

Name _____

Date _____

6.1 Conducting an investigation — worksheet

Plan a statistical investigation: write a question and a prediction, decide what data to collect, and record it in a tally chart or frequency table. · 108 questions · Show your working.

Remember

- A **statistical question** is one whose answer varies, so you need data to answer it.
- Write the question and your **prediction** first — then you know what data to collect.
- **Primary** data you collect yourself; **secondary** data somebody else collected.
- **Categorical** data is words. **Discrete** data you count. **Continuous** data you measure.
- A **tally chart** counts reliably in fives; the totals become the **frequency** column.
- Group continuous data into **class intervals** that do not overlap and leave no gaps: $150 \leq h < 160$, then $160 \leq h < 170$.
- A fair question is neutral, and its answer boxes cover every case exactly once.
- A prediction that the data does not support is still a real result. Report it.

A · Fluency — Classify the data, and read the tables.

- 1 What type of data is **favourite colour**?
 - ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 2 What type of data is **eye colour**?
 - ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 3 What type of data is **country of birth**?
 - ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 4 What type of data is **type of pet**?
 - ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 5 What type of data is **method of travel to school**?
 - ☐ categorical
 - ☐ discrete
 - ☐ continuous

- 6 What type of data is **favourite sport**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 7 What type of data is **hair colour**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 8 What type of data is **the language spoken at home**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 9 What type of data is **type of music**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 10 What type of data is **brand of phone**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 11 What type of data is **favourite subject**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 12 What type of data is **the day of the week you were born**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 13 What type of data is **type of housing**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 14 What type of data is **nationality**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 15 What type of data is **the number of brothers and sisters**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous

- 16** What type of data is **the number of pets**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 17** What type of data is **the number of goals scored**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 18** What type of data is **the number of books read this month**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 19** What type of data is **shoe size**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 20** What type of data is **the number of people in a car**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 21** What type of data is **the number of texts sent**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 22** What type of data is **the number of correct answers**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 23** What type of data is **the number of buses per hour**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 24** What type of data is **the number of rooms in a house**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 25** What type of data is **the number of coins in a purse**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous

- 26** What type of data is **the number of siblings**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 27** What type of data is **the number of days absent**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 28** What type of data is **height**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 29** What type of data is **mass**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 30** What type of data is **the time taken to run 100 m**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 31** What type of data is **arm span**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 32** What type of data is **the temperature at noon**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 33** What type of data is **the length of a leaf**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 34** What type of data is **hand span**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous
- 35** What type of data is **the volume of water in a bottle**?
- ☐ categorical
 - ☐ discrete
 - ☐ continuous

36 What type of data is **the distance walked in a day**?

- ☐ categorical
☐ discrete
☐ continuous

37 What type of data is **the time spent on homework**?

- ☐ categorical
☐ discrete
☐ continuous

38 What type of data is **the mass of a parcel**?

- ☐ categorical
☐ discrete
☐ continuous

39 What type of data is **the width of a desk**?

- ☐ categorical
☐ discrete
☐ continuous

40 What type of data is **the speed of a car**?

- ☐ categorical
☐ discrete
☐ continuous

41 How many learners took part altogether?

Pet	Frequency
dog	12
cat	9
fish	5
rabbit	3
none	11
Total	40

42 How many learners have a dog?

Pet	Frequency
dog	12
cat	9
fish	5
rabbit	3
none	11
Total	40

43 Which pet is the most common? Give the word.

Pet	Frequency
dog	12
cat	9
fish	5
rabbit	3
none	11
Total	40

44 Which pet is the least common? Give the word.

Pet	Frequency
dog	12
cat	9
fish	5
rabbit	3
none	11
Total	40

45 How many more learners have a dog than a cat?

Pet	Frequency
dog	12
cat	9
fish	5
rabbit	3
none	11
Total	40

46 How many learners have a pet of some kind?

Pet	Frequency
dog	12
cat	9
fish	5
rabbit	3
none	11
Total	40

47 How many learners are in the survey?

How they travel	Tally	Frequency
walk	□ □	14
bus	□ □	11
car	□	8
bicycle	□	7

48 How many learners walk or cycle?

How they travel	Tally	Frequency
walk	□ □	14
bus	□ □	11
car	□	8
bicycle	□	7

49 How many more learners take the bus than come by car?

How they travel	Tally	Frequency
walk	□ □	14
bus	□ □	11
car	□	8
bicycle	□	7

50 How many tally marks are in the row for *bus*?

How they travel	Tally	Frequency
walk	□ □	14
bus	□ □	11
car	□	8
bicycle	□	7

51 How many learners were measured?

Height h (cm)	Frequency
$140 \leq h < 150$	4
$150 \leq h < 160$	11
$160 \leq h < 170$	9
$170 \leq h < 180$	6

52 How many learners are shorter than 160 cm?

Height h (cm)	Frequency
$140 \leq h < 150$	4
$150 \leq h < 160$	11
$160 \leq h < 170$	9
$170 \leq h < 180$	6

53 How many learners are at least 160 cm tall?

Height h (cm)	Frequency
$140 \leq h < 150$	4
$150 \leq h < 160$	11
$160 \leq h < 170$	9
$170 \leq h < 180$	6

54 How wide is each group, in cm?

Height h (cm)	Frequency
$140 \leq h < 150$	4
$150 \leq h < 160$	11
$160 \leq h < 170$	9
$170 \leq h < 180$	6

55 Which group has the highest frequency? Give the lower limit of the group, in cm.

Height h (cm)	Frequency
$140 \leq h < 150$	4
$150 \leq h < 160$	11
$160 \leq h < 170$	9
$170 \leq h < 180$	6

56 How many Year 7 learners were asked?

Year group	Walk	Bus	Car
Year 7	14	11	5
Year 8	9	16	7

57 How many Year 8 learners were asked?

Year group	Walk	Bus	Car
Year 7	14	11	5
Year 8	9	16	7

58 How many learners take the bus altogether?

Year group	Walk	Bus	Car
Year 7	14	11	5
Year 8	9	16	7

59 How many learners were asked in total?

Year group	Walk	Bus	Car
Year 7	14	11	5
Year 8	9	16	7

60 How many more Year 8 learners take the bus than Year 7?

Year group	Walk	Bus	Car
Year 7	14	11	5
Year 8	9	16	7

61 Which year group has more learners walking? Give the year group number.

Year group	Walk	Bus	Car
Year 7	14	11	5
Year 8	9	16	7

62 How many learners are in this survey?

Time t (minutes)	Frequency
$0 \leq t < 10$	3
$10 \leq t < 20$	8
$20 \leq t < 30$	12
$30 \leq t < 40$	7
$40 \leq t < 50$	2

63 How many learners spent less than 20 minutes?

Time t (minutes)	Frequency
$0 \leq t < 10$	3
$10 \leq t < 20$	8
$20 \leq t < 30$	12
$30 \leq t < 40$	7
$40 \leq t < 50$	2

64 How many learners spent 30 minutes or more?

Time t (minutes)	Frequency
$0 \leq t < 10$	3
$10 \leq t < 20$	8
$20 \leq t < 30$	12
$30 \leq t < 40$	7
$40 \leq t < 50$	2

65 Which group has the highest frequency? Give the lower limit, in minutes.

Time t (minutes)	Frequency
$0 \leq t < 10$	3
$10 \leq t < 20$	8
$20 \leq t < 30$	12
$30 \leq t < 40$	7
$40 \leq t < 50$	2

66 How many groups are there?

Time t (minutes)	Frequency
$0 \leq t < 10$	3
$10 \leq t < 20$	8
$20 \leq t < 30$	12
$30 \leq t < 40$	7
$40 \leq t < 50$	2

67 How wide is each group, in minutes?

Time t (minutes)	Frequency
$0 \leq t < 10$	3
$10 \leq t < 20$	8
$20 \leq t < 30$	12
$30 \leq t < 40$	7
$40 \leq t < 50$	2

68 How many learners chose a sport?

Sport	Tally	Frequency
football	□ □ □	17
swimming	□	8
athletics	□	6
tennis		4

69 Which sport is most popular? Give the word.

Sport	Tally	Frequency
football	□ □ □	17
swimming	□	8
athletics	□	6
tennis		4

70 How many more chose football than tennis?

Sport	Tally	Frequency
football	□ □ □	17
swimming	□	8
athletics	□	6
tennis		4

71 How many chose a sport other than football?

Sport	Tally	Frequency
football	□ □ □	17
swimming	□	8
athletics	□	6
tennis		4

B · Reasoning — Planning, question design and why the rules exist.

72 Which of these is a good statistical question?

- ☐ What is my favourite colour?
- ☐ Which colour is most popular in my class?
- ☐ Is blue a nice colour?
- ☐ How many colours are there?

73 What should you do first when planning a statistical investigation?

- ☐ Collect the data
- ☐ Write the statistical question and a prediction
- ☐ Draw the chart
- ☐ Write the conclusion

74 Why is a prediction useful before you collect data?

- ☐ It saves collecting data
- ☐ It makes the answer come out right
- ☐ It gives you something to test the data against
- ☐ It is required by the teacher

- 75** Data you collect yourself is called ...
- ☐ primary data
 - ☐ secondary data
 - ☐ continuous data
 - ☐ raw data
- 76** Data taken from a website or a published report is called ...
- ☐ primary data
 - ☐ secondary data
 - ☐ categorical data
 - ☐ biased data
- 77** What is a tally chart for?
- ☐ Making the data look tidy
 - ☐ Counting reliably as the data comes in
 - ☐ Calculating the mean
 - ☐ Drawing a pie chart
- 78** When should you group data into class intervals?
- ☐ Always
 - ☐ When there are many different values, especially continuous data
 - ☐ Only for categorical data
 - ☐ Never — it loses information
- 79** Why must class intervals not overlap?
- ☐ It looks untidy
 - ☐ Some values would belong to two groups at once
 - ☐ It makes the total wrong on purpose
 - ☐ There is no reason
- 80** A question asks “Don't you agree that football is the best sport?” What is wrong with it?
- ☐ Nothing
 - ☐ It is a leading question that pushes people towards one answer
 - ☐ It is too short
 - ☐ It asks for continuous data
- 81** A questionnaire offers the choices 0–5, 5–10, 10–15. What is wrong?
- ☐ Nothing
 - ☐ The groups overlap, so 5 and 10 fit in two boxes
 - ☐ The groups are too wide
 - ☐ There are too few choices
- 82** A questionnaire asks for age with the boxes “under 12” and “over 12”. What is wrong?
- ☐ Nothing
 - ☐ Someone who is exactly 12 has no box to tick
 - ☐ The boxes overlap
 - ☐ Age is categorical data
- 83** Is shoe size discrete data?
- ☐ Yes
 - ☐ No

- 84** Is the time taken to run 100 m continuous data?
☐ Yes
☐ No
- 85** Is a person's favourite subject numerical data?
☐ Yes
☐ No
- 86** Which type of data is best shown in a bar chart with a gap between the bars?
☐ continuous
☐ categorical
☐ neither
☐ both equally

C · Challenge — Missing frequencies, grouping and percentages.

- 87** A tally chart has 4 complete gates of five and 3 extra marks. What is the frequency?

- 88** A survey of 60 learners records 18 who walk. How many do not walk?

- 89** A frequency table has four rows with frequencies 12, 9, 5 and an unknown value. The total is 40. What is the missing frequency?

- 90** Data is grouped as $0 \leq t < 5$, $5 \leq t < 10$, and so on, up to $25 \leq t < 30$. How many groups are there?

- 91** Heights from 142 cm to 178 cm are to be put into groups 10 cm wide, starting at 140. How many groups are needed?

- 92** In a survey of 200 people, 35% chose tea. How many people is that?

- 93** A class of 30 is surveyed and 12 have a bicycle. What percentage is that?

- 94** You want to find the typical time learners spend on homework. Is that data categorical, discrete or continuous?

- 95** You want to find how many pets each learner owns. Is that data categorical, discrete or continuous?

- 96** You predict that most learners in your class walk to school. The data shows only 30% walk. What should you do?
- ☐ Change the data
 - ☐ Collect more data until the prediction is right
 - ☐ Report that the prediction was not supported
 - ☐ Do not mention the prediction

D · Word problems — Surveys in real settings.

- 97** A shop records 45 customers on Monday, 62 on Tuesday and 58 on Wednesday. How many customers in the three days?
-
- 98** In a class of 28, everyone has either a cat or a dog. 17 have a dog. How many have a cat?
-
- 99** A teacher counts 5 gates of five and 2 extra tally marks. How many is that?
-
- 100** A survey collects data from 3 classes of 32 learners. How many learners in total?
-
- 101** A café records drinks sold: 24 tea, 31 coffee, 15 juice. How many drinks altogether?
-
- 102** Using the café figures above, how many more coffees than juices were sold?
-
- 103** A bus company counts passengers each hour for 8 hours and records 47, 52, 38, 61, 55, 43, 39, 45. How many passengers altogether?
-
- 104** Of 150 people surveyed, 90 said yes. What percentage said yes?
-
- 105** A library records books borrowed in a week: 120 fiction, 85 non-fiction. How many books were borrowed?
-
- 106** A researcher wants to know which languages learners speak at home. What type of data is that?
-
- 107** A nurse records the mass of each baby in kilograms. What type of data is that?
-
- 108** A coach records the number of goals each player scored. What type of data is that?
-