



## THE STAR★WITNESS

### Supplemental Educational Support Materials for Special Feature: “Hubble Witnesses Fireworks From Comet Collision”

#### Discussion questions

**Q1.**

**What was the purpose of the Deep Impact mission?**

**Answer:**

The Deep Impact mission’s purpose was to punch through the crust of comet 9P/Tempel 1 to release the material trapped beneath the surface. Comets were formed in the coldest regions of the solar system. They are relics of our early solar system, chunks of leftover material from the formation of the planets. By studying the material released from the impact, scientists can learn about comet Tempel 1’s makeup. They can also learn more about how our solar system formed, by studying the released material, which may still contain original building blocks from the time when the Sun and the planets were forming.

**Q2.**

**Describe the makeup of a comet.**

**Answer:**

Comets are composed of three parts: a nucleus, a coma, and a tail or tails. The heart of a comet is its nucleus — chunks of ice and rock surrounded by a coma. The coma is the gas and dust released by the comet when it is warmed by sunlight. The solar wind pushes the coma away from the comet, in a direction that points away from the Sun, forming one or more tails.

**Q3.**

**Why were the Hubble Space Telescope and other space telescopes involved in the Deep Impact mission?**

**Answer:**

The Hubble Space Telescope and other space telescopes watched (and took images of) the collision between the comet and the impactor. This was an once-in-a-lifetime event.

Each space telescope observed the event in a different part of the electromagnetic spectrum to capture as much of the action as possible. What is visible in one portion of the spectrum may not be visible in another. For example, the Hubble Space Telescope collected visible light, the Spitzer Space Telescope gathered information in infrared light, and Chandra looked for X-rays coming from the comet.

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**Q4.**

**If you could ask a Deep Impact scientist several questions about the mission, what would they be?**

**Answer:**

Some of the questions you might want to ask are:

- Who came up with the idea of crashing into a comet?
- Why did you choose comet Tempel 1?
- How did you program the spacecraft to meet up with the comet?
- Why did you choose the Fourth of July?
- How did the impactor make such a large hole?
- What did you find?
- How do you know what came out of the hole?

**Q5.**

**If you were an astronomer, what question(s) about the solar system would you want to investigate?**

**Answer:**

Some of the questions an astronomer might ask about the solar system are:

- How did the solar system form?
- Why do comets travel into the inner solar system?
- Are asteroids related to comets?
- Why are all the planets moving around the Sun in the same direction?
- Why are the rocky planets near the Sun and the “gas giant” planets farther from the Sun?
- Is Pluto a real planet or a dwarf planet?
- What is under Venus’ atmosphere?

## Vocabulary words

### **Celestial**

Of or relating to the sky or visible objects in the sky, like the Moon, Sun, planets, comets, asteroids, stars, and galaxies.

### **Coma**

The cloud of gas and dust that forms around a comet’s nucleus. This cloud is created when the solar wind strikes the surface of the nucleus.

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## **Flyby spacecraft**

A spacecraft that travels past a celestial object. Frequently, such a spacecraft is unmanned and takes images of the object.

## **Impactor**

The part of the Deep Impact spacecraft that crashed into comet 9P/Tempel 1. When launched, the impactor and the flyby spacecraft were attached to each other. The spacecraft launched the impactor a day before the crash. As the impactor punched through the comet's crust, the flyby craft recorded the event from a safe distance away.

## **Infrared light**

A region of the electromagnetic spectrum that has slightly longer wavelengths and lower frequencies than visible light, but is not visible to the human eye. This region of light is comparable to the range of sounds that are too low for the human ear to hear. Infrared light can be detected as the heat from a fire or a light bulb.

## **Nucleus**

The solid rocky part of a comet.

## **Solar Wind**

Streams of charged particles flowing from the Sun at millions of kilometers an hour. The composition of this high-speed solar wind may vary, but it always streams away from the Sun. The solar wind is responsible for the Northern and Southern Lights on Earth and causes the tails of comets to point away from the Sun.