Hot Pots

You need: a computer (optional)

ACTIVITY ONE

Mrs Jackson's class have been making clay pots and figures and are now going to fire them in a wood-fired kiln they have built outside their classroom. The kiln needs to be kept going overnight. Mrs Jackson, her class, and some adult helpers will sleep over at school. She explains the details to her students:

- The kiln should take $1\frac{1}{2}$ hours to set up, beginning at 8 a.m. on Thursday.
- It will be lit at 10 a.m.
- Lunchtime is 12.30–1.20 p.m., and school finishes at 3 p.m.
- An hour after school finishes, there will be a 20 minute afternoon tea.
- Dinner will be $3\frac{1}{2}$ hours after school finishes. It should take 45 minutes.
- Between afternoon tea and dinner, 50 minutes will be set aside for a game of softball.
- A 112 minute video will be shown, beginning at 8.30 p.m.
- All except those on kiln duty are to be in their sleeping bags by lights-out at 10.45 p.m.
- 26 students and 5 adults (in addition to Mrs Jackson) will be staying over.
- Everyone needs to be ready for breakfast by 7.15 a.m.
- The two classrooms need to be back to normal an hour after that.

To make sure that the fire is kept fed, the students will be rostered in pairs on 75 minute shifts. Everyone will take a turn. Mrs Jackson will supervise the kiln until 7 p.m., when the 5 adult helpers will take over, rostered on $1\frac{1}{2}$ hour shifts. The last adult will let the fire die out.

Mrs Jackson asks two of her students, Josh and Temuera, to make up a detailed programme, using 24 hour time. They number the students 1 to 26, and the adults (apart from Mrs Jackson) 1 to 5. Below is the start of their programme. Complete it, using all the given information.

Roster

Time	Activity	Students	Adult
0800	Start work		
0930	Kiln ready		
1000	Light fire	1 and 2	Mrs Jackson
1115		3 and 4	
1230	Lunch begins	5 and 6	

ACTIVITY TWO

A friend has given Mrs Jackson a pile of old stakes from his vineyard to use for firewood in the kiln. For the first hour, they need 20 stakes every 15 minutes to get the fire up to temperature. For the second hour, they need 10 stakes every 10 minutes. For the next 6 hours, they need 20 stakes every 30 minutes. For every hour after that, they will feed the fire 60 percent of what they used the hour before, rounded up to the next whole stake.

1. Complete the chart, using all the above information:

Time	Stakes burnt per hour	Total stakes burnt
1000		
1100	80	
1200	60	
1300	40	

2. What is the least number of stakes they will use in 1 hour? Why won't this change?

3. Graph the total number of stakes used against the hours passed.

4. After what time will they have used 400 stakes?

5. What does the slope of the graph look like when the rate at which the stakes are being burnt:
   a. is greatest?
   b. is least?