Name: _____ Date: _____

Why Salad Dressing Separates in the Bottle

Circle group

Shake a bottle of oil and vinegar dressing. It looks like one cloudy liquid. Set it on the shelf for a few minutes. A golden layer of oil rises to the top. The watery vinegar sinks below. Why do they not stay mixed?

Vinegar is mostly water. Water molecules pull on each other strongly. They do not pull on oil molecules as much. So each liquid likes to stay with its own kind. Oil is also less dense than water. A cup of oil weighs less than a cup of water. So the oil floats to the top.

Shaking breaks the oil into tiny droplets in the vinegar. This kind of mixture is called an emulsion. But a plain one lasts only a short time. The droplets bump together and join into bigger ones. Then the layers form again.

Cooks have a fix. Add a spoonful of mustard or a little egg yolk. These foods have substances called emulsifiers. One end of each emulsifier molecule is drawn to oil. The other end is drawn to water. So it coats the droplets and keeps them from joining. Mayonnaise is a good example. It is oil with a bit of vinegar or lemon juice, held together by egg yolk. It stays smooth in the refrigerator.

Questions

1. Which liquid rises to the top when the dressing sits?

_____

_____

2. What does it mean that oil is less dense than water?

_____

_____

3. What does shaking do to the oil?

_____

_____

4. What is the job of an emulsifier?

_____

_____

5. Which two foods does the passage name as helping to hold a dressing together?

_____

_____

6. Why do you think mayonnaise stays smooth but plain shaken dressing does not?

_____

_____

Words to know

dense: heavy for its size because it is packed tightly
droplets: very small drops of liquid
emulsion: a mixture of liquids that normally stay apart
emulsifiers: substances that help oil and water stay mixed

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why Salad Dressing Separates in the Bottle

Triangle group

Shake a bottle of oil and vinegar dressing and it looks like one cloudy liquid. Set it on the shelf for a few minutes, and a golden layer of oil rises to the top while the watery vinegar sinks below. Why won't they stay mixed?

Vinegar is mostly water. Water molecules attract one another strongly, and they do not attract oil molecules nearly as much, so each liquid prefers to stay with its own kind. Oil is also less dense than water, which means a cup of oil weighs less than a cup of water. So when the droplets drift together, the oil floats to the top.

Shaking breaks the oil into tiny droplets scattered through the vinegar. This kind of mixture is called an emulsion, but a plain one is only temporary. The droplets bump together, join into bigger ones, and the layers form again.

Cooks have a fix. Adding a spoonful of mustard or a little egg yolk helps keep the mixture together. These foods contain substances called emulsifiers. Each emulsifier molecule is attracted to oil at one end and to water at the other, so it sits around the droplets like a coat and keeps them from merging. Mayonnaise is a famous example. It is made of oil and a bit of vinegar or lemon juice, held together by egg yolk, and it stays smooth in the refrigerator.

Questions

1. Which liquid rises to the top when the dressing sits on the shelf?

_____

_____

2. What does it mean that oil is less dense than water?

_____

_____

3. What does shaking do to the oil in the bottle?

_____

_____

4. What is the job of an emulsifier?

_____

_____

5. Which two foods does the passage name as helping to hold a dressing together?

_____

_____

6. Why do you think mayonnaise stays smooth while plain shaken dressing does not?

_____

_____

Words to know

dense: heavy for its size because it is packed tightly
droplets: very small drops of liquid
emulsion: a mixture of liquids that normally stay apart
emulsifiers: substances that help oil and water stay mixed
attract: to pull something closer

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Why Salad Dressing Separates in the Bottle

Square group

Shake a bottle of oil and vinegar dressing vigorously, and it looks like a single cloudy liquid. Set the bottle on a shelf for a few minutes, however, and a golden layer of oil rises to the top while the watery vinegar sinks to the bottom. Why will the two liquids not stay mixed together?

Vinegar is mostly water. Water molecules attract one another very strongly, and they attract oil molecules far less, so each liquid prefers to remain with its own kind. Oil is also less dense than water, which means that a cup of oil weighs less than a cup of water. As a result, when the droplets drift together, the oil floats to the top.

Shaking breaks the oil into tiny droplets that are scattered throughout the vinegar. This kind of mixture is called an emulsion, but a plain one is only temporary. The droplets collide, join together into larger ones, and eventually the separate layers form again.

Cooks have discovered a reliable fix. Adding a spoonful of mustard or a little egg yolk helps hold the mixture together, because these foods contain substances called emulsifiers. Each emulsifier molecule is attracted to oil at one end and to water at the other, so it sits around the droplets like a protective coat and keeps them from merging. Mayonnaise is a famous example. It is made of oil and a small amount of vinegar or lemon juice, held together by egg yolk, and it stays smooth in the refrigerator.

Questions

1. Which liquid rises to the top when the bottle sits on a shelf?

_____

_____

2. What does it mean to say that oil is less dense than water?

_____

_____

3. What does shaking do to the oil in the bottle?

_____

_____

4. What is the job of an emulsifier?

_____

_____

5. Which two foods does the passage name as helping to hold a dressing together?

_____

_____

6. Why do you think mayonnaise stays smooth while plain shaken dressing does not?

_____

_____

Words to know

dense: heavy for its size because it is packed tightly
droplets: very small drops of liquid
emulsion: a mixture of liquids that normally stay apart
emulsifiers: substances that help oil and water stay mixed
attract: to pull something closer

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Why Salad Dressing Separates in the Bottle

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Why Salad Dressing Separates in the Bottle

Easier · 213 words · Flesch-Kincaid grade 3.6

1. The oil.
2. A cup of oil weighs less than a cup of water.
3. It breaks the oil into tiny droplets in the vinegar.
4. It coats the droplets and keeps them from joining.
5. Mustard and egg yolk.
6. Mayonnaise has egg yolk, which coats the oil droplets and keeps them apart.

Triangle: Why Salad Dressing Separates in the Bottle

This passage · 231 words · Flesch-Kincaid grade 6.9

1. The oil.
2. A cup of oil weighs less than a cup of water.
3. It breaks the oil into tiny droplets scattered through the vinegar.
4. It coats the droplets and keeps them from merging.
5. Mustard and egg yolk.
6. Mayonnaise has egg yolk, which coats the oil droplets and keeps them apart.

Square: Why Salad Dressing Separates in the Bottle

Harder · 251 words · Flesch-Kincaid grade 8.8

1. The oil.
2. A cup of oil weighs less than a cup of water.
3. It breaks the oil into tiny droplets scattered throughout the vinegar.
4. It coats the droplets like a protective coat and keeps them from merging.
5. Mustard and egg yolk.
6. Mayonnaise contains egg yolk, which coats the oil droplets and keeps them apart.