

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Winds, Storms and Cyclones

- Q1. Take a boiling tube. Stretch a balloon tightly over the neck of the tube. You can use a tape to make it tight. Pour some hot water in a beaker. Insert the boiling tube with the balloon in the hot water. Observe for 2–3 minutes for any change in shape of the balloon. Take the tube out, let it cool down to the room temperature. Take some ice-cold water in another beaker and place the tube with the balloon in cold water for 2–3 minutes. Observe the change in the shape of the balloon. Think and try to answer:
- i. What makes the balloon inflated when the boiling tube is placed in hot water?
  - ii. Why is the same balloon deflated when the tube is kept in cold water?
  - iii. Can we infer from the first observation that air expands on heating?
  - iv. Can you now state what happens to the air in the boiling tube when it cools down?

Ans. \_\_\_\_\_

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  - Can you now state what happens to the air in the boiling tube when it cools down?

- Ans.
- Before the air in the balloon is heated, the molecules inside are creating as much pressure as the molecules outside, meaning that the balloon stays at equilibrium and neither expands nor contracts. When they get heated, however, the inside molecules start moving with more force. They create more pressure, causing the balloon to expand outward until the pressure equalizes.
  - When the inflated balloon is placed in cold water, the cold water lowers the overall temperature of the air inside the balloon. The decrease in temperature causes the air molecules to move more slowly, with less energy and air pressure reduces. Since the molecules have lower energies, their collisions with the walls of the balloon are insufficient to keep the balloon inflated.
  - Yes, this shows that air expands on heating.
  - The overall temperature of the air inside the balloon decreases. The decrease in temperature causes the air molecules to move more slowly, with less energy and air pressure reduces.