10 SCIENCE INVESTIGATION

GREENHOUSE EFFECT

Name: _____

Form: _____

Teacher: _____

Due date: _____

IMPORTANT INFORMATION

Plagiarism TEACHER COPY

- The experiment is to be done in your science group but your write-up and results are to be done individually.
- Plagiarising = instant zero on assignment and you will have to re-do it.

Presentation

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

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.

TEACHER COPY

Aim: To investigate the greenhouse effect by making a model of a greenhouse.

Materials (materials in a list, detailed, how many of each item). **(2 marks)**

2x thermometre
scissors
2x cardboard triangles
3x glass slides
sticky tape
piece of play doh
block of wood

Hypothesis (one sentence prediction of what will happen). **(2 marks)**

eg. The air inside the greenhouse will be higher than the temperature in the surrounding air.

Independent variable: (what is being changed) **(1 mark)**

Greenhouse or air

Dependent variable: **(1 mark)**

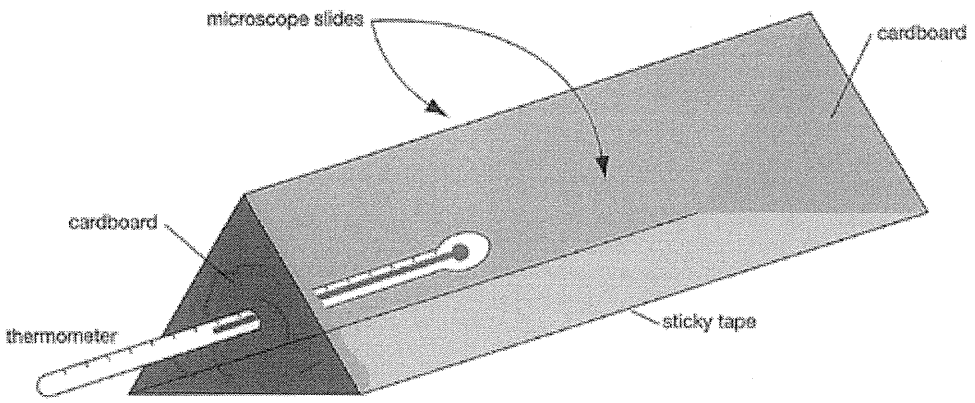
temperature

Two controlled variables: **(2 marks)**

Environment, thermometres are both suspended, same length of time before measuring temperature.

Method

1. Create a hole in one of the pieces of cardboard, just large enough for the thermometer to pass through. Use the modelling clay to hold the thermometer in place. It needs to be a good seal, to stop air escaping.
2. Construct the model greenhouse as shown below.
3. Place the 'greenhouse' outside in a sunny position.
4. Place the second thermometer on the block of wood next to the greenhouse. Make sure that the bulb of the thermometer is suspended in the air.
5. Record the temperatures of the two thermometers at the beginning of the experiment.
6. Record the temperatures every 2 minutes for 14 minutes.



Results: table **(3 marks)**

(Show results taken from experiment, in pencil, with ruler).

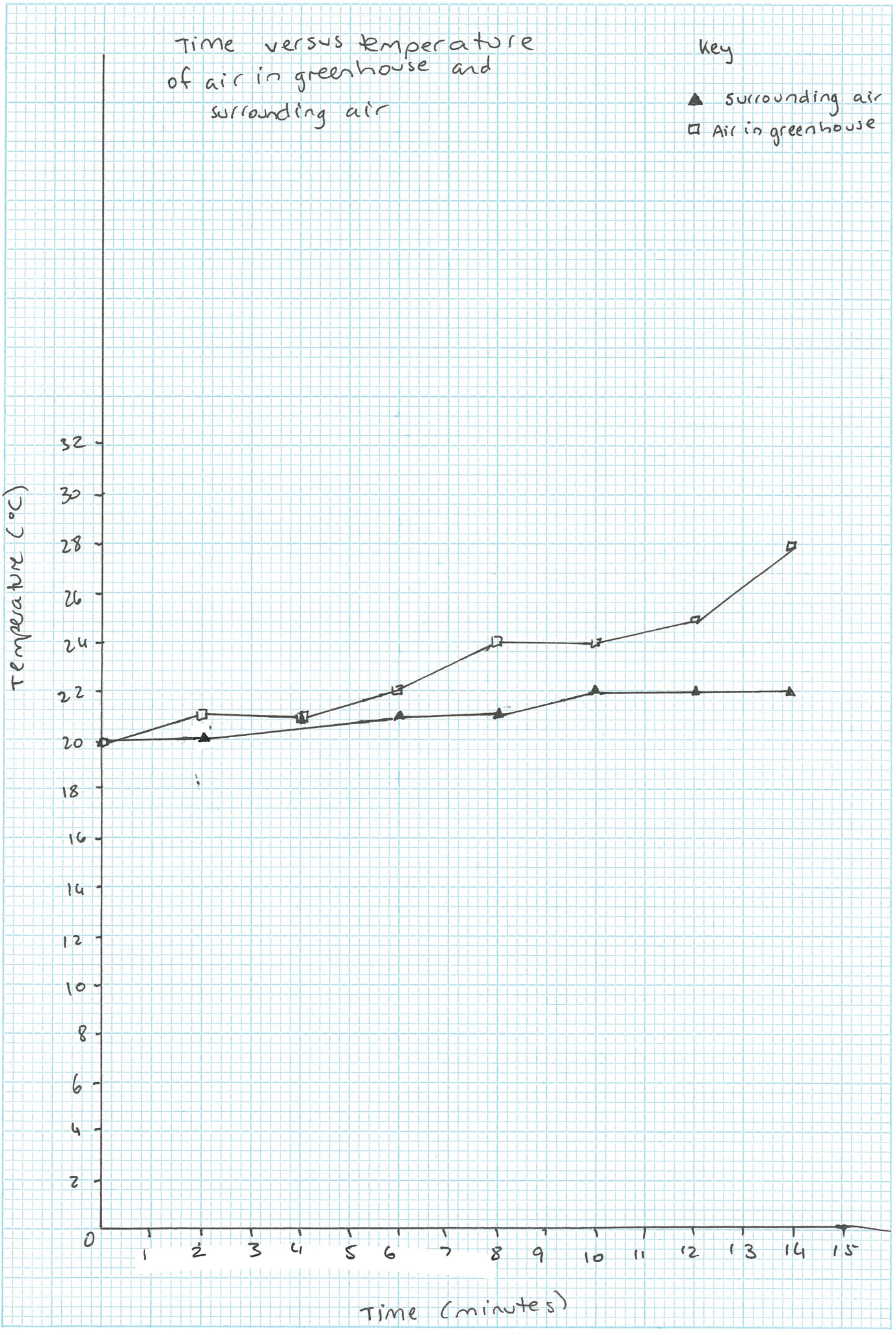
eg

Time (minutes)	Temperature (°C)	
	Air in greenhouse	surrounding air
0	20.	20
2	21	20
4	21	21
6	22	21
8	24	21
10	24	22
12	25	22
14	28	22

Graph: show your group results, Draw on graph paper and attach. **(6 marks)**

BOTH SETS OF DATA MUST BE ON THE ONE GRAPH!

- Use graph paper.
- Use a sharp pencil and ruler.
- Have a title at the top (independent variable versus dependent variable).
- Work out whether you need to draw a bar graph (different groups of data) or a line graph (showing data changing over time).
- Put the independent variable and dependent variable on the correct axis.
- Label each axis.
- Record the units of measurement in brackets next to each label.
- Use an appropriate scale that has the same pattern the whole way along.


Time versus temperature of air in greenhouse and surrounding air
Key
surrounding air
Air in greenhouse
Temperature (°C)
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Time (minutes)

Discussion: **(6 marks)**

(Describe two mistakes/errors that occurred, explain how they affected the results and how they could be avoided next time).

1. Explain why the second thermometer recording air temperature was used. **(2 marks)**

- used as a control (1)
- Two experimental set-ups are the same except for one factor, the greenhouse. If there is a difference in results, it is due to one factor, the greenhouse (1)

2. Compare the temperature patterns inside and outside the greenhouse. **(2 marks)**

(1) The temperature inside the greenhouse rose quickly and reached a higher temperature (1) than the outside temperature.

3. Discuss any other factors that could have affected the temperature. **(2 marks)**

eg. Rain falling on the exposed thermometre, thermometre not suspended and touching the base.

2 factors, 1 mark each

4. Explain what has happened in this model of the greenhouse effect. **(2 marks)**

Light & heat radiation are both electromagnetic (OR SIMILAR) radiation but have different wavelengths. Light passes through glass easily & heat does not. Light enters greenhouse, warms the contents and reradiates warmth. Heat radiation gets trapped in greenhouse (more energy is entering than leaving).

5. Compare the model in this experiment to the global greenhouse effect. **(2 marks)**

The physical set-up of the model is much more simplified (1) than the global greenhouse effect but the principle is the same. (1)

↑ or other point

Conclusion: **(2 marks)**

eg. (1)

The temperature inside the greenhouse was greater than the temperature of the surrounding air. Therefore the hypothesis was proven. (1)

MARKING KEY

Content	Description		Your mark
Materials	Is written in a list Includes all materials and amounts	1 1	
Hypothesis	Correctly worded (e.g. if, then statement). Includes both dependent and independent variable.	1 1	
Independent Variable	Listed the independent variable.	1	
Dependent Variable	Listed the dependent variable.	1	
Controlled Variables	Listed two controlled variables.	2	
Results table	Drawn neatly in pencil and using a ruler. Includes the headings and units of measurement. Includes all the data collected during the experiment.	1 1 1	
Results graph	Shows the average results, includes all the things a graph requires.	6	
Discussion	Describes at least two mistakes/errors that occurred. Explains how these mistakes/error have affected the results. Explains how these mistakes/errors could be avoided. Discussion question.	2 2 2 2	
Discussion questions		10	
Conclusion	One sentence stating the result of the experiment. One sentence stating whether the hypothesis was proven or disproven.	1 1	
Presentation	Correct spelling, grammar, full sentences. Written neatly or typed up neatly.	1 1	
Total mark		37	

Mark as percentage %

Teacher's comments: