17.4 Monohybrid inheritance

01. 0610_m22_qp_22 Q: 33

In a species of pea plant, height is controlled by one gene. The allele for tall is dominant to the allele for short.

A test cross is done to identify the genotype of a tall pea plant.

The table shows the possible phenotypes of the offspring and a description of the genotypes of the tall parent pea plant.

	phenotypes of the offspring	description of the genotype of the tall parent pea plant
1	all tall	heterozygous
2	all tall	homozygous dominant
3	all short	homozygous dominant
4	tall and short	heterozygous

If a large number of offspring are produced, which rows are possible?

A 1 and 3 **B** 1 only **C** 2 and 4 **D** 2 only

---

02. 0610_s21_qp_21 Q: 34

Colour blindness is a characteristic that is sex-linked.

Which statement about colour blindness is correct?

A The gene for colour blindness is located on the Y chromosome and colour blindness is more common in males than in females.

B The gene for colour blindness is located on the X chromosome and colour blindness is more common in males than in females.

C The gene for colour blindness is located on the X chromosome and colour blindness is more common in females than in males.

D The gene for colour blindness is located on the Y chromosome and colour blindness is more common in females than in males.

---

03. 0610_s21_qp_22 Q: 34

Coat colour in cattle is controlled by two codominant alleles.

The genotype C^RC^R results in cattle with a red coloured coat. The genotype C^WC^W results in cattle with a white coloured coat. The genotype C^RC^W results in a roan coat; these cattle have a mixture of red hairs and white hairs in their coat.

A mating occurs between a red cow and a roan bull.

What is the expected ratio of coat colour in the offspring?

A 50% red, 50% white

B 100% red

C 50% red, 50% roan

D 100% roan

---

04. 0610_w21_qp_21 Q: 32

A man of genotype I^AI^B and woman of genotype I^BI^o have a child.

What is the chance that the child will have the same blood group as one of its parents?

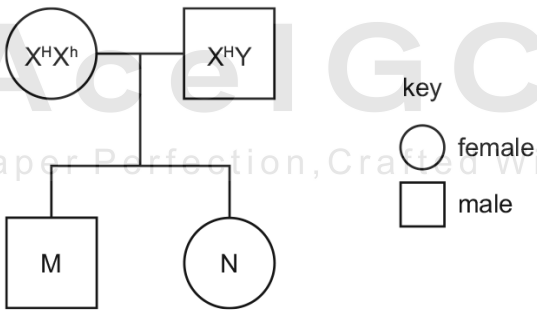
A zero **B** 1 in 4 **C** 1 in 2 **D** 3 in 4

---

05. 0610_w21_qp_22 Q: 32

The gene for haemophilia is found on the X chromosome and the allele for haemophilia is recessive.

In the pedigree diagram the dominant allele is shown as X^H and the recessive allele is shown as X^h.



What is the probability of child M having haemophilia?

A 0.00 **B** 0.25 **C** 0.50 **D** 1.00

---

06. 0610_w21_qp_23 Q: 33

A man with blood group AB and a woman with blood group O have a child.

What are the correct percentages of the possible blood groups for this child?

A 50% A and 50% B

B 50% AB and 50% O

C 25% A, 25% B and 50% O

D 25% AB, 25% A, 25% B and 25% O

---

07. 0610_p20_qp_20 Q: 30

What are the possible blood groups of the offspring of parents who have blood group A and B?

A AB only

B A and B

C A, B and AB

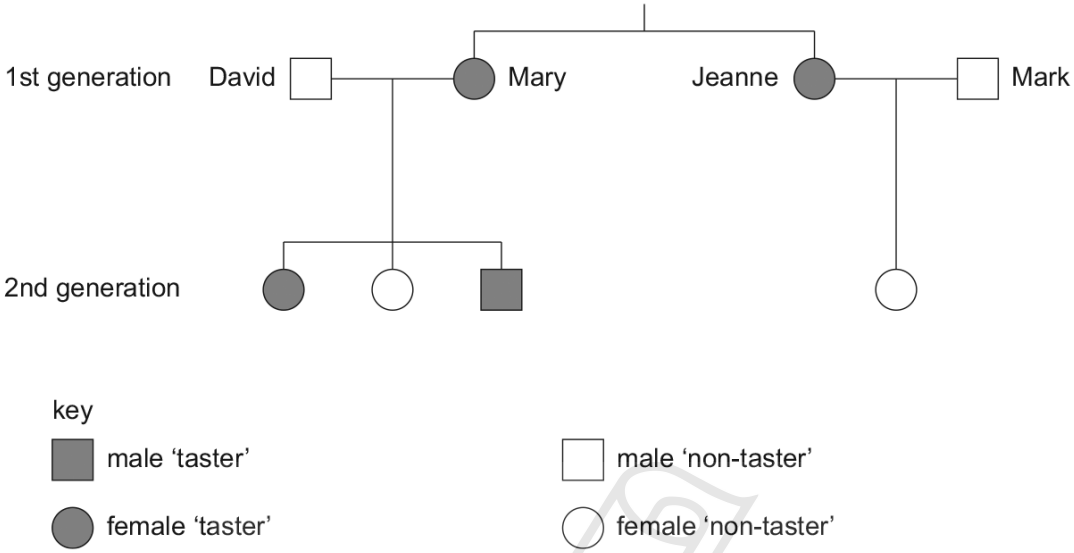
D A, B, AB and O

---

08. 0610_p20_qp_20 Q: 31

The diagram shows a family tree and the inheritance of the ability to taste a certain substance.

The allele for the ability to taste this substance is dominant.



Which statement about the genotypes of the sisters Mary and Jeanne is correct?

A Mary is heterozygous and Jeanne is homozygous.

B Mary is homozygous and Jeanne is heterozygous.

C They are both heterozygous.

D They are both homozygous.

---

09. 0610_p20_qp_20 Q: 32

Haemophilia is a sex-linked recessive condition. A haemophiliac man has one son who has inherited haemophilia and two more sons who have not.

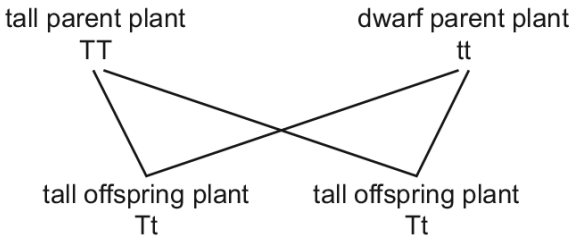
The man's wife is pregnant again. If this baby is a girl, what is the chance that she will have haemophilia?

A 0 % **B** 25 % **C** 50 % **D** 75 %

---

10. 0610_s20_qp_22 Q: 32

The diagram shows the inheritance of height in pea plants.



Which plants have a heterozygous genotype?

A both parent plants

B dwarf parent plant only

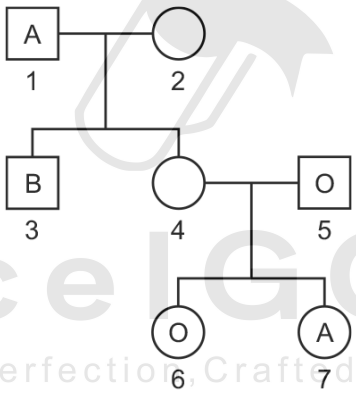
C both offspring plants

D tall parent plant only

---

11. 0610_s20_qp_23 Q: 31

The diagram shows the inheritance of ABO blood groups. The blood groups of some of the individuals are given.



What could be person 2's genotype?

A I^AI^o **B** I^BI^B **C** I^BI^o **D** I^oI^o

---

12. 0610_s20_qp_23 Q: 32

In mice, the allele for black hair is dominant to the allele for brown hair.

What proportion of offspring will have brown hair if a cross is made between a homozygous black mouse and a heterozygous black mouse?

A 0% **B** 25% **C** 50% **D** 100%

---

13. 0610_w20_qp_21 Q: 32

Red-green colour blindness is a condition that occurs more frequently in men than in women.

Which statement about this condition is correct?

A It can pass from father to son.

B It is a sex-linked characteristic.

C It shows co-dominance.

D The gene is on the Y chromosome.

---

14. 0610_w20_qp_22 Q: 32

In guinea pigs, the allele for black fur is dominant and the allele for white fur is recessive.

A test cross can be used to determine the genotype of a black guinea pig.

What would be the expected result of the test cross if the black guinea pig was heterozygous?

A 50% black, 50% white

B 25% black, 75% white

C 100% black

D 100% white

---

15. 0610_w20_qp_22 Q: 33

What is **not** affected by the environment?

A height

B skin colour

C blood group

D weight

---

16. 0610_w20_qp_23 Q: 32

Which statement about the inheritance of red-green colour blindness is correct?

A The gene for red-green colour blindness is located on the X chromosome.

B Females are more likely to have red-green colour blindness than males.

C The allele for red-green colour blindness is the dominant allele.

D The gene for red-green colour blindness is located on the Y chromosome.

---

17. 0610_m19_qp_22 Q: 32

Which parents could produce offspring with blood group O?

A heterozygous father with blood group A and heterozygous mother with blood group B

B heterozygous father with blood group A and homozygous mother with blood group B

C homozygous father with blood group A and heterozygous mother with blood group B

D homozygous father with blood group A and homozygous mother with blood group O

---

18. 0610_s19_qp_23 Q: 31

Parents with alleles I^AI^B and I^oI^o can produce children with which blood groups?

A A and B

B AB

C A and O

D B and O

---

19. 0610_s19_qp_23 Q: 34

The table shows some inherited features.

Which features show co-dominance?

	blood group	colour blindness	sex
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

key

✓ = co-dominant

✗ = not co-dominant

---

20. 0610_w19_qp_21 Q: 32

The diagram shows breeding rats where the allele for grey fur is dominant to white fur.

Which two individuals are definitely heterozygous for fur colour?

A 1 and 4 **B** 2 and 3 **C** 2 and 5 **D** 3 and 6

---

21. 0610_w19_qp_22 Q: 32

The diagram shows a genetic cross between a male bird with black feathers and a female bird with white feathers. All of the offspring have blue feathers.

parents	F^BF^B black	×	F^WF^W white
offspring	F^BF^W 100% blue		

Two of the blue offspring are crossed.

Which row shows the correct phenotype percentages for the cross?

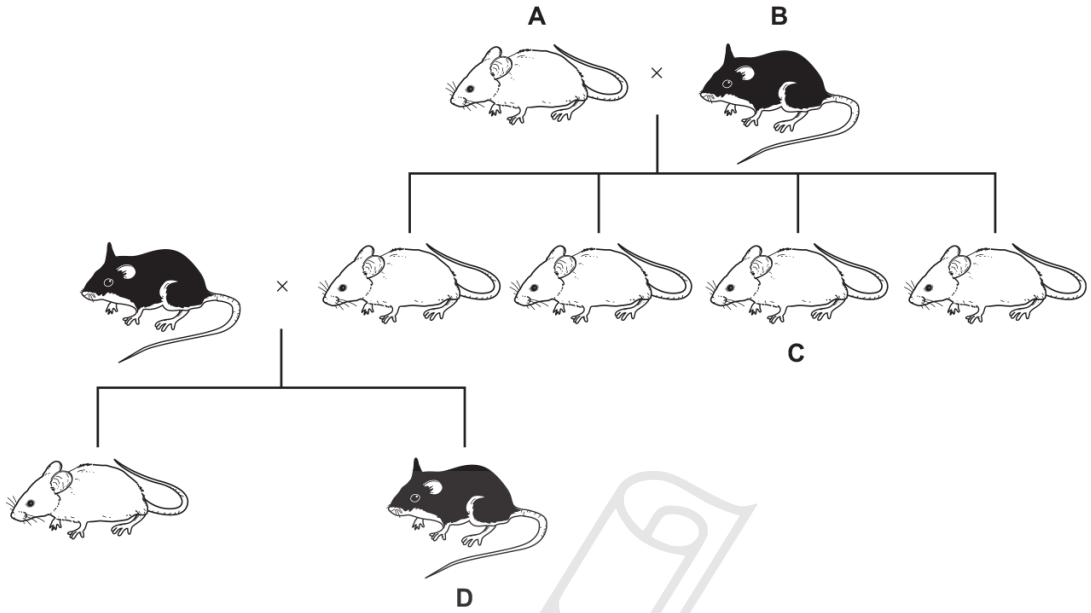
	percentage black	percentage blue	percentage white
A	25	75	0
B	25	50	25
C	50	20	25
D	75	0	25

---

22. 0610_m18_qp_22 Q: 28

The chart shows the inheritance of fur colour in a small mammal.

If the allele for white fur is dominant, which animal **must** be heterozygous for the gene controlling fur colour?



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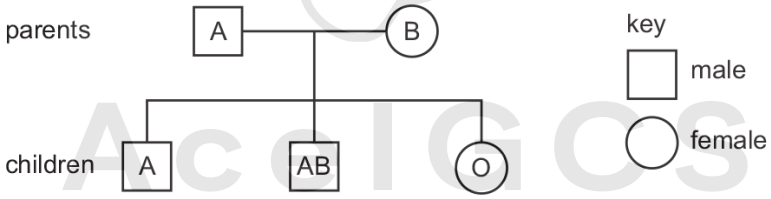
23. 0610_s18_qp_21 Q: 32

The diagram shows the phenotypes for blood groups in a family.



Which statement about the genotypes of the parents is correct?

A Both parents have alleles for blood group A and B.

B Both parents have the allele for blood group O.

C Only the father has the allele for blood group O.

D Only the mother has the allele for blood group O.

---

24. 0610_s18_qp_23 Q: 30

Cystic fibrosis is an inherited disease. The allele for cystic fibrosis is recessive.

A woman is heterozygous and her partner is homozygous dominant.

What is true of any children they produce?

A All of their children will have cystic fibrosis.

B There is a one in two chance of being heterozygous.

C There is a one in four chance of being heterozygous.

D There is no chance of having the cystic fibrosis allele.

---

25. 0610_w18_qp_21 Q: 32

A man marries a woman who has a different blood group from him. They have two children. The children have different blood groups from each other and different blood groups from their parents.

What are the genotypes of the parent's blood groups?

A I^AI^A and I^AI^B **B** I^AI^A and I^oI^o **C** I^AI^B and I^BI^B **D** I^AI^B and I^oI^o

---

26. 0610_w18_qp_22 Q: 32

Pure-breeding black-feathered chickens are mated with pure-breeding white-feathered chickens. All of the individuals in the offspring in the F1 generation have both black and white feathers.

What will be the ratio of offspring phenotypes when two of the F1 generation chickens are crossed?

A 1 black : 1 white

B 1 black : 2 black and white : 1 white

C 3 white : 1 black

D 3 black : 1 white

---

27. 0610_w18_qp_23 Q: 32

Which genotypes result in a person having blood group A?

A I^AI^A and I^AI^B **B** I^AI^A and I^AI^o **C** I^AI^o and I^oI^o **D** I^AI^o and I^AI^B

---

28. 0610_m17_qp_22 Q: 31

A man of genotype I^AI^o and woman of genotype I^BI^o have a child.

What is the chance that the child will have the same blood group as one of its parents?

A zero **B** 1 in 4 **C** 1 in 2 **D** 3 in 4

---

29. 0610_s17_qp_21 Q: 27

Dianthus flowers can be one of three different colours: red, pink or white.

A red flower is always homozygous and a white flower is always homozygous. Pink flowers are heterozygous.

If a red and a white flower are crossed, what percentage of the offspring will be pink?

A 0% **B** 25% **C** 75% **D** 100%

---

30. 0610_s17_qp_22 Q: 34

Colour blindness is a condition that occurs more frequently in men than in women.

Which statement about this condition is correct?

A It affects the cornea.

B It can pass from father to son.

C It is a sex-linked characteristic.

D The gene is on the Y chromosome.

---

31. 0610_w17_qp_21 Q: 30

In some mammals the allele for brown coat colour is dominant to the allele for white coat colour.

Which percentage of offspring will be white if a cross is made between two heterozygous mammals?

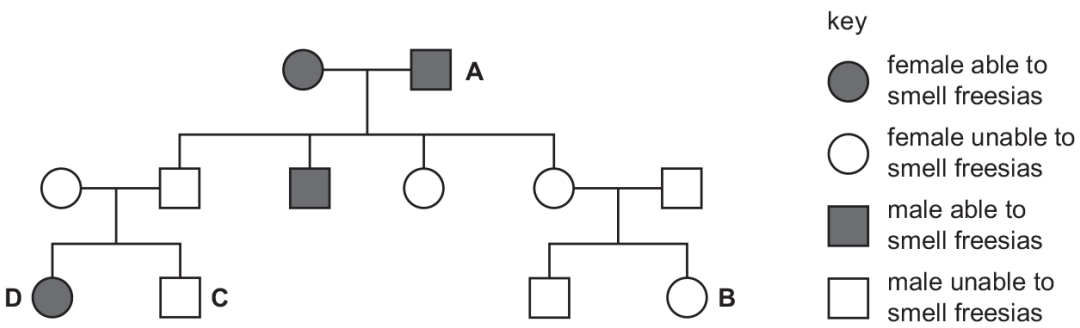
A 0% **B** 25% **C** 50% **D** 100%

---

32. 0610_w17_qp_22 Q: 31

The family tree shows the inheritance of the ability to smell flowers called freesias. The allele for the ability to smell freesias is dominant.

Which individual's symbol is **not** correct?



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33. 0610_w17_qp_23 Q: 30

A pure-breeding white rat was crossed with a pure-breeding black rat. All their offspring were black.

One of the offspring was bred with a pure-breeding white rat.

What is the most likely percentage of black rats in the offspring?

A 25 **B** 50 **C** 75 **D** 100

---

34. 0610_w17_qp_23 Q: 32

Red-green colour blindness is a sex-linked characteristic caused by a recessive allele.

Which prediction can be made about the children of a woman who is colour-blind and a man with normal vision?

A Boys will be colour-blind, girls will have a 50% chance of being colour-blind.

B Boys will be colour-blind, girls will have normal vision.

C Girls will be colour-blind, boys will have a 50% chance of being colour-blind.

D Girls will be colour-blind, boys will have normal vision.

---

35. 0610_m16_qp_22 Q: 33

What are alleles?

A a pair of chromosomes

B different versions of the same gene

C the total number of genes on one chromosome

D two genes side by side on the same chromosome

---

36. 0610_m16_qp_22 Q: 34

The diagram shows the sex chromosomes of a woman and of a man. Their genotypes for a recessive sex-linked condition are also shown.

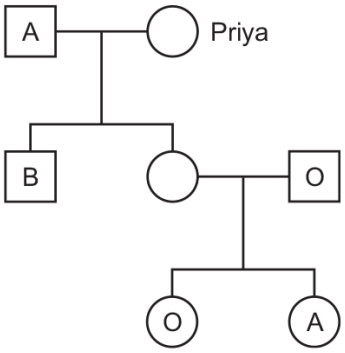
What are the chances that their daughter will show the sex-linked condition?

A 0% **B** 25% **C** 50% **D** 75%

---

37. 0610_m16_qp_22 Q: 35

The diagram shows the inheritance of ABO blood groups. The blood groups of some of the individuals are given.



What could be Priya's genotype?

A I^AI^o **B** I^BI^B **C** I^BI^o **D** I^oI^o

---

38. 0610_p16_qp_20 Q: 30

What are the possible blood groups of the offspring of parents who have blood group A and B?

A AB only

B A and B

C A, B and AB

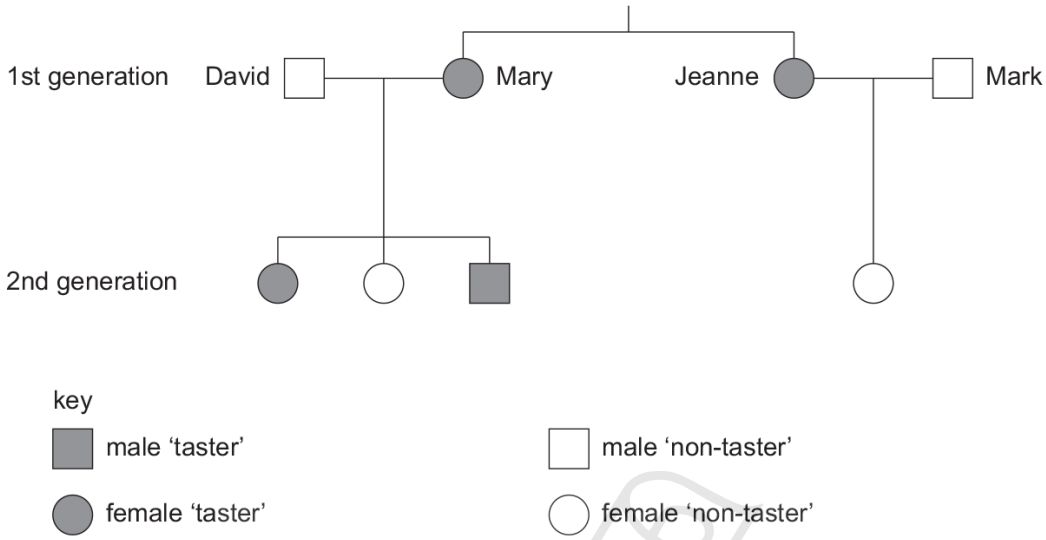
D A, B, AB and O

---

39. 0610_p16_qp_20 Q: 31

The diagram shows a family tree and the inheritance of the ability to taste a certain substance.

The allele for the ability to taste this substance is dominant.



Which statement about the genotypes of the sisters Mary and Jeanne is correct?

A Mary is heterozygous and Jeanne is homozygous.

B Mary is homozygous and Jeanne is heterozygous.

C They are both heterozygous.

D They are both homozygous.

---

40. 0610_p16_qp_20 Q: 32

Haemophilia is a sex-linked recessive condition. A haemophiliac man has one son who has inherited haemophilia and two more sons who have not.

The man's wife is pregnant again. If this baby is a girl, what is the chance that she will have haemophilia?

A 0% **B** 25% **C** 50% **D** 75%

---

41. 0610_s16_qp_22 Q: 11

When a tissue from a man is grafted onto a woman it may be rejected by the woman's body.

What is the main cause of this rejection?

A antibody production

B phagocytosis

C the action of antibiotics

D the presence of a Y chromosome

---

42. 0610_s16_qp_22 Q: 32

In the inheritance of ABO blood groups, when two parents have the genotypes I^AI^A and I^AI^o, what is the blood group of their offspring?

A group A

B group AB

C group B

D group O

---

43. 0610_s16_qp_23 Q: 30

Owners of successful race horses hope that the horses' offspring will be like their parents.

How does a young race horse inherit its characteristics?

A equally from its mother and father

B mainly from its father

C mainly from its mother

D passed across the placenta

---

44. 0610_w16_qp_21 Q: 31

One parent has blood group A and the other parent has blood group B.

Their first child has blood group O.

What are the possible blood groups of their next child?

	group A	group B	group AB	group O
A	✓	✓	✓	✓
B	✓	✓	✓	✗
C	✓	✓	✗	✓
D	✗	✗	✓	✗

---

45. 0610_w16_qp_22 Q: 34

What is the inheritance of colour blindness an example of?

A co-dominance

B continuous variation

C reduction division

D sex linkage

---

46. 0610_w16_qp_22 Q: 35

The phenotype of an organism is its

A combination of alleles.

B family pedigree.

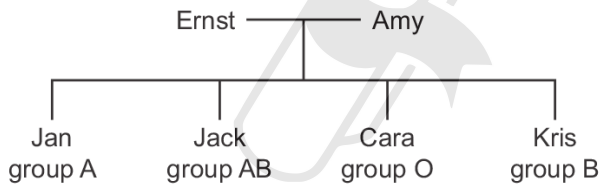
C genetic make-up.

D observable features.

---

47. 0610_w16_qp_23 Q: 32

Ernst and Amy have four children of different blood groups, as shown.



What are the genotypes of Ernst and Amy?

A I^AI^A and I^BI^o

B I^AI^B and I^oI^o

C I^AI^o and I^BI^B

D I^AI^o and I^BI^o

SN	Paper	Q. No.	Answer
01	0610_m22_qp_22	33	C
02	0610_s21_qp_21	34	B
03	0610_s21_qp_22	34	C
04	0610_w21_qp_21	32	D
05	0610_w21_qp_22	32	C
06	0610_w21_qp_23	33	A
07	0610_p20_qp_20	30	D
08	0610_p20_qp_20	31	C
09	0610_p20_qp_20	32	C
10	0610_s20_qp_22	32	C
11	0610_s20_qp_23	31	C
12	0610_s20_qp_23	32	A
13	0610_w20_qp_21	32	B
14	0610_w20_qp_22	32	A
15	0610_w20_qp_22	33	C
16	0610_w20_qp_23	32	A
17	0610_m19_qp_22	32	A
18	0610_s19_qp_23	31	A
19	0610_s19_qp_23	34	B
20	0610_w19_qp_21	32	D
21	0610_w19_qp_22	32	B
22	0610_m18_qp_22	28	C
23	0610_s18_qp_21	32	B
24	0610_s18_qp_23	30	B
25	0610_w18_qp_21	32	D
26	0610_w18_qp_22	32	B
27	0610_w18_qp_23	32	B
28	0610_m17_qp_22	31	C
29	0610_s17_qp_21	27	D
30	0610_s17_qp_22	34	C
31	0610_w17_qp_21	30	B
32	0610_w17_qp_22	31	D
33	0610_w17_qp_23	30	B
34	0610_w17_qp_23	32	B
35	0610_m16_qp_22	33	B
36	0610_m16_qp_22	34	C
37	0610_m16_qp_22	35	C
38	0610_p16_qp_20	30	D
39	0610_p16_qp_20	31	C
40	0610_p16_qp_20	32	C
41	0610_s16_qp_22	11	A
42	0610_s16_qp_22	32	A
43	0610_s16_qp_23	30	A
44	0610_w16_qp_21	31	A
45	0610_w16_qp_22	34	D
46	0610_w16_qp_22	35	D
47	0610_w16_qp_23	32	D