



FACILITATOR GUIDE

Nebula Spin Art

Learning 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

- Neon tempera paints
- Small squeeze bottles (1 for each color)
- Black construction paper circles
- 2 OXO Good Grips salad spinners
- Gel pens
- Activity and facilitator guides
- Information sheets
- *Tips for Leading Hands-on Activities*
- Optional: paper towels and old newsprint or brown paper table covering to contain mess

The Explore Science toolkit comes complete with all necessary materials for this activity.

Materials are also readily available online or at local retail stores to create or restock activity kits. Graphic files can be downloaded from www.nisenet.org.

Safety

The neon tempera paint supplied in the physical toolkits is non-toxic, but participants should avoid ingesting it. If you substitute materials, you may want to share additional information with visitors.

Advance preparation

- Mix 3 parts paint and 1 part water in each small squeeze bottle and shake well for vibrant colors. Consider having 4 or more colors available in separate small squeeze bottles to offer enough color choices for visitors. If a large crowd is expected, think about mixing a back-up squeeze bottle of each color.

- Although not much force is needed to operate the spinner, please consider a stable table or surface when facilitating the activity. You may choose to cover the table in old newsprint or brown paper to prevent paint getting on the surface.
- You may want to have some paper towels on hand for periodic cleanups. You may need to wipe excess paint from the bottom of the spinner if too much collects after a lot of use.
- Set up a drying area for visitors to leave their recently completed nebula spin art. To help during the pickup process, encourage visitors to write their names or initials on their creations (possibly on the back) using the gel pens.

Notes to the presenter

While we recommend 3 parts paint to 1 part water to create a paint nebula that dries with vibrant colors, facilitators can dilute the paint with more water to conserve materials. However, if too much water is used in the mixture, or if the water and paint are not mixed together well, the construction paper may wrinkle and curl when drying.

One result of this activity is that every paint nebula is unique in shape, similar to nebulas observed in space! This means that some nebulas may have the paint spread more evenly, resulting in rings, while some may have the paint concentrated on one side. In order to make a slightly more symmetrical nebula, the facilitator can pick up the salad spinner basket after the participant adds their drops of paint to the middle of the paper and gently tilt the basket in a circular motion in order to start spreading the paint evenly around the center. Another technique that may help is to take out the spinner basket and set it on a flat surface while the drops of paint are added. Regardless of technique, if there is more paint on one side of the paper than the other, the paint will often unevenly spread toward the heavier edge when the salad spinner is in motion.

Conversational prompts

While engaging in this activity, or while participants are waiting for their artwork to dry, you may find yourself with some additional time to chat with visitors about this content. Try prompting some of these conversations:

As participants are picking out their paint, try saying, “Nebulas are made of different elements (represented by the colored paint that you see here). What colors do you want your nebula to have?”

Facilitate a conversation about how the colors (elements) mixed together as a result of the nebula’s formation. For example, try asking:

- “What happened to the colors, or elements, you put onto your paper?”
- “How would you describe the pattern of your nebula?”

For younger visitors, walk them through observations

- “Do you see how the color spread out from the center?”

- “Do you notice how the colors mixed together (point to where paints overlap)?”
- Point out any color blending or interesting shapes that form while spinning.
- Point out whether the paint spread outward in a mostly circular way, resembling a round nebula, or if the paint spread is more random like a uniquely shaped nebula.

Share that “Some nebulas are named after animals or shapes they resemble. For example, there’s the Butterfly Nebula and the Cat’s Eye Nebula.” And try asking participants, “What shapes do you see in your nebula?” or “What name would you give your nebula?”

Difficult concepts

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.

Visitors may wonder if stars are alive. While stars are often referred to as being “born” or “dying,” they are not biologically alive, like animals or plants. Language like “born,” “life cycle,” or “dying” may be helpful in introducing concepts related to stars, but be conservative when using similar analogies for stars and other space objects.

Visitors may struggle to recognize the basic structure of the universe. Earth is a planet in our solar system. Our solar system has one star at its center, the Sun. There are billions of other stars in our galaxy, the Milky Way. Many of these stars also have orbiting planets, which we call *exoplanets* or exoplanet systems. The universe contains hundreds of billions of galaxies.

While this guide contains detailed information about nebulas and stars, it should not be implied that scientists know everything there is to know about these space science topics. Studying and further understanding the birth and death of stars, and many other phenomena in the universe, is an ongoing process we as a society choose to pursue.

Staff training resources

Refer to the *Tips for Leading Hands-on Activities* sheet in your activity materials.

- Content Training Video: <https://vimeo.com/366778632>
- Activity Training Video: <https://vimeo.com/366778366>
- Edu-cathalon Facilitation Strategies Video: <https://vimeo.com/304241578>

The NISE Network has a curated list of programs, media, and professional development resources that directly relate to the toolkit. These resources can be viewed and downloaded from: www.nisenet.org/earthspacekitextensions

Credits and rights

This activity was adapted from Space Art Exploration, developed by Children’s Creativity Museum. Retrieved from: www.universe-of-learning.org/informal-learning/touch-the-universe-childrens-creativity

Image of Clown Face Nebula courtesy of NASA/CXC/IAA-CSIC/N.Ruiz et al,
Optical: NASA/STScI

Image of Cat’s Eye Nebula courtesy of NASA/CXC/SAO & NASA/STScI



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