Curriculum Guide / Lesson Plan

Exploring the Universe: Nebula Spin Art

In this activity, learners create their own colorful model nebula using paint and a spinner.

Subject areas / Grade levels / App tie-in / Learning standards

Nebula Spin Art covers Earth & Space Science and is for grades 3 and up. It is connected to the following NGSS standards: CCC.3.6-8.5 and CCC.4.6-8.6. The Visceral Science app allows learners to speed up the passage of billions of years to watch the birth and death of stars. Learners will connect the digital versions of nebulas in the app to their hands-creations in Nebula Spin Art to further explore the beautiful patterns formed by dying stars and the forces involved. Learners will also discover when nebulas play a role in the life cycle of stars and the importance of nebulas in our universe.

Access

Access Visceral Science via student's personal internet-connected devices iPhone x or iPad X or higher: verizon.com/learning.

Overview

- In this activity, participants will learn about how gigantic clouds of gas and dust in space, called nebulas, are formed. They'll create their own colorful model nebula using paint and a spinner. Because of the unique quantities and locations of the materials and the forces that spread them out, each model nebula will be unique – just like each real nebula! Setup and learning time will be at least 20 min.

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CHILDREN'S CREATIVITY MUSEUM NISE NETWORK

Objectives

- A nebula is a large cloud of gas and dust in space that can be created by a dying star.
- Nebulas are responsible for mixing up and spreading out elements in space.
- NASA scientists can assign colors in nebula images to represent different elements and other characteristics we can't see with our eyes.

Materials and preparation

- Neon tempera paints
- Small squeeze bottles (1 for each color)
- Black construction paper circles
- 2 OXO Good Grips salad spinners
- Gel pens
- Optional: paper towels and old newsprint or brown paper table covering to contain mess
- Please note, Visceral Science can be accessed before or after hands-on using the activity with learners to connect concepts of stellar evolution, gravity, and light.

Vocabulary

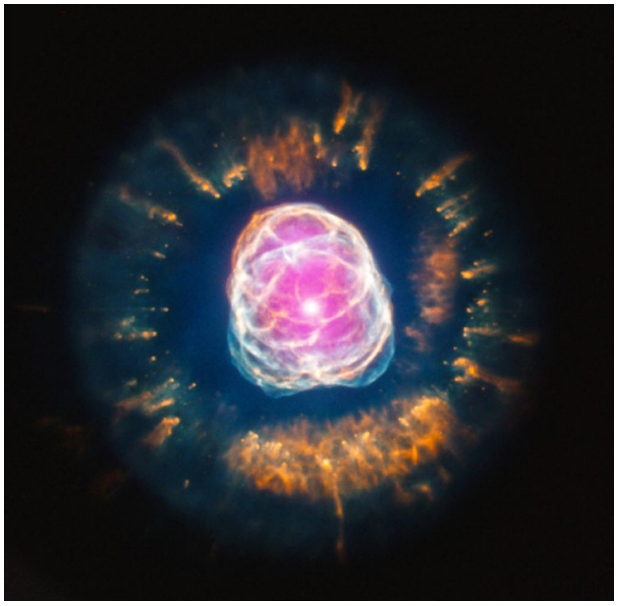
- **Nebula:**
  A large cloud of gas and dust in space.

- **Planetary Nebula & Supernova**
  Planetary nebulas are only one type of nebula. Clouds of gas and dust can also be present at the beginning of a star's life. When gravity pulls together dense clumps of gas and dust, large objects can form – if they are large enough, they can become stars. This is why these star-forming nebulas, like the Orion Nebula, are often referred to as stellar nurseries.
  Some nebulas are formed by a supernova. Many high-mass stars – much more massive than the Sun – explode at the end of their life cycle, creating a nebula type known as a supernova remnant. These nebulas often have asymmetrical shapes, like the Crab Nebula.
  Most stars in the universe are low-mass stars, like the Sun, and many of them end their lives in less dramatic ways. These stars can run out of hydrogen in their cores, eventually shedding their outer layers and expanding less violently over time. Nebulas that form this way are called planetary nebulas and are often round in appearance, like the Ring Nebula.

Background

A nebula is a large cloud of gas and dust in space that can be created by a dying star.

Nebulas are responsible for mixing up and spreading out elements in space. In this activity, the spreading paint represents a dying star ejecting its matter into space. Out in the universe, a dying star pushes out gas and dust, forming rays, rings, and other features of nebulas just like the ones you can make with the paint. Some giant stars, much larger than the Sun, die with a violent explosion called a supernova. But many stars slowly shed their contents into space to form planetary nebulas. Planetary nebulas aren't actually planets, but these fuzzy objects resembled planets through old telescopes. Many nebulas are round, but strange shapes are also possible depending on what's nearby the dying star. No matter the final shape, the messy process of creating a nebula stirs up elements in nearby space – just like mixing paint colors in the spinner. Elements from stars that died a long time ago spread throughout space and contributed matter to the solar system, Earth, and even us. The oxygen you breathe, the calcium in your bones, and the precious metals in jewelry are all elements that came from dying stars!



Clown Face Nebula

Cat's Eye Nebula

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Step-by-step classroom guide

Step #1: Place a black paper circle in the bottom of the spinner and choose at least 3 colors of paint. Squirt 5–10 drops of each color into the center of the paper circle so that all the drops are touching.

Step #2: Before spinning, lift up the spinner And tilt it back and forth to start spreading the paint equally in all directions. (This will be your star with its mix of elements!)

Step #3: Cover the spinner with the lid and Use the hand pump to spin everything for several seconds. Open it up and look inside. What happened to your star? Where did the star's elements go as it became a nebula? Can you find similar patterns and colors in the digital nebulas of the Visceral Science app?

Now try this! Can you make another nebula with a different pattern or color mixture? Use a gel pen to add the name of your nebula or your own name to the paper.

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CHILDREN'S CREATIVITY MUSEUM NISE NETWORK

Activity components

Activity Guide (English & Spanish)	**Student-facing**
Planetary Nebula or Supernova infosheet (English & Spanish)	
The Colors of Astronomy infosheet (English & Spanish)	
Beautiful Nebulas poster (English & Spanish)	
Life Cycle of Stars poster (English & Spanish)	
Activity Standup Sign (English & Spanish)	
Facilitator Guide (English only)	**Educator-facing**
Tips for Leading Hands-On Activities (English only)	