



UNIT

**1** The sentences below are about heat conduction in solids. Are they true (T) or false (F)?

- a) When the particles of a solid absorb thermal energy, they have more kinetic energy.
- b) If you heat the end of a metal rod, its particles move faster.
- c) If the particles in a solid move, this means they change position; therefore, since the particles move more when the solid is heated, when heat is transferred by conduction, matter is transported.
- d) Wood conducts heat very well; this is why we have to be very careful not to start forest fires.
- e) Metals do not conduct heat well.



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- 2 The sentences below are about heat conduction in fluids. Are they true (T) or false (F)?
  - a) Convection currents form in a fluid due to the variation in the fluid's density caused by changes in temperature.
  - b) When a mass of fluid heats up, the heated mass expands, increasing its density.
  - c) Hot air is less dense than cold air; this is why radiators are installed near the floor.
  - d) Cold air is more dense than hot air; this is why air conditioning units are installed near the ceiling.
  - e) Air conditioning units and heaters are installed in such a way that convection currents are established.



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**3** The sentences below are about heat conduction in a vacuum (in other words, radiation). Are they true (T) or false (F)?

- a) Radiation is the only mechanism of heat transfer that does not require matter.
- b) Most bodies emit radiation.
- c) Radiation cannot be transmitted through air; it can only be conducted in a vacuum.
- d) Life can exist on Earth thanks to the energy that reaches us in the form of radiation from the Sun.
- e) The Sun's energy reaches the Earth through radiation.

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**4** Discuss what you see in this illustration with your classmates:





**5** Complete the sentences according to the illustration:

a) The bar is heated by means of \_\_\_\_\_



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#### b) The Sun's energy reaches the Earth by \_\_\_\_\_



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c) In the photograph on the left, heat is being transferred mainly by means of \_\_\_\_\_\_, and in the photograph on the right, it is being transferred

mainly by means of \_\_\_\_\_\_.







#### d) Energy from the Sun reaches solar panels by means of \_\_\_\_\_





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e) In solar power towers, thermal energy is transmitted mainly by means of





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f) All bodies emit \_\_\_\_\_

\_ energy because they have a

greater than absolute zero.





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g) Insulating buildings prevents \_\_\_\_\_\_ from flowing through walls and windows by any of the three mechanisms studied in this unit.







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# 6 How many heat transfer mechanisms are involved in the process shown in the picture?





7 In Northern Europe, many houses, like the ones shown in the photograph on the left, have large windows, are painted dark, deep colours and have very steep roofs. Houses in hotter regions, on the other hand, have small windows and gently sloping roofs, and they are often painted white. Explain the reasons for these differences.





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# 8 How many heat transfer mechanisms are involved in the process shown in the picture?





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In this picture, there is one main heat transfer mechanism at work:

a) Say which of the three heat transfer mechanisms is at work here and discuss the picture with your classmates.





b) The picture has a few extra elements now. What are they? Why are they there? Do you still feel the same about the picture?



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**10** Discuss this picture with your classmates.





#### **11** Write four or five lines about how heat is being transferred in the picture.



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