# Teachers notes - UK Babies data – multi bar graphs.

**Getting started**

This session is designed to encourage students to think more deeply about data presented in diagrams.

A good starting point would be a diagram which you suspect will get students talking and thinking about the data. The teacher's powerpoint has two slides as an example.

Show the first slide and give the students some time to think. Ask them:

What do you notice?

What do you want to ask?

Some points to raise
- The percentages in each bar chart don't total 100% why? *In the small print it says these are only the most popular responses. Also multiple responses were possible so in theory it could add to over 100% see https://www.icmunlimited.com/wp-content/uploads/2019/01/Voting-18thJan19_pv-only-BPC.pdf*
- What does n=2046, in the small print towards the bottom, mean? *This is the number of people surveyed. Is this enough?*
- Compare and contrast the choices of the remain voters and the leave voters, what are the implications?

The second chart is intended as an introduction to composite bar charts.

Show the slide and ask – Why is the number missing from the blue section of the 2018 bar?

The aim is to prompt them to think about the chart works.

*Some students may think it should be 900b – 611b = 289 billion but look more closely and the bar is labelled as 900+.*

Follow this up with

What do you notice?

What do you want to ask?

Some points to raise

- Are there any differences between the trends in music and video.
- You might like to look at percentage change year on year. (Table below)

| Year | Music Streams (Billions) | Percentage change | Video Streams (Billions) | Percentage change |
|------|--------------------------|-------------------|--------------------------|-------------------|
| 2013 | 49 | | 57 | |
| 2014 | 79 | 61.2% | 85 | 49.1% |
| 2015 | 143 | 81.0% | 167 | 96.5% |
| 2016 | 252 | 76.2% | 180 | 7.8% |
| 2017 | 400 | 58.7% | 218 | 21.1% |
| 2018 | 611 | 52.8% | | |

Once you are happy the students are able to make a start let them have the student sheet.

Answers below

The diagram below uses information from the birth registration document, which by law all parents must complete.

Figure 1: Live births by age group of mother and father, 2016

England and Wales
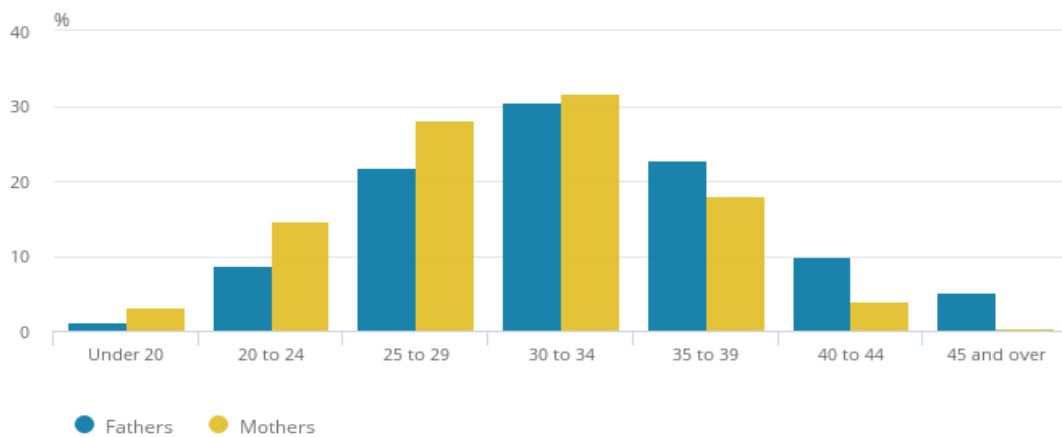


Source: Office for National Statistics

1. Which parent's average age would be older, the mother or father?

(Explain how you can use the diagram above to check your answer)

*The fathers are older on average. In the diagram the proportion of the mothers in the younger age groups, (U20, 20-24, 25-29, 30-34) is larger than the fathers. In the older age groups (35+) the opposite is true. This would mean that the average age of fathers would be higher than average age mothers.*

## Figure 2: Average age of mothers and fathers at the birth of their child, 1938 to 2016

Age (years)
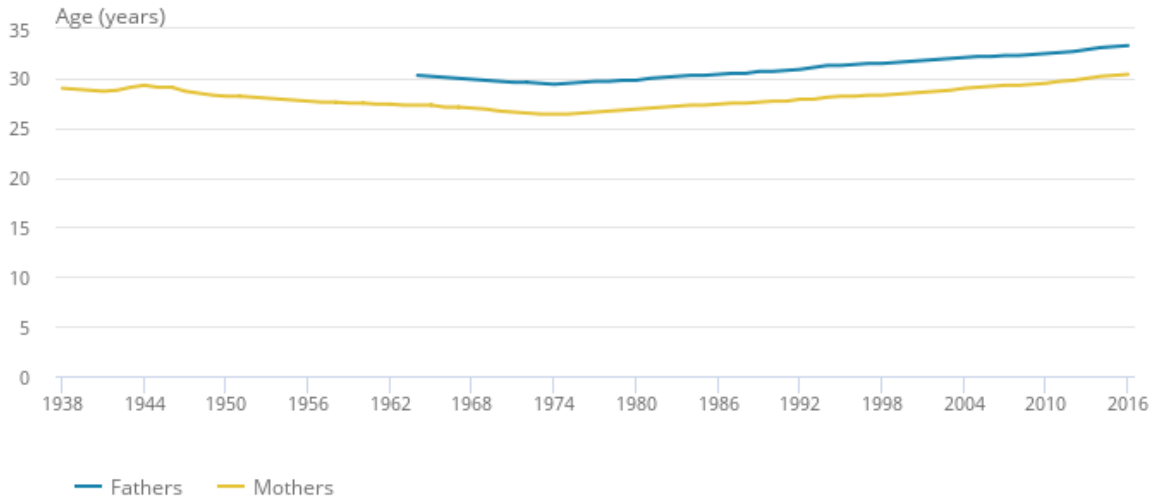
— Fathers   — Mothers

2.  Describe any trends you notice from the diagram above.

*From 1938 to about 1974 the average age of mothers seemed to be getting younger, this was also the case for fathers from 1962 to 1974. From about 1974 the average age of both parents appears to be increasing. The gap between the average age of mothers and fathers appears to remain reasonably consistent at about 3 years from 1962 to the present.*

The table below and the diagram in the next page shows information about the parents of new born babies.

**Joint registration** means both parents' names are recorded on the registration document, **sole registration** means one parent's name is on the register.

| Year | % Within marriage or civil partnership | % Joint registrations, same address | % Joint registrations, different addresses | % Sole registrations |
|------|----------------------------------------|-------------------------------------|--------------------------------------------|----------------------|
| 1986 | 78.6 | 10 | 4.2 | 7.2 |
| 1996 | 64.2 | 20.8 | 7.1 | 7.9 |
| 2006 | 56.5 | 27.7 | 9.0 | 6.8 |
| 2016 | 52.4 | 32.1 | 10.3 | 5.2 |

## Figure 3: Live births by type of registration, 1986, 1996, 2006 and 2016

England and Wales
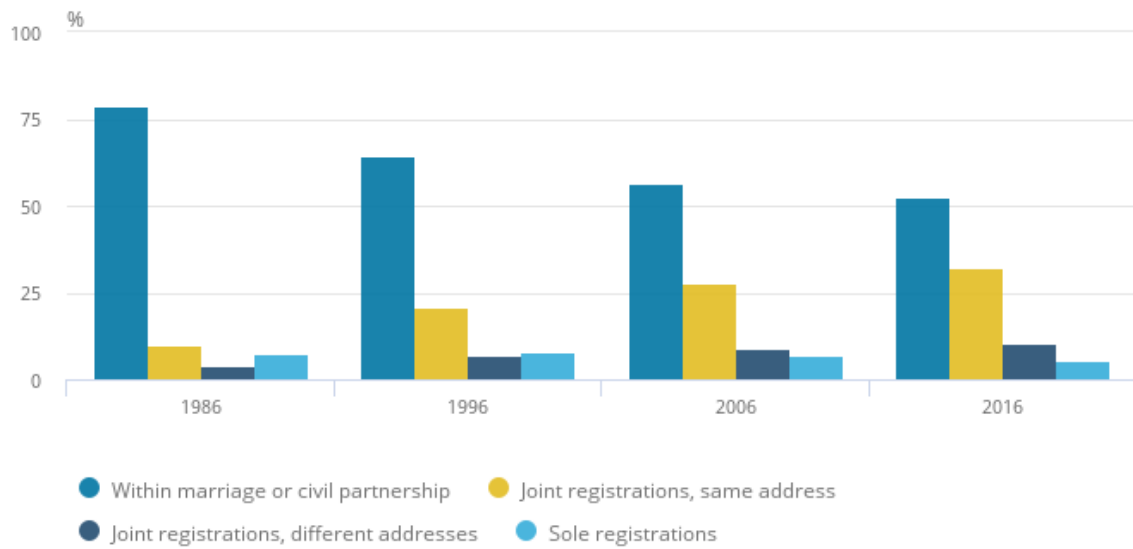


Source: Office for National Statistics

3. Describe any trends you notice from the data.

*Sole registrations appear to be reasonable consistent in 1986, 1996 and 2006, but there is slight fall in 2016.*
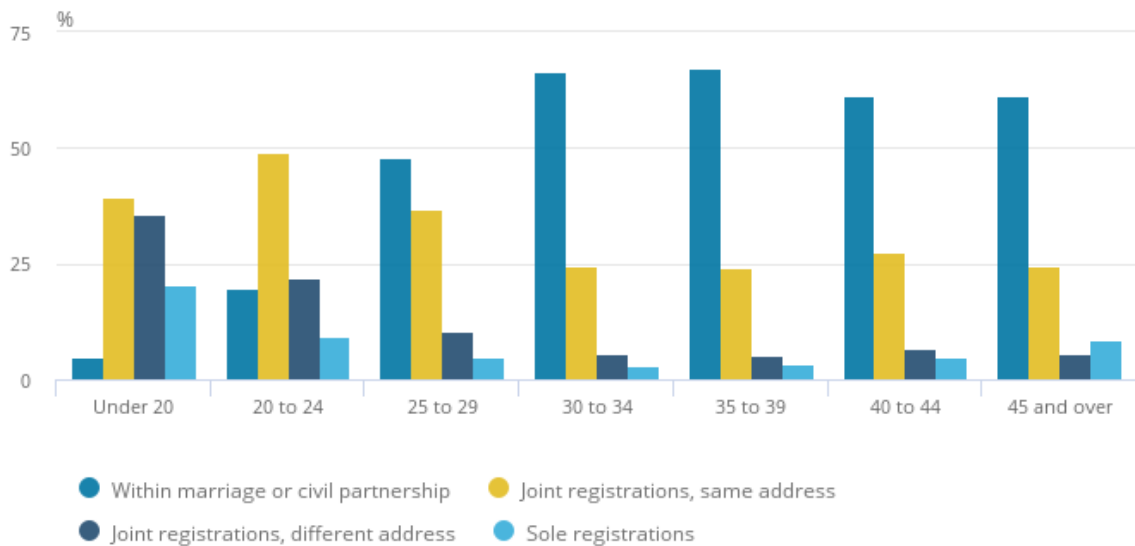
*Joint registrations at different addresses as increased from 1986 to 2016 although the rate of increase appears to be slowing down.*

*Joint registrations at the same address has grown significantly from 10% to approximately 32%. Marriage and civil partnership has fallen by similar amounts.*

*Marriage and civil partnership is the most common family setting in all years.*

## Figure 4: Live births by type of registration and mother's age group, 2016

England and Wales



Bar chart showing percentages (0 to 75%) for age groups Under 20, 20 to 24, 25 to 29, 30 to 34, 35 to 39, 40 to 44, 45 and over.

- ● Within marriage or civil partnership
- ● Joint registrations, same address
- ● Joint registrations, different address
- ● Sole registrations

**Source: Office for National Statistics**

4. What age related trends do you notice from this information?

The percentage of births that were either jointly registered by parents living at different addresses or solely registered by the mother was higher among women aged under 25 years than 25 or over mothers.
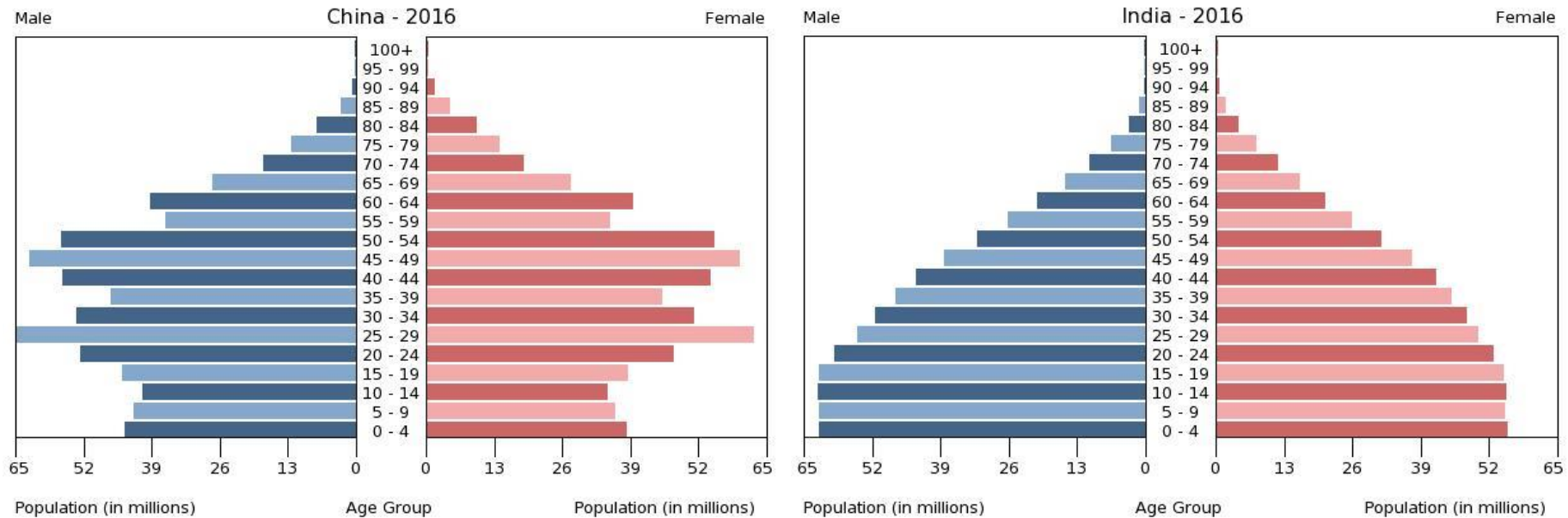
"In 2016, births to mothers aged under 25 years were most likely to be jointly registered by cohabiting parents, while for women aged 25 and over, marriage or civil partnership was the most common family setting for births, followed by cohabitation"

From ONS *https://www.ons.gov.uk/releases/birthsbyparentscharacteristicsinenglandandwales2016*

Also see
*https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthsummarytables*

The diagrams below are called a population pyramids. These are from the CIA World Factbook *https://www.cia.gov/library/publications/the-world-factbook/*



5. Using the data population pyramids state two differences between the population of China and India.
*Answers may vary. The shape of the two pyramids is different India has a large young population (0-19). In China there are fewer (0-19) than (25-54). Looking at the population of India, starting with the 20-24's the number on people in each of the successive age group declines steadily. The population of China has a bulge around the central ages There is a large drop from 50-54 to 55 -59, a slight increase in 60-64s then the numbers taper away as the age group increases.*

6. Although both population pyramids look roughly symmetrical their shapes are quite different.
   Why might you expect population pyramids to be roughly symmetrical?

*As male and female live in the same environment it is explected that their life expectancies are similar.*
*Some students may have studied sensitive issues such as the male/female ratios in these and other countries in other subjects. For more information see the following:*
*https://data.worldbank.org/indicator/SP.POP.BRTH.MF*
*http://m.statisticstimes.com/demographics/countries-by-sex-ratio.php*
*http://www.bbc.co.uk/ethics/abortion/medical/infanticide_1.shtml*
*https://www.unfpa.org/resources/trends-selective-abortions-girls-india*

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**Composite bar charts**



**Chinese Smartphone Sales Keep Dropping**
Quarterly smartphone shipments in China, by vendor (in million units)

Legend: Apple, Xiaomi, Huawei, Samsung, OPPO, vivo, Other

2015: Q1 98.7, Q2 103.6, Q3 108.8, Q4 114.3
2016: Q1 102.6, Q2 107.0, Q3 115.1, Q4 135.7
2017: Q1 104.0, Q2 111.9, Q3 114.8, Q4 114.4
2018: Q1 87.5, Q2 104.8, Q3 102.7

@StatistaCharts    Source: IDC    statista

Use the information in the chart above to comment how smartphone sales have changed from 2015 to 2018.

<span style="color:red">Any valid comments should be recognised.</span>

<span style="color:red">You can see the report at *https://www.statista.com/chart/16833/chinese-quarterly-smartphone-shipping-volumes/*</span>

<span style="color:red">The decline commented on in the headline is referred to in the report as 5 consecutive quarters, but If you look at each quarter individually it could be argued that it has been happening since 2016 Q3.</span>

<span style="color:red">The proportion of the shipments belonging to "other" seems to have declined from the beginning of 2015. Huawei's share seems to have grown steadily over the same period. The same is true of vivo and OPPO.</span>

<span style="color:red">It may be that some of the Chinese manufactures such as Huawei have seen worldwide sales grow.</span>

<span style="color:red">Xiaomi's figures dropped in 2016 and early 2017 but they have regained some ground from 2017 Q2.</span>