	LESSON PLAN: What happens when water vapor condenses? Expected Time ~ 30 minutes
Standards	MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. DCI. ESS2.C The Roles of Water in Earth's Surface Processes ● Water continually cycles among land, ocean and atmosphere via transpiration, evaporation, condensation, and crystallization, and precipitation, as well as downhill flows on land. MS-PS1-4 Develop a model that predicts and describes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. DCI.PS1.A Structure and Properties of Matter ● The changes in state that occur with variations in temperature or pressure can be described and predicted using models of matter.
Vocabulary	Condensation ● Condensation is the process in which molecules of a gas slow down, come together, and form a liquid. ● When gas molecules transfer their energy to something cooler, they slow down, and their attractions cause them to join together to become a liquid. ● Making water vapor colder increases the rate of condensation. ● Increasing the concentration of water vapor in the air increases the rate of condensation.
Objective	Students will be able to explain the process of condensation as they observe it happening during this experiment.
Materials	1 short wide-rimmed clear plastic cup 1 tall smaller-rimmed clear plastic cup Hot water (about 50℃) magnifier Labsheet google doc or google form
Bell Ringer	Condensation on two cups video Why does water appear on the outside of only one of the cups?

Class work	Procedure 1. Fill a wide clear plastic cup about 2/3 full of hot tap water. Place the tall up upside down inside the rim of the bottom cup as shown. 2. Watch the cups for 1–2 minutes. 3. Use a magnifier to look at the sides and top of the top cup. 4. Take the top cup off and feel the inside surface. Expected results The top cup will become cloudy-looking as tiny drops of liquid water collect on the inside surface of the cup. Have the students discuss and answer ● What do you think is on the inside of the top cup? Students should agree that the inside of the top cup is coated with tiny drops of liquid water. ● How do you think the drops of water on the inside of the top cup got there? Students should realize that some of the water in the cup evaporated, filling the inside of the top cup with invisible water vapor. Some of this water vapor condensed into tiny drops of liquid water when it condensed on the inside of the top cup. If needed: Explain that water vapor leaves the hot water and fills the space above, contacting the inside surface of the top cup. Energy is transferred from the water vapor to the cup, which cools the water vapor. When the water vapor cools enough, the attractions between the molecules bring them together. This causes the water vapor to change state and become tiny drops of liquid water. The process of changing from a gas to a liquid is called *condensation*.
Notes	IF time allows and you would like to discuss it further you could ask them if cooling water vapor would increase the rate of condensation? (We will see this in the Rainmaker experiment)

Modified from the same activity found at ACS.org