Maths Talent Quest 2020

A study of time

Measures of Time

Aim

I'd like to explore measures of time.

For example, milliseconds, seconds, minutes, hours right up decades and centuries

I am also interested in roman numerals on clocks

Method

Work out things I can time and things I can't time using the tools I have. Things I think I can time using an iPad are: milliseconds, seconds, minutes and hours. I will need to work out another way to time days, months, years and longer times as my iPad will run out of battery. My plan is to search up on the internet a way to learn about these times or ask a grown up.

Materials

Pens

Paper

Timer

Websearch

Maths Involved

- Measures of time
- Tables
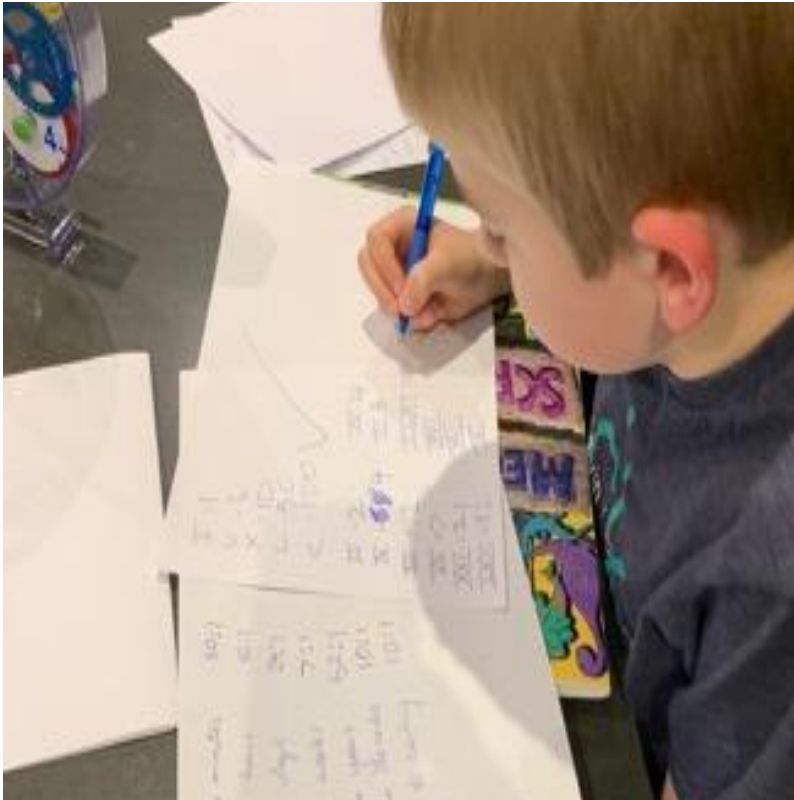- Roman Numerals

Prediction/Estimation

The only prediction I did for time was the number of weeks in a year. Dad helped me to learn about this and I know that the answer is 52.

I did spend a long time working out roman numerals once I learnt how they work.

Method/Working Out

Here is a picture of me working on some roman numeral questions that my dad gave me.

You can also see some of my ratio work.

Conclusions

Measures of time

Second	1000 millseconds
Minute	60 seconds
Hour	60 minutes
Day	24 hours
Week	7 days
Month	28,29,30 or 31 days
Year	365 days
Year	52 weeks (note: 364 days)
Decade	10 years
Century	100 years

Roman Numerals

Letter 'I'	1
Letter 'V'	5
Letter 'X'	10
Letter 'L'	50
Letter 'C'	100

Calculating Time - Seconds
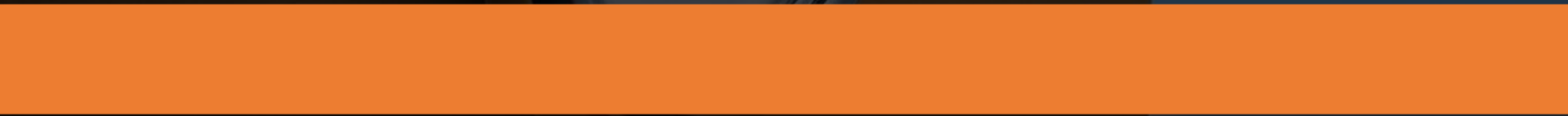
Aim

I'd like to calculate how many seconds in a day, week, month & year or longer if I can.

Method

The first thing I need to understand is the maths sums I need to work out. For example how many seconds in a minute and then how many minutes in an hour.

I will use my pen and paper for some sums and a calculator for hard sums.

I will then put my finding into a table.

Materials

- Pens
- Paper
- Computer/Excel (for table & leap year calculation)

Maths Involved

- Addition

- Multiplication

- Division

- **New:** Long Multiplication

Long Multiplication is a new method I learnt to multiply numbers larger than 10. I used this to calculate seconds in a year by hand.

Prediction/Estimation

I didn't do a lot of predictions. I did learn that a year has just over 52 weeks as 52 weeks x 7 days = 364 days. When I did my year calculation it was different using weeks.

I also had to work out the leap years in a decade and a year to change my decade and century calculation.

Method/Working Out

I did all calculations by hand except for leap year calculations where we used the computer to add the extra days.
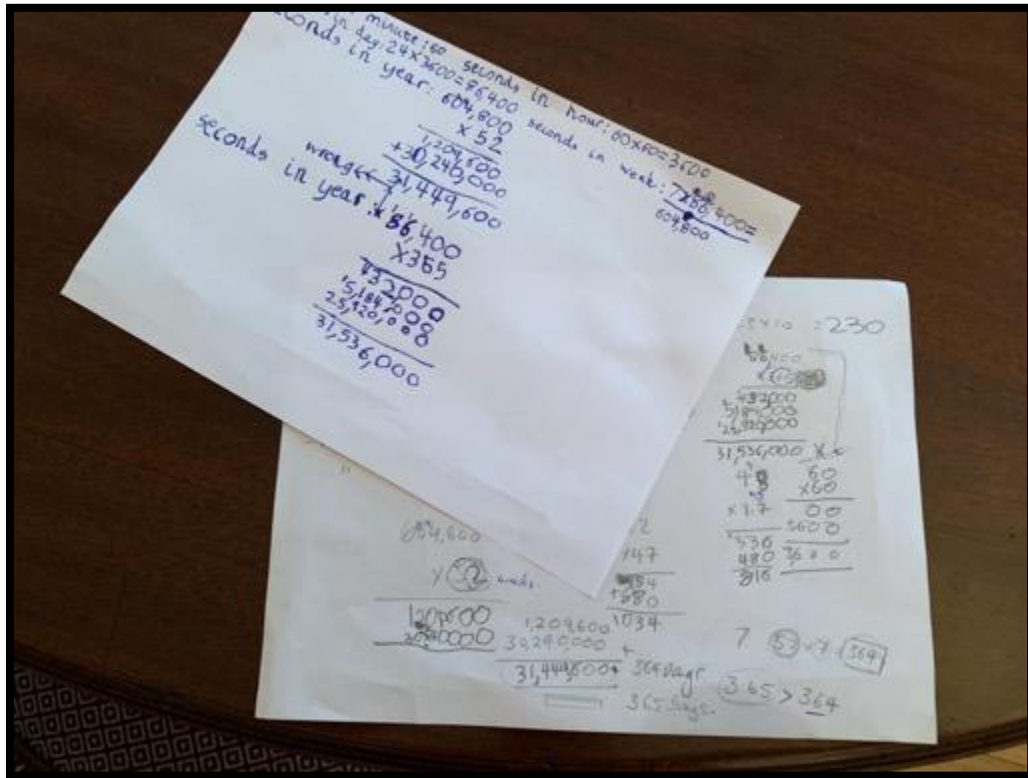
Conclusions

Time Unit	Seconds
Minute	60
Hour	3,600
Day	86,400
Week	604,800
Year (52 weeks/364 days)	31,449,600
Year (365 days)	31,536,000
Decade	315,360,000
Decade (2.5 leap years)	315,576,000
Century	3,153,600,000
Century (25 leap years)	3,155,760,000

Estimating & Measuring Time

Aim

I'm going to capture how long it takes to complete a range of activities. For example, how long it takes to do 10 star jumps, how long it takes to write a sentence and other things as well.

Method

Making a list of all the things that I'm going to time.

I will time the things I can e.g. do 10 push ups

For other things I will follow these steps:

1. First, a grownup will get the timer ready.

2. Next, you get ready to do ten star jumps.

3. Then, the grownup says "go!" then you start.

4. Finally I will display my findings in a table or graph.

Materials

- Timer (iPad/iPhone)
- Pens
- Paper
- Table/Graphing Tools (excel)

Maths Involved

- Timing
- Tables
- Graphs
- **NEW:** I learnt a new idea called 'Average'

The average is calculated by adding up all the results and then dividing by the number of times the activity was completed.

Prediction/Estimation

I predicted the average for some of the results prior to calculating by hand and also in excel.
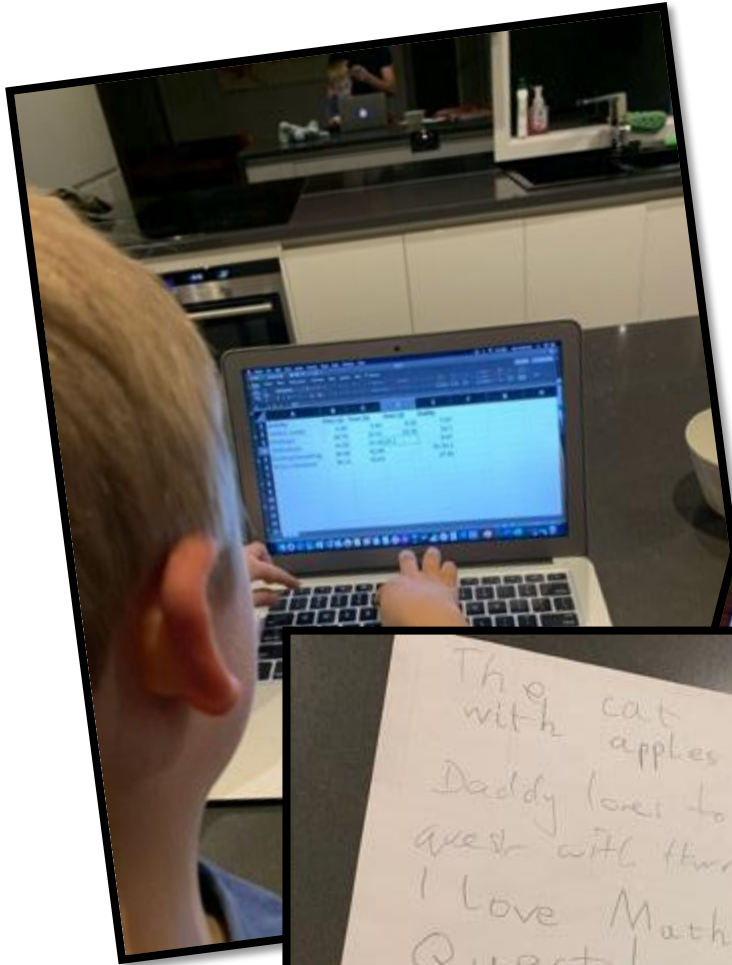
For example I was able to estimate that the average time to do 10 push ups was 17 seconds.

When I checked this using excel on the computer I was correct.

Method/Working Out

Conclusions

Table of Results and Graph (in seconds)

Activity	Time (1)	Time (2)	Time (3)	Harry Average	Daddy
10xStar Jumps	6.95	5.92	6.02	6.30	7.07
10xSitups	20.75	12.51	12.33	15.20	10.7
10xPushups	14.69	22.16	15.51	17.45	8.67
Building Something	36.06	32.48	26.89	31.81	87
Write a Sentence	56.11	43.63	29.93	43.22	27.92

Maths Talent Quest
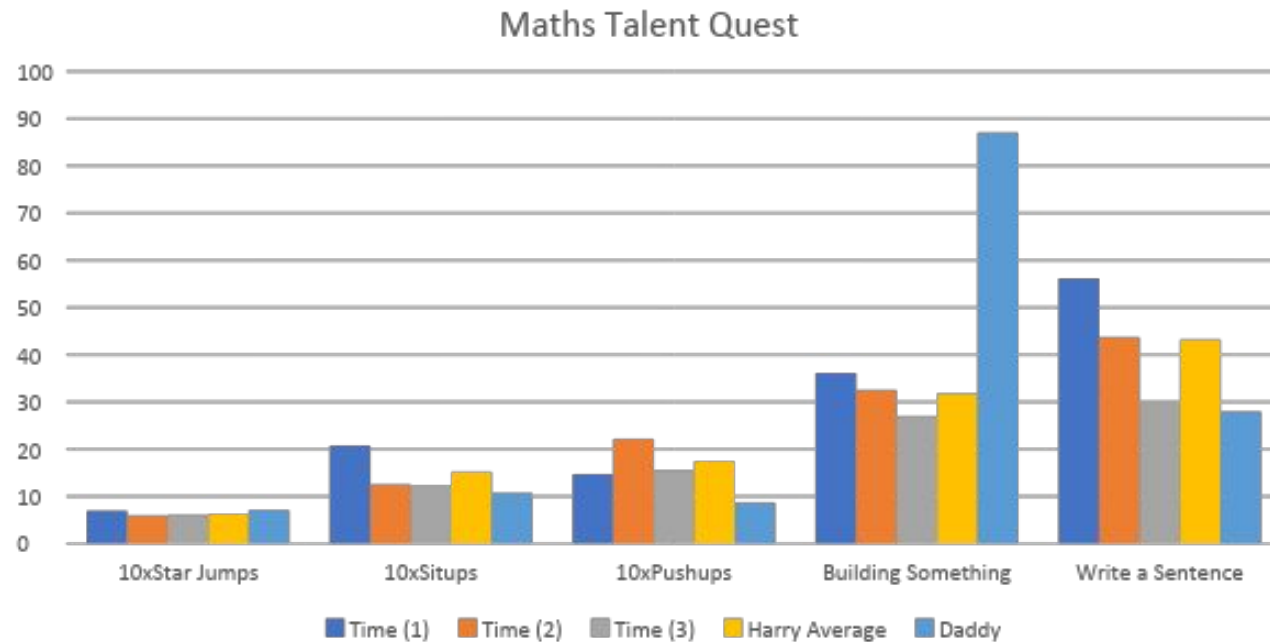
Exploring Clocks

Aim

I'm going to learn about how clocks work to record time and have a clock model that I am going to build with my dad
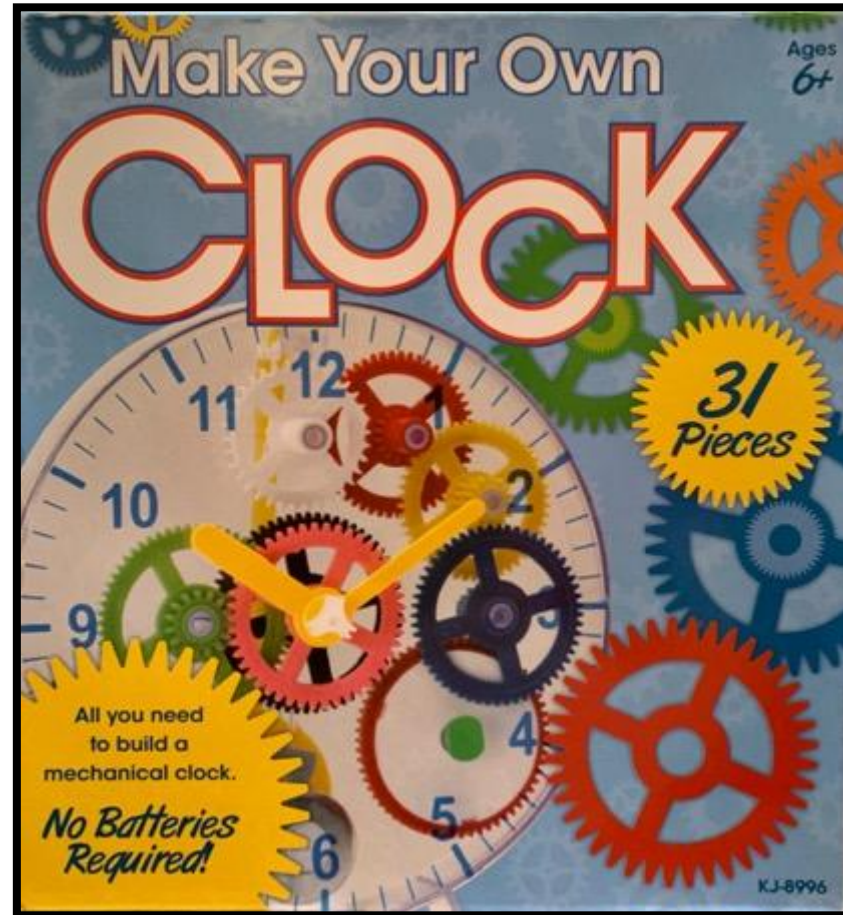
Method

I will follow the instructions in the box to build the clock and get help from a grownup if I need

Materials

Clock Building Kit

A spring powered mechanical clock with a range of gears and other parts that lets kids learn about how a clock works.

Maths Involved

Time

New: Gears

A gear is a circle with teeth all around it, they come in different sizes and with different numbers of teeth. This means that some gears move around more or less times than others when the teeth join together.

New: Ratios

Ratios describe the relationship between two things for example gears or time

eg : 60 seconds : 1 minute.

Prediction/Estimation

I spent some time looking at each of the gears in the clock, talking to my dad and estimating the ratios between each gear.

This was tricky as there are lots of gears in the clock.

Conclusions

I worked out that the clock is powered by a spring which I can wind up. The spring moves the gears on the clock.

Each gear has a different ratio to control the time.

There is a gear that moves every second and others that move the minutes and hours.

The minute hand needs to move around the clock every hour and the hour gear needs to move around every 12 hours.

Gears on the bike control how many times the back wheel turns for every time the peddle goes around.

Appendix

Where I needed help…..

I built my own clock and did all the calculations for this project.

Dad helped me with the following activities:

- Learning about long multiplication, gears, ratios and roman numerals
- Powerpoint layout, photos and how to make a graph in excel.

Worked examples

Further worked examples