Formation of the Sun and Planets

Formation of the Solar System

Scientists' current explanation of how the solar system was created is known as the **nebular hypothesis**, which says that the Sun and the planets of our solar system formed about 4.6 billion years ago from the collapse of a **nebula** (a giant cloud of gas and dust). As the nebula collapsed, gravity caused the cloud to spin, creating a flattened disk of matter.

Study Tip

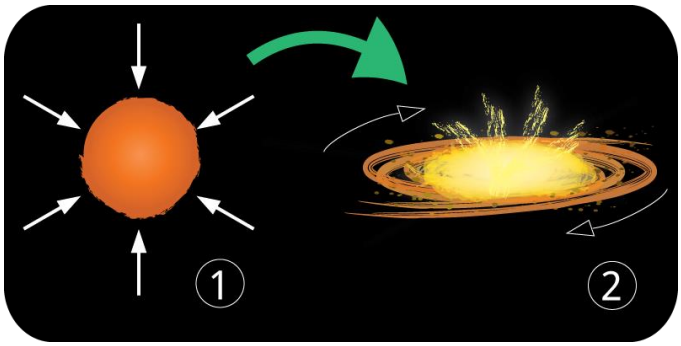
To remember the planets in order (starting from closest to the Sun), use the mnemonic device *my very easy method just speeds up names*. The first letter from each word corresponds to a planet. Just remember that Mercury is closer to the Sun than Mars. So, the planets are (in order) **M**ercury, **V**enus, **E**arth, **M**ars, **J**upiter, **S**aturn, **U**ranus, and **N**eptune.

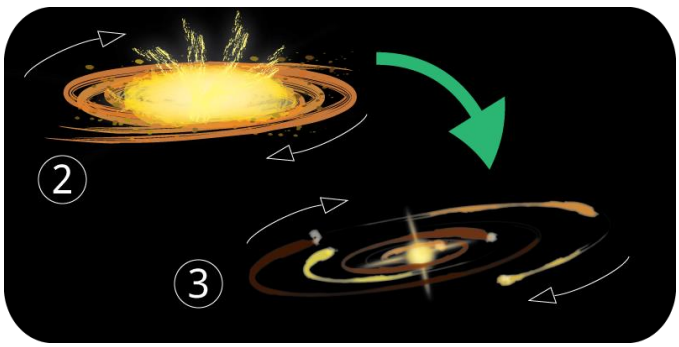
Formation of the Sun

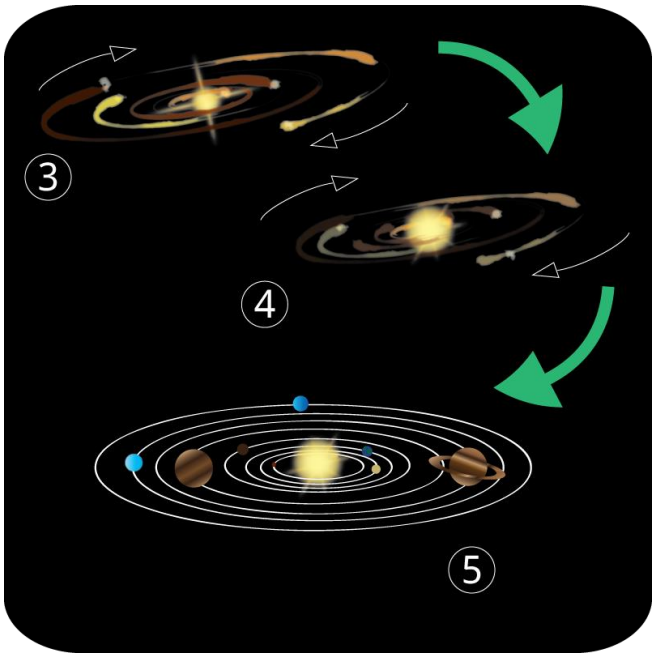
Gravity in the center of the collapsed nebula caused matter to be pulled in, increasing the density and pressure. This caused nuclear fusion to start, resulting in the formation of the **Sun**.

Formation of the Planets

5With the Sun at the center of the disk, the matter orbiting around it began to collide and form larger clumps. These clumps began to cool off and solidify, forming the planets. Because of gravity from the sun, these clumps of matter were sorted by their composition. The inner planets (**Mercury**, **Venus**, **Earth**, and **Mars**) formed from dense rock and metal. The outer planets (**Jupiter**, **Saturn**, **Uranus** and **Neptune**) condensed further from the Sun from lighter materials such as hydrogen, helium, water, ammonia, and methane.







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Nebular Hypothesis

The **nebular hypothesis** describes some of the basic features of our solar system. It includes five main points:

1. The orbits of the planets lie in nearly the same plane with the Sun at the center.
2. The planets revolve in the same direction.
3. The planets mostly rotate in the same direction.
4. The axes of rotation of the planets are mostly nearly perpendicular to the orbital plane.
5. The oldest moon rocks are 4.5 billion years.

Concept Check

- What is the nebular hypothesis?
- Name all the planets in order.
- Describe how the Sun and the planets formed.

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