February Calendar Collector

CALENDAR COLLECTOR

Roll & Multiply

Overview

This month, students collect data from repeated trials of a probability experiment in which they roll two dice marked 4–9 and multiply the two numbers. Before conducting the experiment, they predict how likely it is that a given product will be odd and how likely it is to be even. In the middle of the month, after conducting 5 trials every day, students revise their predictions and then continue making 5 trials a day through the end of the month.

Frequency

Update the data daily, and share observations and predictions about the data as a whole group once or twice a week.

Skills & Concepts

- ★ using multiplication facts through 9 × 9 with fluency
- ★ predicting the probability of various outcomes or events
- ★ representing all possible outcomes for a simple probability situation
- ★ conducting a probability experiment
- ★ constructing, reading, and interpreting bar graphs

You'll need

- ★ Roll & Multiply Data Chart (Overhead NC 6.5)
- ★ Roll & Multiply Record Sheet, pages 1 and 2 (Blacklines NC 6.3 and 6.4, 1 copy each, see Advance Preparation)
- ★ Roll & Multiply Data Chart (Number Corner Student Book, page 63)
- ★ Thinking about Roll & Multiply (Number Corner Student Book, page 65)
- ★ One More Look at Roll & Multiply (Number Corner Student Book, page 69)
- ★ 2 dice marked 4–9
- ★ calculators
- ★ black felt-tip marker
- ★ yellow highlighter marker
- ★ overhead pens

Advance Preparation Run 1 copy each of Blacklines NC 6.3 and 6.4. Trim and then glue or tape them together to form one long chart. Post on your calendar display board before conducting your first Calendar Collector Workout this month. You can also run a class set if you want each student to keep a record.

Week 1 Introducing Roll & Multiply

Introduce Roll & Multiply by holding up two dice marked 4–9. Ask students what the chance of getting an odd product would be if you rolled the two dice and multiplied the numbers that came up. What would be the chance of getting an even product? Is there a better chance of getting one than the other, or is it equally likely that you'll get an odd or an even product? What if you repeated the experiment 100 times? Would you get odd products more often

Calendar Collector Roll & Multiply (cont.)

Number Corner Student Book

NAME _____ DATE _____

Thinking about Roll & Multiply

CALENDAR COLLECTOR

Date	Total odd products	Total even products	Total products

1 What observations can you make about the data above?

2 Fill in the missing numbers on this multiplication table. Then color in the squares with odd products.

×	4	5	6	7	8	9
4	16	20	24		32	
5	20		30	35		45
6	24		36		48	
7	28	35		49	56	63
8	32		48		64	
9		45	54	63		81

3a How many products are there altogether on the multiplication table?

b How many of those products are odd?

c How many of those products are even?

d What does this tell you about the Roll & Multiply experiment?

As they finish working on their sheets, have students meet in pairs to compare and discuss their work, especially their responses to the final question. When everyone is finished, ask them to discuss the last question as a class.

Week 4 Drawing Conclusions about the Data & the Experiment

Before you conduct the last Calendar Collector Workout, record on the Roll & Multiply Data Chart overhead the total number of times odd and even products have come up so far this month. To open the last workout, display the overhead with the totals filled in and invite students to share observations. Then ask them to think about how the total number of odd products relates to the total number of even products. (It is likely that students will notice that there are about 3 times as many even products as odd products and that about a fourth of all the products are odd.) After students have had a chance to discuss the results as a whole group, have them complete page 69 in their Student Books.

If there are still a few days remaining in the month, ask students to think about whether the additional data is likely to alter their conclusions. Have student helpers continue to collect and record data through the remainder of the month, and if there is time and high student interest, take a few minutes at the very end of the month to re-examine the totals one last time.

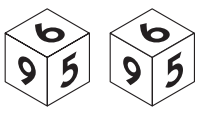
Calendar Collector Roll & Multiply (cont.)

than even, even more often than odd, or about the same number of odd and even products? Give students time to consider these questions and discuss their reasoning in pairs and as a whole group.

Explain that they will conduct 5 trials of this experiment for each day in February, including weekends and holidays. Then ask them to discuss the following questions:

- How many rolls will that be in all? (5 rolls per day × 28 days = 140 rolls or 5 rolls per day × 29 days = 145 rolls)
- Does the class really need to collect that much data? How much do they think is enough to determine the chances of rolling an odd or an even product?
- How many rolls will they need to make today? (The number of rolls will depend on how many days have passed already this month.)

Finally, have students roll and multiply as you record the products on the Calendar Collector Record Sheet. You might do this by calling students up one by one or having them pass the 2 dice from student to student. After recording all of the products, ask students to classify each one as odd or even, and highlight the odd products with a colored marker. Finally, ask them to count how many odd and even products they got in each group of 5 trials, and record those totals on the record sheet. Some students may have difficulty identifying whether these larger numbers are odd or even. If so, take some time for students to discuss how they can tell. Some may think about dividing each by 2, while others may see that they can refer to the number line to see if each number is marked as a multiple of 2. At some point, some students may also see that if one of the multipliers is even, the product will also be even.



Roll & Multiply Record Sheet

Day	Products					Number of Odd Products	Number of Even Products
1	42	20	20	30	63	1	4
2	40	64	72	45	36	1	4
3							
4							
5							
6							
7							

To conclude the first workout, ask students to share observations and predictions about the likely outcomes of this experiment over the course of the month. Based on the data they collected today, many fourth-graders will suggest that they will get more even than odd products but may not be able to explain why. Others may be convinced that they are just as likely to roll an even or odd product, because there are 3 odd and 3 even numbers on each die.

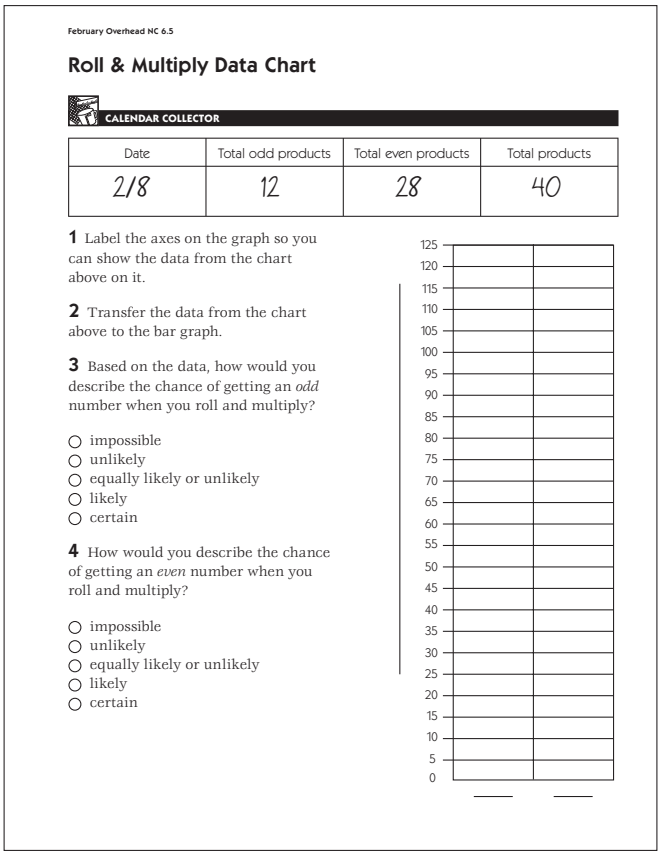
Calendar Collector Roll & Multiply (cont.)

Week 2 Showing the Data on a Chart & Graph

Before conducting the second Calendar Collector Workout, have a student helper make sure the record sheet is up to date. Then have another student or pair of students find the total number of times odd and even products have been rolled and enter those totals on the overhead Roll & Multiply Data Chart. Emphasize that this task needs to be done carefully and accurately. You may want to check students' work quickly before proceeding with the workout.

Roll & Multiply Record Sheet

Day	Products					Number of Odd Products	Number of Even Products
1	42	20	20	30	63	1	4
2	40	64	72	45	36	1	4
3	20	48	28	54	54	0	5
4	32	16	81	54	42	1	4
5	54	48	25	81	35	3	2
6	48	35	64	20	72	1	4
7	48	72	49	63	35	3	2
8	72	45	63	54	32	2	3
9							
10							
11							
12							
13							
14							



February Overhead NC 6.5

Roll & Multiply Data Chart

CALENDAR COLLECTOR

Date	Total odd products	Total even products	Total products
2/8	12	28	40

1 Label the axes on the graph so you can show the data from the chart above on it.

2 Transfer the data from the chart above to the bar graph.

3 Based on the data, how would you describe the chance of getting an *odd* number when you roll and multiply?

- ○ impossible
- ○ unlikely
- ○ equally likely or unlikely
- ○ likely
- ○ certain

4 How would you describe the chance of getting an *even* number when you roll and multiply?

- ○ impossible
- ○ unlikely
- ○ equally likely or unlikely
- ○ likely
- ○ certain

125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

Display the Roll & Multiply Data Chart with the totals filled in at the top. Give students a few minutes to share observations and conjectures about the data, and then ask them to think about how they can transfer the data to the bar graph on the overhead. Remind them that they need to label both axes of the graph and ask them to decide together what those labels should say. When they have decided, label the axes on the overhead.

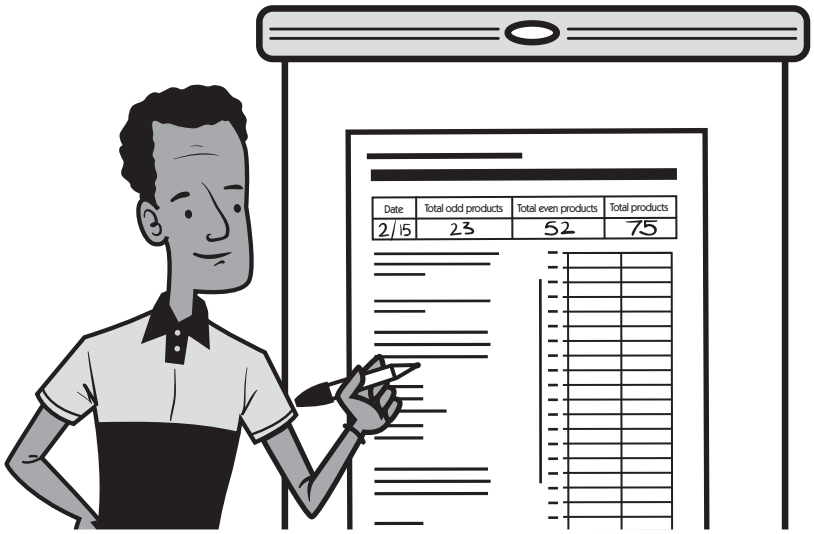
Then read questions 2 and 3 together and have students share their current understandings of the terms *impossible*, *unlikely*, *equally likely or unlikely*, *likely*, and *certain*. Students' understandings of these terms are often intuitive at this time of year, and that is fine. Next, have students complete page 63 in their Student Books, which is identical to the overhead. They will need to fill in the

totals, label the axes, and then fill in the bar graph with the totals and answer questions 2 and 3.

As they finish working on their sheets, have students meet in pairs to compare their graphs and the ways they described the probability of getting odds and evens. They'll discuss these ideas further in the workout next week.

Week 3 Thinking about the Data So Far

Before conducting the third Calendar Collector Workout, have a student helper make sure the record sheet is up to date. Then have another student or pair of students find the total number of odd and even products that have been rolled so far. Ask them to enter those totals on the overhead Roll & Multiply Data Chart. By now, the data should show that even products come up far more frequently than odd products.



Display the overhead with the totals filled in and give students a couple of minutes to share observations and conjectures about the data. Then ask them to complete page 65 in their Student Books.

The multiplication table on the page will help students see that the chances of rolling an odd product are 9 out of 36 (or 1 out of 4) and the chances of rolling an even product are 27 out of 36 (or 3 out of 4). While fourth graders may not express these probabilities in numerical form, the sheet will help them begin to see why they have gotten more even than odd products.

Roll & Multiply Data Chart

CALENDAR COLLECTOR

Date	Total odd products	Total even products	Total products

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- ◯ impossible
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- ◯ certain

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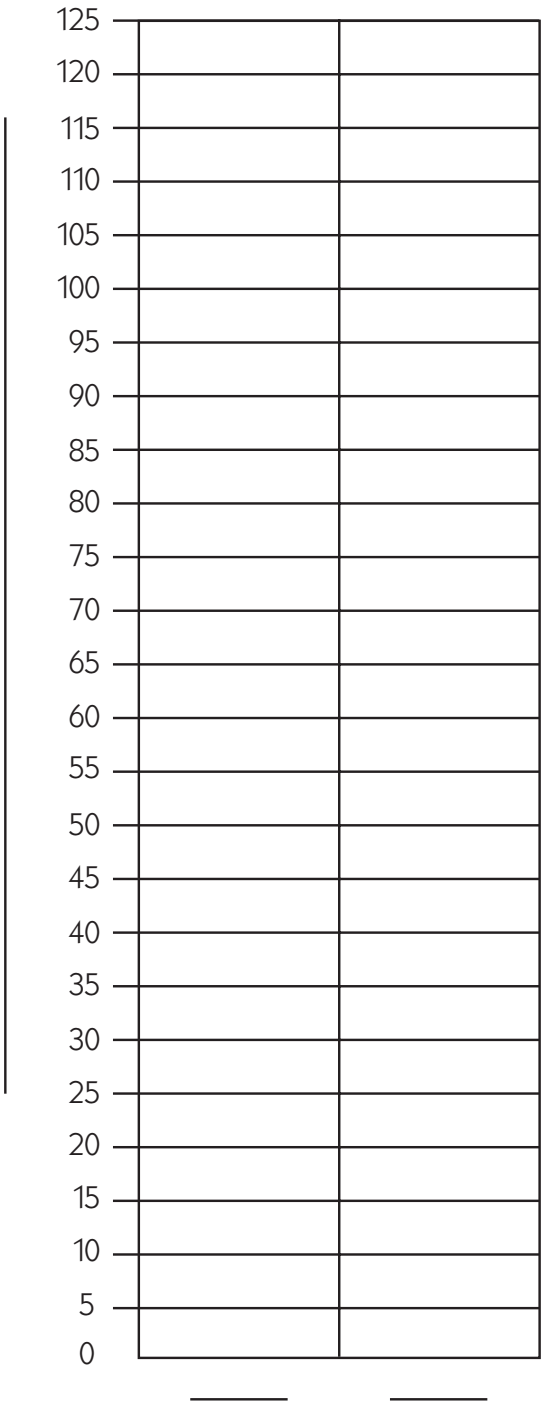

Roll & Multiply Record Sheet page 1 of 2

Roll & Multiply Record Sheet							
Day	Products					Number of Odd Products	Number of Even Products
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

Glue or tape page 2 here.

Roll & Multiply Record Sheet page 2 of 2

15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

NAME _____ **DATE** _____

Roll & Multiply Data Chart

CALENDAR COLLECTOR

Date	Total odd products	Total even products	Total products

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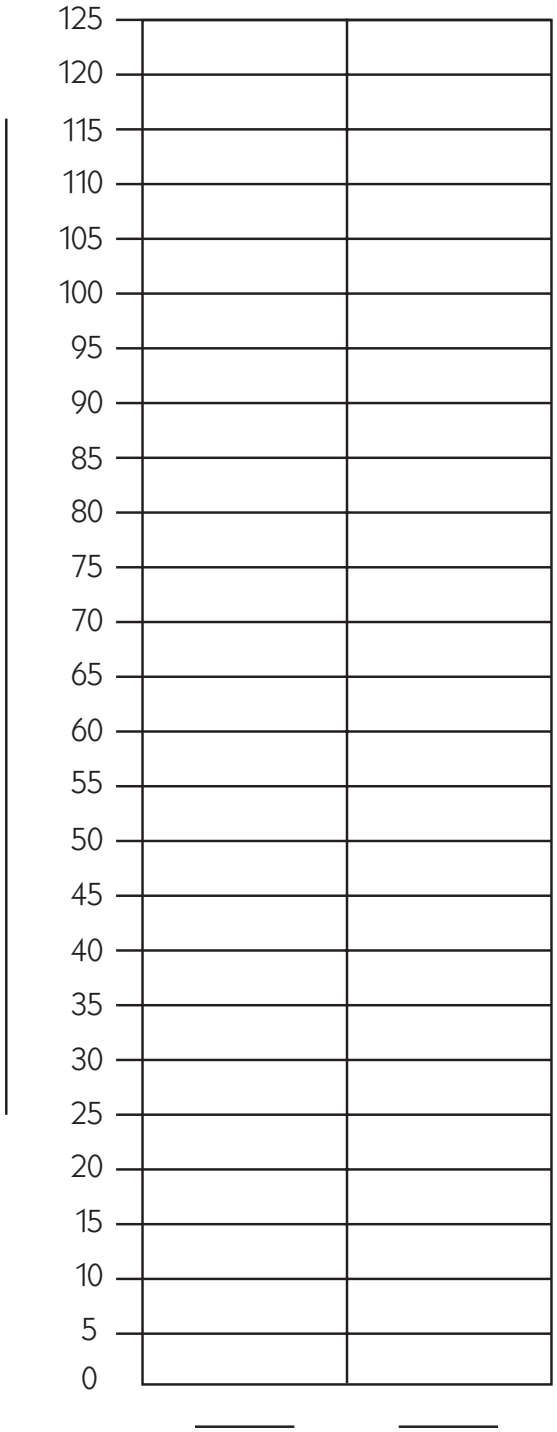

NAME _____ **DATE** _____

Thinking about Roll & Multiply

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1 What observations can you make about the data above?

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3a How many products are there altogether on the multiplication table?

b How many of those products are odd?

c How many of those products are even?

d What does this tell you about the Roll & Multiply experiment?

NAME _____ **DATE** _____

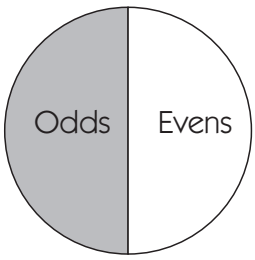
One More Look at Roll & Multiply

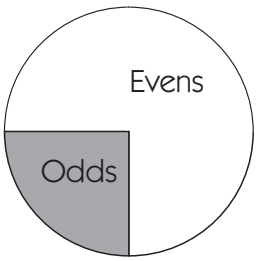
CALENDAR COLLECTOR

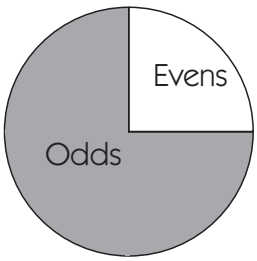
1 Fill in the chart below with the total number of odd and even products rolled so far.

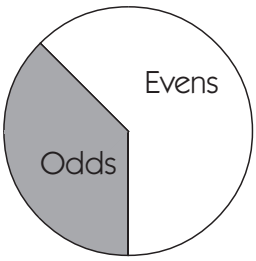
Date	Total odd products	Total even products	Total products

2a Circle the pie graph below that you think comes closest to showing the results of your experiment so far.









b Explain your choice above.