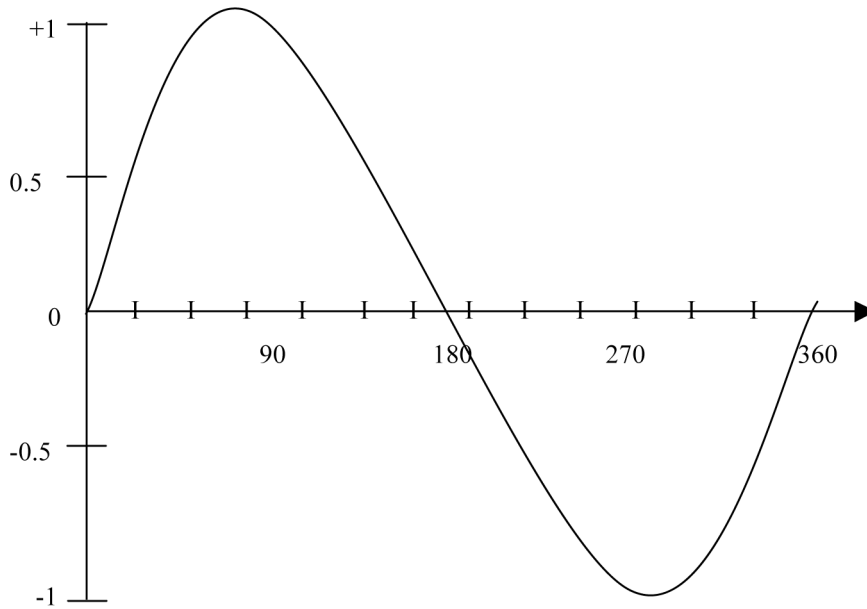


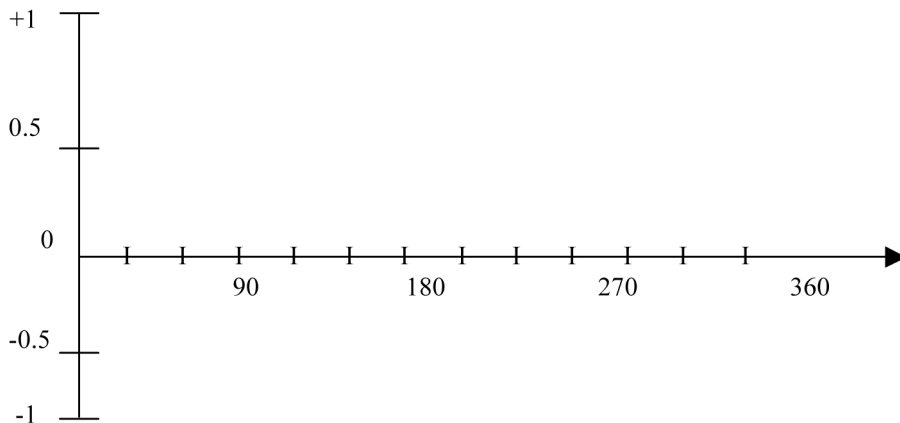
Sine Wave



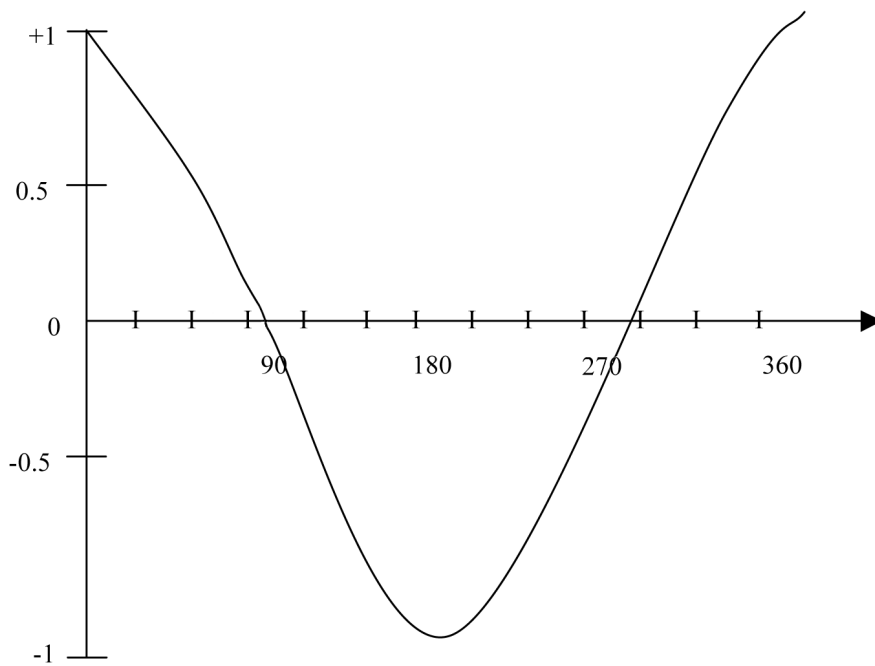
... starts at ...
... ends at ...
... rises to ...
... falls / drops to ...
... continues up / down ...
... reaches ...
... passes ...

Description

Cosine Wave



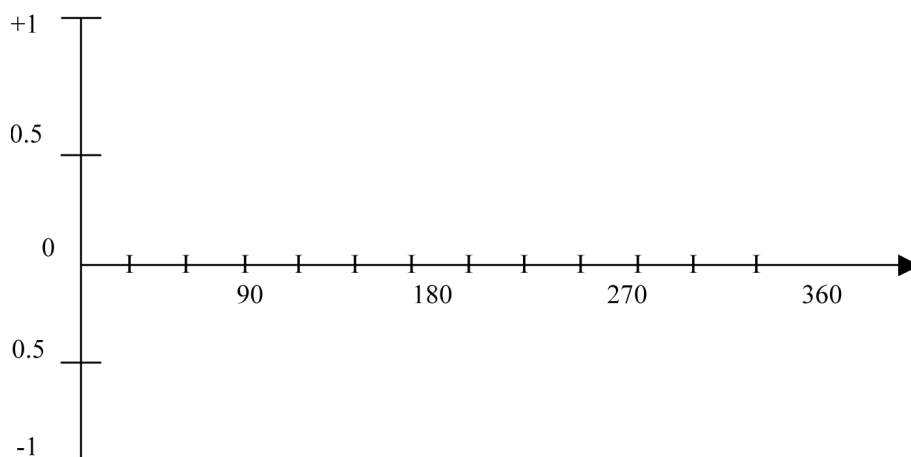
Cosine Wave



... starts at ...
... ends at ...
... rises to ...
... falls / drops to ...
... continues up / down ...
... reaches ...
... passes ...

Description

Sine Wave



Subject:	Mathematics
Content aim:	To familiarise students with similarities and differences between sine and cosine graphs
Language aim:	To practise giving accurate information in written form To practise intensive listening about graphs To review and extend vocabulary connected with graphs
Material:	Sine wave handout Cosine wave handout
Time:	45 minutes

Procedure:

1. Introduce the topic of the lesson; writing and speaking about the shapes of sine and cosine waves. Show the class the two handouts briefly from the front; long enough to show that they are similar but not the same and not long enough for them to memorise any details.
2. Give out the sine wave handout to half the class (A) and the cosine wave handout to the other half (B). Organise the class so that A and B students cannot easily see each other's handouts.
3. Tell students that they will write a description of the graph on their handout but you will first give them some questions to help. Read out the following questions. Students should write the answers on another piece of paper in note form. This should help the students to focus on the essential information they need to write a description at stage 4.
 - a. Where does the wave start on the y axis? (vertical)
 - b. Where does it pass zero on the x axis? (horizontal)
 - c. Where does it reach the lowest point?
 - d. Where is it at 360 degrees?
 - e. Is it a symmetrical wave?
4. Students now write a description of their wave graph in the space provided. This can be done individually or in pairs. Monitor and help where necessary.
5. A and B students now come together and in pairs and tell each other their description of the graph. The student listening to the information draws their partner's graph on the blank graph at the bottom of the handout.
6. Students now write a description of the graph they've drawn from the description given by their partner.

Optional Activity

1. You can now use one of the written descriptions for the class to look at and comment on or correct. Depending on the facilities in your classroom, write it on the board; transfer to an OHP sheet; or project the scanned text (or typed text) using a projector and board or interactive whiteboard if you have one.
2. Focus students on the language used about graphs for example;
It starts from
It increases / goes up / rises to..
It falls/ goes down / drops to..
It continues up / down
It reaches 180 degrees etc
3. Students now look at both graphs together and note the similarities and differences for example;
They both go between +1 and -1
The shapes are identical
The cosine wave goes through zero at 90 degrees less than the sine wave

Notes about the lesson

This is an information transfer writing lesson with the format: writing – listening – writing. The lesson shape can be flexible. Another way to run lessons like this would be:

1. Read a description and draw the graph
2. Describe the graph to your partner and draw what you hear
3. Write a description of the graph you heard
4. Compare and learn from the differences between the original description they read and the one they have just written themselves