



Heat and Heat Technology

Section 3 Matter and Heat

Essential Questions



- Identify the three states of matter.
- Explain how heat affects matter during a change of state.
- Describe how heat affects matter during a chemical change.
- Explain what a *calorimeter* is used for.

States of Matter



- **State of matter - the physical forms a substance**
 - solid, liquid, and gas (and plasma)
- **The state of a substance depends on the speed of its particles, the attraction between them, and the pressure around them.**

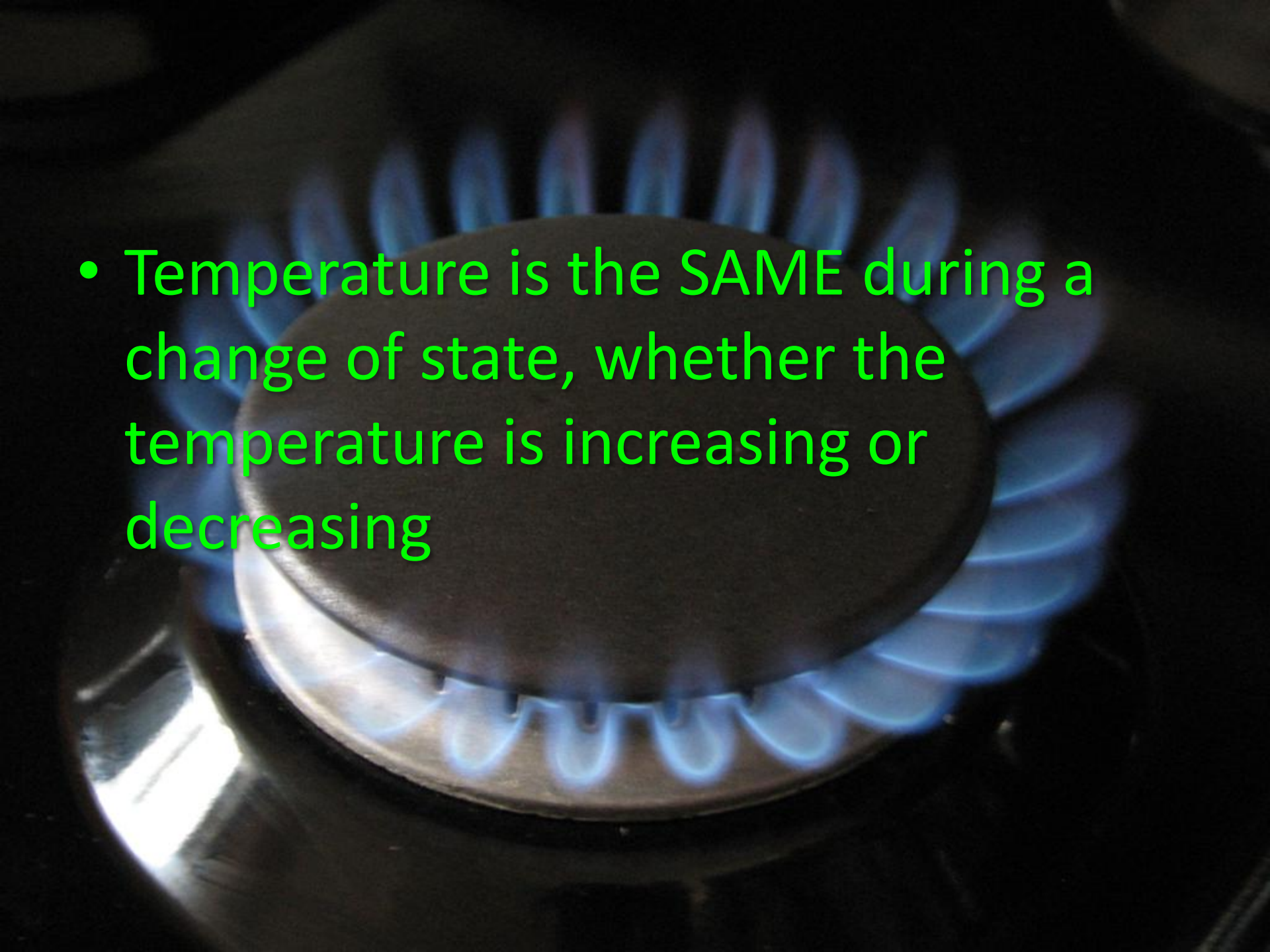
Particles of a Solid, a Liquid, and a Gas



Particles of a solid, such as ice, do not move fast enough to overcome the strong attraction between them, so they are held tightly together. The particles vibrate in place.

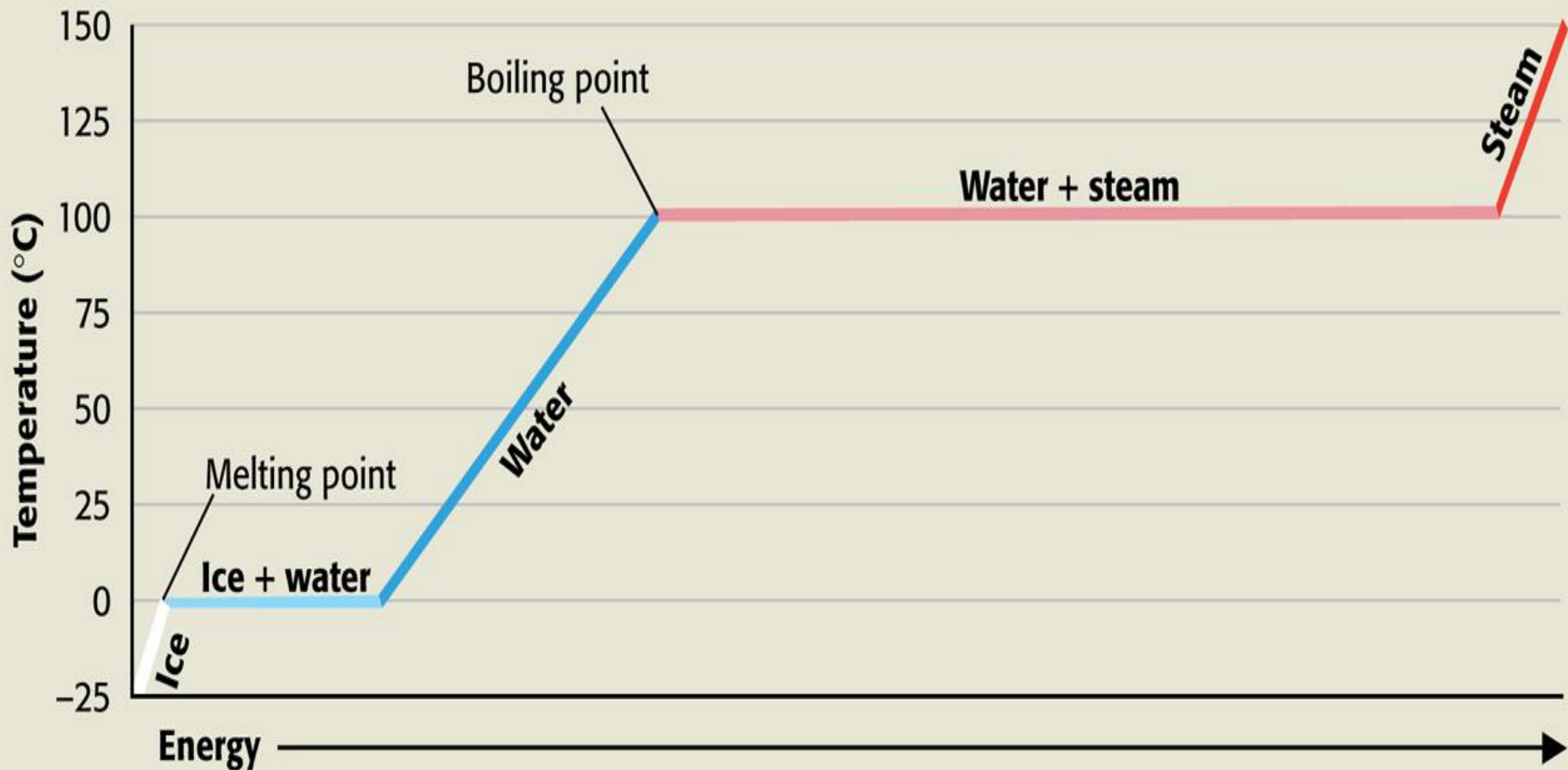
Changes of State

- Changes of State are physical changes – changes from one state to another
- Changes of state include *freezing* (liquid to a solid), *melting* (solid to liquid), *boiling* and *evaporation* (liquid to gas), *condensation* (gas to liquid), and *sublimation* (solid to gas).

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- Temperature is the SAME during a change of state, whether the temperature is increasing or decreasing

Copy and study the graph

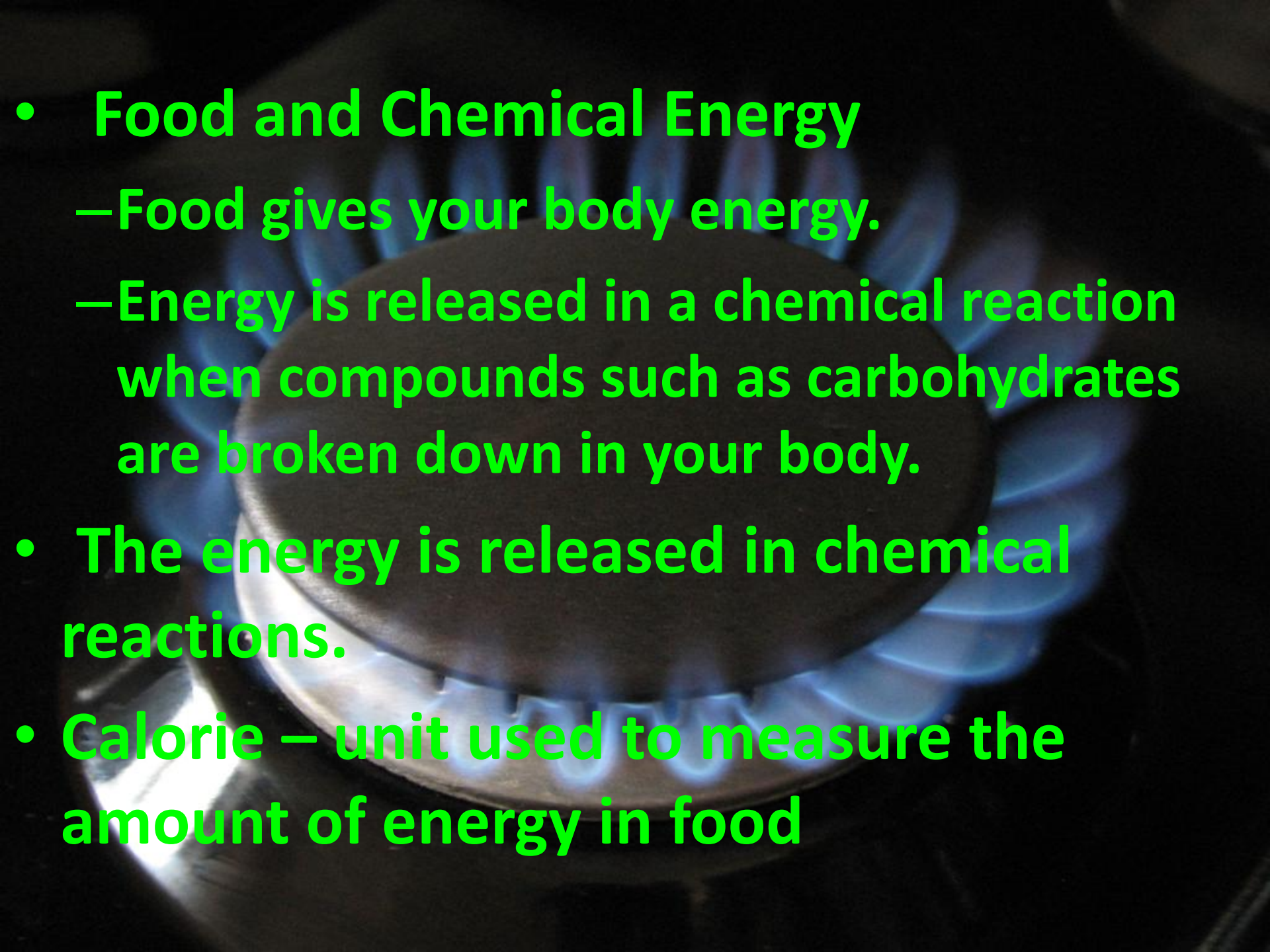
Changes of State for Water



Heat and Chemical Changes



- Heat is also involved in chemical changes
- During a chemical change, a new substance is formed.
 - Sometimes a chemical change requires heat
 - Ex: baking a cake
 - Sometimes a change releases energy in the form of heat
 - Ex: wood burning

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- **Food and Chemical Energy**
 - Food gives your body energy.
 - Energy is released in a chemical reaction when compounds such as carbohydrates are broken down in your body.
 - **The energy is released in chemical reactions.**
 - **Calorie – unit used to measure the amount of energy in food**

- **Calorimeters** - a device that measures heat. The energy lost by one object is gained by the other object through thermal energy.

