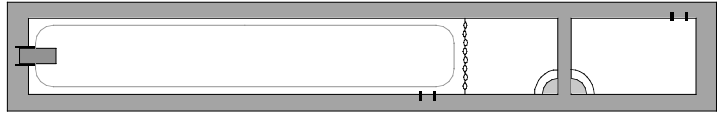


PHYZ SPRINGBOARD: COFFEE ON THE ICEBERG



TERMINOLOGY TURMOIL

When discussing thermal physics, we often use the following terms: **temperature**, **heat**, and **internal energy**. The terms are often confused. We will use the scenarios that follow to distinguish between the terms.

TWO CLASSES

1. Consider the results of a PhysQuiz given in two sections of a physics course. The first period class had 18 students and the average score was 8 out of 10. The second period class had 24 students and the average score was 8 out of 10.

- Which class has the higher grade based on the results of the quiz?
- Which class earned the greater total number of quiz points?

THE COFFEE

2. Consider a hot cup of coffee. And consider a spoonful of coffee taken out of the cup.

- Where is the average kinetic energy of the molecules greater?
- Where is the total kinetic energy of the molecules greater?



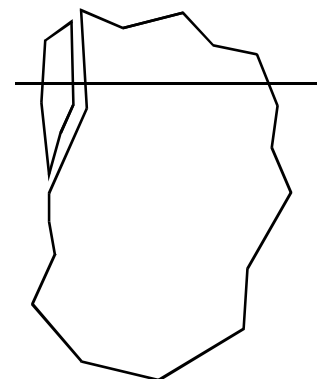
3. a. Which of the concepts addressed in question 1 is associated with temperature?

b. The other concept addressed is associated with **internal energy**. Internal energy is

THE ICEBERG

4. Consider an iceberg in the process of calving (a column, or calf, of ice detaches and falls from the side of the body of the iceberg).

- Which has the higher temperature, ___ the body, ___ the calf, or do ___ both have the same temperature?
- Which has more internal energy, ___ the body or ___ the calf, or do ___ both have the same internal energy?



BACK TO CLASS

5. Review the results of the PhyzQuiz mentioned earlier. Another class, the 3rd period class, had 28 students and their average score was 7 out of 10.

a. How does the average grade in the 3rd period class compare to the average grade in the 2nd period class?

b. Which class earned the greater total number of quiz points, 2nd or 3rd period?

c. The 4th period class had only 20 students, yet they earned a greater number of quiz points than the 3rd period class. How is this possible?

NEW BRICK OLD BRICK HOT BRICK COLD BRICK

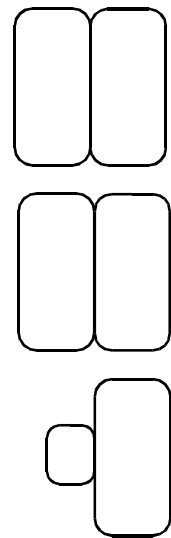
6. Consider two bricks with equal dimensions and masses.

a. If one brick is hot and the other is cold and the bricks are in contact, what will happen?

b. What if the bricks have the same temperature?

c. Suppose all the internal energy of one of the two bricks mentioned in part b were transferred to a smaller brick with less mass. The smaller brick would have...

d. And when placed in contact with the regular brick, what would happen?



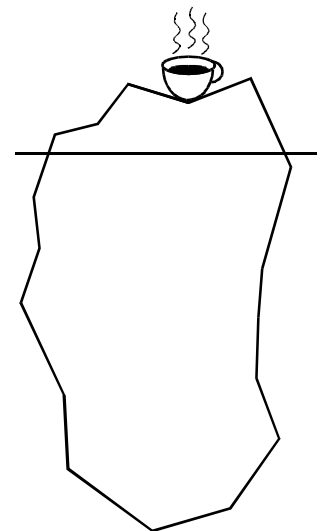
THE COFFEE ON THE ICEBERG

7. Suppose the hot cup of coffee were set down on top of the iceberg.

a. Which has the higher temperature, the coffee or the iceberg?

b. Which has more internal energy, the coffee or the iceberg?

c. Will energy flow from the coffee to the iceberg or from the iceberg to the coffee? Or will no heat flow between the coffee and the iceberg?



HEAT

8. Write a definition of **heat**.