<u>3.5 Graphing Non- Linear Relations</u>

<u>Investigation: Motion of a Pendulum</u>
page 175 in text

LINK

<u>Purpose:</u>
To determine if there is a relationship between the length of a pendulum and the time it takes it to complete 6 swings.
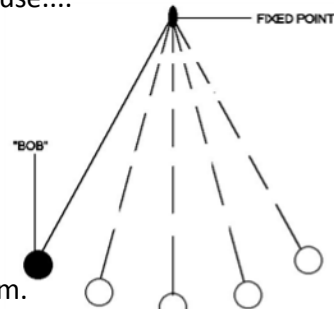
<u>Hypothesis</u>:
I think that as the length of the pendulum decreases, the time to complete six swings will _____ because....

<u>Materials:</u>
Pencil, investigation recording sheet,
pendulum (washer on a string),
measuring tape, clock/watch, tape.

FIXED POINT

"BOB"

<u>Procedure:</u>
1. Start with a pendulum length measuring 50 cm.
2. Secure the pendulum to a pencil with tape. Hold the pencil on the desk so that the pendulum is hanging off the side and swings freely.
3. Release the pendulum from a 35 degree angle and start the timer.
4. Record the length of time it takes to complete six full swings.
5. Repeat, after decreasing the length of the pendulum in increments of 10 cm (ie. repeat for lengths of 40 cm, 30 cm, 20 cm and 10 cm).

<u>Observations:</u>
- Record your measurements in the table provided.
- Create a scatter plot of your data.
- Draw a curve of best fit for the data.

<u>Conclusion/Inference:</u>
- Describe the relationship in your own words.

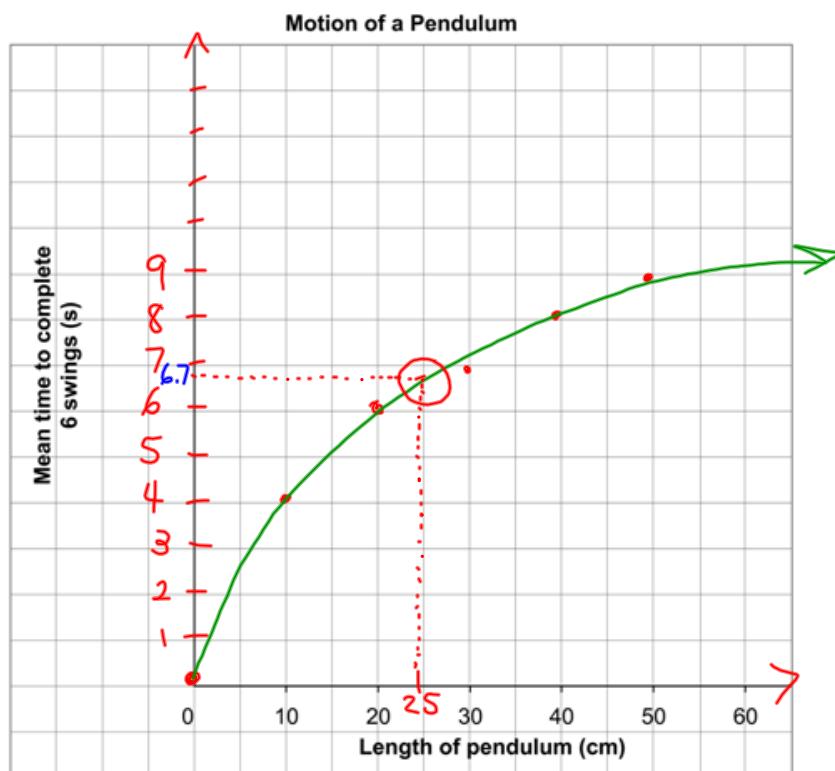

- Was your hypothesis correct?

<u>Reflection:</u>
- Describe any factors that may have affected your results.

- Estimate how long it might take to complete 6 swings if your pendulum was 25 cm long.

- What other factors do you think might affect the time for one swing? How could you check?
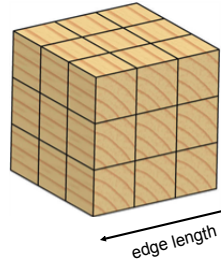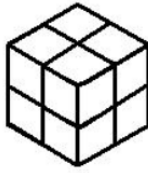
Section 5.5, *Investigate* Recording Sheet

Motion of a Pendulum

Pendulum length (cm)	Time to complete 6 swings (s)				Total time for all 4 trials (s)	Mean time (s) ($\frac{\text{Total time}}{4}$)
	Trial 1	Trial 2	Trial 3	Trial 4		
50 cm						8.8
40 cm						8.0
30 cm						6.8
20 cm						6.0
10 cm						4.0

Average

Motion of a Pendulum

Practice: page 179 #5

edge length

a) Describe the pattern in the cubes.

b) Extend the pattern to the
next two solids that would occur.
Copy and complete the table.

c) Describe any trends in the data.

Edge Length	Number of Cubes
1	
2	
3	

d) Suppose you know the edge length of a solid in this pattern.
i) How can you determine the number of cubes needed to build it?

ii) How is this number related to the volume of the solid?

e) Continue the table for the next two solids in the pattern.

f) Graph the data.
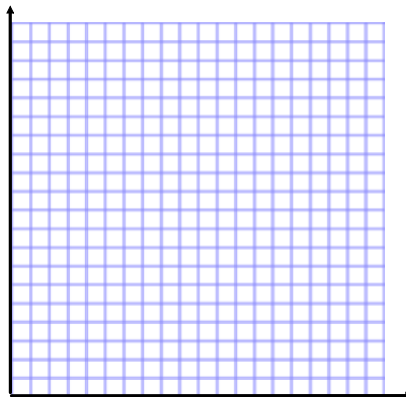
g) How is the volume of a solid related to its edge length?
   Write a rule.

h) What is the edge length of the solid with 512 cubes?

i) How many cubes would be needed for the 10th solid?

Homework: page 177 #1,4,5