

## CONSOLIDATION TASK

Topics: The Scientific Method  
Total: 35



### QUESTION 1

Life Sciences learners read the extract below in a scientific magazine.

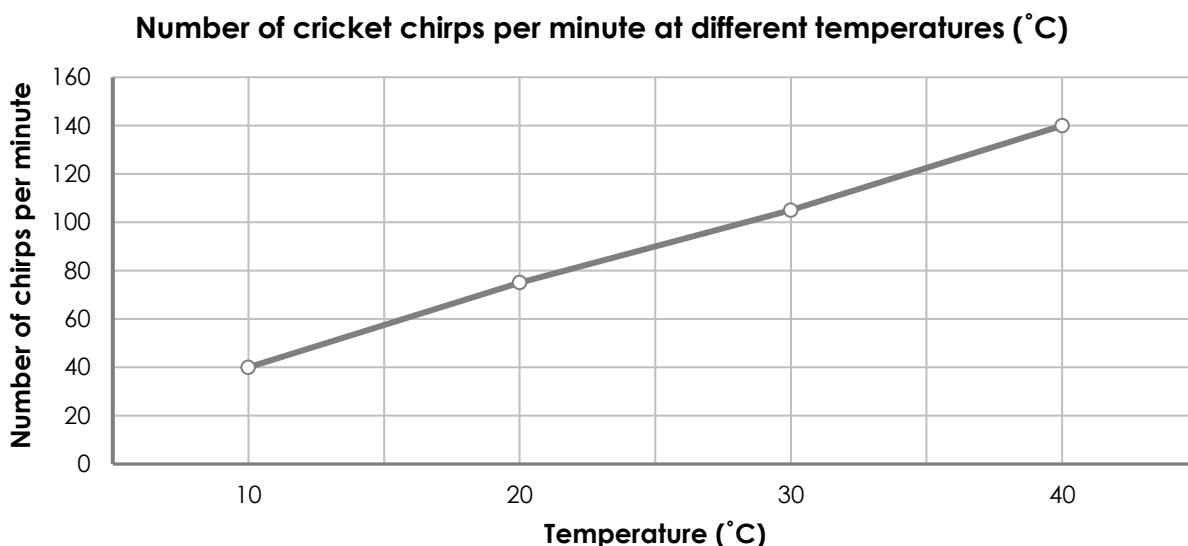
#### HOW IS A CRICKET'S CHIRP RELATED TO TEMPERATURE?

Crickets are insects. Like all living things, they have many chemical reactions, e.g. reactions that allow muscles to contract to produce the chirping sound. All insects are ectothermic ('cold-blooded') and take on the temperature of their surroundings. Changes in temperature affect how quickly these chemical reactions occur.

They decided to conduct an experiment to determine the relationship between the temperature and the number of chirps per minute. The procedure was done as follows:

- They collected four crickets of the same species.
- They took four wooden boxes of the same size and placed one cricket in each box.
- Each box was also fitted with a temperature-controlled heater.
- The boxes were labelled A, B, C and D.
- The heater in box A was set at 10°C, box B was set at 20°C, box C at 30°C and box D at 40°C.
- Each box was left for 10 minutes so that the crickets could get used to the temperature.
- They then recorded the number of chirps per minute.

The results are shown in the line graph below.



- 1.1 Write a suitable hypothesis for this investigation. (2)
- 1.2 Give the:
- (a) independent variable (1)
  - (b) dependent variable (1)
- 1.3 State **THREE** factors that were kept constant during the investigation. (3)

- 1.4 Explain **ONE** way in which the learners could have improved the reliability of their investigation. (2)
- 1.5 In which season would you expect to hear more crickets chirping? Give a reason for your answer. (2)
- 1.6 Use the graph and determine:  
 (a) the number of times the crickets chirp per minute in 15°C. (1)  
 (b) in which temperature the crickets will chirp 100 times per minute. (1)
- 1.7 Organise the information in the graph into a table with a heading and columns. (5)
- (18)**

## QUESTION 2

Scientists performed an investigation regarding the following scientific question:  
*Will learners' test scores be affected by distracting sounds in the testing environment?*

The scientists followed the procedure below:

- 20 learners were randomly selected and divided into two groups of 10 each.
- All the learners were the same age, in the same grade and studying the same Mathematics course.
- Both groups were given the same subject content material to prepare for a test.
- After some time, both groups sat to write a test, but in different rooms.
  - The test for group 1 was administered in a quiet, soundproof exam room.
  - The test for group 2 was administered in the music room during band practice.
- The scientists recorded the test scores for the learners in each group.

- 2.1 State the aim for this investigation. (2)
- 2.2 What was the sample size for this investigation? (1)
- 2.3 What was the independent variable in this investigation? (1)
- 2.4 State **THREE** other factors that the scientists should have kept constant. (3)
- 2.5 Why is it important that the learners were randomly selected and divided into groups? (1)
- 2.6 Which group (1 or 2) served as the control? Explain the importance of the control group in this investigation. (3)
- (11)**

## QUESTION 3

Draw a pie chart using the information provided in the table.

Percentage of high school learners in South Africa that participate in sports	
Grade	Percentage learners (%)
8	70
9	62
10	58
11	59
12	51

**(6)**