Solids, Liquids, Gases, Experiments

1. To show how air changes to liquid, provide a mirror or glass surface.
   Discuss inhaling and exhaling. We can't see it, it is a gas. Use your breath to create vapor on a window or a mirror. Ask what happened.
   (Gas changes to liquid)

2. Have students blow up balloons slowly. This will show that gas takes up space.

3. Show an egg. Discuss how the shell is solid but ask what's inside the shell. Crack the egg to show that it's liquid. Ask what needs to happen to turn the liquid to a solid.

4. Use water to make ice cubes (*add dye to show the process clearly)* and demonstrate solid to liquid and liquid to solid.

5. Using a clear jar with a lid, let the students see how dry the inside of the lid is. Add boiling water and put the lid on the jar. Show the lid with the water droplets on it. Ask why. *(The water in the jar evaporates into water vapor which is a gas, when the gas molecules are exposed to the cold lid, they return to the liquid state, a process called condensation.)*

6. There are also many cooking experiments you can do: make Jello to show liquid to solid, make toffee candy, melt chocolate.

7. To show that solids have a definite shape and liquids do not, use various containers to show how liquid takes the shape of the container. Ask what happens when you put solids (stones) into different containers.

8. Freezies are great to show liquid to solid, solid to liquid and solid and vapor to liquid.

9. Making terrariums with pop bottles (soil, seeds and water) also show changes of state.

10. Determine what material will keep a fluid colder. You will need thermometers that can be immersed. Use various water bottles or have students design wraps for bottles. Put cold water in each and test the temperature every 20 minutes to see which ones keep the cooler temperatures. Remind students that engineers test these things daily.

11. If you have access to water droppers, have students practice just putting one drop on various materials, on wax paper, on foil, on paper towels. Have them notice the way the water droplet changes, discuss absorbency. Engineers do similar tests to determine the most absorbent types of matter. Ask why this might be important.