

NEXT-TIME QUESTION

CONCEPTUAL Physics

When you dip the teabag in my cup I can feel the weight of the cup increase.

No way! I'm still holding the teabag off the bottom and the string is taut.



Is the cup heavier when the teabag is dipped in it?

thanx to Marshall Ellenstein

NEXT-TIME QUESTION



Is the cup heavier when the teabag is dipped in it?

Answer: yes

The cup is indeed heavier when the teabag is suspended in it—by an amount equaling the buoyant force on the teabag.

The forces acting on the submerged teabag are:

1. the upward tension T in the supporting string
2. mg , the weight of the teabag
3. the upward buoyant force, BF .

The forces acting on the water-filled cup are:

1. the force F the hand exerts in holding it up
2. Mg , the weight of the cup and water
3. BF , a downward force on the water equaling the upward buoyant force that acts on the teabag.



The water cannot exert an upward buoyant force on the teabag without the teabag simultaneously exerting a downward same-magnitude force on the water (Newton's third law).

