Heterogeneous vs. Homogeneous Mixtures

How are they different?

- Homogeneous mixtures have **uniform** composition

- Heterogeneous mixtures have **non-uniform** composition

What type of mixtures are these?

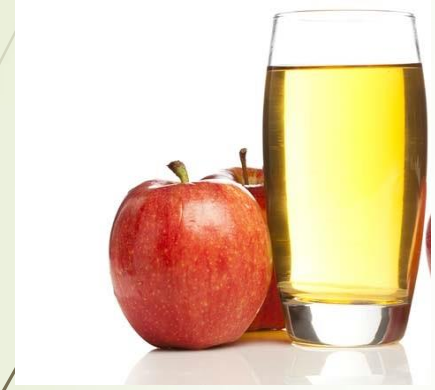
- Cheerios

- Trail mix

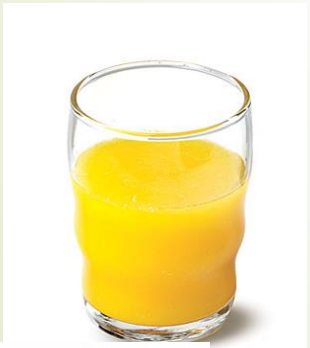
Cheerios is homogeneous

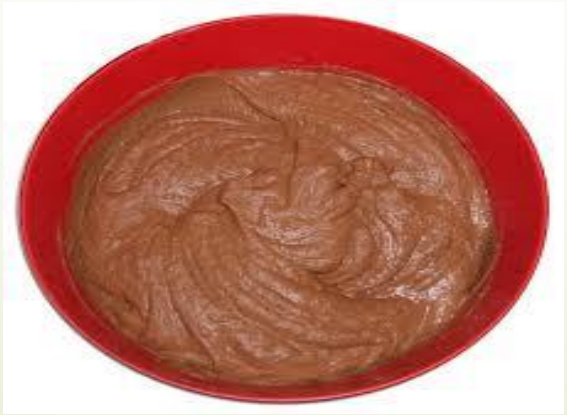
Trail mix is HETEROGENEOUS

What type of mixtures are these?

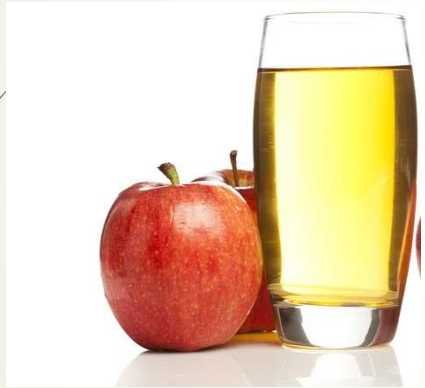


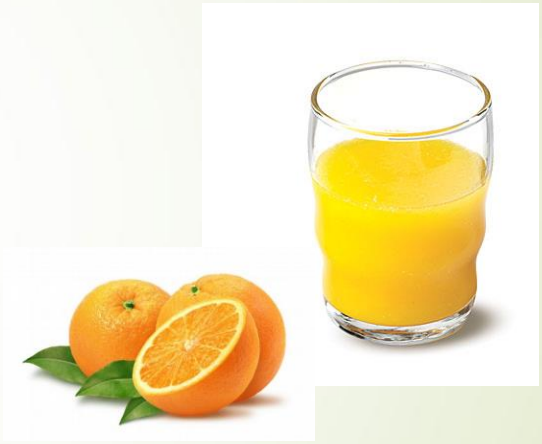
- Apple juice
- Orange juice with pulp
- Chocolate dough
- Italian salad dressing

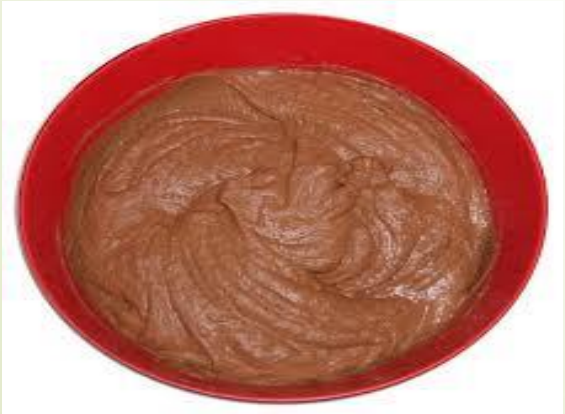




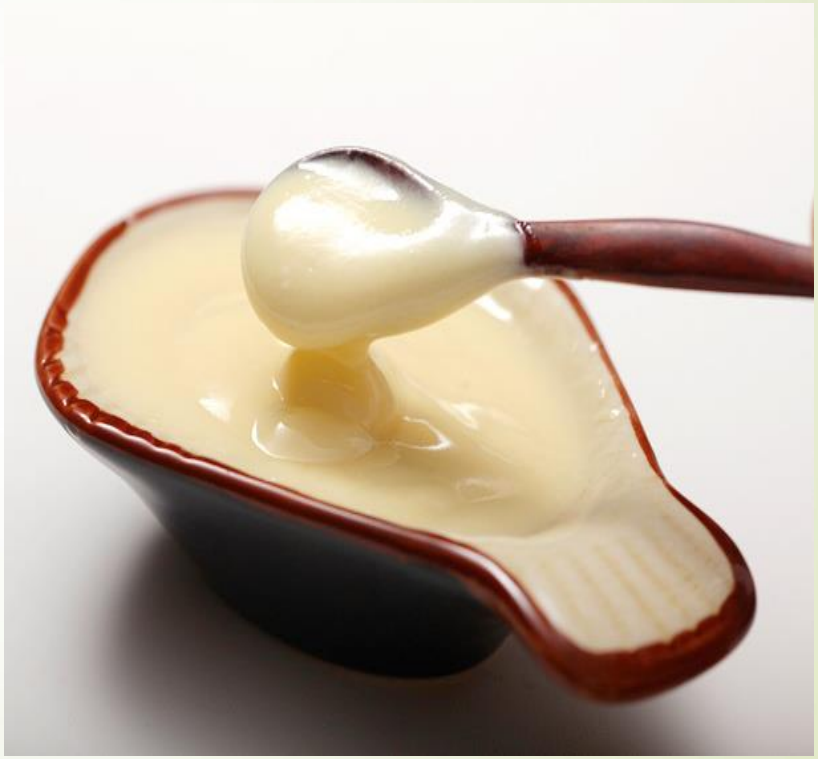
- Apple juice is homogeneous
- Orange juice with pulp is heterogeneous
- Chocolate dough is homogeneous
- Italian salad dressing is heterogeneous





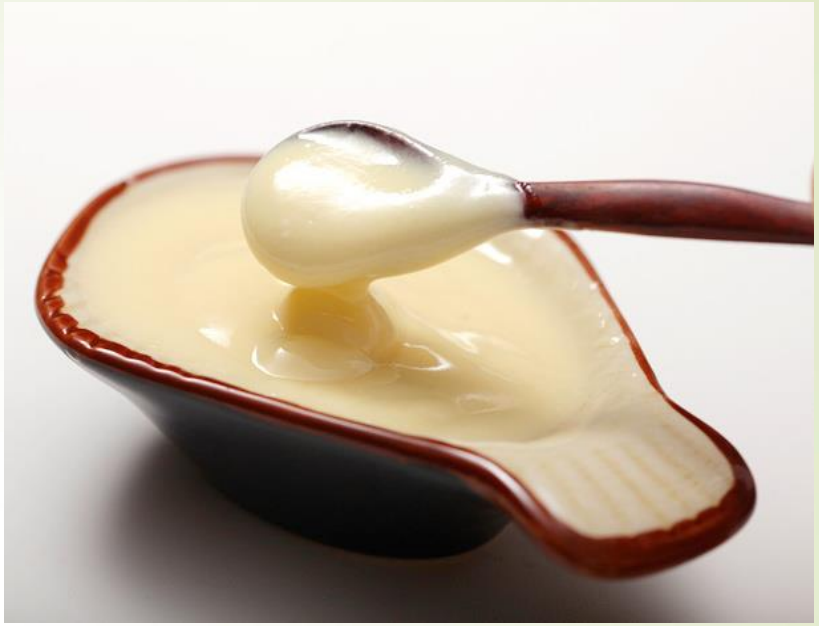


What type of mixtures are these?



Mayonnaise, which is mainly made of oil and water

heterogeneous

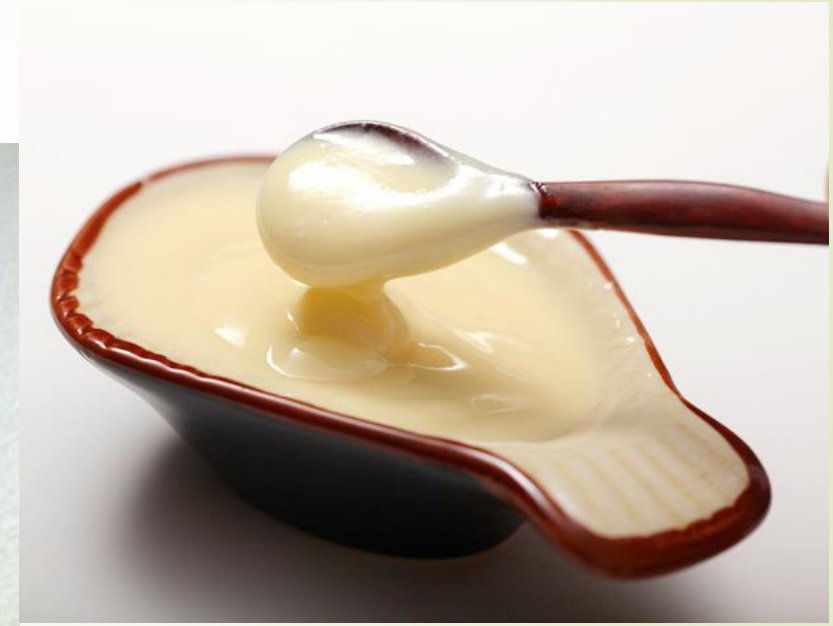


homogeneous

How many components? How many phases?

water

oil & water

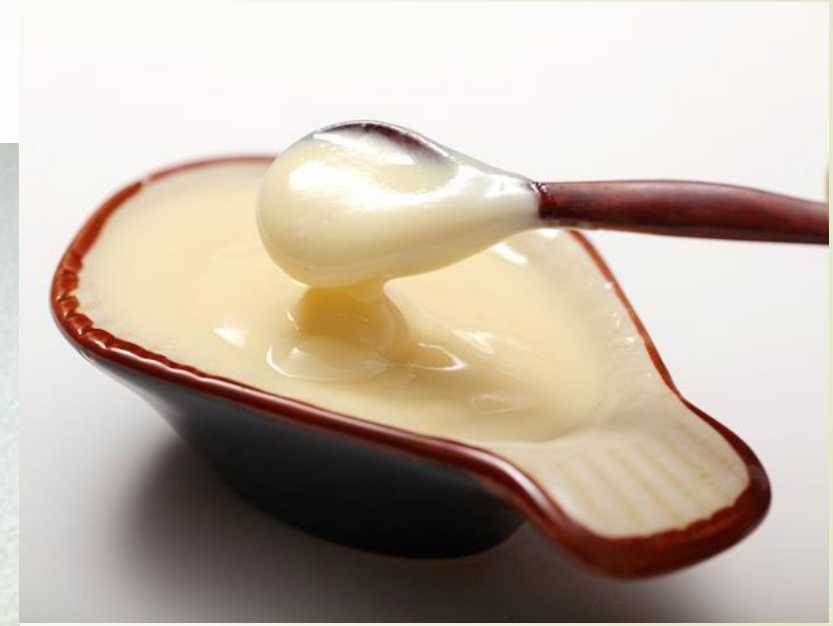


mayonnaise,
(made of oil & water)

How many components?
How many phases?

water phase

water phase and oil phase



Water phase, oil phase, and many other phases

How would you separate mixtures?

- It depends on the **type of mixture**, whether they are homogeneous or heterogeneous

Mixture Separation Techniques

Homogeneous Mixtures	Heterogeneous Mixtures
centrifugation coagulation distillation evaporation	filtration hand picking magnetic separation sieving winnowing sedimentation

Solution-Based Mixtures

- True solution
- Colloidal solutions
- Suspensions

These solutions typically differ in the particle size of the solute.

Solution-Based Mixtures

- True solution: solute size: <1 nm
- Colloidal solutions:
  solute size: 1 nm to 100 nm
- Suspensions: solute size: >100 nm

These solutions typically differ in the manner in which the solutes reside in the solvent.

Solution-Based Mixtures

- True solutions: The solute is dissolved and is invisible
- Colloidal solutions: The solute is dispersed uniformly throughout the solution; the presence of the solute is visible, but you cannot lift it out
- Suspensions: The solute stays outside the solvent; that is, the solute is suspended

These solutions typically differ in the manner in which the solute can be separated from the solvent.

Separation Techniques for Solution-Based Mixtures

True solutions	Colloidal solutions	Suspensions
evaporation	coagulation	filtration
distillation	centrifugation	sedimentation

We will discuss coagulation, centrifugation and sedimentation