

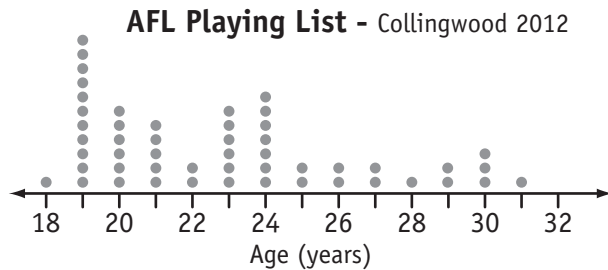
29. [Statistics]

Skill 29.1 Interpreting dot plots.

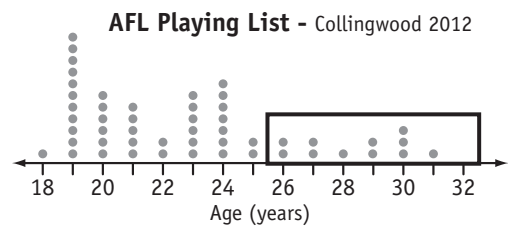
MM4.2 1 2 2 3 3 4 4
MM5.1 1 1 2 2 3 3 4 4

- Hint: Each dot (•), cross (x) or picture shows the position of a sample of the data above a number line.

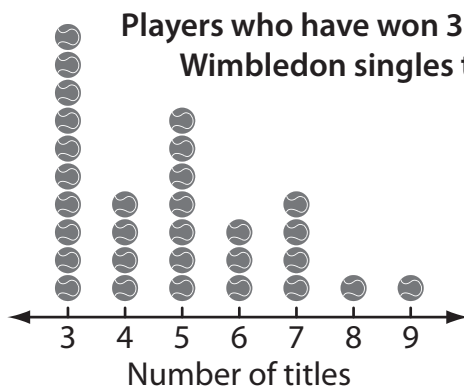
Q. How many Collingwood players are over the age of 25?



A. $2 + 2 + 1 + 2 + 3 + 1$
 $= 11$

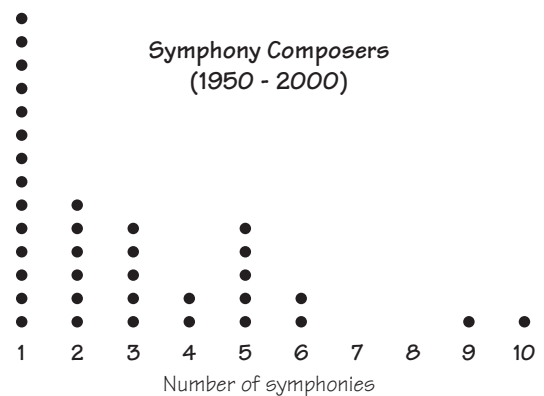


a) How many players have won more than 6 Wimbledon titles?



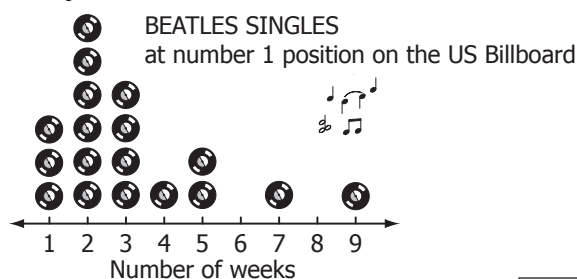
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b) Between 1950 and 2000, how many musicians composed more than 4 symphonies?



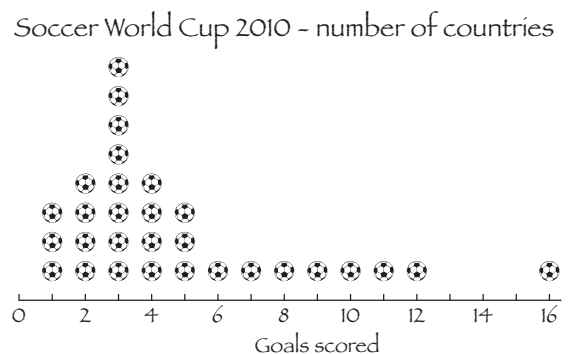
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c) 'Hey Jude' was The Beatles single that held the number one position on the US Billboard for the longest amount of time. For how many weeks was 'Hey Jude' at number one?



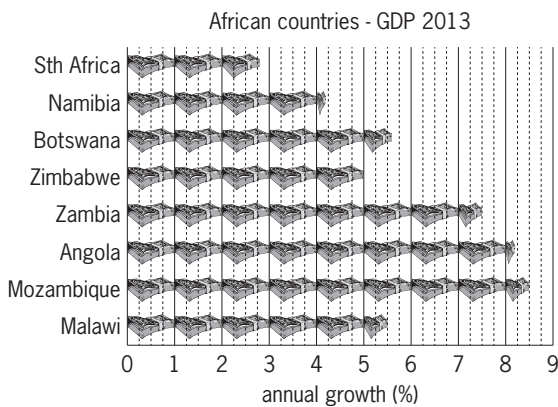
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d) How many countries scored more than 5 goals in the 2010 soccer world cup?

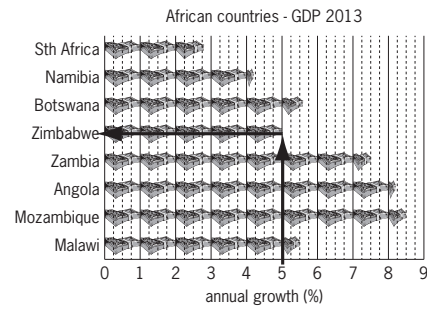


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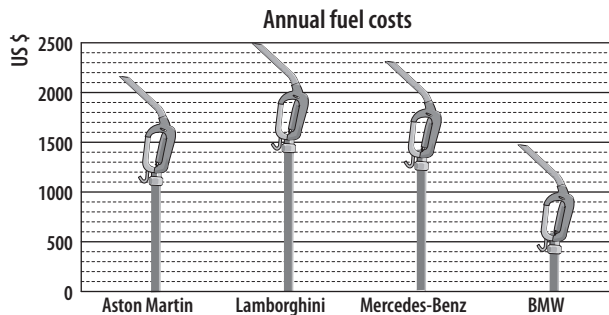
Q. Which African country had 5% annual growth in 2013?



A. Zimbabwe



a) Which car has closest to \$2200 each year in fuel costs?

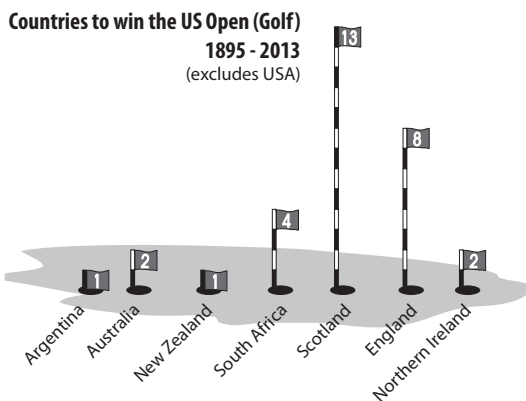


b) Which river is closest to 6000 km in length?

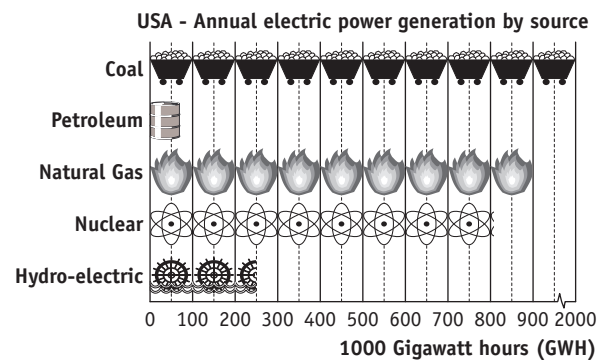


Ω = 1000 km in length

c) Which country has won the US Open twice as often as South Africa?



d) Which source of power generates approximately 250 000 gigawatt hours of electricity each year in the USA?



- Read the title and sub-headings.
- Check what each row (across) and column (down) represents.
- To find the information you need, follow a row across to where it meets the relevant column.
- Using the information gathered, perform any calculations necessary.

Q. Which type of nut contains twice as much protein as a walnut?

Nut (100 g)	energy (kj)	proteins (g)	fats (g)	carbohydrates (g)
cashew	2314	18.2	43.9	28.72
peanut	2385	25	47	16.5
almond	2418	19.8	50	19
pistachio	2391	21.4	46	27.7
walnut	2578	9.9	59	8.6

A. *almond*

Walnut protein is 9.9 g

$$9.9 \times 2 = 19.8$$

Almond protein is 19.8 g

Nut (100 g)	energy (kj)	proteins (g)	fats (g)	carbohydrates (g)
cashew	2314	18.2	43.9	28.72
peanut	2385	25	47	16.5
almond	2418	19.8	50	19
pistachio	2391	21.4	46	27.7
walnut	2578	9.9	59	8.6

a) Of the birds listed, which bird has a wingspan of 3.4 metres?

Wing Spans (m)							
barn owl	wedge tailed eagle	kooka-burra	swan	white pelican	condor	stork	albatross
0.9	2.5	2	2.2	3	3	3.4	3.5

b) Which type of coal has the highest percentage of carbon?

Coal Type	moisture	carbon	other
lignite	35%	30%	35%
sub-bituminous coal	10%	75%	15%
bituminous coal	5%	80%	15%
anthracite	3%	92%	5%

c) Which activity expends one third of the amount of kj per minute as swimming?

Energy needed (kJ per minute)						
sleeping	writing	house work	tennis (doubles)	swimming	cycling	sprinting
4	10	16	21	30	36	42

d) How many chemicals in seawater have a content of more than one part per thousand?

Principal constituents of seawater	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₂)	Sulphate (SO ₄)	Chloride (Cl)	Bromide (Br)	Total dissolved solids (Salinity)	
	Chemical Constituent	Content (parts per thousand)	0.419	1.304	10.710	0.390	0.145	2.690	19.350	0.070
Content (parts per thousand)	0.419	1.304	10.710	0.390	0.145	2.690	19.350	0.070	19.350	

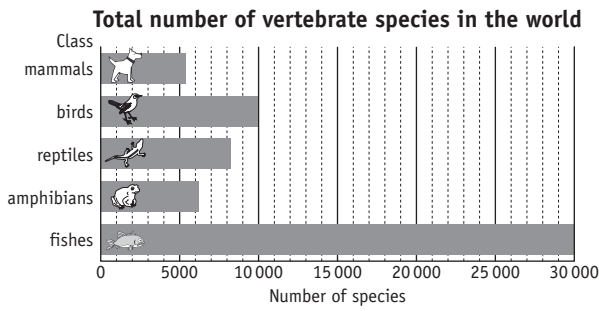
e) Which ski field listed below has the second most number of lifts?

Australian snow field	Skiable area (hectares)	Number of Lifts
Perisha Blue	1245	49
Thredbo	480	14
Selwyn	45	12
Charlotte Pass	50	4
Mt Buller	180	25
Mt Hotham	245	13
Falls Creek	451	14
Mt Baw Baw	30	7

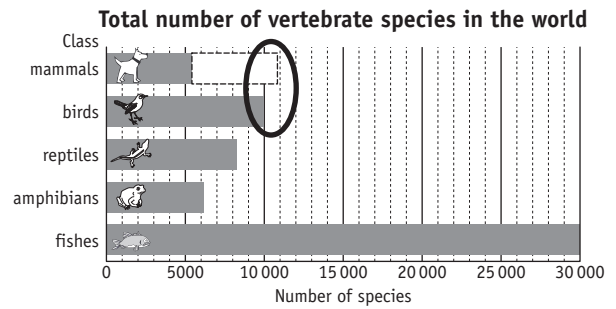
f) Which animal has the greatest $\frac{\text{jump height}}{\text{weight}}$ ratio?

How high can they jump?	Antelope	Human	Cat	Galago	Cuban tree frog	Locust	Flea	
Animal	Weight (g)	200 000	70 000	2500	300	12.9	3	0.0005
Weight (g)	200 000	70 000	2500	300	12.9	3	0.0005	
Jump height (cm)	250	60	150	225	65	45	10	

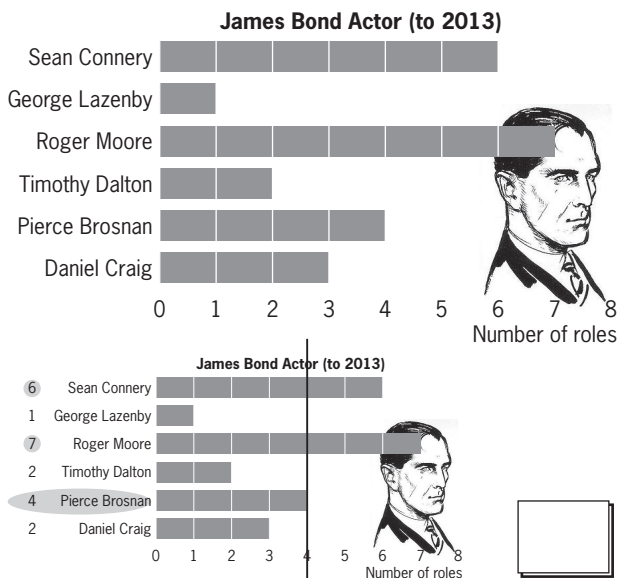
Q. Which vertebrate class has closest to twice as many species as mammals?



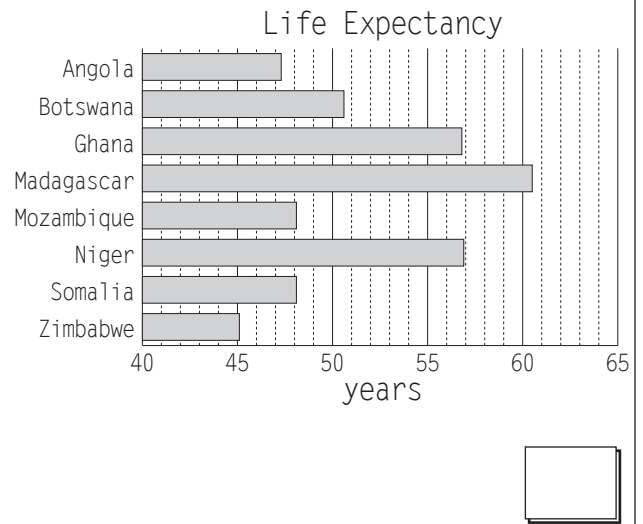
A. *birds* Find the mammals bar. Double the bar length and compare to bar lengths.



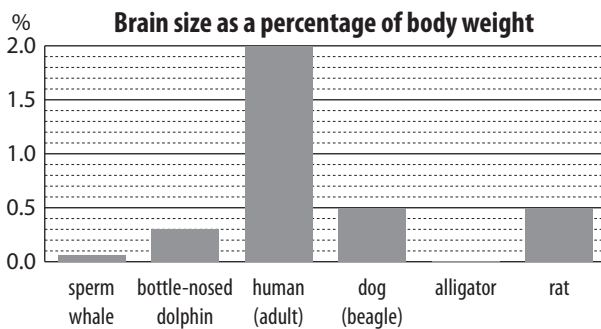
a) How many actors have played James Bond more often than Pierce Brosnan?



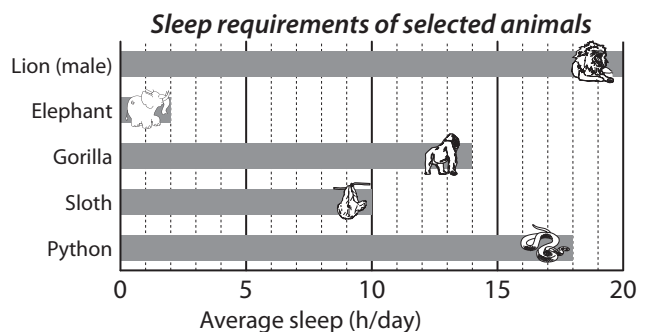
b) Using the graph below, how many countries have a life expectancy of less than 50 years?



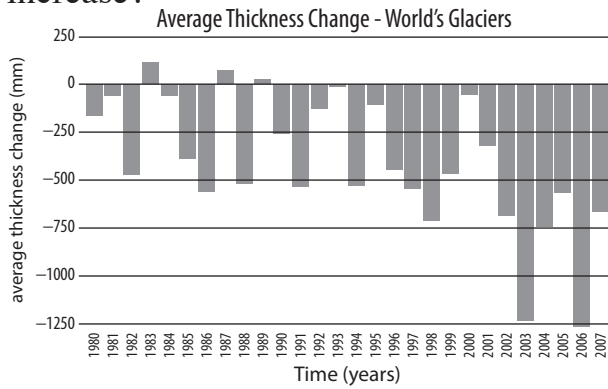
c) Which creature listed below has a brain weighing 0.3% of their body weight?



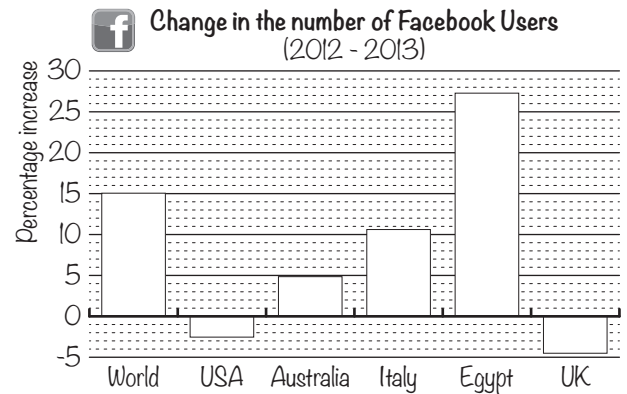
d) Which of the animals shown below sleeps for 7 times as many hours as an elephant?



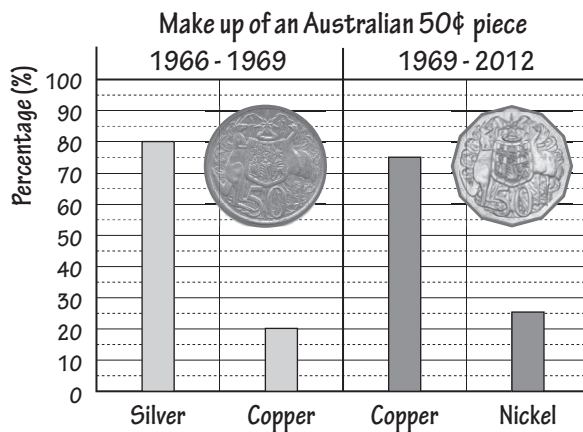
- e) In which years did the average thickness of the world's glaciers increase?



- f) Which of the countries shown has a percentage increase of facebook users closest to 5%?

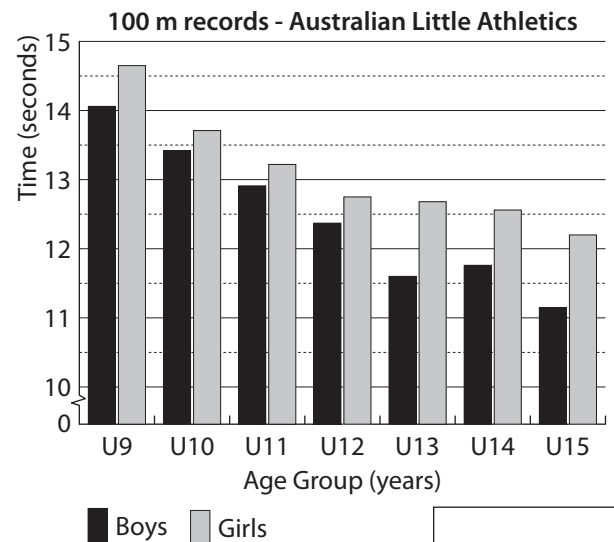


- g) After 1969 what is the percentage difference in the amount of copper in a 50 cent piece?



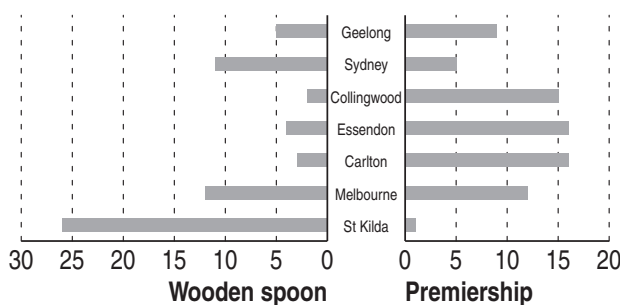
%

- h) In which age group is there the least difference in 100 m records for boys and girls at Little Athletics?

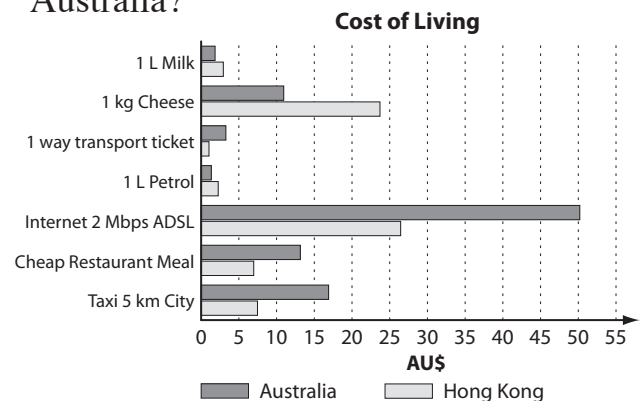


- i) How many of these AFL teams have won both more than 10 premierships and less than 5 wooden spoons since 1900?

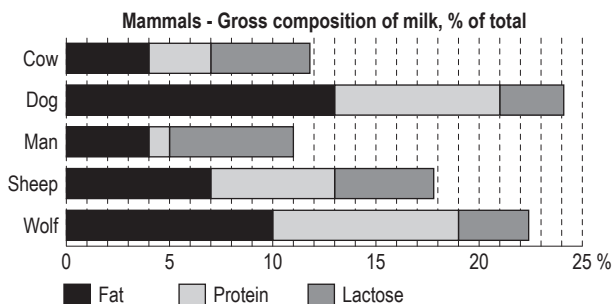
AFL Premierships / Wooden spoons 1900 - 2012



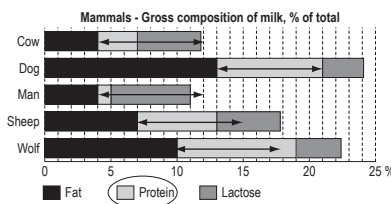
- j) Which cost of living item is twice as expensive in Hong Kong as it is in Australia?



Q. Which of the mammals shown has the highest protein content in their milk?



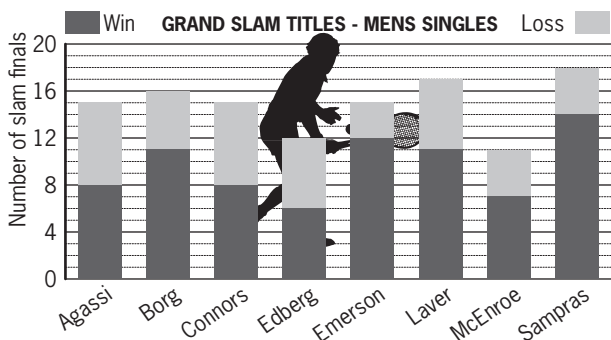
A. *wolf*



The width of the wolf bar for protein represents 9%.

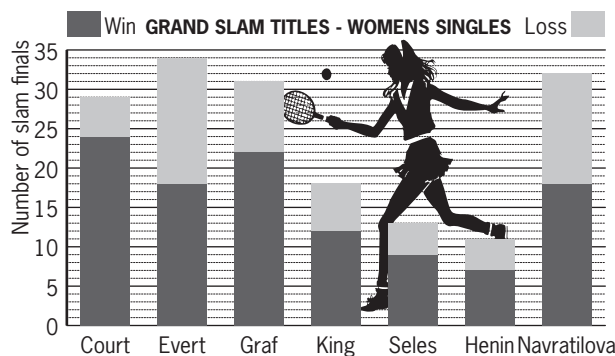
No other bar for protein content is as long in any other mammal shown.

a) Who had the best ratio of wins to losses in their grand slam singles finals?

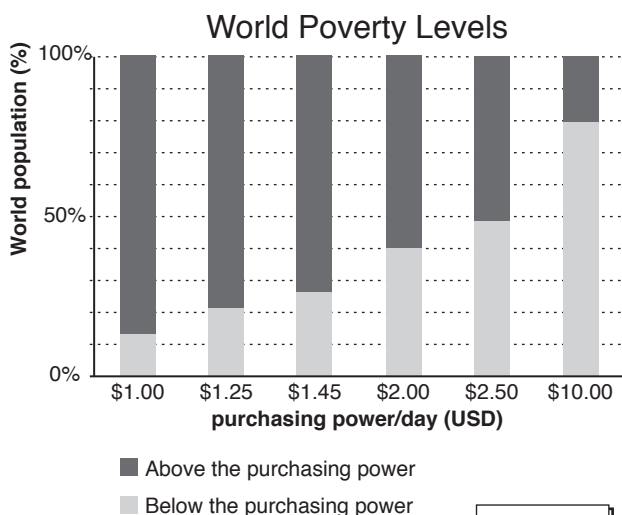


Emerson

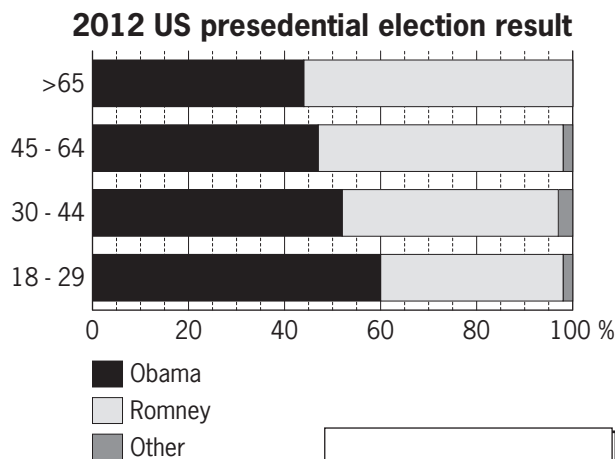
b) Who had the best ratio of wins to losses in their grand slam singles finals?



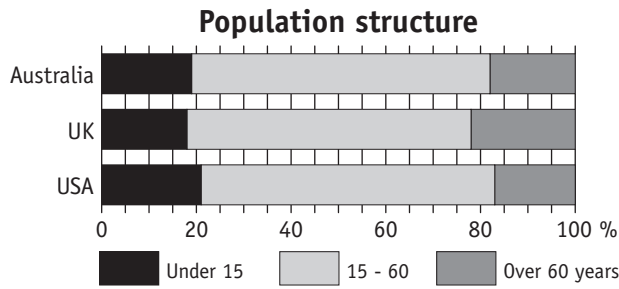
c) What percentage of the world's population lives on less than \$10 a day?



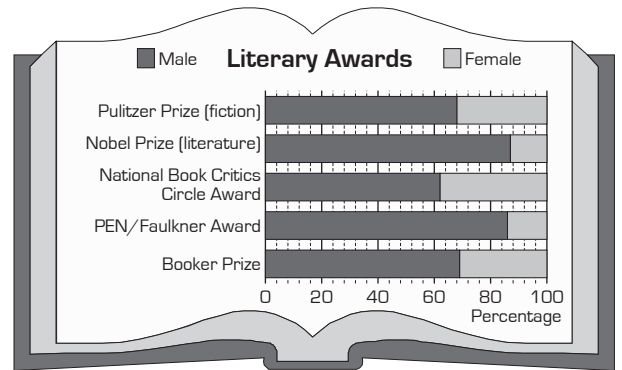
d) Obama and Romney split their votes 51% to 47% in the 2012 election. Which age group best reflects this result?



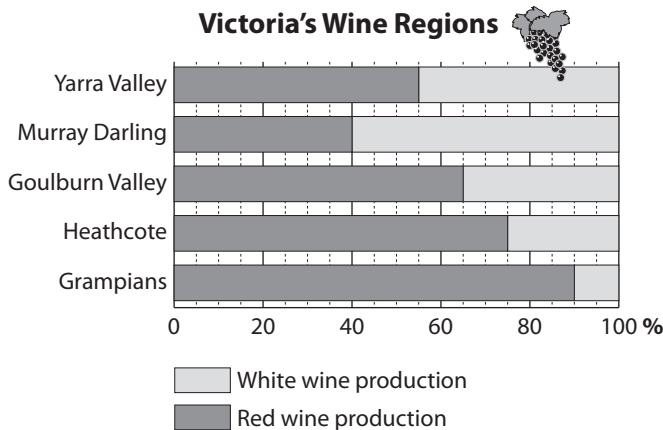
e) Which of the countries shown below has approximately 22% of their population over 60 years of age?



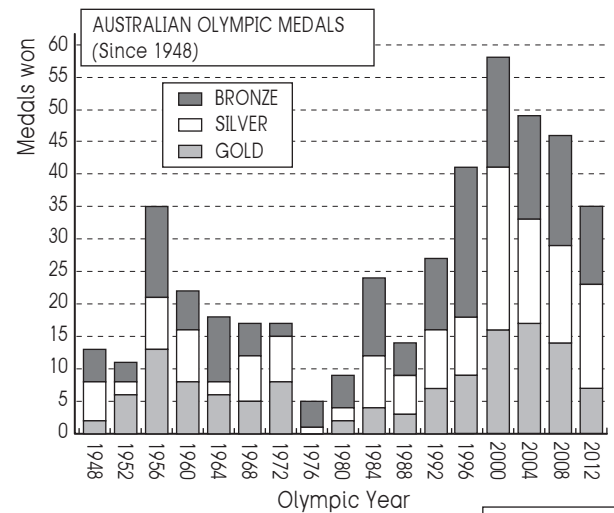
f) For which of the literary awards shown did males make up closest to three fifths of the recipients?



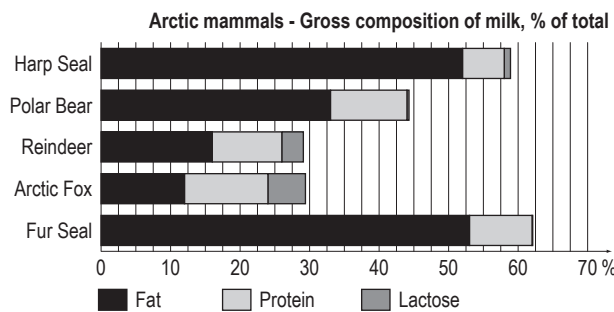
g) In which of the wine regions shown does red wine production account for two fifths of total production?



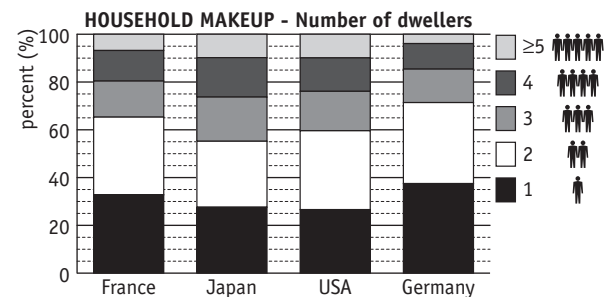
h) Of all the years in which Australia has won more than 15 medals, which year produced the least gold medals?



i) Which of the mammals shown has the lowest protein content in their milk?



j) Which country has the highest percentage of people living on their own?



Skill 29.6 Calculating the mean and median of sets of data (1).

MM4.2 11 22 33 44
MM5.1 11 22 33 44

Mean (or average)

- Add all the values in the set.
- Divide the total by the number of values in the set.

Set of data: 5, 1, 5, 3, 2, 1, 5, 2

Mean $1 + 1 + 2 + 2 + 3 + 5 + 5 + 5 = 24$
8 values so $24 \div 8 = 3$

Median (middle value)

- Write all the values in order.
- Odd numbered set - middle value.
- Even numbered set - average of the 2 middle values.

Set of data (even): 5, 1, 5, 3, 2, 1, 5, 2

Ordered set: 1, 1, 2, 2, 3, 5, 5, 5

Median $\frac{2+3}{2} = \frac{5}{2} = 2.5$

- Q.** This table shows the number of ski runs at selected resorts in Colorado. Find the mean and median of the data.

Resorts in Colorado - ski runs					
33	44	52	76	84	131

A. Mean

$$33 + 44 + 52 + 76 + 84 + 131 = 420$$

$$420 \div 6$$

$$= 70$$

6 values in the set, so divide by 6

Median

33, 44, 52, 76, 84, 131 order values

$$\frac{52+76}{2} = \frac{128}{2}$$

find middle value

$$= 64$$

average 2 middle values

- a)** This table shows the number of stations on some of the monorails in the USA. Find the median of the data.

Monorails of USA (Number of Stations)									
2	2	2	3	4	6	7	8	8	8

2, 2, 2, 3, 4, 6, 7, 8, 8, 8 middle values

$$\Rightarrow \frac{4+6}{2} = \frac{10}{2}$$

median =

- b)** This table shows the NASCAR sprint finishes for Carl Edwards between 2005 and 2009 at Pocono Raceway. Find the median of the data.

Pocono Raceway NASCAR sprint car series '05 - '09 finishes - Carl Edwards								
1	1	2	4	9	14	21	25	39

⇒ median =

- c)** This table shows the atomic number of the non-metals in the periodic table of elements. Find the median of the data.

Non-metals • Periodic table of elements

Carbon (C)	Nitrogen (N)	Oxygen (O)	Phosphorus (P)	Sulphur (S)	Selenium (Se)
6	7	8	15	16	34

⇒ median =

- d)** This table shows a 7-day temperature forecast for Hamilton. Find the median high temperature for the interval.

Hamilton NZ 7-day Forecast Oct 16 2013							
	WED	THU	FRI	SAT	SUN	MON	TUE
High	19°C	21°C	22°C	22°C	23°C	23°C	22°C
Low	10°C	5°C	10°C	4°C	5°C	10°C	10°C

order values

⇒ median =

- e) This table shows the average lifespan of some animals. Find the mean of the data.

ANIMAL LIFESPANS - years

cat	camel	rhinoceros	grizzly bear
12	12	15	25

4 values in the set, so divide by 4

$12 + 12 + 15 + 25 = 64$

Mean = $64 \div 4$

mean =

- f) Ada selects scrabble letters that spell the 7 letter word 'quartz'. Find the mean value of her tiles.

Value of Scrabble tile selection

A	U	R	T	Y	Q	Z
1	1	1	1	4	10	10

Mean =

mean =

- g) This table shows the number of calories per serving of some carbohydrates. Find the mean of the data.

Carbohydrate	Calories per 100 g
potatoes	70
macaroni	95
spaghetti	100
pasta	105
rice	140
bread	210

Mean =

mean =

- h) This table shows the number of stations on some of Europe's monorails. Find the mean of the data.

Europe's monorails (Number of Stations)

2	2	2	2	2	3	3	5	6	20
---	---	---	---	---	---	---	---	---	----

Mean =

mean =

- i) This table shows the number of petals on some flower species. Find the mean and median of the data.

Number of petals

Lily	Iris	Fuschia	Buttercup	Amaryllis	Narcissus	Delphinium
3	3	4	5	6	6	8

Mean =

Median =

mean =

median =

- j) This table shows the total number of medals won by the USA at the winter Olympics from 1992 to 2010. Find the mean and median of the data.

[Round to the nearest integer.]

United States Winter Olympics Medals

year	1992	1994	1998	2002	2006	2010
medals	11	13	13	34	25	37

Mean =

Median =

mean =

median =

Mode (most common value)

Range

- Write all the values in order.
- Subtract the lowest value from the highest value.

Hint: A set of data can have more than one mode if two or more values repeat the same number of times.

Set of data: 5, 1, 5, 3, 2, 1, 5, 2
Ordered set: 1, 1, 2, 2, 3, 5, 5, 5

Mode 5
Range $5 - 1 = 4$

Q. The number of scrabble tiles available for each letter is shown below. Find the mode and range of the data.

Numbers of Scrabble tiles

Z	Q	X	J	K	Y	W	V	H	F	P	M	C	B	G	D	U	L	S	R	T	N	O	I	A	E
1	1	1	1	1	2	2	2	2	2	2	2	2	3	4	4	4	4	6	6	6	8	9	9	12	

A. Mode
= 2

Range
 $12 - 1$
= 11

Numbers of Scrabble tiles

Z	Q	X	J	K	Y	W	V	H	F	P	M	C	B	G	D	U	L	S	R	T	N	O	I	A	E
1	1	1	1	1	2	2	2	2	2	2	2	2	3	4	4	4	4	6	6	6	8	9	9	12	

difference between highest and lowest

The value 2 is in the set 9 times

a) This table shows the NASCAR sprint finishes for Jeff Gordon between 2005 and 2009 at Pocono Raceway. Find the mode and range of the data.

Pocono Raceway NASCAR sprint car series '05 - '09 finishes - Jeff Gordon								
1	3	4	4	9	10	13	14	34

The value 4 is in the set 2 times

Range = $34 - 1 = 33$

mode = range =

b) The values of scrabble tiles are shown below. Find the mode and range of the data.

Values of Scrabble tiles

A	E	I	L	N	O	R	S	T	U	D	G	B	C	M	P	F	H	V	W	Y	K	J	X	Q	Z
1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	4	4	4	4	4	5	8	8	10	10

Range =

mode = range =

c) This table shows the total number of gold medals won by Great Britain at the summer Olympics. Find the mode and range of the data.

Great Britain Olympic Gold Medals

year	1984	1988	1992	1996	2000	2004	2008
medals	5	5	5	1	11	9	19

Range =

mode = range =

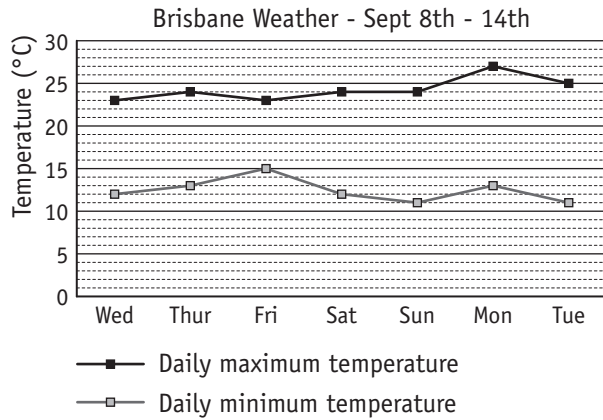
d) This table shows the number of calories per serving of some fruits. Find the mode and range of the data.

Fruit	Calories per 100 g
Apple	47
Orange	40
Banana	95
Grapes	60
Kiwi fruit	49
Pear	40

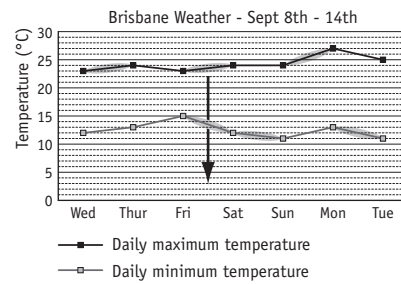
Range =

mode = range =

Q. In Brisbane, between which 2 days did the maximum temperature increase and the minimum temperature decrease?



A. Friday & Saturday

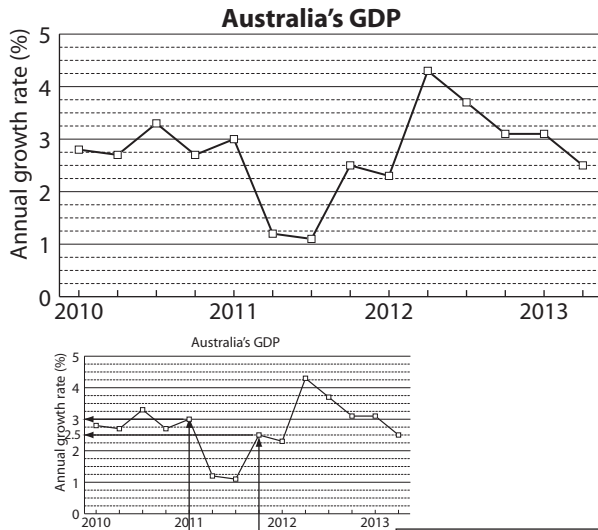


Find the daily maximum temperature graph and mark where the line increases between days.

Then find the minimum graph and mark where the line decreases.

They match between Friday and Saturday.

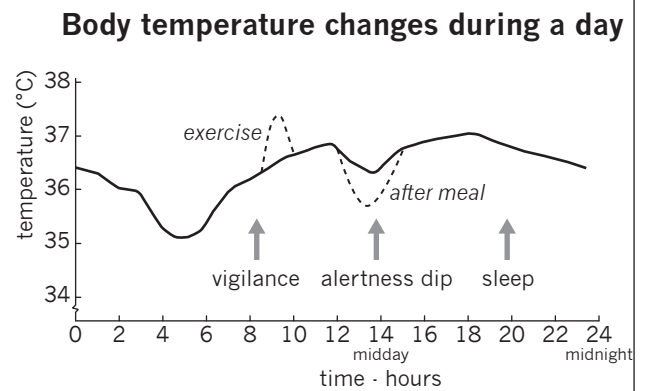
a) What was the difference in Australia's annual growth in GDP between January 2011 and October 2011?



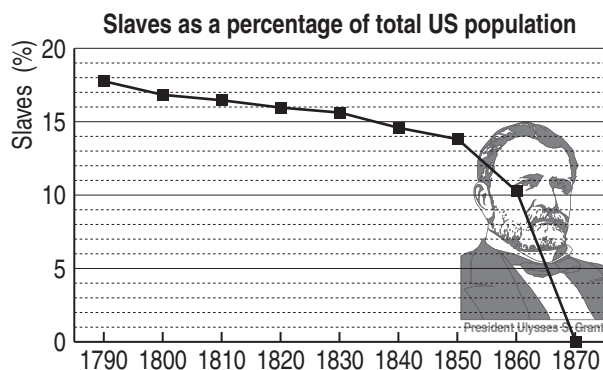
0.5 %

b) At what time of day is your body temperature the lowest?

[Give your answer to the nearest hour.]

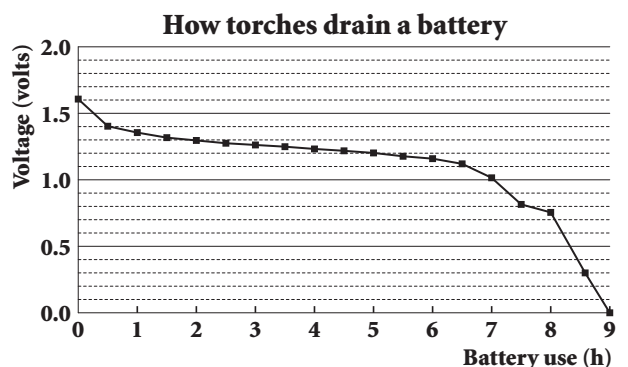


c) In which decade was the biggest percentage decrease in the number of slaves?



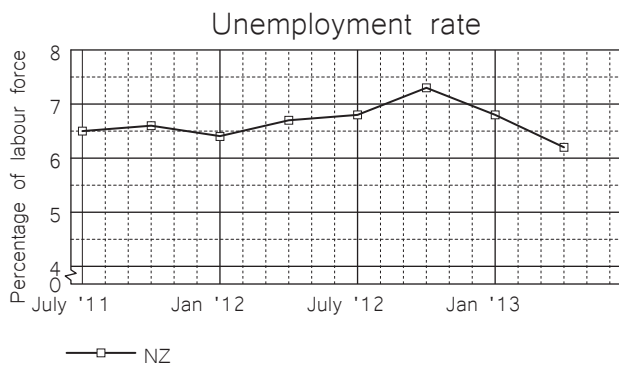
1850-1860

d) For how many hours would this torch have been in use if the battery had 1.2 volts remaining?

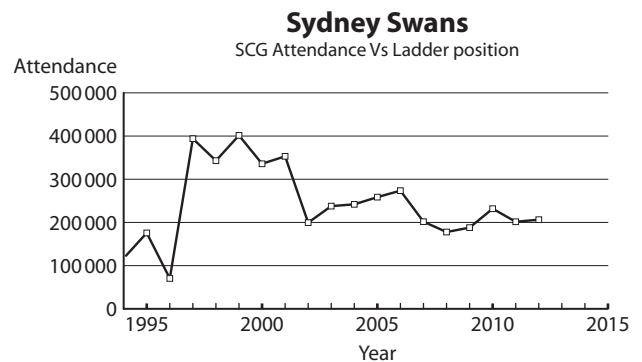


7 h

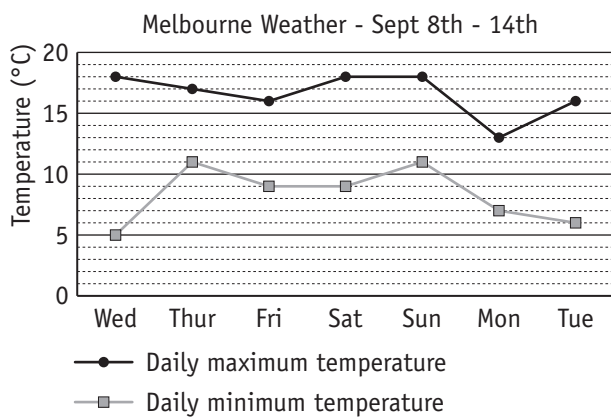
- e) What was the unemployment rate in New Zealand in February 2012?



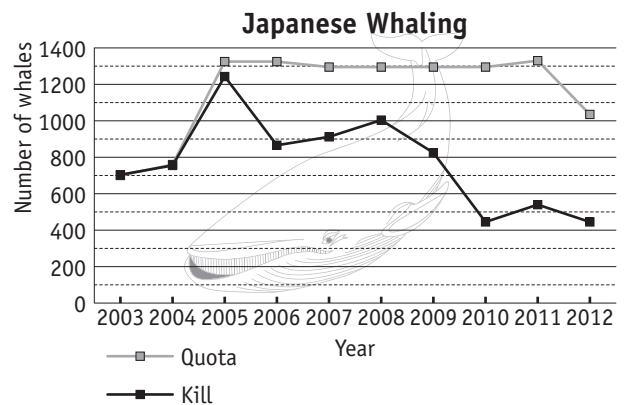
- f) Between which two consecutive years did the Sydney Swans attendance increase the most?



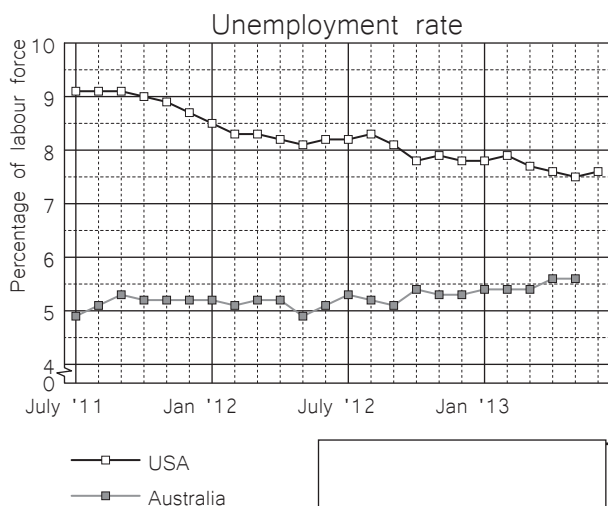
- g) Which day of the week in Melbourne had a difference between the daily maximum and daily minimum temperatures of 9°C?



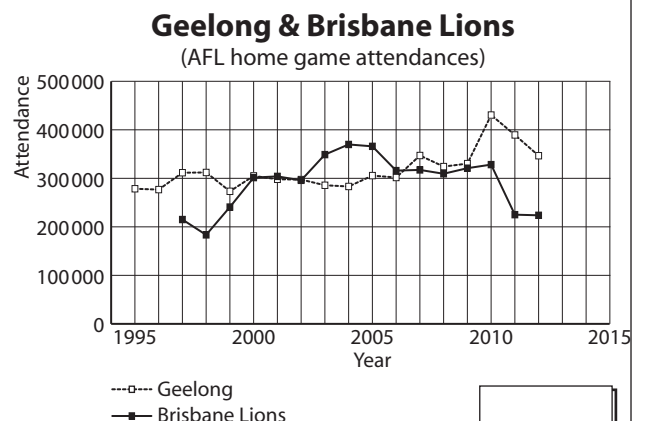
- h) In which year was there the greatest difference between the quota and the kill by Japanese whalers?



- i) Which country has the least change in unemployment rate between July 2011 and July 2012?

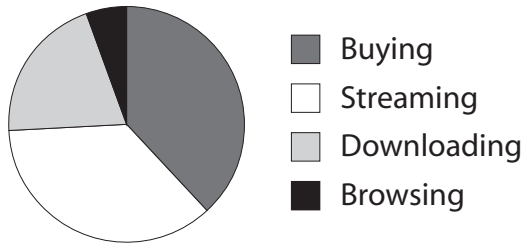


- j) Between 2000 and 2006 Brisbane Lions's home game attendance exceeded Geelong's home game attendance apart from one year. Which year was this?

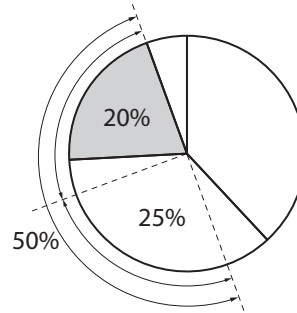


Q. Which activity makes up 20% of iTunes traffic?

Daily iTunes traffic composition

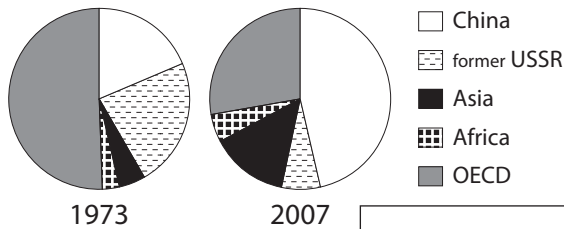


A. downloading



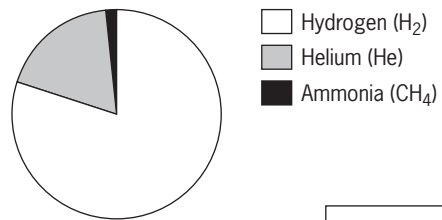
a) Which region closest to halved their hard coal production between 1973 and 2007?

Hard coal production



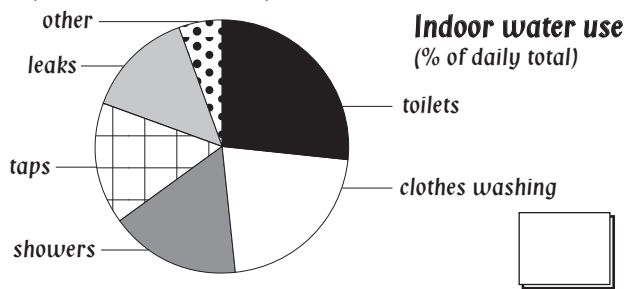
b) Which element makes up about 80% of Neptune's atmosphere?

Atmospheric composition of Neptune



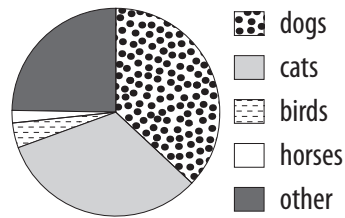
c) Approximately what percentage of indoor water usage is accounted for by showers?

- A) 5% B) 15%
C) 25% D) 50%



d) Which two animals account for 70% of all pets?

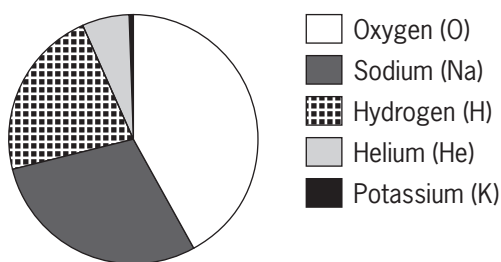
Pet owners' choice



e) Approximately what percentage of Mercury's atmosphere is sodium?

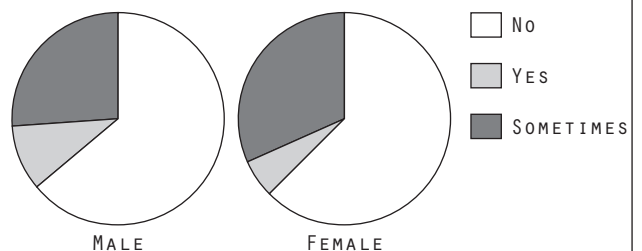
- A) 15% B) 20%
C) 30% D) 45%

Atmospheric composition of Mercury



f) Which response, to accepting a stranger as a friend on facebook, is most similar between males and females?

ACCEPTING STRANGERS AS FRIENDS ON FACEBOOK?



To complete a stem-and-leaf plot from a given set of data

- Write the values from the data set - each unit digit is a leaf beside its corresponding tens (or hundreds) digit, which is a stem.

Hint:

tens value	units value	
STEM	LEAF	
0	2	= 2
1	5 7	= 15 and 17

hundreds & tens values	units value	
STEM	LEAF	
23	7	= 237

To calculate values from a stem-and-leaf plot

Median (middle value)

- Count the number of leaves.
- If an odd number of leaves:
 - Count from the top left leaf until you reach the middle leaf.
 - This digit is the unit and must be put with the corresponding stem.

If an even number of leaves:

- Count from the top left leaf until you reach the two middle leaves.
- Read the digits with their corresponding stems.
- Find the average of the 2 middle numbers.

Range

- Subtract the lowest number (top left leaf) from the highest number (bottom right leaf).

Data set of 13 elements:

{ 13, 18, 18, 19, 20, 21, 21, 22, 22, 22, 29, 30, 31 }

median (7th element) = 21

range

stem	leaves	lowest value = 13
1	3 8 8 9	median = 21
2	0 1 1 2 2 2 9	
3	0 1	highest value = 31

range = high - low
= 31 - 13
= 18

Q. This stem-and-leaf plot shows the number of winners of the Tour de France by country. Find the median of the data.

Stem	Leaf
0	1 1 1 2 2 4 9
1	0 2 8
2	
3	6

1 | 8 = 18

A. 11 countries have Tour de France winners ⇒
median = 6th score
= 4

Stem	Leaf
0	1 1 1 2 2 4 9
1	0 2 8
2	
3	6

1 | 8 = 18

Annotations: 5 values above, middle leaf, 5 values below

- a) Complete the stem-and-leaf plot for the data:
48, 56, 73, 55, 48, 62, 72, 49, 57, 44,
59, 60, 66, 55

Stem	Leaf
4	4 _ _ _
5	5 _ _ _
—	— _ _ _
—	— _ _ _

Key
3 | 5 = 35

- b) Complete the stem-and-leaf plot for the data showing the results of the women's high jump at the 1968 - 2008 Olympics:
205, 206, 201, 205, 202, 203, 202, 197,
193, 192, 182

Stem	Leaf
18	<u>2</u> 23 5 = 235 cm
—	— _ _ _
—	— _ _ _

- c) Find the median and range of the monthly average high temperatures for Adelaide, SA.

Stem	Leaf
1	<u>5</u> 6 7 9 9
2	2 <u>3</u> 5 6 7 9 <u>9</u>

lowest score = 15
highest score = 29
2 | 5 = 25°C
12 scores so middle score halfway between score 6 (22) and score 7 (23)

median =

range =

median = range =

- d) This stem-and-leaf plot shows the results of the men's pole vault jump at the 1968 - 2008 Olympics. Find the median and range of the data.

Stem	Leaf
54	0
55	0 0
56	
57	5 8
58	0
59	0 0 2 5 6

53 | 1 = 531 cm

median =

range =

median = range =

- e) Find the median and range for these 15 American states that have the lowest number of counties.

Stem	Leaf
0	3 5 5 8
1	0 4 4 5 6 7
2	1 3 4 9 9

1 | 4 = 14 counties

median =

range =

median = range =

- f) This stem-and-leaf plot shows the water consumption rates per kilogram of body weight for selected livestock. Find the median and range of the data.

Stem	Leaf
7	0
8	0 5 8
9	4
10	0
11	8 9
12	5
13	0
14	
15	
16	0 8 9

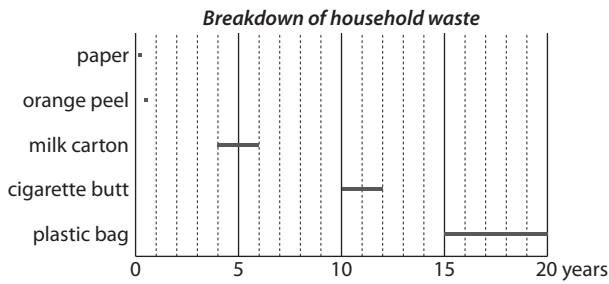
12 | 6 = 126 mL

median =

range =

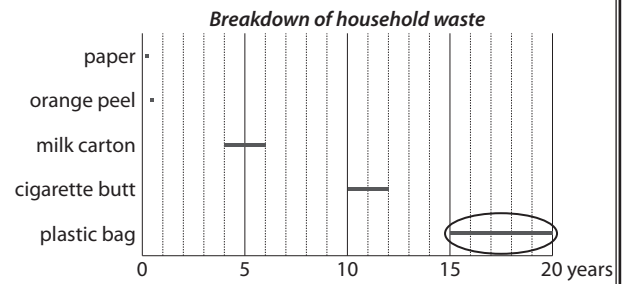
median = range =

Q. Of the items shown which has the longest breakdown time span?

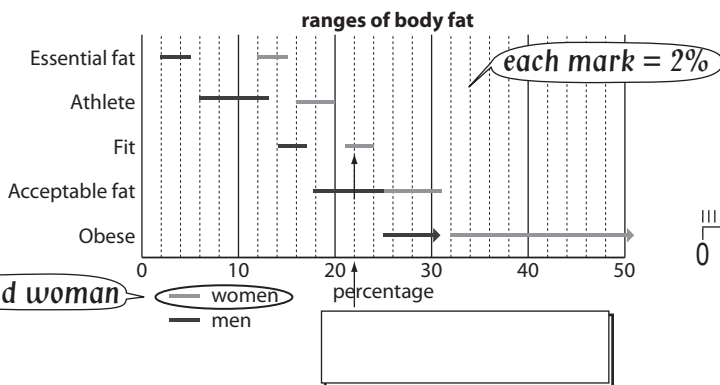


A. *plastic bag*

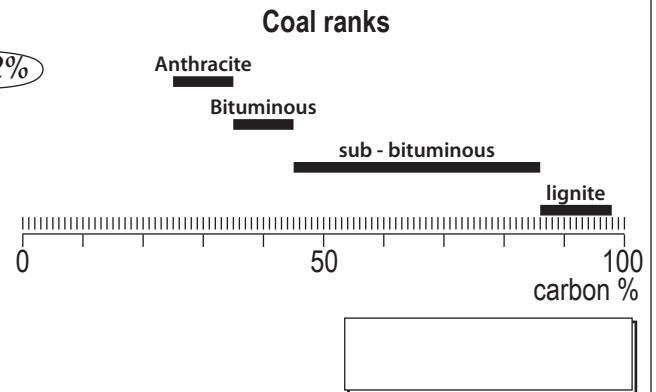
Check the length of each line segment.



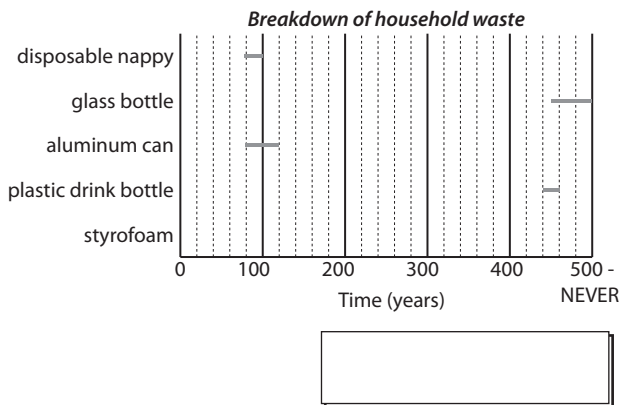
a) If you were a female with 22% body fat into which category would you fall?



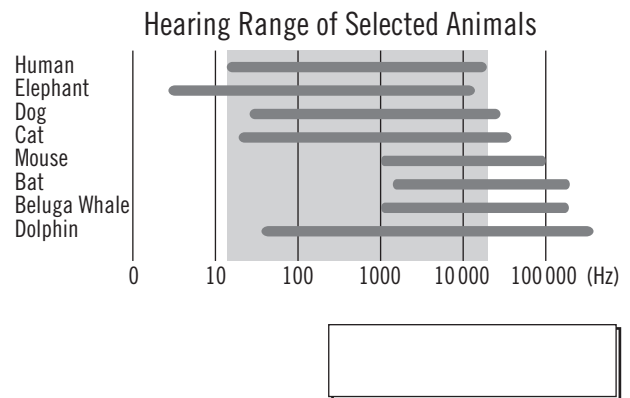
b) A sample of coal contains 38% carbon. To which category does it belong?



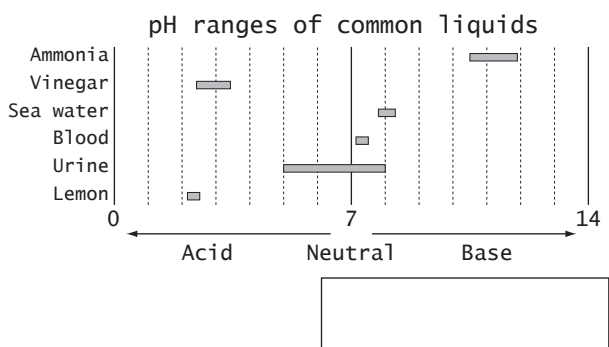
c) Apart from styrofoam which product has the longest breakdown time span?



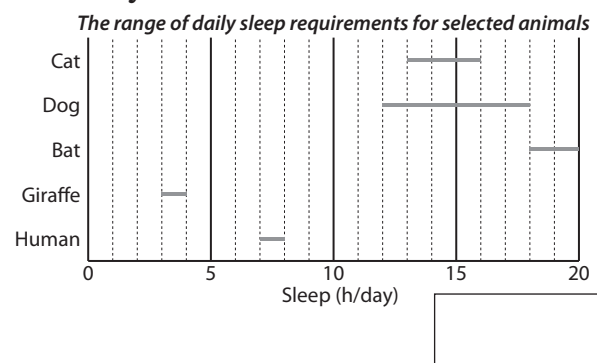
d) Which animal can hear sounds with a frequency of less than 10 Hz?



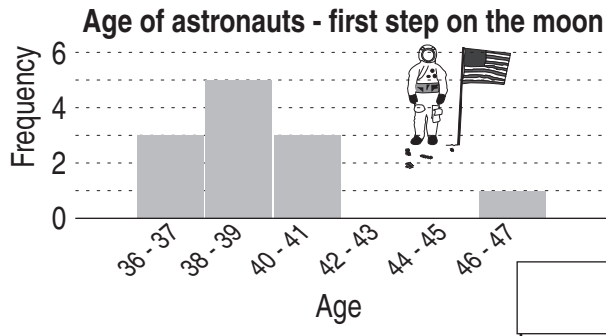
e) Of the liquids shown below which could have a pH that is neutral?



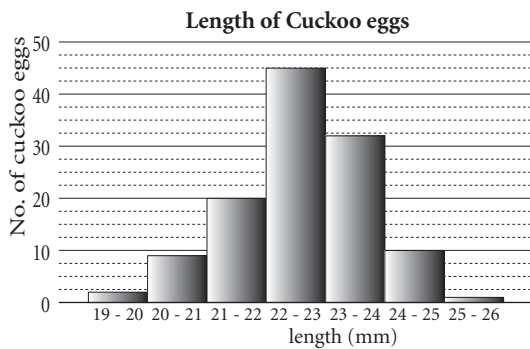
f) Which animal sleeps the most hours each day?



- g) How many astronauts were less than 40 years old when they first stepped on the moon?

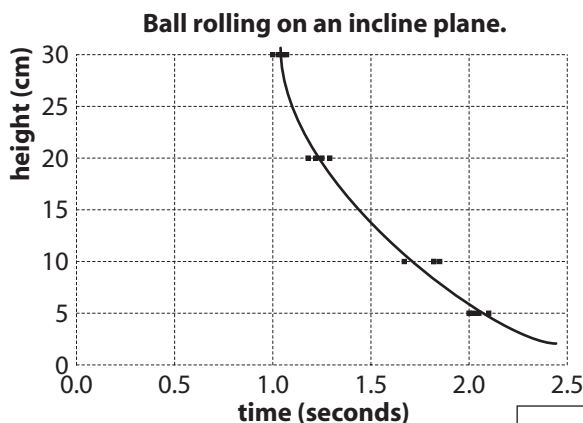


- i) Are more cuckoo eggs longer than or shorter than 23 mm?



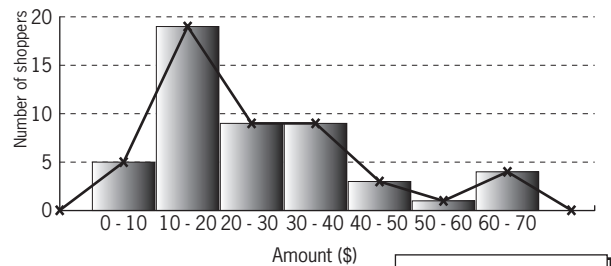
- k) An inclined plane is propped at one end to a certain height and a ball is rolled down. Which best describes the trend line for the time taken for a ball to roll the length of the inclined plane?

- A) no height, faster rolling ball
B) greater height, faster rolling ball
C) lesser height, faster rolling ball



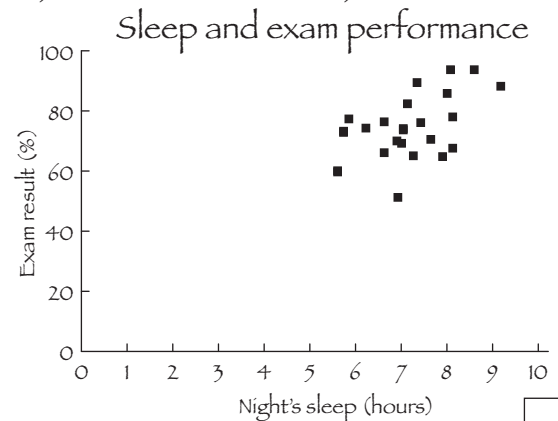
- h) Did most shoppers spend more or less than \$20?

Amount spent in a grocery store by 50 consecutive shoppers



- j) Based on this data what is a reasonable exam result for a student who sleeps for 6 hours on the night before their exam?

- A) 20% B) 40%
C) 60% D) 100%



- l) Which best describes the sample?

- A) increased price, decreased sales
B) increased price, increased sales
C) decreased price, decreased sales

Average sales price of \$20 books by month

