1. Here is a pattern of figures made with Colour Tiles.
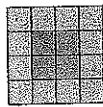
Figure 1   Figure 2   Figure 3   Figure 4
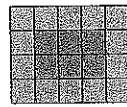
The pattern continues.
a) Draw the next two figures on grid paper.
b) Copy and complete the table for the first 6 figures.

Figure	Number of Green Tiles	Number of Yellow Tiles
1	2	10

c) Write a pattern rule for the number of green tiles.
d) Write a pattern rule for the number of yellow tiles.
e) How many green tiles will be in the 8th figure?
f) How many yellow tiles will be in the 10th figure?
g) Will any figure have 21 green tiles? 31 yellow tiles?
   Describe how you made your decision.

2. Regular pentagons are combined to make new figures.
   Each pentagon touches no more than 2 other pentagons.

   The side length of each pentagon is 1 unit.
   The perimeter of each figure is recorded in a table.

Figure 1

Figure 2

Figure 3

Figure 4

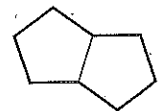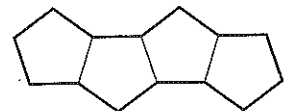| Number of Pentagons	Perimeter (units)
1	5
2	8

a) Copy and complete the table for the first 4 figures.
b) Write a pattern rule for the perimeters.
c) Use the pattern to predict the perimeter
   of the figure with 6 pentagons.
   With 10 pentagons.

3. Pizza Parlour has prices that follow a pattern.

Pizza Number	Pizza Size	Price with Cheese ($)	Price with Two Toppings ($)
1	4-slice	5	7
2	8-slice	10	12
3	12-slice	15	17
4	16-slice	20	
5	20-slice		

a) Copy and complete the table.
b) Write a pattern rule for the price with cheese.
c) Write a pattern rule for the price with two toppings.
d) Suppose the patterns in the table continue.
What is the price of a 48-slice pizza with two toppings?
e) How is the price of the pizza with two toppings related to the price of the pizza with cheese?

4. Each package of cards contains 5 cartoon cards.
a) Copy and complete this table for the first 5 packages.

Number of Packages	Number of Cards
1	
2	

b) Write a pattern rule for the number of cards.
c) Find the number of cards in 9 packages and in 15 packages.
d) The deluxe edition contains 4 packages in a tin.
How many cards will there be in 3 deluxe tins? 7 deluxe tins?
Show your work.

Reflect

How can a table help you solve a problem?
Use an example to show your thinking.

Math Link

Music

There are many patterns in music. A melodic ostinato is a short pattern in the melody. It repeats throughout a song.

Use a calculator when it helps.

1. Write the first 5 terms of each pattern.
   a) Start at 3. Add 9 each time.
   b) Start at 5. Add 2. Increase the number you add by 2 each time.
   c) Start at 7. Alternately add 3, then subtract 1.

2. Write the next 4 terms in each pattern. Write each pattern rule.
   a) 1, 2, 4, 5, 7, 8, ...
   b) 2, 4, 3, 5, 4, 6, 5, ...
   c) 98, 85, 87, 74, 76, ...
   d) 1, 10, 7, 70, 67, 670, ...

3. Find each missing term. Write the pattern rule.
   a) 3, 23, 13, 33, □, 43, 33, ...
   b) 99, 98, 198, 197, □, 296, 396, ...
   c) 2, 22, 12, 132 , 122, 1342, □, ...

4. What is the 7th term of this pattern?
   Start at 200. Subtract 8 each time.
   How could you find the 7th term without writing the first 6 terms?

5. Find each missing term. Write the pattern rule.
   a) 74, 148, 222, □, 370, ...
   b) 100, 198, 295, 391, □, 580, ...
   c) 1122, 1112, 1101, 1091, 1080, □, 1059, ...

6. What is the 10th term of this pattern?
   Start at 13. Alternately subtract 4, then add 5.

7. The first 2 terms of a pattern are 6, 12, ...
   How many different patterns can you write with these 2 terms?
   For each pattern, list the first 6 terms and write the pattern rule.
   Show your work.

Reflect

How do you find the pattern rule for a number pattern?
Use an example to explain.

Master 1.6   **Additional Activity 1: What's Next?**

Work on your own.

Write the next three terms in each pattern. Write each pattern rule.

➤ 4, 24, 14, 34, 24, _____, _____, _____

Rule:

➤ 88, 77, 87, 76, 86, _____, _____, _____

Rule:

➤ 4, 20, 10, 50, 40, _____, _____, _____

Rule:

What is the 8th term in each pattern? Write each pattern rule.

➤ 144, 132, 120, 108, …

Rule:

➤ 166, 177, 188, 199, …

Rule:

Take It Further: Write two different patterns that begin: 10, 20, 40, …
For each pattern, list the next 3 terms and write the pattern rule.

(Master 1.7)   **Additional Activity 2: Patterns with Eleven**

Work with a partner.

You will need a calculator.

Each product below has one factor of 11.

➢ Find each product.

14 × 11 =

26 × 11 =

45 × 11 =

53 × 11 =

What patterns do you see in the products?
Write a rule for finding the product of a two-digit number and 11.

➢ Use your rule to predict these products.

16 × 11 =

23 × 11 =

81 × 11 =

33 × 11 =

➢ Are there any two-digit numbers for which your rule does not apply? Make up your own multiplication statements to find out.

Take It Further: Find these products.
How are these statements different from those above?

56 × 11 =
83 × 11 =

Does your rule for multiplying by 11 still work?

Name _____ Date _____

Work on your own. Find the missing numbers.

Write a rule for each table. Your rule must explain what you do to the input number to get the output number.

1.

Input	Output
2	6
	12
6	
8	24
10	

Rule:

2.

Input	Output
30	6
25	
	4
15	3
10	

Rule:

3.

Input	Output
35	
13	0
27	
	35
74	61

Rule:

Take It Further: Create two different Input/Output tables with missing numbers.
Trade tables with a classmate.
Complete your classmate's tables.

(Master 1.9)   **Additional Activity 4: Perimeter Patterns**

Work with a partner.

Use Colour Tiles or grid paper.

Step 1

Build these 4 figures of a growing pattern.
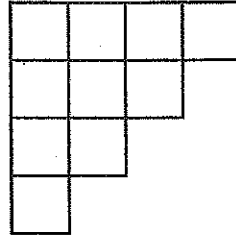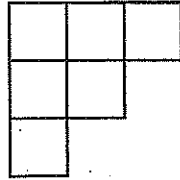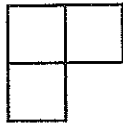
Figure 1   Figure 2   Figure 3   Figure 4

Step 2

Find the perimeter of each figure.

Record your results in the table.

Predict the perimeter of the

5th figure and the 6th figure.

Build the figures to check.

Write a pattern rule for the perimeters.

Figure	Perimeter
1	
2	
3	
4	
5	
6	

Take It Further:

Use Colour Tiles to create your own growing pattern.

Make the first 4 figures.

Trade patterns with your partner.

Repeat Step 2 above for your partner's pattern.

Master 1.10   ## Step-by-Step 1

Lesson 1, Question 7

Here are the first two terms of a pattern: 6, 12, …

Step 1   How can you get 12 from 6?

Find the missing numbers:

6 + ____ = 12   6 × ____ = 12

Step 2   Start at 6. Add 6 each time. Write these terms.

6, 12, ____, ____, ____, ____

Write the pattern rule.

_____

Step 3   Start at 6. Use a calculator. Multiply by 2 each time. Write

these terms.

6, 12, ____, ____, ____, ____

Write the pattern rule.

_____

Step 4   Think about alternately adding two numbers.

Create a different pattern that begins with 6, 12, ….

6, 12, ____, ____, ____, ____

Write the pattern rule.

_____

Step 5   Think about alternately adding a number, then subtracting a smaller

number. Create a different pattern that begins with 6, 12, ….

6, 12, ____, ____, ____, ____

Write the pattern rule.

_____

Name _____ Date _____

Step-by-Step 2

Lesson 2, Question 6

Step 1   Draw an Input/Output machine in the space below.

Choose addition or multiplication.

Choose a number to go with your operation.

Write the operation and number in your machine.

Input	Output

Use the input numbers 3, 6, 9, and 12.

Find the output numbers.

Record your work in the table.

Step 2   What is the pattern rule for the input numbers?

_____

Step 3   What is the pattern rule for the output numbers?

_____

Name _____ Date _____

Lesson 3, Question 4

Step 1   Fill in the missing numbers.

Sundae	Number of Scoops	Price ($)	Price with Extra Topping ($)
1	1	1.25	1.75
2	2	2.50	3.00

Step 2   Complete the pattern rule for the price:

Start with $1.25. Add _____ each time.

Step 3   Complete the pattern rule for the price with extra topping:

Start with $1.75. Add _____ each time.

Step 4   Extend the pattern in the table. Show 5 scoops, then 6 scoops.
Fill in the missing numbers.

Sundae	Number of Scoops	Price ($)	Price with Extra Topping ($)
1	1	1.25	1.75
2	2	2.50	3.00
3	3		
4	4		
5			
6			

Step 5   The price of a 6-scoop sundae with extra topping is $ _____.

Name _____ Date _____

Lesson 4, Question 6

Use a calculator when it helps.

Step 1   Continue this number pattern until you reach 31.

70, 67, 64, 61, 58, _____

Which day will Dave read 31 pages? _____

Step 2   Complete the table.

Day	Number of Pages
1	70
2	67
3	64
4	
5	
6	
7	

Day	Number of Pages
8	

Step 3   Find the sum of the number of pages read from Day 1 to Day 7.

70 + 67 + 64 + _____ + _____ + _____ + _____ = _____

Step 4   What is the total number of pages in the book?

_____