

# CLASSROOM READY Weekly News

LEVEL 1

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## Hubble Turns 30

**O**n April 24, 1990, **Space Shuttle *Discovery*** blasted off into space to launch of the Hubble Space Telescope (Hubble).

The astronauts on *Discovery* successfully put the 11,000-kilogram Hubble into orbit around Earth. In the 30 years since, it has contributed greatly to our understanding of the universe.

As a telescope, Hubble is supposed to make faraway objects appear larger. It is a **reflecting telescope**, with a 2.4-metre mirror. The telescope was built to see the most distant stars and galaxies in the universe. The fact that it is in space would help make things even clearer. Telescopes on Earth are limited by our planet's atmosphere.

While air appears invisible to our eyes, it does cause a bit of

distortion in how we see things. Think of how hot air can make it look like there is a shimmer above a road on a sunny day. When trying to examine distant galaxies, or get a close look at a star, even the slightest bit of distortion by the atmosphere can be a problem. As well, ground-based telescopes have to wait until it is dark to study the heavens.

Hubble would fix that with no atmosphere, a large mirror, endless night, and the latest scientific devices. These devices would enable Hubble to see visible light, ultraviolet light, and infrared light. **Astronomers** were anticipating many astounding images of the universe to study.

At the beginning, that wasn't the case. The first images were fuzzy. The scientists discovered Hubble had a flaw in its mirror.

Astronauts were able to fix

the problem in 1993. Since then, Hubble has provided many beautiful and scientifically important images of space. Its ability to view distant stars has enabled astronomers to more precisely estimate the age of the universe. They have also been able to spot evidence of black holes and to study the atmospheres of planets around other stars. ★



### DID YOU KNOW

The telescope is named after famed American astronomer Edwin Hubble. He was the first astronomer to discover that the universe is much larger than the Milky Way galaxy.

To view videos, go to:  
<http://resources.dynamic-classroom.ca/books/gskb>

Video



### WORD POWER

**SPACE SHUTTLE:** A reusable type of spacecraft built by NASA that flew missions from Earth to orbit from 1981 to 2011.

**REFLECTING TELESCOPE:** A type of telescope that uses mirrors instead of lenses to make objects appear larger.

**ASTRONOMER:** A scientist who studies space and space objects including planets, moons, stars and galaxies to better understand how the universe works.

## Hubble Turns 30

1. What happened on April 24, 1990?

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2. Why was the telescope built?

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3. How are telescopes limited by Earth's atmosphere?

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4. What problem was there when Hubble was first used?

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5. What has Hubble been able to do over the last 30 years?

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### CRITICAL THINKING

1. What are your thoughts on how Hubble has been able to help understand the universe?

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# Hubble Facts

## Size

- Length: 13.2 metres (the length of a large school bus)
- Weight: At Launch: 10,886 kilograms
- Maximum Diameter: 4.2 metres

## Spaceflight Statistics

- Low Earth Orbit: Altitude of 547 kilometres
- Time to Complete One Orbit: about 95 minutes
- Speed: about 27,300 kilometres per hour

## Hubble's Mirrors

- Primary Mirror Diameter: 2.4 metres
- Primary Mirror Weight: 828 kilograms
- Secondary Mirror Diameter: 0.3 metres
- Secondary Mirror Weight: 12.3 kilograms

## Did you know...

- Hubble has made more than 1.3 million observations since its mission began in 1990.
- Astronomers using Hubble data have published more than 15,000 scientific papers, making it one of the most productive scientific instruments ever built. Those papers have been cited in other papers 738,000 times.
- Hubble does not travel to stars, planets, or galaxies. It takes pictures of them as it whirls around Earth.
- Hubble has circled Earth and gone more than 6.4 billion kilometres along a circular low earth orbit.

1. How long is Hubble? \_\_\_\_\_
2. At what altitude does Hubble orbit Earth? \_\_\_\_\_
3. At what speed does Hubble orbit Earth? \_\_\_\_\_
4. What energy source does Hubble use? \_\_\_\_\_
5. How many observations has Hubble made? \_\_\_\_\_

## Data Statistics

- Hubble transmits about 150 gigabits of raw science data every week.

## Power Needs

- Energy Source: The Sun
- Mechanism: Two 25-foot solar panels
- Power Generation (in Sunlight): about 5,500 watts
- Power Usage (Average): about 2,100 watts

# Word Power

Using the words defined below, fill in the blank in each of the following sentences with the word that fits best. All of the words have been used in the article.

1. The explorers took the risk of travelling to a \_\_\_\_\_ land.
2. I asked for the mechanic to \_\_\_\_\_ how much it would cost to fix my car.
3. The family was \_\_\_\_\_ going on vacation to Disneyland next year.
4. There was a \_\_\_\_\_ in the marble slab so it couldn't be used.
5. Jonathan \_\_\_\_\_ placed the parts in the correct places.

**Anticipating:** Looking forward to; expecting.

**Astounding:** Causing very great surprise.

**Distortion:** The process of twisting something out of its usual shape or look.

**Estimate:** To make a general but careful guess about the size, quality, value, or cost of something.

**Faraway:** Distant; far.

**Flaw:** A break, scratch, or crack that spoils something.

**Fuzzy:** Not clear or distinct; blurred.

**Precisely:** In a way that is exact in every detail; exactly.

## Quiz

1. On April 24, 1990, Space Shuttle *Discovery* blasted off into space to launch of the Hubble Space Telescope.  
True      False
2. As a telescope, Hubble is supposed to make faraway objects appear smaller.  
True      False
3. Hubble is a reflecting telescope, with a 2.4-metre \_\_\_\_\_.
4. Ground-based telescopes have to wait until it is \_\_\_\_\_ to study the heavens.
5. Hubble's ability to view distant stars has enabled astronomers to more precisely estimate the age of the \_\_\_\_\_.