|  |
| --- |
| **How Do Planets Form?** Source: [**https://exoplanets.nasa.gov/faq/43/how-do-planets-form/**](https://exoplanets.nasa.gov/faq/43/how-do-planets-form/) |
| Read the article below. On the right write a one sentence summary for each paragraph. |

## Understand

|  |  |  |
| --- | --- | --- |
|  | **How Do Planets Form?** | **One sentence summary in your own words.** |
| 1 | The dust around a star is critical to forming celestial objects around it. Dust around stars contains elements such as carbon and iron which can help form planetary systems. When a star is in its forming disk, otherwise known as the *T Tauri* phase, it is ejecting extremely hot winds dominated by positively charged particles called protons and neutral helium atoms. Although much of the material from the disk is still falling on the star, small groups of lucky dust particles are crashing into one another, clumping into larger objects. |  |
| 2 | Dust clumps become pebbles, pebbles become larger rocks that grind together to expand. The presence of gas helps particles of solid material stick together. Some break apart, but others hold on. These are the building blocks of planets, sometimes called "planetesimals." |  |
| 3 | Scientists think planets, including the ones in our solar system, likely start off as grains of dust smaller than the width of a human hair. They emerge from the giant, donut-shaped disk of gas and dust that circles young stars. Gravity and other forces cause material within the disk to collide. If the collision is gentle enough, the material fuses, growing like rolling snowballs. Over time, dust particles combine to form pebbles, which evolve into mile-sized rocks. As these planetesimals orbit their star, they clear material from their path, leaving tracks of space empty but for fine dust. At the same time, the star gobbles up nearby gas and pushes more distant material farther away. After billions of years, the disk will have totally transformed, much of it now in the form of new worlds. Watch the video to see this process unfold. |  |
| 4 | Where the disk is colder, far enough from the star that water can freeze, tiny fragments of ice hitch a ride with dust. Dirty snowballs can amass into giant planetary cores. These colder regions also allow gas molecules to slow down enough to be drawn onto a planet. This is how Jupiter, Saturn, Uranus and Neptune, the gas giants of our solar system, are thought to have formed. Jupiter and Saturn are thought to have formed first and quickly within the first 10 million years of the solar system. |  |
| 5 | In the warmer parts of the disk, closer to the star, rocky planets begin to form. After the icy giants form there’s not a lot of gas left for the terrestrial planets to accrete. Planets that are rocky like Mercury, Venus, Earth and Mars may take tens of millions of years to form after the birth of the star. The details of exactly where planets prefer to form in disks is still a mystery and an ongoing area of research. |  |
| 6 | Once planets form around a star they are referred to as planetary systems, which are defined as sets of gravitationally bound objects that orbit a star. They can consist of one or more planets, but may also include dwarf planets, asteroids, natural satellites, meteoroids, and comets. The Sun and its planets, including Earth, is known as the solar system. The term "extrasolar" system and "exoplanet" system refer to planetary systems other than our own. |  |

## Analyze

|  |
| --- |
| **Now watch this video about how planets form.** |
| <https://www.youtube.com/watch?v=zOX2qKRiE6M> |
| **In the box below, write a paragraph describing how planets form. This should be in your own words, using complete sentences. Use at least 3 pieces of evidence from the article or video. These should be explained in your own words.** |
|  |