

MISSION: CREATE A CLOUD IN A JAR



MISSION GOALS AND OBJECTIVES:

FUNDamental Goal: Children will make a cloud in the classroom.

Primary Goal: Children will learn about Form and Function by inquiring about cloud composition, formation, shapes, and colors.

Primary Objective: Children will learn that clouds are made mostly of water and a tiny bit of dust particles.



NATIONAL SCIENCE EDUCATION STANDARDS MET BY THIS MISSION:

• Earth and sky • Property, position, and motion of objects



MISSION VOCABULARY:

Cloud, Shape, Color, Dust Particle, Water Drops



MISSION TIME: This mission can be divided into several shorter periods of discussion, reading, viewing, and experimentation. Be flexible – children’s inquiry of clouds can extend and deepen over the course of a week or beyond!



MISSION EQUIPMENT AND PREPARATION CHECKLIST:

- Mason jars
- Aluminum foil or pie pan
- Hot, but not boiling, water
- Ice cubes
- Fireplace matches
- Blue food coloring or coffee (optional)
- Book about clouds
- Cloud photographs, which are available in the online photo library at zula.com

Recommended Reading

Find additional titles at zula.com.
Cloud Dance by Thomas Locker
The Cloud Book by Tomie de Paola

MISSION IGNITION!

Teachers: Introduce the Primary Goal by piquing curiosity and stimulating thinking.

Students: Engage in open-ended dialogue related to the MISSION GOALS AND OBJECTIVES.

- Go outside and look at the clouds in the sky. Show students pictures of clouds. Through **open-ended dialogue**, discuss the Primary Goal: What do clouds look like to you? (shape, color) What do you think they are made of? How do you think they’re made or formed? What do you think they feel like? Would you like to find out?
- The end result of the discussion should be a need on the part of the students to explore or solve questions. Encourage children to come up with their own questions.

• Throughout the activity give children *plenty* of time to think and wonder before offering answers. And remember, every answer should be treated as a valuable contribution. Instead of judging an answer as “off topic” or “inaccurate,” say “How interesting, what makes you say that?” to find out what they are thinking!

CREW BRIEFING:

Teachers: View, read about, and discuss this “mission” with your children.

Students: Explore, ask questions, gather information, research (books, video clips, pictures), and hypothesize.

- **Read** and discuss a book about clouds (see Recommended Reading).
- **Watch** *The Zula Patrol: Under the Weather!* full-dome show. Discuss the subject of clouds, what they’re made of, and how they form:

Q: What are the six basic elements that make up weather? (temperature, air pressure, wind, humidity, clouds, precipitation)

Q: What are clouds made of? (water and a tiny bit of dust)

Q: How are clouds formed? (water from Earth’s surface rises into the sky and mixes with tiny bits of dust)

Q: What other elements of weather might have an effect on clouds? (temperature, air pressure, wind, humidity)

Connect responses to children’s MISSION IGNITION observation and discussion.

- Ask students where clouds usually are. Ask them if they would like to make a cloud right in the classroom!

MISSION BLASTOFF!

Teachers: Support and facilitate student experimentation; introduce MISSION VOCABULARY after children describe concepts in their own words.

Students: Experience the concepts, work with materials, experiment, test, collect data, measure, quantify, discover and observe.

Safety Note: For the following activity, only adults should manipulate the hot water and matches. Children should watch the “cloud in a jar” from a safe distance. Rules about how hot water and matches/fire can be dangerous should be consistently reinforced with the children.

1) Fill mason jars one third full with hot water from the faucet (should not be boiling).

2) Place a lighted match at the opening of the jar with the water and blow it out. Then quickly place aluminum foil on top. (The match should not touch the water.) *What you are doing is adding dust particles into the jar filled with water drops. Water drops and a tiny bit of dust particles condense to form clouds.*

3) Place ice on top of the foil. *What you are doing is creating cooler air above the warm water and dust particles. This will cause them to rise, and create cloud formations. You will clearly see the clouds form and rise in the jar. You will also see air currents.*

4) Ask children what they see. How are clouds forming in the jar? How do they now think clouds form outside? What color and shape is the cloud? What colors and shapes are the clouds outside?



MISSION SPIN-OFFS AND CONNECTIONS

Teachers: *Enrich and extend content by supporting children's understanding of the Primary Goal, its connection to other concepts, and application to "real world" situations.*

Students: *Review results, analyze, record and infer, use deductive reasoning, elaborate on findings, and extend activities to the home.*

• Mission Spin-offs

1) Blue Cloud Mission: During the experiment, add blue food coloring to the water (or use coffee) to show that water drops do not change...clouds are always the same (generally whitish/grayish) color.

2) Cloudy Conditions Mission: Now that the main experiment is done, have children predict what will happen if they vary the "cloud-in-a-jar" contents. What will happen if they use cool water instead of warm? What if no dust particles are added? What will happen if there is no ice on top of the foil, etc.? Allow children to experiment with these conditions. (The point you are making is that all original "cloud-in-a-jar" elements are necessary for a cloud to form.)

3) Home Mission: Is there water in the air? Place a sealed, cool canned or bottled drink outside on a warm day. When you return an hour later what has happened? Is it moist or wet on the outside of the can or bottle? Where did the water come from? If the can is dry on the outside, that means there's very little water or humidity in the air. If there is moisture on the outside of the can that means there is water or humidity in the air. The tiny drops of water in the air are attracted to the cool can and condense (change from vapor to liquid) on the surface of the can. (Any moisture on the outside of the can did not come from inside it.) *Note that this last point needs to be stressed. Ask children how water could have come out of the can – if they open a can, do they observe that there is less soda in it? No! So the can must be watertight.*

Mission Connections

Support additional learning about clouds with the *Keep a Cloud Chart* and *Make a Rain Gauge* activities.

MISSION ACCOMPLISHED:

Teachers: *Empower students to express their conclusions and determine the next mission.*

Students: *Draw conclusions, assess learning, evaluate what they've discovered, and envision their next mission.*

1) After completing this mission, ask students to assess what they've discovered and how. What conclusions can they draw about how clouds are formed and what they are made of? Use their comments to reinforce the Primary Goal. Ask what else the children would like to know about clouds. For additional *Zula Patrol* activities and information, log onto zula.com.

2) Mission Accomplished Badge: Celebrate a mission accomplished by downloading this free badge at zula.com. Distribute them for children to color and wear or glue into their science journals.

Congratulations on a mission well done – keep exploring!



FICTION VS. FACT!

Fiction: It is a common misconception that clouds go to oceans to get water.

Fact: Clouds are actually made mostly of water and a tiny bit of dust! They are created when water drops that are in the air condense onto tiny bits of dust that are also in the air.