

## Are children today taller than 150 years ago?

Here are some data from 1837, collected to try to establish the age of children working in factories. It was suspected that under-age children were being employed and that the law was being broken by parents giving false ages to their children. The aim of collecting the data was to give an age for a child based on its height. The report which publishes this data says "If a child be 3ft 11 inches in height it may be assumed that it is nine years of age..."



- 1) Use the data from Table 1 and Table 2 to compare heights in 1837 to the heights of children from *CensusAtSchool* 2010/11. In Table 1 the mean for each age group has been calculated for you. You will need to group the data in Table 2 and calculate the mean for each group.
- 2) Decide on the best type of graph to display this data to answer the question 'Are children today taller than 150 years ago?'

Age (years)	No. of boys	No. of girls	Average height of boys		Average height of girls			
			ft	ins	cm	ft	ins	cm
8 and under 8.5	327	267	3	9 <sup>3/4</sup>	115.9	3	8 <sup>11/16</sup>	111.9
8.5 and under 9	339	272	3	11	119.4	3	10 <sup>3/8</sup>	117.8
9 and under 9.5	527	438	3	11 <sup>5/8</sup>	121	3	11 <sup>3/8</sup>	120.3
9.5 and under 10	418	375	4	0 <sup>1/8</sup>	122.2	4	0	121.9
10 and under 10.5	574	506	4	1	124.5	4	1	124.5
10.5 and under 11	550	421	4	1 <sup>7/8</sup>	126.7	4	1 <sup>5/8</sup>	126
11 and under 11.5	664	577	4	2 <sup>3/8</sup>	128	4	2 <sup>1/8</sup>	127.3
11.5 and under 12	59	478	4	3 <sup>1/16</sup>	129.7	4	3 <sup>1/4</sup>	130.2
12 and under 12.5	767	712	4	3 <sup>3/4</sup>	131.4	4	3 <sup>7/8</sup>	131.8
12.5 and under 13	660	618	4	4 <sup>1/4</sup>	132.7	4	4 <sup>3/4</sup>	134
13 and under 13.5	1269	1260	4	5 <sup>1/8</sup>	134.9	4	5 <sup>1/8</sup>	134.9
13.5 and under 14	864	980	4	6 <sup>3/8</sup>	138.1	4	6 <sup>1/2</sup>	138.4
14 and under 15	117	140	4	8 <sup>1/4</sup>	142.9	4	9	144.8
15 and under 16	82	106	4	10 <sup>1/2</sup>	148.6	4	10 <sup>3/4</sup>	149.2
16 and under 17	43	90	5	0 <sup>1/2</sup>	153.7	4	11 <sup>1/2</sup>	151.1
17 and under 18	47	112	5	0	152.4	5	0	152.4

Table 1 Source: The Penny Magazine, 15 July 1837

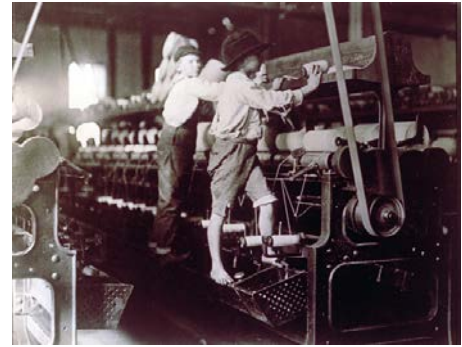
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Height (cm)	Age (years)	Height (cm)	Age (years)	Height (cm)	Age (years)
136	11	150	14	152	11
167	12	125	15	168	14
140	14	165	15	148	11
164	14	148	12	163	14
154	10	158	12	165	13
169	14	164	13	156	12
166	13	159	11	167	13
155	12	160	12	158	11
155	12	161	12	161	13
164	12	162	12	193	15
163	14	160.5	14	161	13
171	13	175	14	100	14
171	13	153	11	157	12
188	12	174	14	165	11
148	12	155	15	143	11
157	12	145	11	161	14
149.9	14	146	11	175	15
164	13	166	13	166	14
162	12	163	14	154	12
134	12	159	12	149	13
139	10	161	12	159	13
163	12	142	12	159	14
167	12	137	12	149	13
167	12	147	13	180	15
166	13	146	12	155	13
164.5	13	158	13	184	14
147	12	147	11	150	12
186	13	156	13	155.6	11
153	12	149	12	160	13
158	11	168	14	163	12
156.5	11	162	14	158	15
175	14	162	14	163	14
161	12	173	12	165	13
180	15	175	14	159	13
160	12	150	12	146	11
126	11	151	11	153	12
164	13	138	12	160	13
160	12	147	11	166	12
153.5	11	152	12	153	12
147.4	12	172	13	111	10

Table 2 Source: *CensusAtSchool* 2010-11

# Are children today taller than 150 years ago?

- 3) So, are children taller today than 150 years ago? If so, on average, by how much?
- 4) Can you suggest reasons for your findings?
- 5) Explain why the conclusions reached from the 1837 data would not be very accurate. What other data would be needed in order to make estimates of age from height?
- 6) Your graphs should look similar to the scatter diagram below. Why do you think the lines representing boys 2009 and boys 1837 dip downwards at ages 17 and 18? Do you think boys suddenly get shorter when they reach this age?



### Height of Boys and Girls, 1837 and 2009

