

## ADVISORY 1, UNITS 1-3, LESSON 1 SPACE SCIENCE

### Summary

- In this lesson, students will read "A Star Is Born" (pp. 4-9) and "Mighty Milky Way" (pp. 10-15) to understand the role gravity plays in the birth and death of stars.

### Science Background

When you look up at the night sky, it's hard to miss the stars. They shine, and they twinkle. It's easy to imagine that they'll be there forever. But like everything else in the universe, stars have a life cycle. They are born, and they die.

A star is born in a cloud of dust called a nebula. There are nebulae scattered throughout most galaxies. When enough gases and dust collect, the gravitational attraction becomes too great. This causes the cloud to collapse upon itself.

As the cloud collapses, it shrinks and starts to spin. The material in the center of the cloud grows hotter and denser. Over time, it forms a core. The core grows as it collects more gasses and dust. When the temperature and pressure get high enough, the core ignites, and a star is born. Newborn stars give off light that carries energy deep into space.

### ENGAGE

Encourage students to flip through the articles and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about stars and the universe.

### EXPLORE

Instruct students to examine the photos on pages 4-5 of their Readers. **Ask:** *Which parts of these photos are stars?* (the bright spots) *What's in the areas that look smoky?* (gases and dust) Brainstorm ideas about why some areas have more gases and dust than others.

### EXPLAIN

Point out to students that there can be great distances between atoms and molecules in space. **Ask:** *What brings molecules together in a nebula?* (gravity) *How?* (Gravity pulls everything toward the cloud's center.) Have students turn and talk as they review the articles for details about how stars are born. Then challenge students to identify three reasons why stars die. (They collide with other stars; They explode; They are ripped apart by gravity.)

Encourage students to turn and talk as they discuss how gravity can destroy stars. (There is a massive black hole in the center of the Milky Way. It has super gravity and all stars in our galaxy orbit around it. Nothing can escape its grip. When a star gets too close, the black hole rips it apart.)

### ELABORATE

Invite students to participate in Galaxy Zoo ([www.zooniverse.org/projects/zookeeper/galaxy-zoo/](http://www.zooniverse.org/projects/zookeeper/galaxy-zoo/)), a Citizen Science project used in classrooms worldwide. Students will view images and record their observations. Their responses help scientists classify galaxies according to their shape.

### EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare their results in small groups.

**CONTENT ASSESSMENT: Space Science, Lesson 1**

Make a checkmark to show if you think each sentence is true or false.  
Use information from the articles to explain each of your answers.

Sentence	True	False	Explanation
1.  All nebulae make stars.			
2.  Stars could not form without the help of gravity.			
3.  Stars could not die without the help of gravity.			
4.  A supernova is a kind of star.			
5.  Everything in the Milky Way rotates around our sun.			