substances in a chemical reaction that react-they are present before the chemical reaction.
51. **Products** are the new substances formed as a result of the chemical reaction.
52. A **molecule** is the smallest particle of a compound that still has properties of that compound.

Core Science Fast Facts-Second Quarter

Unit Two: Astronomy

53. Our **sun** is a medium sized star that is the center of the solar system.
54. The **seasons** are caused by the relationship of the tilt of the earth's axis and its revolution around the sun.
55. The **eight phases of the moon** are new, waxing crescent, first quarter, waxing gibbous, full, waning gibbous, last quarter, waning crescent.
56. When the moon is **waxing**, it appears to be getting bigger and the lighted side of the moon is on the right.
57. When the moon is **waning**, it appears to be getting smaller and the lighted side is on the left.
58. **Crescent moon** looks like a banana-shaped moon where you can see less than half.
59. A **gibbous moon** is a three-quarter shaped moon.
60. The period of **revolution** is when an object travels around another. For a planet, one revolution is one year.
61. The period of **rotation** is one spin on axis. For a planet, one rotation is one day.
62. A **solar eclipse** occurs when the moon passes between the earth and the sun, casting a shadow on the earth.
63. A **lunar eclipse** occurs when the earth passes between the moon and the sun, blocking the sunlight from the moon.
64. **Solar eclipses** only occur in the daytime and **lunar eclipses** can only happen at night.
65. **Gravitational pull** from the moon causes tides on earth.
66. A **spring tide** occurs when there is a new and full moon. There is a big difference between high and low tide. High tides are really high, and low tides are really low.
67. A **neap tide** occurs when there is a first and third quarter moon. There is a small difference between high and low tide. High tides are not very high, and low tides are not very low.
68. The first four planets, Mercury, Venus, Earth, and Mars are the **inner planets** because they are closest to the sun.
69. The five remaining planets, Jupiter, Saturn, Uranus, Neptune, and Pluto are the **outer planets** because they are the farthest away from the sun. (Pluto is now considered a dwarf planet)

70. **Asteroids** are smaller bodies that orbit the sun. Thousands are held by gravity between Mars and Jupiter.
71. **Venus and Earth** are very similar in size.
72. **Early astronomers** believed that the sun orbited the earth and the earth was the center of the solar system.
73. **Copernicus** was the first to say that the sun was the center of the solar system and the planets orbited around the sun.
74. **Galileo** was an Italian astronomer who improved the telescope.
75. The first human to step on the moon was **Neil Armstrong**.
76. The **solar system** consists of the sun, planets, comets and other objects that orbit it.
77. Sir Isaac **Newton** theorized that gravitational force keeps the planets orbiting the sun.
78. An **ellipse** is the shape of each planet's orbit around the Sun.
79. The total amount of energy coming into and leaving the atmosphere is the **Earth's Energy Budget**.
80. The transfer of energy that occurs when molecules bump into one another is **conduction**.
81. The transfer of heat that occurs by the flow of material is **convection**.
82. The transfer of energy that occurs in the form of rays or waves is **radiation**.
83. A visible mass of tiny condensed water droplets formed high in the atmosphere is a **cloud**.
84. The thin layer of air that forms a protective covering around the Earth is the **atmosphere**.
85. The warming of the Earth's atmosphere caused by certain gases trapping heat is the **Greenhouse Effect**.
86. Invisible light from the sun that causes skin cancer is **ultraviolet** light.
87. The main way liquids and gases transmit heat is by the process of **convection**.
88. **Convection** occurs because warm air rises because it is less dense than cold air.
89. The **ozone** primarily absorbs ultraviolet rays from the sun.
90. Dark colors absorb more of the **sun's energy** than light colors.

Unit Three: Sun and Earth's Energy Budget

Core Science-Second Semester Fast Facts

Unit Four: Energy

91. **Energy** is the ability to do work. **Energy** is the ability to cause change.
92. **Potential energy** is energy of position.
93. **Kinetic energy** is energy of motion.
94. **Nonrenewable energy sources** are energy sources that will run out such as fossil fuels and nuclear.
95. **Renewable energy sources** are replenished often such as geothermal, wind, tidal/hydroelectric, biomass, and solar.
96. Time, heat and pressure are needed for **fossil fuels** to form.
97. Energy is transformed from one form to another. Energy is transformed but never created or lost. This is the **Law of Conservation of Energy**.
98. Energy that changes from one form to another is called **energy transformation**.
99. Most energy sources on the Earth are a result of solar radiation from the sun.

Unit Five: Atmosphere and Weather

100. The five layers of the atmosphere are **troposphere, stratosphere, mesosphere, thermosphere, and exosphere**.
101. The **Ozone layer** is in the stratosphere.
102. Weather occurs in the **troposphere**.
103. **Nitrogen** makes up 78% and **oxygen** 21% of our atmosphere.

104. **Weather factors** include humidity, temperature, wind speed and direction, air pressure, and precipitation.
105. **Humidity** is the amount of water vapor in the air.
106. The amount of water vapor in the air (humidity) depends mostly on the temperature.
107. **Wind** is the movement of air from a high pressure area to a low pressure area.
108. **Fog** is a stratus cloud that forms when air is cooled to its dew point near the ground.
109. Boundary between two air masses with different temperatures, densities, and moistures is a **front**.
110. **Cold fronts** are shown with blue triangles.
111. **Warm fronts** are shown with red semicircles.
112. **Occluded fronts** are shown with purple alternating triangles and semicircles.
113. **Stationary fronts** are shown with alternating blue triangles on one side and red semicircles on the other.
114. **Isobars** are lines connecting areas with equal atmospheric pressure.
115. **Isotherms** are lines connecting areas with equal temperatures.
116. **Cirrus** clouds are the highest cloud and are thin and wispy and are associated with fair weather.
117. **Stratus** clouds are low layered clouds and are associated with steady rain.
118. **Cumulus** clouds are big, puffy, white clouds and are associated with fair weather and sometimes showers.
119. **Severe weather** includes tornadoes, thunderstorms, and hurricanes.

120. A **hurricane** is a low pressure circulating storm that forms over warm tropical waters.

121. A **tornado** is a violent whirling wind that moves across the ground in a narrow path

122. The **water cycle** is made up of evaporation, transpiration, condensation, precipitation, and runoff.

123. **Evaporation** is when liquid water turns into water vapor.

124. **Condensation** is when water vapor turns into water.

125. **Precipitation** is when condensed water falls to Earth as liquid water (rain) or solid water (snow, sleet, or hail).

Unit Six: Water

126. **Density** is the mass of a substance per unit of volume. ($D=M/V$)

127. Density of water is **1g/ml**.

128. Ice is less dense than water which is why it floats in water.

129. When water goes through a **phase change**, there is no change in temperature.

130. Attraction between water molecules is called **cohesion**.

131. The attraction between water and other substances is called **adhesion**.

132. A **water molecule** consists of two hydrogen atoms and one oxygen atoms.

133. **Capillary action** is water's ability to travel upward against the force of gravity.

134. Water is the **universal solvent** which means it dissolves many substances.

135. The careful use and protection of water is called **water conservation**.

136. **Irrigation** is bringing in water from elsewhere to grow crops.

137. **Point source pollutants** come from one source and are easier to control.

138. **Non-point source pollutants** come from many sources and are hard to control.

Unit Seven: Watershed

139. A **wetland** is the link between the water and the land and is covered with water during part of the year.

140. An **estuary** is a body of water where freshwater rivers and salty seawater mix together.

141. The **Chesapeake Bay** is the largest estuary in the United States.

142. Land that water flows across, under, or through is a **watershed**.

143. Three types of **wetlands** are swamps, bogs, and marshes.

144. A wetland is identified primarily by the types of vegetation (plants) that grows there.

145. Three major **functions of wetlands** are to minimize flooding, filter pollutants and sediments, and provide habitat for plants and animals.

146. The states in the **Chesapeake Bay watershed** are New York, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia.

147. A watershed is an area where rivers and streams feed into a larger body of water.

148. Rivers and streams drop silt and mud in a process called **deposition**.

149. Most of our freshwater resources are found in glaciers and polar ice caps.

150. The percentage of fresh, non-frozen freshwater is less than 1%.

