

Audit feedback: Scientific enquiry

Task 2-a

The length of straw is the independent (input) variable. The pitch of the sound made is the dependent (outcome) variable. These are the two key factors.

Task 2-b

The length of the straw is the independent factor.

Task 2-c

The material from which the straw is made and the colour of the straw are being controlled.

Task 2-d

The pattern shows that the shorter the straw the higher the pitch.

Task 2-e

A vibrating column of air produces the sound in the squeaker. The rate of vibration determines the pitch of the sound.

Task 2-f

In order to be a fair test the diameters of the straws should be the same.

Commentary on Task 2

Task 2-a

These are the key factors (variables) because changing the one will alter the other.

Task 2-b

The input factor (variable) is the length of the straw because this is the thing you are investigating and therefore deliberately changing.

Task 2-c

The material from which the straw is made should be controlled since this might affect the sound. The colour of the straw is highly unlikely to have an effect but has been controlled anyway. Children may not realise that this is irrelevant. In the table, the heading "type of straw" should really be "diameter of straw", with the description "wide" or "narrow", rather than "big" or "thin". In order to be a fair test the diameters of the straws should be controlled.

Task 2-d

The pattern in the pupils' results reflects the same pattern they would find in sounds made by different types of recorder. Air vibrates inside the straw and the pitch of sound produced depends on the frequency of the vibration. Air vibrating with a high frequency produces a high-pitch note. An understanding of the relationship between frequency and pitch is not expected of children until Key Stage 3.

Sound and light (continued)

Task 2 -e

The air inside the straw vibrates and the vibrations travel through the air to the pupils' ears and hence they hear the sound. The wavelength of the vibration changes as the length or thickness of the straw is changed and this alters the pitch of the note produced.

Task 2-f

Both the length and the diameter of the straw could affect the sound made by the squeaker. Since the length is being investigated and is clearly indicated on the table, "big" and "thin" presumably relate to the diameter of the straw.

1. markers should read the answers to parts a and b before marking this question
parts a and b should be marked together

(a) • temperature of the water *accept 'temperature'* 1 (L7)
accept 'room temperature'
do not accept responses that describe rates of heating.

any one from 1 (L7)

• rate of evaporation *accept 'the time for it to evaporate'*
answers must refer to both time taken and amount of water lost

• time taken for all the water to evaporate *accept 'measure how much water is left after a certain time'*
'time taken' is insufficient

• volume or mass or amount of water lost in a fixed time

any one from 1 (L7)

• starting volume of water *accept 'the amount of water'*
accept a specified volume of water
'same heater' and 'same starting measurement' are insufficient

• shape of container

• same ambient conditions *accept 'room temperature' if the independent variable is 'water temperature'*

(b) a column or row indicating temperature and a column or row indicating time or volume lost or volume remaining 1 (L7)

accept a column or row indicating 'rate of evaporation'
accept 'amount lost' or 'amount remaining'
both headings are required for the mark
the units of measurement are not necessary for the mark
the second column or row should be consistent with the dependent variable identified in part a
ignore other columns in the table

[4]