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(2) They are too small to resolve; they are too small to see individually.

(4) These props are different. H_2: explosive gas, O_2: gas that you need to breathe; H_2O is neither a gas nor explosive. H_2O can not be used by humans to get oxygen when taken into the lungs.

(6) You can shrink or expand a gas. You can squeeze more gas into a given volume with enough effort (more pressure). A liquid such as water can not, on the other hand, be compressed or expanded to any appreciable extent.

(8) chemical change. There are changes in color, phase of matter, etc.

(9) phys prop: its color is bright orange. (Here's another: potassium dichromate is soluble.)

↳ #9

(12) (a) Chemical change
(c) chemical
(e) chemical
(g) chemical
(i) physical

(14) (a) mixture; it looks like speckled sand if you break it open to study it.
(c) mixture; looks like a bunch of different-colored chunks.

(15) (a) homogenous (c) heterogeneous -- it has chunks.

(17) Filtration can be used to separate a mixture on the basis of particle size. Example: spaghetti and water can be separated by straining the mixture; water (small particles) goes through the collander but spaghetti stays behind (chunks of pasta too big to go through holes).

(19) Distillation is the separation of a mixture on the basis of a difference in boiling points. Water boils at a relatively low temperature, perhaps 100 to 105°C, even with salt dissolved in it. However, salt will not even melt (let alone boil) until about 800°C. The water turns into a gas, but the salt stays behind. The water is recaptured as a liquid by cooling the steam and letting gravity pull it down through the condenser into the collection flask at right.