Standard Grade Physics
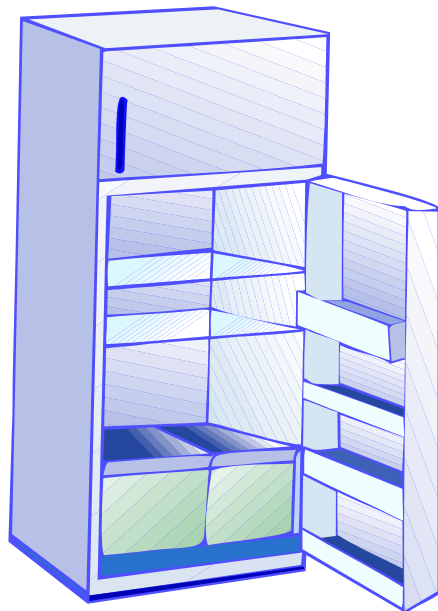
North Berwick High School
Physics Department

UNIT 7
Measuring Heat
PUPIL PACK

Homework Sheets

Measuring Heat
Working at Home

TO THE PUPIL

Each day you have physics at school, you should set aside time for work at home. By this stage you should be accepting more responsibility for your own learning and should undertake the following tasks on a regular basis:

- Tackle the supplied homework sheets as each section of work is completed in class.

- Check your own progress in the homework sheets by referring to the homework answer files available in class. Discuss any difficulties that arise with your class teacher.

- Complete any formal homework tasks that your teacher may issue from time to time and hand them in on the due date for marking.

- Revise the work you have covered in class activities by referring to your classwork jotters.

TO THE PARENT

Your co-operation would be appreciated in ensuring that pupils are encouraged to complete homework. It would be helpful if you could talk over the work given for homework and sign the homework record sheet on this page after they have completed each exercise.

The physics department hopes that this record of your child's achievement will be of interest to you, and we would welcome any comments on this or other areas related to the work of the department.

Please sign here to confirm that you have seen the homework record sheet: _____

HOMEWORK RECORD SHEET

HOMEWORK	SECTION OF WORK	MARK	CHECK	PARENTAL SIGNATURE
7.1	Heat in the Home 1			
7.2	Heat in the Home 2			

Some questions in the pack are marked with symbols to give you specific information. Here is the key:

CR Credit Level question. This relates directly to the Credit Level learning outcomes.

PS Problem Solving question. This puts the knowledge you have gained into new contexts.
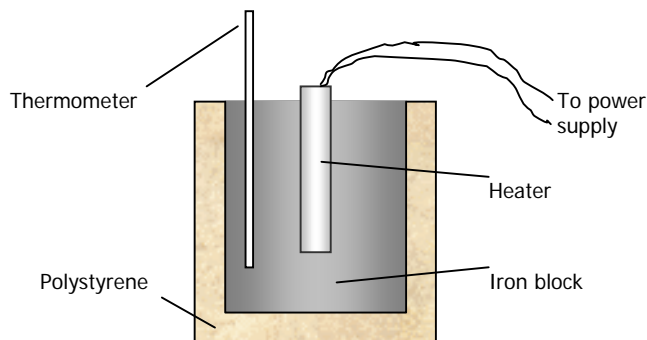
Measuring Heat
Homework Exercises

Homework 7.1 – Heat in the Home I

1. (a) Give a definition of temperature. (1)
    (b) What unit is temperature measured in? (½)

2. (a) Describe one way of reducing convection heat losses in a house. (½)
    (b) Describe one way of reducing radiation heat losses in a house. (½)
    (c) Describe one way of reducing conduction heat losses in a house. (½)

3. Assuming the specific heat capacity of water to be 4200 J/kg°C, how much heat energy is required to:

    (a) Heat 1 kg of water in a kettle from 20°C to 100°C? (2)
    (b) Heat 400 litres of water in a tank from 20°C to 60°C? (1 litre of water has a mass of 1 kg) (2)

4. In an experiment to determine the specific heat capacity of iron, the following experiment is set up:

    The block of iron has a mass of 2 kg. The heater is left on for 5 minutes and it supplies 6000 J of heat energy to the block in this time. The temperature rises from 20°C to 26.25°C.

    (a) What value do these figures give for the specific heat capacity of iron? (2)
    (b) Why was the block encased in polystyrene? (1)

    Total 10 marks

Measuring Heat
Homework Exercises

Homework 7.2 - Heat in the Home II

1. When a liquid changes to a gas, it takes heat energy in from its surroundings.

   (a) What must happen to the temperature of the surroundings? (1)
   (b) What happens to the temperature of the liquid as it changes to a gas? (1)
   (c) Give an example of an everyday use for this principle. (1)

PS 2. Use your knowledge of latent heat to explain the following situations:

   (a) In desert countries, water is stored in skin bags that are slightly porous to keep it cool. Some water leaks out of the pores. (1)
   (b) A climber is more likely to suffer from hypothermia in mild, wet and windy weather than on a calm, frosty day. (1)

CR 3. A 2 kW kettle contains 1.5 kg of water. Its automatic cut-off is broken, meaning it will not switch off when it starts to boil. The specific latent heat of vaporisation for water is 2.26×10^6 J/kg.

   (a) Calculate how much heat energy would be required to turn all of the water into water vapour. (2)
PS (b) How long would the kettle take to evaporate all the water? (1)

4. The specific latent heat of fusion for ice is 3.3×10^5 J/kg. What mass of water could be turned into ice if a freezer removed 165 000 J of heat energy? (2)

Total 10 marks