Do Older Children at South Dartmoor Community College Get More Pocket Money than younger children do?

Aim: To discover whether younger children at south Dartmoor community college get less pocket money than older children.

Task: I am going to ask a selection of boys and girls in each year group how much pocket money they get. Asking in the year group bands will enable me to group the data easily as year groups correspond to ages. Asking for some ones year group when you survey them is also easier and q uicker than asking for their date of birth.
To ask a variety of people I will ask a variety of people I will ask form groups until I have asked the correct number of people from each year. Asking in forms is fair because at South Dartmoor form groups ar e mixed year and the people in them come from different places.
The sample method I am going to use is Convenient Sampling in a Stratified Strata. My strata's are year groups 7,8,9,10 and 11 and it is convenient sampling because I am asking form groups th at i will be able to visit and I will not have to go out in search of.

Predictions: I am going to make the following predictions about what I will find from my research;

- The older you are the more pocket money you get
- Boys get more pocket money than boys
- The average amount for a year 7 will be around £3
- The average amount for a year 11 will be about £10

Data Collection: I am going to ask 5% of the school my survey. The total school attendance is 1172 so 5% = 1172/100 X 5 = 58.6 = 59 students

There are different numbers of student in each year group. To make my data representative I will need to make the number of students asked from each year proportional. To work out how many people from each year group and how many of each sex to ask I must work ou t for each person we ask how many people that is equal to.
To do this I have to do the following sum;
Total Attendance DIVIDED BY (/) Number of people to be asked
1172 / 59 = 20 This means that for every 20 people in a year group 1 of them will be surveyed.
Now to find the exact number to be asked we must divide the number of students in each stratum by 20. I have got the figures for the number of students in each year group from the pastoral office and will use these to work out the number of people to be asked in a table.

		BOYS			GIRLS	
Year	**Total Boys**	**Divided by 20**	**Number to be asked**	**Total Girls**	**Divided by 20**	**Number to be asked**
7	144	7.2	**7**	117	5.85	**6**
8	138	6.9	**7**	115	5.75	**6**
9	139	6.95	**7**	110	5.5	**6**
10	119	5.95	**6**	98	4.9	**5**
11	94	4.7	**5**	98	4.9	**5**
Totals			**32**			**28**

The total number of people being asked is 60 (32+28) this is 1 higher than 5% of the attendance (59). This is because you can't have half a student and when rounding the division I have to round to the nearest whole number.

I collected by data in a data collection table that I designed on the computer. I will make a copy of it here. This is not the exact one I used as I have typed my results up on this one. The layout is the same.

Year Group	Sex	Amount Received per Week
7	F	£3.5
9	F	£6
11	M	£2.5
8	F	£1
10	M	£6.5

My data collection sheets were good and simple to use. There were only 3 columns so they were easy to read from and add to.
The other sheets show the data I collected presented in its strata's of year group and sex. I have worked out the means on this sheet and will refer back to them later in the investigation.

Data Presentation: Now I have collected my data I can start to analyse it.

I will start by working out an average amount of pocket mone y received in the whole school.

From my sheets where I have presented my results I have the total amount received per year group. If I add these values and divide by the number of people I asked I will get the mean amount for the whole school.

$$\frac{(41.50 + 56 + 70 + 76.50 + 76.50)}{60} = £5.34 \text{ (to the nearest whole penny)}$$

I am going to draw a Cumulative frequency graph to show the data for the whole school. From the graph I will be able to work out the interquartile range and find the middle value.
To do this graph I need to group all my data I have done this in the table below.

Group	Tally	Total	Cumulative Frequency
$0 \leq x < 2$	IIIII	5	5
$2 \leq x < 4$	IIIIIIIIIIIIIII	16	21
$4 \leq x < 6$	IIIIIIIIIIIIIIIIII	20	41
$6 \leq x < 8$	IIIII	5	46
$8 \leq x < 10$	IIIII	5	51
$10 \leq x < 12$	IIIII	5	56
$12 \leq x < 14$	III	3	59
$14 \leq x < 16$	I	1	60

From the table I can see that the modal group is $4 \leq x < 6$ this shows that one of the averages lies between those values.
Look at Cumulative Frequency Graph.
From my graph you can see that the mid point or mid value is £4.70. This corresponds with the modal group of $4 \leq x < 6$ as £4.70 lies in that group.
The interquartile range can also be worked out. To do this I must do the following sum. £7.40 - £3.30 = £4.10 This shows the range or spread that the majority of the amounts received lie in.
I have found lots of averages but I think the mean gives the best indication of an average as it takes in to consideration all the values.

I am now going to look at the different age groups and see if an older year group receives more pocket money than a younger one.
From my tables I produced earlier I can see that the mean the increases in higher year groups.
From the mean values it appears that boys and girls do not get more or less pocket money than each other in general as in some years, looking at the mean boys get more and in others girls get more.
To see how accurate the data is I have collected I can work out the standard deviation of the data. This shows the spread of the data and can also be used to see if there are any outliers.
First I will work out the standard deviation for each year group.

The formula for standard deviation is

Refer to the 2nd Data sheet.
On the data sheet I have done some of the sums for parts of the standard deviation formula.
I will put them together to find the standard deviation for each year stating with year 7.
Year 7

Year 8

Year9

Year10

Year11

The results for the standard deviation or the spread of the data show that the lower year group's data is spread out more. This could be why they have a lower mean it could be that they have some outliers in them that make the mean appear lower. To see if there are any outliers I can use a formula, which uses the value of the standard deviation for the data.
A value is an outlier if it is more than 2 times the standard deviation away from the mean. An example of how you would write how outliers are checked for would be as follows. If the mean was 5 and the standard deviation 3, you would write -1<------5------>11. This shows that the numbers not between –1 and 11 are outliers and could affect the mean of the data. I will now find and highlight any outliers in my data as they could be affecting my results.

Year 7
Values should be £-4.71<------£3.19------>£11.85 No Outliers

Year8
Values should be £-7.93<------£4.31------>£16.55 No Outliers

Year9
Values should be £-7.72<------£5.38------>£18.48 No Outliers

Year10
Values should be £1.55<------£6.95------>£12.35 No Outliers

Year11
Values should be £1.17<------£7.65------>£14.13 No Outliers

Although there are no outliers in some of the lower years some of the amounts received are closer to being outliers than in the higher years. This is why there is a large standard deviation and spread of the values.

The mean therefore might not be a good average to use. The median might be better. I will now work this out for each year group. To do this u put the

values in ascending order and take the middle one as the average. We can also find the modal value. This is like the modal group we used earlier but is one value not a group

Year 7 Modal value = £2 and £3 and £5

£0.00
£1.00
£1.50
£2.00
£2.00
£2.50
£3.00 Median
£3.00
£4.00
£5.00
£5.00
£5.50
£7.00

Year 8 Modal value = £5

£0.00
£2.00
£2.00
£2.50
£3.00
£3.50
£4.00 Median
£4.00
£5.00
£5.00
£5.00
£5.00
£15.00

Year 9 Modal value = £4 and £5 and £10

£0.00
£2.00
£2.50
£3.75
£4.00
£4.00
£5.00 Median
£5.00
£5.50
£8.75
£9.50
£10.00
£10.00

Year 10 Modal value = £5

£3.00
£4.00
£5.00

£5.00
£5.00
£6.00 Median
£8.00
£8.50
£10.00
£10.00
£12.00

Year 11 There are 2 middle values. When this happens the 2 values are added and then divided by 2. Because the 2 values are the same the median is £7.50. Modal value = £7.50

£2.50
£3.00
£5.00
£7.50
£7.50 Median
£7.50 Median
£9.00
£10.00
£12.00
£12.50

I have now showed that the higher year groups on average are receive more pocket money per week than a lower year group on averag e. I say that because they are not outliers as such but there are some small exceptions in some of the years.

Conclusions:

- The higher years get more pocket money than the lower years.
- Boys and girls are treated equally when it comes to pocket money
- Once you reach year 9 you receive higher than the average amount of pocket money received by a student
- I predicted the amount received by a year 7 would be about £3 this prediction was correct
- I predicted that by year 11 a student would be receiving £10 this is incorrect as the average for a year 11 is only £7.50