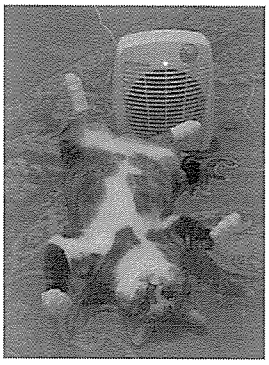
8 SCIENCE ENERGY EFFICIENCY ASSIGNMENT

Name:_____

Form:_____



Teacher:_____

Due date:_____

Aim: to investigate different ways to improve energy efficiency in the home.

IMPORTANT INFORMATION

ANSWER KEY

Plagiarism

- This assignment is to be done individually, not with a partner.
- You must write in your own words not copy sentences word for word from another student or another source.
- Plagiarising = instant zero on assignment and you will have to re-do it.

Referencing

- You must reference your information.
- Include a minimum of 2 references.

How to reference a web site:

Rice, C. (2013). Cute cats could be key to learning new languages. Retrieved February 8, 2014 from www.bbc.co.uk/news/technology-25103362

Author's last name, first letter of first name. (Year of publication). Title of website. Date you retrieved the information, website

Presentation

- Neat writing (if you struggle with this, type your information).
- Correct spelling, grammar and full sentences.

ANSWER KEY

Assessment policy

Have sick note/legitimate reason from parent = new negotiated due date.
Assignment not submitted on due date and no sick note from parents = -20% mark
Assignment not submitted on new negotiated due date = -40% mark
+ Letter home to parents
+ Must attend academic completion to complete assignment

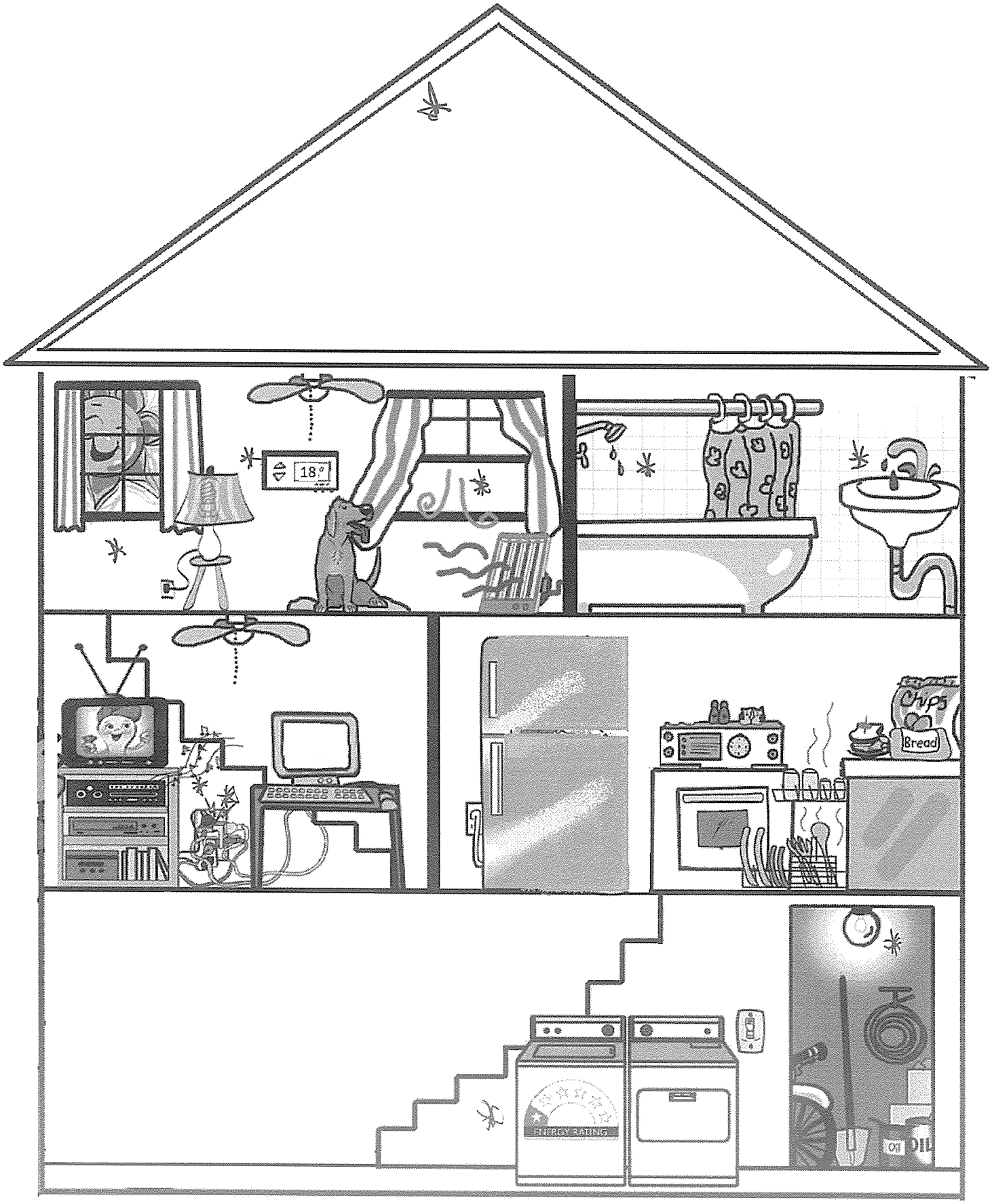
OR

Submit assignment to student services before academic completion date and academic completion not necessary.
Academic completion not attended = zero on assignment + Saturday detention

If you know that you cannot submit your assignment on the due date, let your teacher know BEFORE the due date (email them if you are not in school) or just email them your assignment the night before.

SECTION 1: ANALYSE THE HOME

1. On the picture of the house below, mark clearly six situations where energy is not being used efficiently. Place a number (1-6) and colour the number in highlighter so it can be clearly seen.



2. In the table below, next to each number, describe how energy is not being used efficiently and describe how you could make the situation more energy efficient. (12 marks)

Situation number	Describe how energy is not being used efficiently or is being wasted	Describe how you could make the situation more energy efficient and waste less energy
1 (eg)	-light left on basement - light in basement not energy saver globe - window left open while air con is on - curtain open allowing heat inside	
2	- Air con on low - no insulation in roof - tv on while music is playing - too many appliances turned on & plugged in at once	
3	One mark per box	
4		
5		
6		

SECTION 2: READ ARTICLE THEN ANSWER QUESTIONS

Home Insulation

Heat naturally flows from regions of higher temperature to regions of lower temperature. When you use heating to warm up the living area of your home in winter, this warm air will flow through any cracks or gaps in walls to the cool air outside. Heat can also flow up into the roof space, or through walls into a garage. This means that people need to use a lot of energy to keep a house warm in winter.

In summer, the warm air outside will naturally flow into a cool house. People need to use a lot of energy to cool their homes.

Insulation is material that can be added in ceilings and between the walls of a home to reduce heat flow. If heat flow is reduced, the energy costs to heat and cool a home are reduced. The following fact sheet produced by the Queensland Government explains what types of insulation are available.

EnergyWise
Queensland

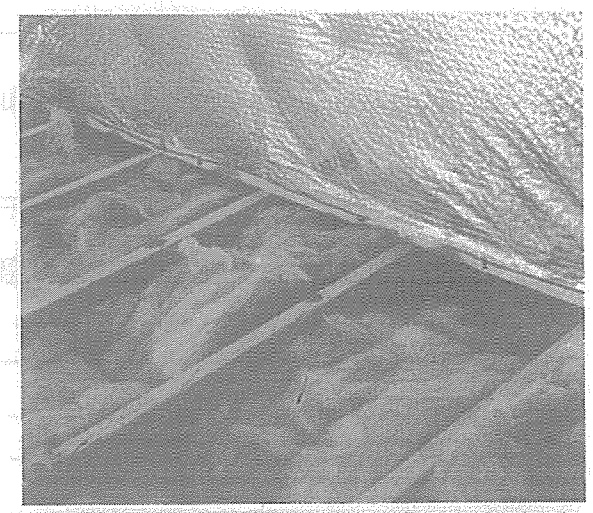
Insulation – saving energy and money

Energy efficient cooling and heating

Insulation can be the most effective item you can add to your home to improve its energy efficiency.

Insulation works by creating a barrier to heat transfer through the ceiling and walls. In summer it helps keep your home cooler by reducing the amount of heat entering your home. In winter it helps keep your home warmer by trapping the warm air inside. For best results, all ceilings, walls and raised walls should be insulated.

Save up to 45 percent on heating and cooling energy with roof and ceiling insulation.



Insulate to help cut air conditioning and heating running costs

Ceiling insulation can make a significant difference to the cost of running your air conditioner.

When your home is insulated, it will be more comfortable regardless of the season, and less reliant on climate-controlled appliances, such as air conditioners and heaters. As you reduce the amount of energy you use to stay comfortable, you will save money on appliance running costs and reduce the amount of greenhouse gases emitted.

When you do turn on your air conditioner or heater, it will use less energy and cost you less to run. There will also be less wear and tear on your heating and cooling appliances as they don't have to work as hard.

continued >

barrier (n) wall; something that stops movement

regardless (adv) no matter what

reliant (adj) relying; depending

wear and tear (n) wearing out

Types of insulation available

There is a variety of insulation products available and it is important to assess the type of insulation that will best suit your energy needs. There are three main types of ceiling insulation—loose fill, bulk fill (commonly referred to as 'batts') and reflective foil. The right type for your home will depend on the type of ceiling cavity, access available to the ceiling and personal choice.

The most important thing to consider when choosing insulation is the **R value**. An R value is a measure of the insulation's resistance to heat flow and therefore, its performance.

The higher the R value, the greater the resistance to heat transfer. The climate where you live and the design of your home will influence the R value and type of insulation suitable for your home, and potential for energy savings.

Enhancing home insulation

You may already have adequate roof insulation, however, **roof ventilators** are recommended when you install bulk fill insulation. Ventilation removes excess heat in summer preventing overheating and removes moisture in winter. **Eave vents**, usually small rectangular grids located under your eaves, are required when a roof ventilator is installed. The roof ventilator extracts air from the roof and the eave vents replenish the ceiling cavity with fresh air from outside.

West-facing **windows should be shaded or tinted** to maximise the benefit of insulation. This can be achieved with awnings, blinds or specialised products such as solar window tinting.

assess (v) to judge; to decide

cavity (n) a space or hole in the middle of something

access (n) entrance; way in

resistance (n) power to stop something

ventilator (n) a device that lets in air

eave (n) underneath the part of a roof that hangs over the walls

replenish (v) to fill up again

tint (v) to make something darker

awning (n) an outside blind

Answer the questions based on the information above.

1. Without insulation, it is hard to keep a home cool in summer and warm in winter. Explain why.
(At least two sentences) (2 marks)

- It is hard to stop heat being transferred through the ceilings and walls etc.

2. List three places that insulation can be used in a home. (3 marks)

ceilings, walls, ~~floors~~ raised walls, floors

one mark for each

3. Explain how adding insulation to a home will improve its energy efficiency (at least two sentences). (2 marks)

Adding insulation to a home (1) reduces the heat flow through ceilings & walls, so heating & cooling is more efficient.

(1)

or similar

4. List the three main types of ceiling insulation that are available. (3 marks)

Loose fill

Bulk fill (batts)

Reflective foil

5. Explain what is meant by the term 'R value' (at least two sentences). (2 marks)

It is a measure of the resistance (1) to heat transfer etc.

(1)

6. State whether it is better to use insulation with a low or a high R value. (1 mark)

High R value

SECTION 3: ONLINE RESEARCH

Choose two of the following energy saving home features then answer the questions below.

- Double glazed windows
- Gas hot water system
- Solar panels
- Compact fluorescent lights
- Front loader washing machine

Websites to use: livinggreener.gov.au synergy.net.au ee.ret.gov.au/energy-efficiency/homes

1a) Energy saving feature: _____

b) Where is this feature used in the home? (1 mark)

_____

c) Find an estimate how much it will cost to put in the home (look at websites that sell the item in Australia).(1 mark)

_____

_____

d) Describe how this feature saves energy (at least two sentences). (2 marks)

_____

_____

_____

_____

_____

_____

e) Describe how widely used this feature is in Australia? (How common is it in households in Australia) (2 marks)
(at least two sentences).

_____

_____

_____

_____

_____

2a) Energy saving feature: _____

b) Where is this feature used in the home? (1 mark)

_____

c) Estimate how much it will cost to put in the home (look at websites that sell the item in Australia). (1 mark)

_____

_____

d) Describe how this feature saves energy (at least two sentences). (2 marks)

_____

_____

_____

_____

_____

_____

e) Describe how widely used this feature is in Australia? (How common is it in households in Australia) (2 marks)
(at least two sentences).

_____

_____

_____

_____

_____

References (2 marks)

- One mark for correct reference format
- two references (minimum) given one mark

One reference only = 0.5 mark

Grammar and spelling (1 mark)

Mark: /40 Percentage: %

Teacher's comments: