



# Teacher Notes for Jugs

Compatibility: TI-83/83+/83+SE/84+/84+SE

Run The Program Called: **JUGS**

## ► Summary

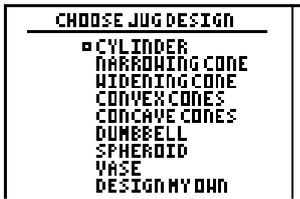
This program uses real-time animation to demonstrate how the height of water in different shaped jugs can be shown on both a linear scale and a graph of height plotted against volume.

You can demonstrate with “standard” jugs or design your own.

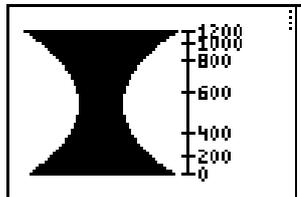
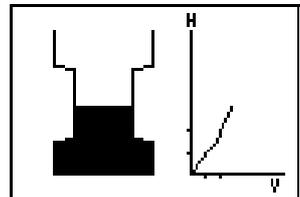
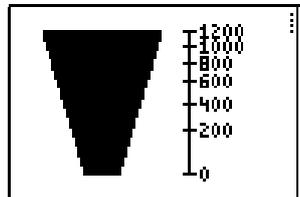
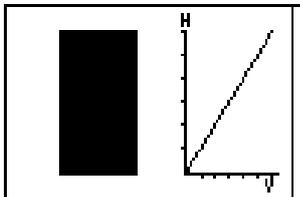
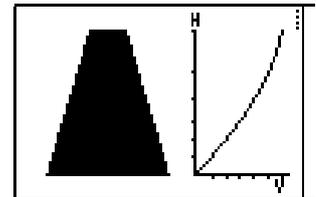
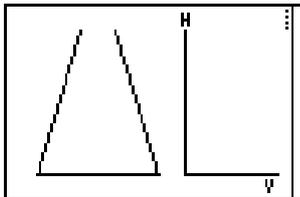
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JUGS
v1.0 BY A HOPLEY 1999
USE UP + DOWN + ENTER
  ▣ JUG + GRAPH
  ▣ JUG + SCALE
  ▣ JUG ONLY
  ▣ GRAPH ONLY
  ▣ SCALE ONLY
  ▣ QUIT
  
```

## ► Features

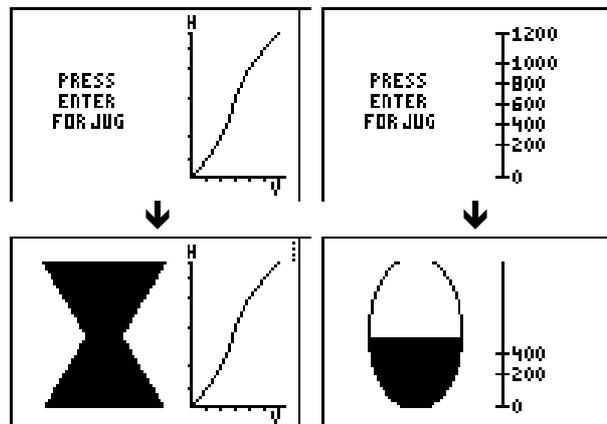


- The first two menu screens give you the choice of what to view.
- The water flows in at constant rate to the jugs so the height rises more quickly when they narrow and vice-versa - just as in real life!
- If you choose to view a jug and its graph/scale, you will be shown an empty jug first, as on the left.
- ◆ Press **ENTER** to fill the jug and update the scale/graph at the same time (see right)
- ◆ All of the pre-set jugs are on shown on this sheet - you can match them to their names!



If you choose to initially view only the jug, afterwards you can select whether you want a graph or scale to be shown (see below).

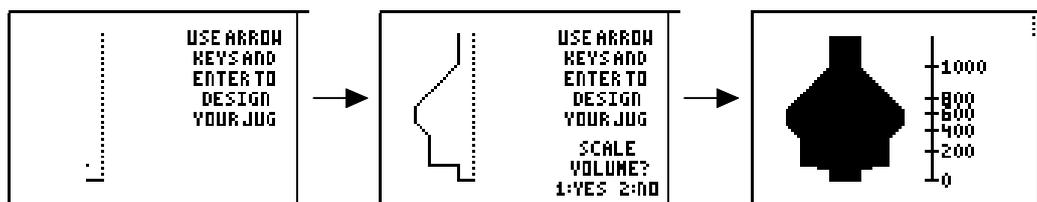
If you choose to view only the scale or graph, then you will be presented with screens like those below - pressing **ENTER** fills the jugs.



If you choose to design your own jug, you enter in the left side profile.

This will be reflected in the vertical axis.

The ◀ ▲ ▶ arrow keys determine where your next point will be plotted - either ←, ↶, ↑, ↷ or → from the last point. Pressing **ENTER** fixes the point allowing you to continue.



When you have finished your design, you can choose to have its width automatically scaled so that it holds 1200ml, or not. The above example was not scaled.

### ► Suggestions

This program is best used by the teacher to demonstrate, but students can gain further understanding from designing their own bottles and predicting what the graph/scale will look like - or indeed, what their neighbour's would look like.

The teacher should use one of the more straightforward jugs as a demonstration of the scale and graph displays and then instruct students to use their worksheets to record what they think subsequent jug animations would generate.

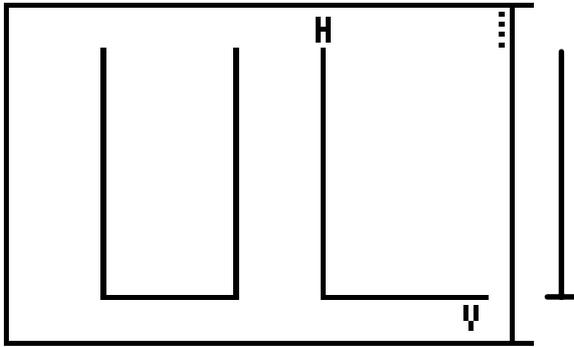
If the teacher initially just shows the jug filling up, the students can use that to sketch the graph and/or scale. At a more advanced level, the teacher should only show the jug and not fill it up - this is akin to many exam questions on this sort of work.

In order to reverse the thought process and only show students either a graph or scale and they have to sketch the outline of the jug, it is advised to do two things:

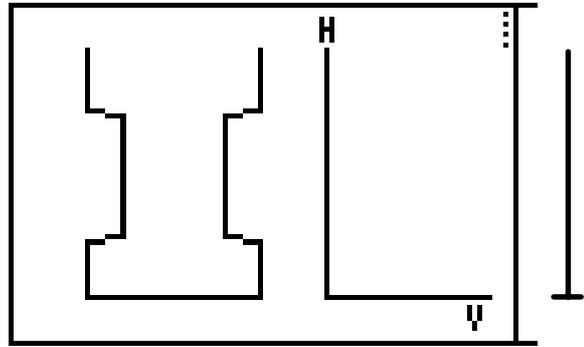
1. cover up the viewpanel display when making the choice of jug shape from the menu.
2. not use the jugs worksheet as these have all the jug types on them and the students quickly see it as a multiple choice problem, rather than give the shape of the jug due consideration.

Alternatively, the teacher can design their own jug, but this may not be practical in front of a whole class, in the middle of a lesson.

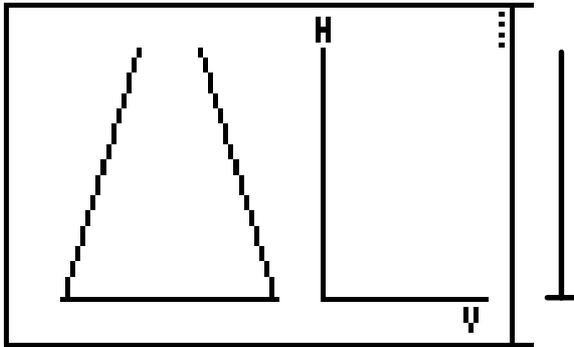
# Jugs Worksheet



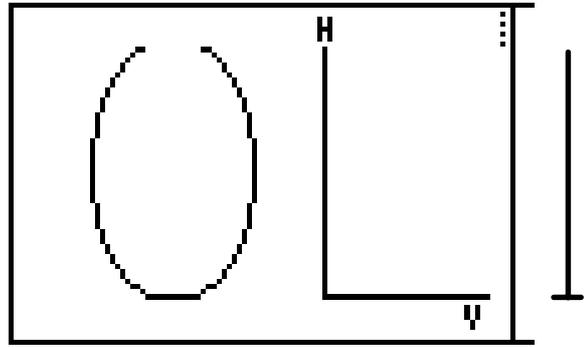
cylinder



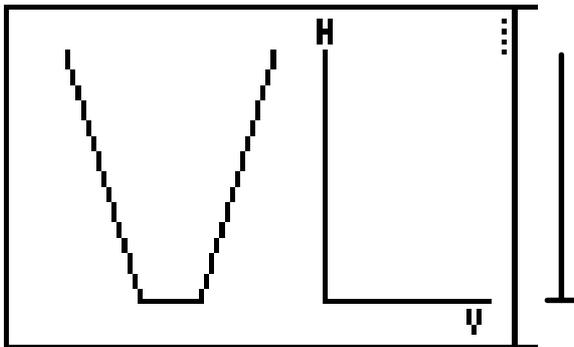
dumbbell



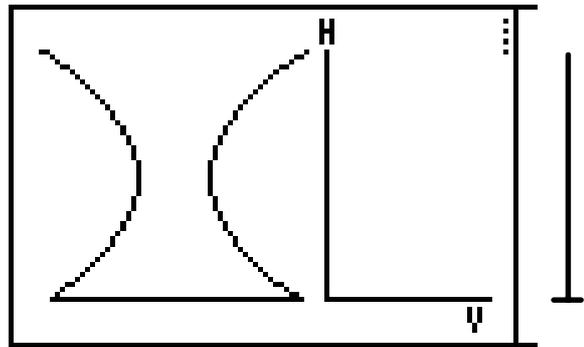
narrowing cone



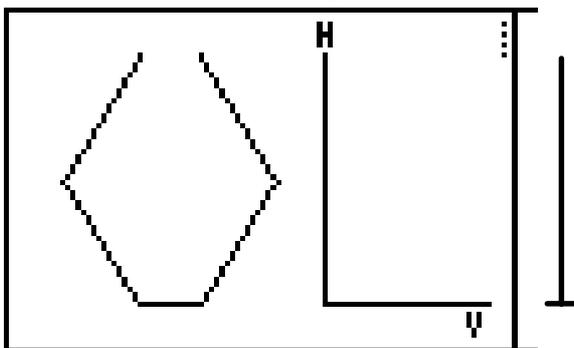
spheroid



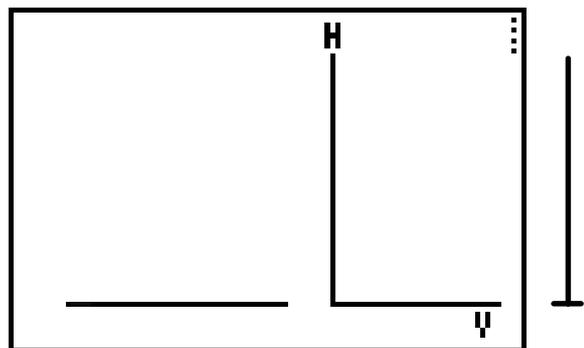
widening cone



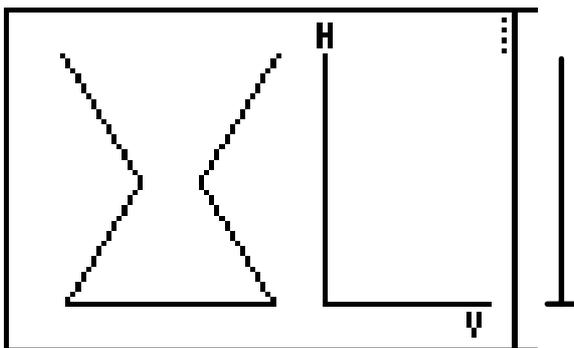
vase



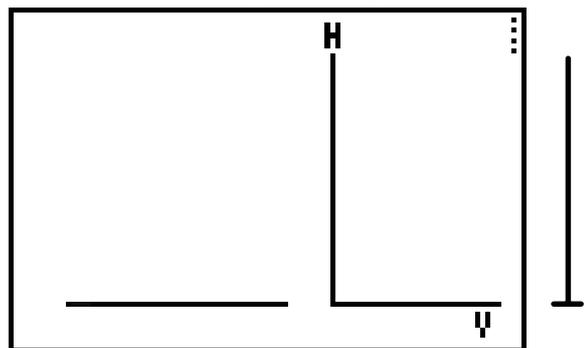
convex cone



your design



concave cone



your design