

Week 2 Lesson 2

What can we learn from termite mounds?

Aim: The lesson is designed to explore how our understanding of how heat energy is transferred and how this can help architects design more efficient buildings.

Keywords: conduction, convection, radiation, infra-red, social insects, porous

Starter activity

1. Odd one out

Give students the sheet 'Odd one out' or simply read out the lists. The answers are all related to the activities during the lesson.

Main activities

1. Heat transfer practical

Students demonstrate and observe three types of heat transfer using a Bunsen burner.

- **Conduction.** E.g. using a spatula resting in a beaker of water. Heat the water gently and gauge the temperature of the spatula with fingers
- **Convection.** E.g. students cut out a paper spiral, put a thread through one end and suspend above Bunsen flame - has obvious safety implications, you may choose to demonstrate!
- **Radiation.** E.g. students cup hands as close to side of flame (to show warmth is not coming from heat rising) as is comfortable. Their partner inserts a bench mat between their hands and the flame. Can the students still feel the heat?

2. Designing buildings and biomimicry

Use the PowerPoint, 'What can we learn from termite mounds?', to explore how architects are influenced by nature when designing buildings. Use the worksheet, 'Cross section of a termite mound', as this will help the students in the plenary, 'Design an office block'.

Plenary activities

1. Changing architecture

Show the CH2 in Melbourne - a later design by the same architect. Explain that you will ask them about the special features of this new design before they leave.

www.youtube.com/watch?gl=AU&hl=en-GB&v=N1CkwnqrYrE

(The clip is approximately 5 minutes long.)

2. Design an office block

Draw a simple outline of an office block on the board and ask students to annotate it to show features that they could incorporate into it (influenced by termite mounds) that would help keep the building cool.

Assessment opportunity

This activity can be used to assess students' understanding of energy transfer. The activity could be done individually or in pairs by students copying the diagram from the board and adding their own annotations.

Starter 1

Odd one out – Answers

1. **dissolving**

the others involve a change of state

2. **dragonflies**

the others are social insects

3. **architect**

the others help construct buildings rather than design them

4. **porous**

the others don't allow water to be absorbed

5. **infra-red**

the others are ways thermal energy can be transferred

2.2: What can we learn from termite mounds?

Odd one out

Draw a circle around the odd one in each group. Write down the reason for your choices.

1 evaporation condensation freezing dissolving melting

.....

2 termites dragonflies wasps bees ants

.....

3 architect plumber electrician tiler brick-layer

.....

4 impermeable porous impervious impenetrable

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5 conduction convection radiation infra-red

.....

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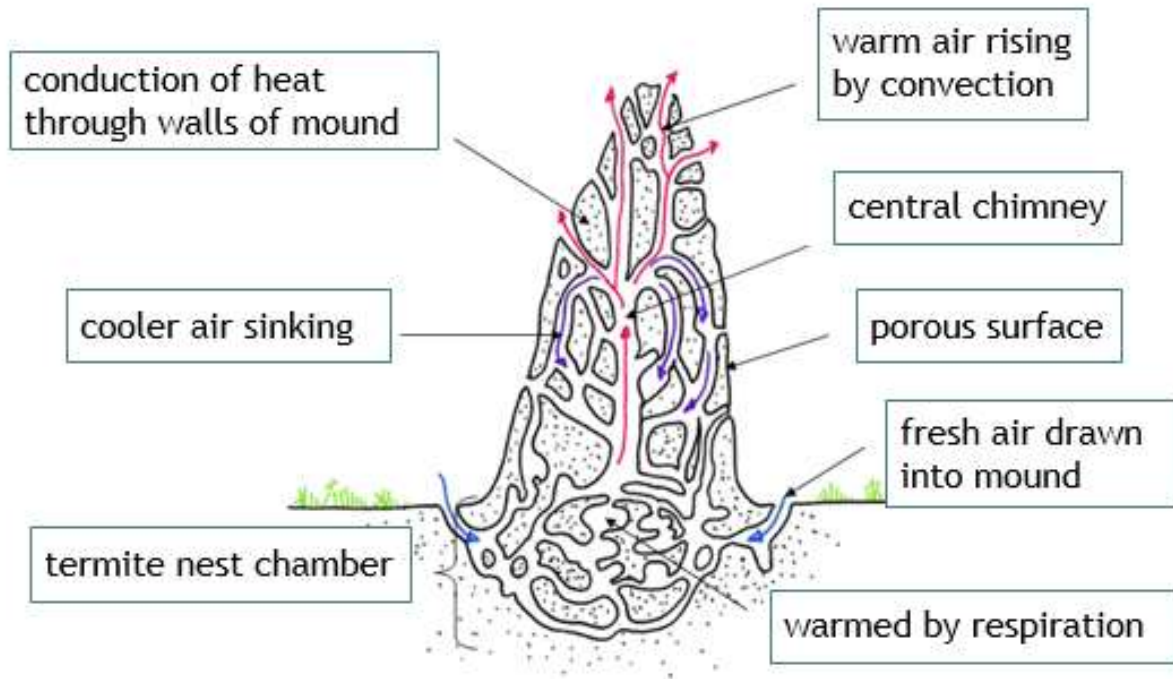
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5 conduction convection radiation infra-red

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Main activity 2

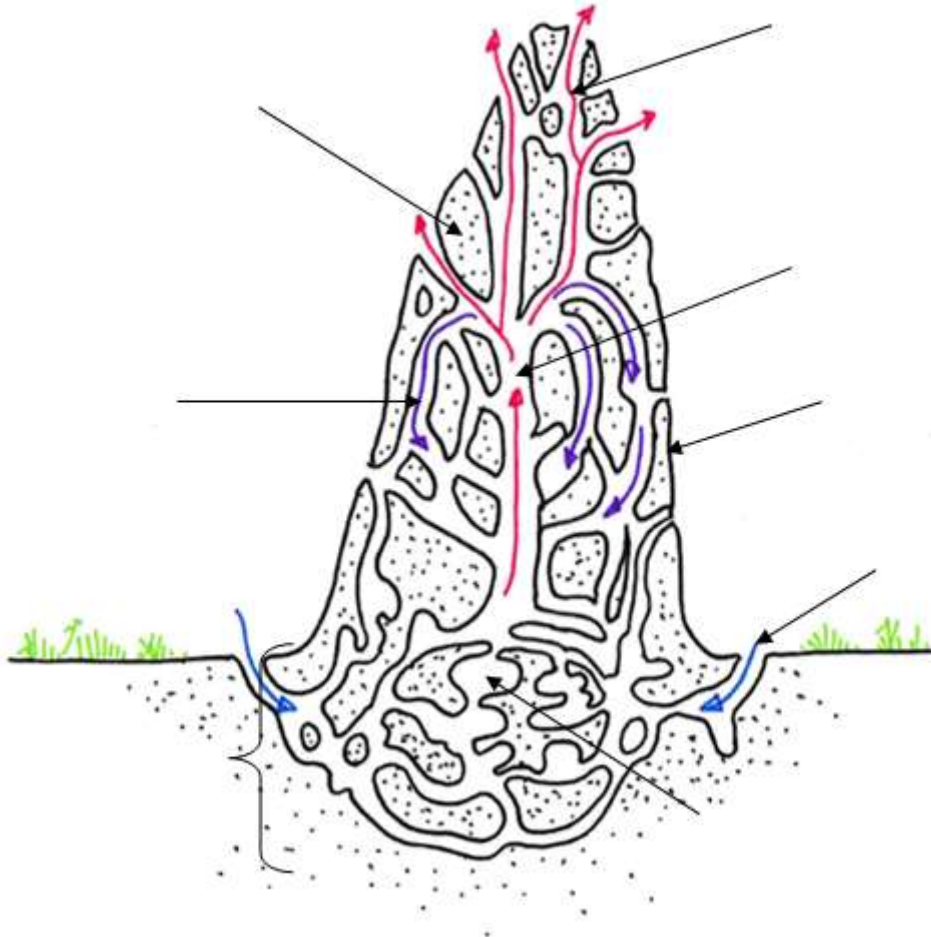
Cross section of a termite mound – Answers



2.2: What can we learn from termite mounds?

Cross section of a termite mound

Cut out the labels and stick in the correct places on the diagram.



termite nest chamber	warm air rising by convection
central chimney	cooler air sinking
porous surface	fresh air drawn into mound
warmed by respiration	conduction of heat through walls of mound

