

## Photo Description

This image shows ornamental grasses covered with tiny water droplets that look like sparkling beads. The feathery, fluffy seed heads are wet from morning dew, and each drop catches the light. The grasses have long, thin blades and soft, fuzzy flower clusters that spread out like tiny fireworks.



## Scientific Phenomena

The Anchoring Phenomenon is dew formation on plant surfaces. This occurs when water vapor in the air condenses into liquid droplets on cool surfaces during nighttime hours. As temperatures drop after sunset, the air becomes saturated with water vapor and can no longer hold all the moisture. The grass surfaces act as condensation points where invisible water vapor transforms back into visible liquid water droplets, creating the beautiful dewdrops we observe in early morning.

## Core Science Concepts

1. Water Cycle Processes: Dew formation demonstrates condensation, one of the key processes in Earth's water cycle where water vapor changes back to liquid form.
2. States of Matter: The image shows water in its liquid state after transitioning from its gaseous state (water vapor) in the air.
3. Plant Adaptations: The feathery structure of ornamental grass seed heads maximizes surface area for collecting moisture from the air.
4. Temperature and Weather Patterns: Dew formation requires specific temperature and humidity conditions, typically occurring on clear, calm nights when surfaces cool rapidly.

### Pedagogical Tip:

Use this image as a "Notice and Wonder" activity starter. Have students spend 2-3 minutes silently observing before sharing what they notice and what questions they have. This builds observation skills and generates authentic student-driven inquiry.

### UDL Suggestions:

Provide magnifying glasses for students who need closer visual examination, and consider having students use their sense of touch (safely) to feel dewdrops on grass outside. Create vocabulary cards with both words and images to support diverse learners.

## Zoom In / Zoom Out

**Zoom In:** At the molecular level, individual water molecules are slowing down as they cool and forming hydrogen bonds with each other, clustering together to create liquid droplets. The grass surface provides nucleation sites where these molecules can gather and form visible drops.

**Zoom Out:** This dew formation is part of Earth's global water cycle, contributing to local ecosystem water availability. Plants can absorb some of this moisture through their leaves, and as the sun rises, these droplets will evaporate back into the atmosphere, continuing the endless circulation of water around our planet.

### Discussion Questions

1. What conditions do you think are needed for dew to form on plants? (Bloom's: Analyze | DOK: 2)
2. How might dew formation help plants survive in dry environments? (Bloom's: Evaluate | DOK: 3)
3. Where else have you observed water droplets forming, and what might cause them? (Bloom's: Apply | DOK: 2)
4. If you were a water molecule in the air, describe your journey to becoming a dewdrop. (Bloom's: Create | DOK: 3)

### Potential Student Misconceptions

1. Misconception: Plants "sweat" out the water droplets like humans do.  
Clarification: The water comes from the air around the plant, not from inside the plant. The plant surface just provides a cool place for water vapor to condense.
2. Misconception: Dew only forms when it rains.  
Clarification: Dew forms from water vapor already in the air, even on clear nights without any precipitation.
3. Misconception: All the droplets are the same size because they formed at the same time.  
Clarification: Droplet size varies based on surface texture, angle, and local air movement, even when forming simultaneously.

### Cross-Curricular Ideas

1. Math - Measurement and Data: Have students measure the diameter of dewdrops using rulers or measuring tapes (in millimeters). Create a class chart or bar graph showing the range of droplet sizes found on different plants. This connects to measurement skills and data representation standards.
2. ELA - Descriptive Writing: Ask students to write a "day in the life" narrative from a water droplet's perspective, describing its journey through the water cycle. Encourage use of sensory language and metaphors (e.g., "I felt myself cooling down like a tired runner after a race"). This builds descriptive writing skills and vocabulary development.
3. Art - Nature Observation Drawing: Have students create detailed pencil or watercolor sketches of grass with dewdrops, focusing on how light reflects off the water. This develops observational drawing skills and understanding of light, shadow, and texture in visual representation.
4. Social Studies - Weather and Human Survival: Research how different cultures and indigenous peoples around the world have collected dew for drinking water in arid regions. Discuss how understanding dew formation helps humans adapt to different climates and environments.

## STEM Career Connection

1. Meteorologist: A meteorologist is a scientist who studies weather and the atmosphere. They track how water moves through the air, predict when dew will form, and help people understand weather patterns. Meteorologists use special instruments and computers to help keep communities safe from dangerous weather. Average Annual Salary: \$97,000 USD
2. Hydrologist: A hydrologist is a scientist who studies water on Earth—where it comes from, where it goes, and how it moves. They learn about the water cycle in detail and help communities manage water resources for drinking, farming, and industry. Hydrologists might study how dew contributes to water in soil and groundwater. Average Annual Salary: \$88,000 USD
3. Environmental Scientist: An environmental scientist protects nature and studies how living things interact with water, air, and soil. They might research how plants use dew to survive, how climate change affects dew formation, or how to design gardens that collect and use water efficiently. Average Annual Salary: \$75,000 USD

## NGSS Connections

- Performance Expectation: 5-ESS2-1 - Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- Disciplinary Core Ideas: 5-ESS2.A - Earth's major systems interact through physical and chemical processes
- Crosscutting Concepts: Systems and System Models - A system can be described in terms of its components and their interactions
- Science and Engineering Practices: Developing and using models to describe natural phenomena

## Science Vocabulary

- \* Condensation: When water vapor in the air turns into liquid water droplets.
- \* Water vapor: Water in its invisible gas form that floats in the air around us.
- \* Surface area: The amount of space on the outside of an object where things can stick or collect.
- \* Humidity: The amount of water vapor present in the air.
- \* Nucleation: The process where water molecules gather together on a surface to form droplets.

## External Resources

### Children's Books:

- The Magic School Bus Wet All Over: A Book About the Water Cycle by Joanna Cole
- A Drop Around the World by Barbara Shaw McKinney
- Water is Water: A Book About the Water Cycle by Miranda Paul