The Early Bird Catches the Worm

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With parent-teacher conferences coming up, I would like to be able to answer parents' questions about fourth and fifth graders' sleeping habits.

Please conduct a survey to help me become more informed about this topic.

I want you to keep track of the work that you are doing as you do it! Tell me how you decided on a question, how you decided the way you were going to collect your data, what changes you make along the way, and represent your data so that the class can analyze it too. Then I will need you to write a formal analysis of your data, including what is important about the data and what it means to you. You should also make recommendations to parents who are having a hard time deciding when their children need to go to bed.

Thanks for your help!

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Grade Levels 3 - 5

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Context

Our "Math Words of the Week" that we were studying included mode, mean and median. After studying these words and understanding their differences and similarities, I provided students with the following task to assess their ability to use these words appropriately in a real-life context.

What This Task Accomplishes

This task enabled me to assess where students stand in their understanding of mode, mean and median so I could plan future instruction. It also showed students that they could structure an investigation to find answers to every-day questions. This activity can lead to a great discussion of how data can be manipulated to prove different points of views and perspectives.

What the Student Will Do

Most students chose to create a formal survey, collect and organize their data and make conclusions. This was an authentic learning experience for students in creating meaningful and useful surveys. Some students became quite frustrated when the results of their survey did not fit the format they expected. For instance, some students responded that their bedtime was a range between 8:00-10:00, while others stated 8:30. Students then had to figure out how they were going to deal with these discrepancies. Some students were obviously "untruthful" about

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their bedtimes and that added another dimension to the data analysis. Obtaining the typical bedtime was not the only investigation students performed. They also investigated whether or not students agreed with their bedtimes and whether bedtimes varied from weekends to weeknights.

Time Required for Task

2-3 hours

Interdisciplinary Links

This study would be interesting to accompany a study of other topics students feel are "not fair". For instance allowances, time spent on chores, time spent on homework, etc.

Teaching Tips

Definitions:

Mean or Average - adding all the information together and dividing by the number of pieces of data.

Median - arranging all of the data in order and determining the middle piece of each data.

Mode - the most common.

When grading my students, I used the following format:

Understanding of the problem and evidence of approach and strategy: tally, scratch work, narration describing what was done and why. (10 pts)

Representation (50 pts)

Use of math language (20 pts)

Conclusion, recommendation, I noticed statements (20 pts)

Suggested Materials

- Ditto masters
- Graph paper
- Markers
- Stencils
- Calculators

Possible Solutions

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Solutions will vary depending upon what students decide to research.

Benchmark Descriptors

Novice
Student has limited awareness of the problem: S/hedoes not understand the goal is to collect and analyze data about which to draw a conclusion. Student has not organized data in a way that would lead to a mathematically relevant conclusion.

Apprentice
Student shows some understanding of the problem, but has a random or weak strategy. Student collects relevant data, but makes an incorrect or incomplete mathematically relevant conclusion.

Practitioner
Student understands the problem and obtains a correct solution. Student collects relevant data and makes a correct and complete mathematically relevant conclusion.

Expert
Student creates multiple solutions, looks at the problem in a more complex manner, makes a correct and complete mathematically relevant conclusion and considers more than one dimension (time and day or bedtime and wake-up time).

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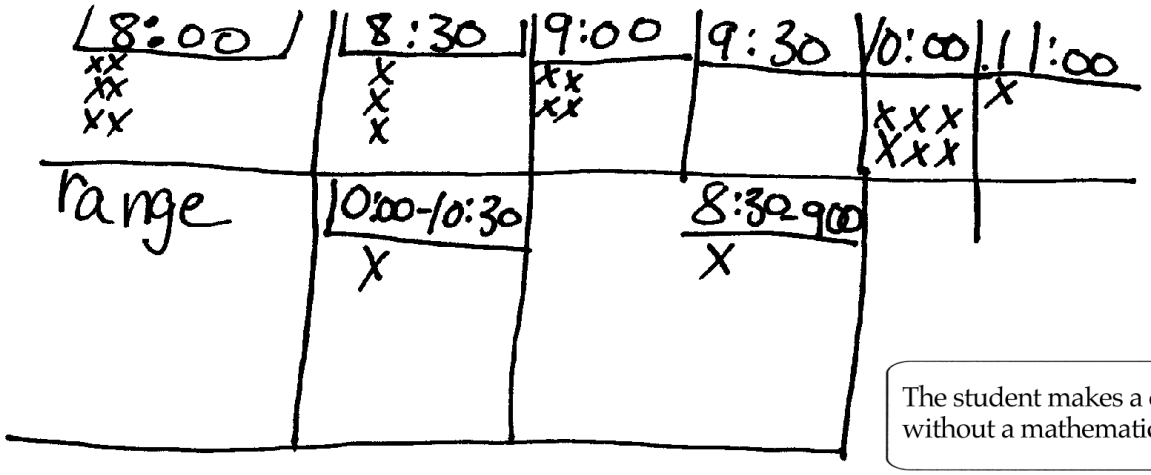
Novice

Some accurate language of statistics is used.

The student attempted to solve the problem by surveying his/her peers and summarizing results.

my task Was to find the Aaverg student bedtime I ocend Out that most people got to bed at 8:00 and 10:00, thera nge of bedtimes is 8-11:00.

I think parents should there kid to bed at 9:00 because I get a good sleep and that is what time I go to bed on sader day.



The student makes a conclusion without a mathematical basis.

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Apprentice

Student explains his/her approach.

The problem my friend and I had to solve was called "The Early Bird Catches the worm, But What Time does the Bird go to Bed?" It was about a question that a teacher kept getting asked at many parent confrences. The question was "What time should their children go to bed, in order to be their best at school the next day."

The way we figured out this problem was we made a paper with two columns. One for what you go to bed and one for what time do you wake up. Then we had it coppied, and handed out to a class of 20 kids. After everybody had filled the survey out we made a data sheet and recorded all the different times kids go to bed. Then we found the time that was the most popular, and made that our mode. The time was 8:30. Next we made our representation, showing the kids names, the time they went to bed. and the time they woke up. Our mode for what time they woke up was 6:00,

The student uses accurate and appropriate language of statistics.

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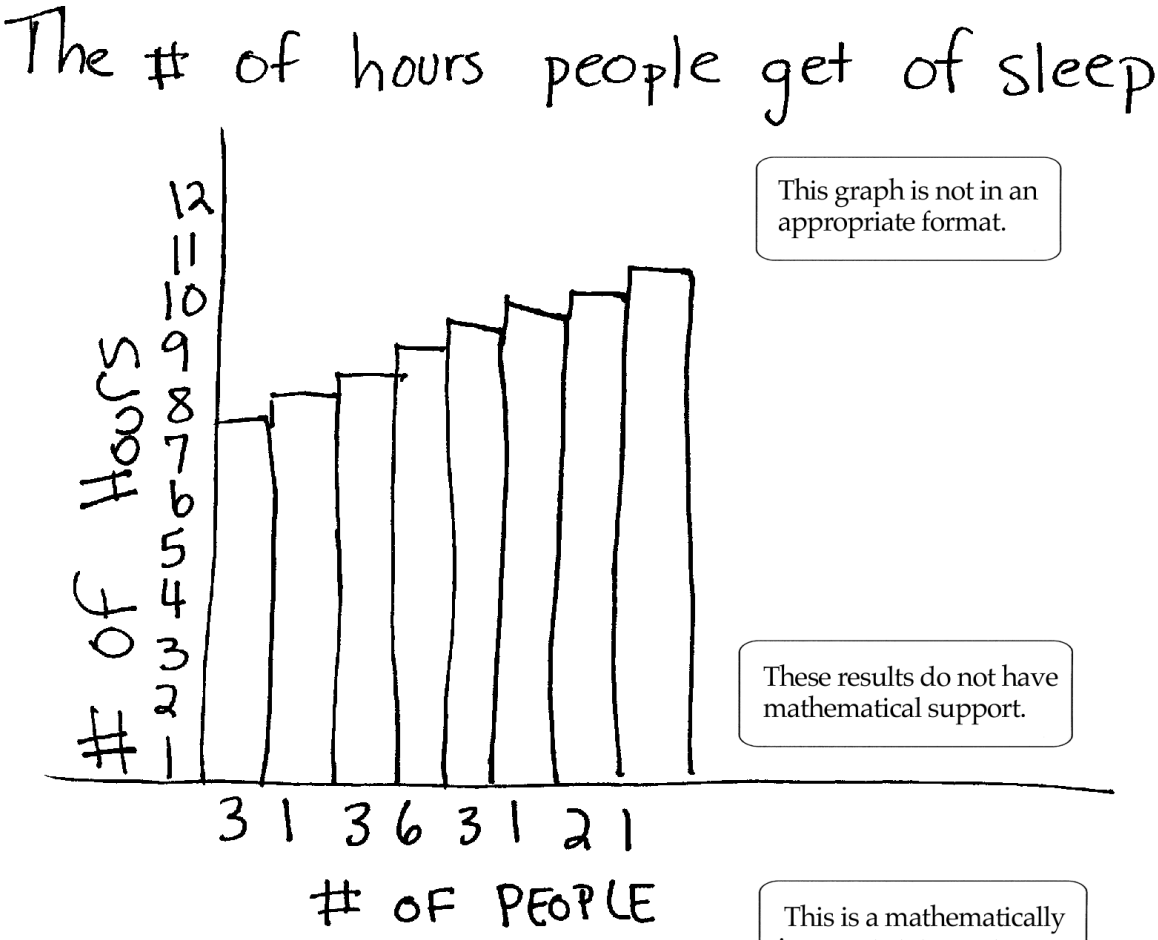
Apprentice



This graph is not in an appropriate format.

These results do not have mathematical support.

This is a mathematically incorrect statement.

From our results we recomend having your child go to bed at 8:30, and waking up at 6:00 or 7:00, unless they have to go to school. earlyer. I noticed that there is a 1 and a half hour difference bettween the time kids should go to bed, and the time kids wake up. Overall I think I learned alot from this math problem, and I think it was fun.

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Apprentice

The Time 4-5 Graders Go To Bed

The Names Of The kids	What Time They Go To Bed	What Time They Wake Up	Hours of Sleep Each Person Gets.
Elyse	8:30	6:00	9 and a half
Jamie	8:00-8:30	6:00	9 and a half
Cortney	8:30	6:45	10 and 15 minute
Jeremey	9:00-10:00	5:30-6:00	8 hours
Desiree	9:00	7:30	10 and a half
Milly	8:00	6:30	10 hours
Eric	8:30-9:00	6:00-6:30	10 hours
Marcus	8:00-9:30	7:00	10 hours
Courtney	8:00-8:30	6:00	9 and a half
Kelly	8:00	6:30	9 and a half
Bobbi-Jo	8:00-8:30	5:30-6:00	9 and a half
Chris	9:00-10:00	5:30-6:00	9 hours
Levy	7:00-8:00	7:00	10and a half
Patrick	8:00	6:30	9 and a half
Everett	8:00-9:00	6:00-6:30	9 hours
CKristen	10:00	6:00	8 hours
Emma	9:30-10:00	6:30	8 and a half
Michelle	8:00	6:00	9 hours
Sam	9:00-10:00	5:53	8 hours
Scott	8:00	7:00	11 hours

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Practitioner

The student explains his/her approach and decisions.

The frist thing that I did was I decided to ask people in my class when they whent to bed on Saturday I Piked Saturday Becaluse it was in the middle of the weekend. I made a survey and gave it to kids in the class. when I got my servy Back I made a tally of the times people whent to bed. I took my information and Put it on a peace of graph paper. I figured out that more people go to bed at tenoclock. My range for a weekend Bed times was 7:00 pm to 2:00 Am. from looking at my graph I Noticed that the times were clustered between 7:00Pm to 11:00 pm. I also Noticed thert 2:00 Am was a outlier because it was Not the same as the others. I found out the average 4th and

The student uses accurate and appropriate language of statistics.

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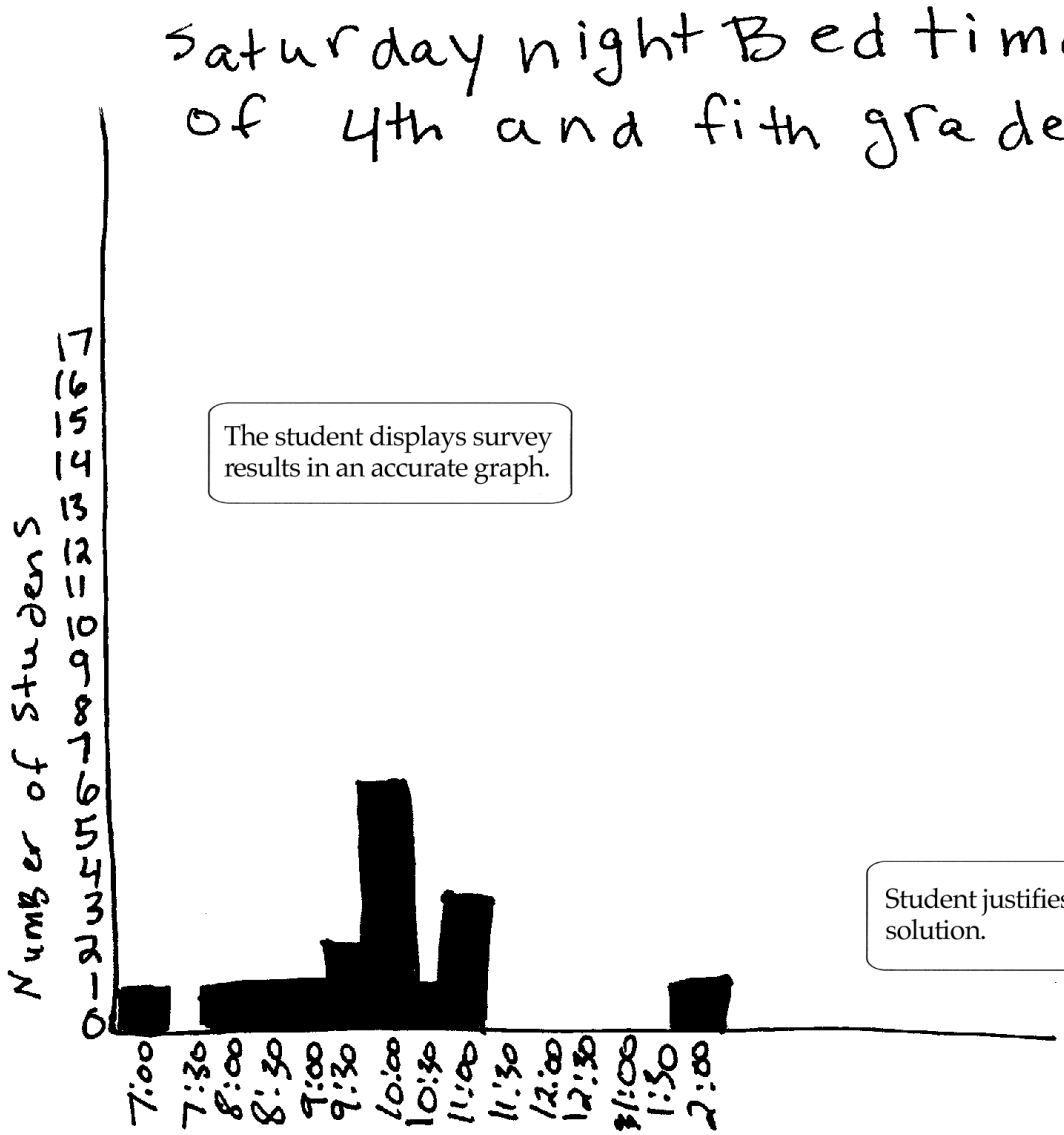
Practitioner



Saterday Night Bedtimes of Stuckens in mrs. Hasson's class

fith graders go to Bed at 10:00 on satordays because 10:00 is the Mode.

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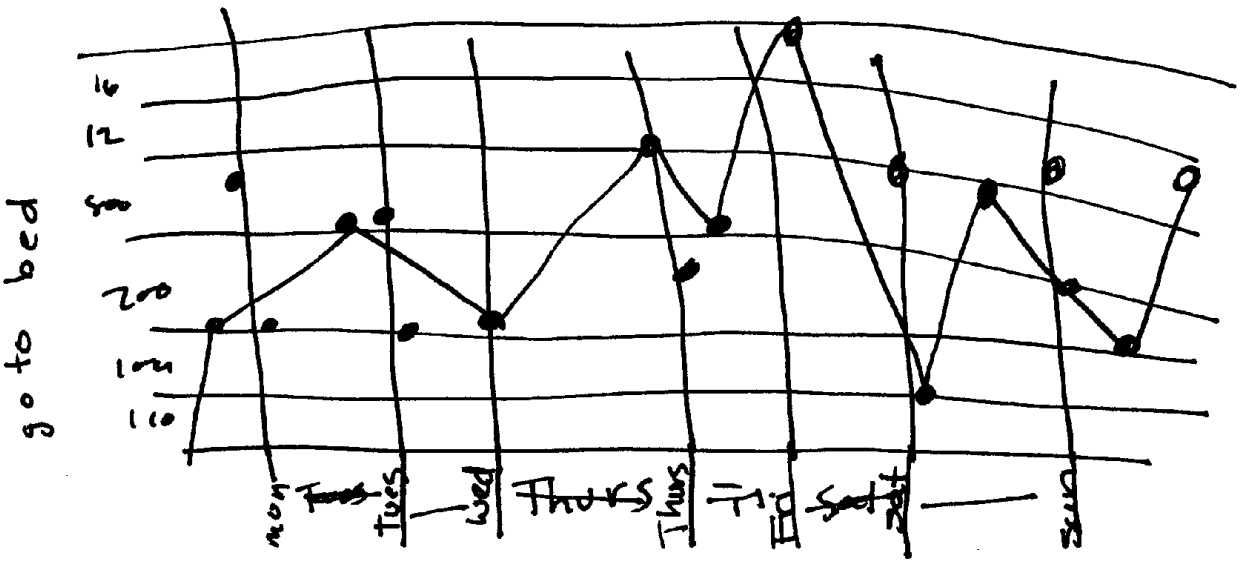
Expert

Draft
Jr The most pouplar bed times of Kids.



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Expert

The student explains his/her reasoning.

The student uses accurate and appropriate language of statistics.

My task was to figure out what times kids go to bed. The way I figured this out was by making a survey and giving it to all of the people in my class (showed on page 2) Once I got all of the data back I made a tally to help me make my line graph. When I was handing out the surveys I told the people that they could have ranges of times. I knew that it would only be a sample of kids' bed times but at least you could get an idea of what times kids get to bed on all of the different days. The results I got back weren't really clusterd and they weren't outliers either.

For figuring out kids bed times I found the most frequent or mode of the bed times. When I told the people they could have ranges and when they handed the surveys back with ranges on them I figured what time they went to bed by using the first bed time that they put down.

I noticed that the avrage kid goes to bed (out of my sample) at 800 on Mondays, 8:30 on Tuesdays, in between

The student analyzed the data by day of the week.

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Expert

8:00 and 8:30 on Wednesday's, 8:30 on Thursdays, 10:00 on Friday's, 10:00 on saturdays, and 8:00 on Sunday nights.

I reccomend that you look at this graph I made and maybe make a reasonible time according to these results.

All that Dont have Am Are pm.

Days of week.

Times kids go to bed.

Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
8:00	8:00	8:00	8:00	10:00-1:30	10:00-1:30	8:00
8:00	8:30	8:00	8:30	11:00-12:00	11:00-12:00	8:00
8:30	8:30	8:30	8:30	9:30-10:00	9:30-10:00	8:00
9:30-10:00	9:30-10:00	9:30-10:00	9:30-10:00	1:30 Am	4:30-5:00 Am	2:30 Am
8:30	8:30	8:30	8:30	10:00-1:30	10:00-1:00	8:30-1:30
9:00	8:30-9:00	8:30	8:30-9:00	9:30	9:30	8:30
9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00
8:30	8:30	8:30	8:30	8:00-12:00	8:00-12:00	8:30
8:00	8:00	8:00	8:00	8:00	8:00-10:00	8:00
8:00	8:00	8:00	8:00	10:00	10:00	8:00
8:00-10	8:00-10:00	8:30-9:30	8:30-9:30	9:30-11:00	9:30-11:00	9:00-10:00
8:00	8:00	8:00	8:00	8:00	10:00	10:00
9:00	9:00	10:00	9:00	8:00	9:00	8:00
8:30-9:00	8:30-9:00	8:30-9:00	8:30-9:00	10:00-11:00	10:00-1:00	8:30-9:00
9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	11:00	11:00	11:00
8:00	8:30	8:30	9:30	10:00-12:00	10:00-12:00	8:00
9:00	9:00	9:00	9:00	12:00	12:00-2:30	9:00
7:00-8:00	7:00-8:00	7:00-8:00	7:00-8:00	7:00-8:00	7:00-8:00	8:00
10:00	10:00	10:00	10:00	3:00 AM	3:00 Am	3:00 Am.

The student reaches a supported conclusion.

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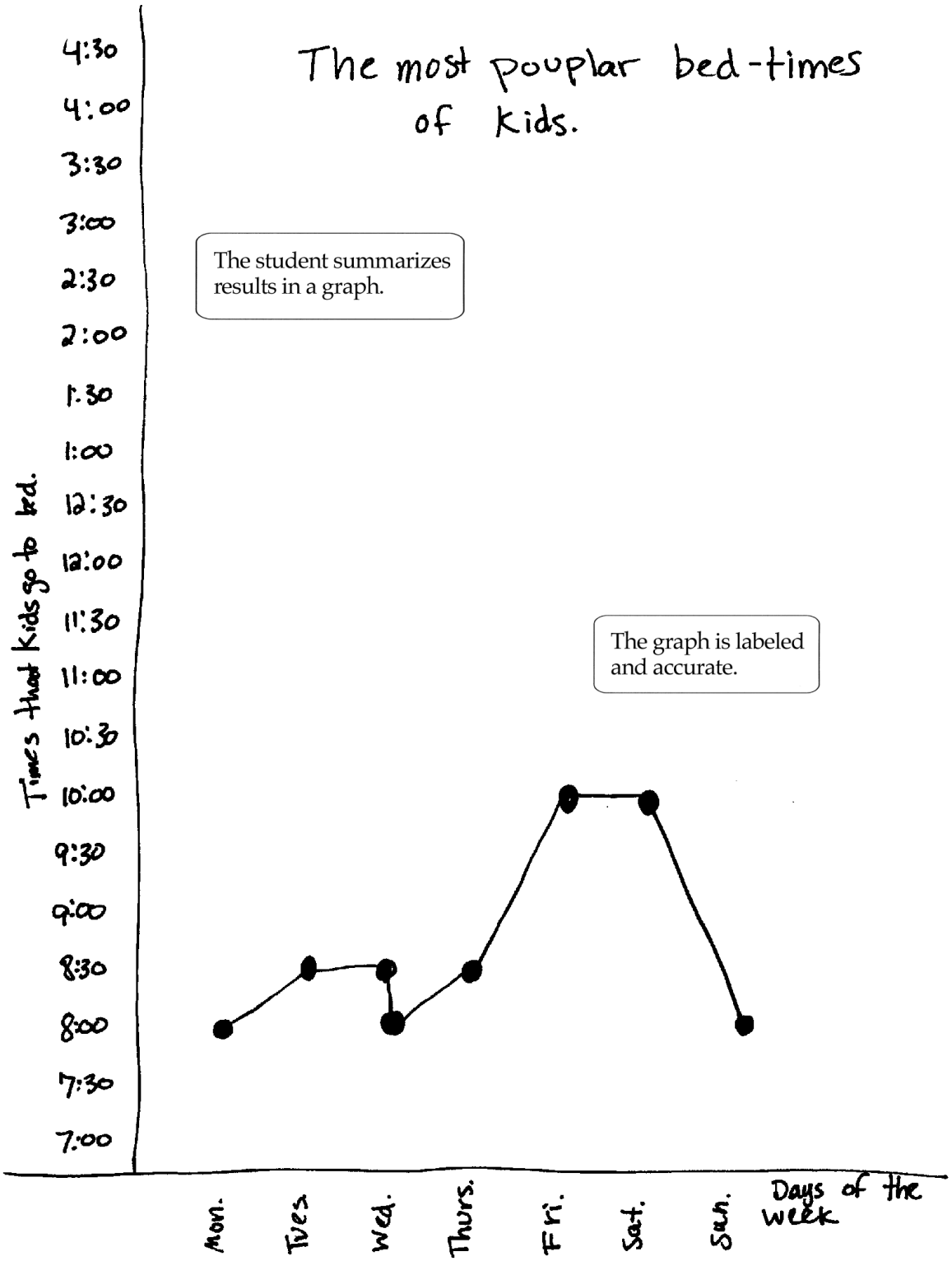
Expert



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