

Learn & Play



# Sudoku

for Fifth Grade





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**Learn & Play**



# Sudoku

for Fifth Grade



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5301 Oceanus Drive

Huntington Beach, CA 92649-1030

<http://www.shelleducation.com>

**ISBN 978-1-4258-0324-7**

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## What Is Sudoku?

Whether you are traveling or just relaxing on a Sunday morning, Sudoku is a pastime that the whole family can enjoy. The Sudoku craze has taken over. It is goodbye to crossword puzzles and magic squares. If you search the word *Sudoku* on Google™, you will get over 70 million hits. Sudoku puzzles are published in newspapers, magazines, and books. They even come in electronic handheld games or interactive games on the Web.



Source: TheSupe87/Shutterstock, Inc.

Sudoku is a logic puzzle. Each puzzle has one or more mini-grids. Each mini-grid has boxes that are arranged in rows and columns. Hints are given in some of the boxes. There are different types of puzzles. The puzzles can be 1 x 1 grids, 2 x 2 grids, 2 x 3 grids, 3 x 3 grids, or even more. Pictures, letters, and numbers are all used within the puzzles in this series.

The objective of a Sudoku puzzle is to fill in all the boxes of the puzzle using only the given hints. Each column, row, and mini-grid must have each picture, letter, or number only once. That means you have to pay attention to three things while you try to solve these puzzles. You have to look up and down the column, across the row, and around the mini-grid!

## The History of Sudoku

How did the Sudoku craze start? Sudoku puzzles first appeared in a U.S. magazine in 1979. At that time it was called “number place.” A magazine editor from Japan saw the number place puzzle and liked it so much that he decided to create a magazine with his version of it. He called the puzzle Sudoku. The word *su* in Japanese means *number*, and the word *doku* means *single*. The puzzle became very popular in Japan. Today, 660,000 Sudoku magazines are circulated every month in Japan.



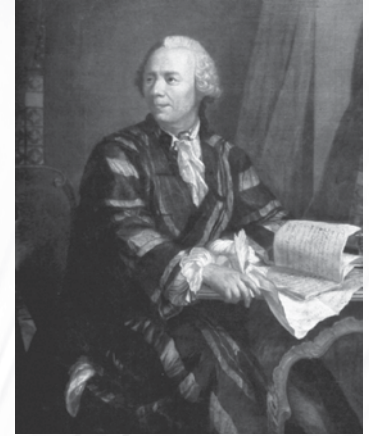
Source: Daniel Gale/Shutterstock, Inc.

The Sudoku craze spread to the United Kingdom when Wayne Gould saw the puzzle in a magazine while working in Hong Kong. He was fascinated by the puzzles, so he created a computer program to generate Sudoku puzzles. Then, he sold his idea to the *London Times*. They used Gould's program to create a series for their daily games pages. Other newspapers then jumped on the bandwagon, spreading the craze back to the United States. In April 2005, Sudoku became a regular feature in the *New York Post*. The *Daily News* and *USA Today* followed a few months later.

## The History of Sudoku *(cont.)*

### Deep Roots

The puzzle goes back further than 1979. It actually has its roots in Latin Squares. Latin Squares were taken from the work of Swiss mathematician Leonhard Euler. He lived from 1707 to 1783. A Latin Square is a square grid that contains sets of different symbols repeated. The cells of the grid contain each symbol only once and the symbol can appear only once in each row and column. (Sound familiar?) Sudoku puzzles are really Latin Squares that have some of the symbols already filled in, and you have to fill in the rest. A set of Latin Squares is combined to form a Sudoku puzzle.



Portrait by Johann Georg Brucker

### A Mental Sport

In 2006, the World Puzzle Federation held its first World Sudoku Championship. Like the Olympics, different countries send teams. There are both individual and team competitions. Each country can enter six participants plus one nonplaying captain. The participants have to solve different variations of Sudoku puzzles.

### Find Out More

- What other number puzzles have similar rules to Sudoku?
- What other ideas have come from mathematician Leonhard Euler?

## Sudoku Research

Sudoku is a kind of logic puzzle. No mathematical skills are needed to solve the puzzles, and you do not even need to use arithmetic. People solve the puzzles by logical reasoning alone (Sharp 2006). For this reason, these puzzles can be interesting and addictive for both children and adults alike. Not only are the puzzles a fun hobby, but the skills used to solve Sudoku puzzles can be transferred and applied to other areas of life.

For young people, the main benefit of solving Sudoku puzzles is the development of logical reasoning skills. These skills will help them solve math problems.

There is a misconception that logical reasoning has nothing to do with mathematics. This seems to be tied to the idea that mathematics is about numbers. Indeed, Sudoku puzzles could have letters or colors or pictures instead of the numbers or any other property that comes with various attributes. (Sharp 2006)

### Sudoku Research *(cont.)*

The heart of the puzzle, the mini-grid, is really a math problem about arrangements or combinations of objects (Sharp 2006). Logic is required in most areas of mathematics, and many examples of math problems can be given that require logical reasoning. Students can also use logical reasoning skills to find new ways to look at a problem and develop creative problem solving strategies.

To fully understand the depth of math concepts and become lifelong learners of mathematics, students need both logical reasoning and problem-solving skills. By solving Sudoku puzzles, students will begin to develop systematic thinking. They will learn to identify patterns and apply them. And, they will develop an awareness of the need to examine data carefully. These skills will also transfer over to other content areas, such as language acquisition. Puzzles are “well suited for contributing to a problem-based environment that is conducive to learning in the second-language classroom and may play an important role in the development of critical and higher-order thinking skills.” Most importantly, puzzles offer second-language students the opportunity to repeat vocabulary and sentence structures in authentic contexts (Raizen 1999).

In the classroom, Sudoku puzzles are an easy way to differentiate instruction. The different grade levels of Sudoku can be used in one classroom. Each student can be given a puzzle from the grade level and skill level that best suits his or her cognitive development of logical reasoning and problem-solving skills.

Riddles and puzzles have broad appeal and are accessible to literally all ability levels. The conditions and objectives of the problems that are posed as puzzles are usually understood easily, although the solutions may be challenging. Even though some students may not be able to solve every puzzle, many enjoy the challenge of the attempt. (Evered 2001)

Students who have not been successful in mathematics can find success in solving Sudoku puzzles. In the preface to Raymond Smullyan’s book, *The Lady or the Tiger and Other Logic Puzzles*, he states, “So many people I have met claim to hate math, and yet are enormously intrigued by any logic or math problem I give them, provided I present it in the form of a puzzle. I would not be at all surprised if good puzzle books prove to be one of the best cures for the so called, math anxiety” (1982).

Sudoku puzzles serve as an excellent warm-up activity, closing activity, problem-of-the day, enrichment activity, or break from the traditional curriculum content. Will Shortz, a puzzle creator and editor, states, “You can learn it in 10 seconds, and yet the logic needed to solve Sudoku is challenging. It’s a perfect amount of time to spend on a puzzle, anywhere from five minutes to half an hour” (Bennett 2006).



## Sudoku Research *(cont.)*

The puzzles are engaging and addictive for students. Filling in the empty cells appeals to them, and the rush at the very end to complete the puzzle gives them a great feeling of accomplishment. This inherent element of solving the puzzle adds a level of excitement to the classroom and is an intrinsic motivator for students (Evered 2001). The puzzle serves as a catalyst for learning (Raizen 1999).



Source: Ramon Berk/Shutterstock, Inc.

For both adults and students, Sudoku is a way to sharpen your brain and improve your focus. It requires concentration, patience, and self-discipline. According to Shortz, “You have to be focused to be a good Sudoku solver, because if you make a mistake and then base further logic on the mistake you made you have no option but to erase everything and start over. So Sudoku really teaches you to be careful” (Bennett 2006). Sudoku can also be a way to reduce stress or anxiety. While working on the puzzle, all other challenges and worries can be put aside. The puzzle becomes your focus and as a result, your brain feels refreshed and ready to tackle whatever life throws at you. Other researchers are finding Sudoku as a way to slow the progress of Alzheimer’s disease (Critser 2006).

This puzzle with its simple rules and small numbers can be a tool for students, teachers, and parents. For students, it helps them develop logical reasoning skills and problem-solving strategies. Students will become self-disciplined, patient, and careful problem solvers. For teachers, it is a tool for differentiating instruction, engaging students, and supporting language acquisition. For parents, it is a family pastime that reduces stress, increases focus, and turns a child from a math hater to a math lover.

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## Learn to Play Sudoku

### Sudoku Words

- **items**—the letters or numbers in the cells of the puzzle
- **mini-grid**—group of square cells that make a large square or rectangle
- **column**—line of cells that go up and down
- **row**—line of cells that go side to side
- **hints**—cells that are filled in before you start the puzzle
- **scanning**—looking at the mini-grids, columns, and rows to find cells with only one possibility for the missing item

### Sudoku Rules

- Every mini-grid must have one each of each item.
- Every column must have one each of each item.
- Every row must have one each of each item.

### How to Play

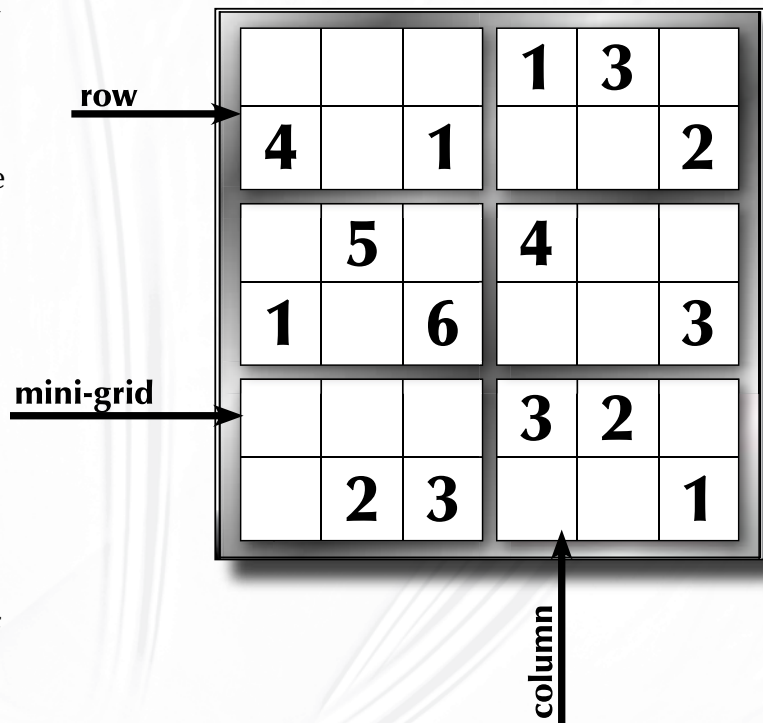
- **Step 1**—Look at the puzzle. Find a mini-grid that has lots of hints.
- **Step 2**—Look at each row and column. Fill in the missing items. Each item can only be once in each row or column!
- **Step 3**—Look at the columns and rows again. Check to make sure none of the items are the same. Move any that are repeated.
- **Step 4**—Repeat these steps for each mini-grid.



#### Top Secret Tip

Try this! Don't look for the mini-grid with the most hints. Look for the column or row with the most hints. Then start the puzzle there.

### The Parts of a Sudoku Puzzle



## Strategies for Sudoku

### What Is a Strategy?

A strategy is a plan, or a way to solve a puzzle. It is a good idea to have a plan, so you know what steps to take as you work.

### Strategy 1—Scanning

#### Step 1

- Find the mini-grid with the most hints. Ask, “What letters or numbers are missing from the mini-grid?”
- Write those missing items outside the mini-grid. These are the only items needed to complete this mini-grid.
- If there is only one empty cell, fill in the missing item and go to another mini-grid.
- If there is more than one empty cell, go to step 2.

#### Step 2

- Look at a row of the puzzle that crosses the mini-grid from step 1.
- In each empty cell, write any items that are missing in both the mini-grid and the row. Use the list you wrote outside the mini-grid.
- If there is only one possible item left for a cell, fill in the cell with that item.
- If there is more than one possible item, go to step 3.

#### Step 3

- Repeat step 2 for each row of the puzzle that crosses the mini-grid.
- Move onto step 4 if there are still empty cells in the mini-grid.

#### Step 4

- Look at a column of the puzzle that crosses the mini-grid from step 1.
- In some of the cells, there will be numbers written from steps 2–3. Cross out any items that are already given in that column.
- If there is only one possible item left for a cell, fill in the cell with that item.
- If there is more than one possible item, go to step 5.

#### Step 5

- Repeat step 4 for each column of the puzzle that crosses the mini-grid.
- Move onto step 6 if there are still empty cells in the mini-grid that can be filled in with more than one possible item.

#### Step 6

- Repeat steps 2–5 for all the other mini-grids in the puzzle.
- If you still have empty cells, make an educated guess for one cell.

#### Step 1

4			3		6
	3			5	
		1			4
5			1		
		2		4	
6		3			5

1  
4  
5

#### Steps 2–4

4			3		6
	3			5	
		1			4
5			1		
<del>1</del>	<del>4</del> <del>5</del>	2		4	
6	<del>4</del> <del>5</del>	3			5

~~1~~  
~~4~~  
~~5~~

## Strategies for Sudoku *(cont.)*

### Strategy 2—Identifying Twins

#### Special Note

This strategy should be used in combination with the scanning strategy.

#### Step 1

- As you scan the puzzle, write possible items in the empty cells.

#### Step 2

- As you write the possible items in the empty cells, look for “twins” in each mini-grid, column, or row. A twin is when two cells in the same mini-grid, row, or column have the same two possible items.
- For example, if you wrote 4 and 5 in two cells in one mini-grid, they are twins.

#### Top Secret Tip

- Twins always hang out in the same area together. Sometimes they like to hang out in the same mini-grid. Other times they like to hang out in the same row. Or, they like to hang out in the same column. It’s your job to look for twins in these three areas.
- Beware of fake twins! If two cells have the same possible items, but are not in the same mini-grid, row, or column, they are not twins.

#### Step 3

- If you find twins, cross out those two possible items in all the other empty cells in that mini-grid, row, or column.
- Using the example above, if you found a third empty cell in the same mini-grid that had the possible items of 3, 4, and 5, you could eliminate the 4 and 5. Those two items will go in the twin cells. That means you can write the 3 in the third cell.

#### Why Does This Work?

- For twin cells, one empty cell will have one of the items and the other empty cell will have the other item. Therefore, all other empty cells in that mini-grid, row, or column will not have those two items.
- In the example above, you can only write 4 or 5 in the empty cells that have the twins. Therefore, the only option for the third empty cell is 3.

Step 1

234	23	34	36	<b>1</b>	<b>5</b>
<b>6</b>	123 5	135	3	<b>4</b>	2
45	<b>6</b>	45	<b>2</b>	<b>3</b>	<b>1</b>
<b>1</b>	235	345	56	6	46
5	<b>4</b>	156	16	26	<b>3</b>
3	13	<b>2</b>	<b>4</b>	<b>5</b>	6

#### Step 2

234	23	34	36	<b>1</b>	<b>5</b>
<b>6</b>	123 5	135	3	<b>4</b>	2
(45)	<b>6</b>	(45)	<b>2</b>	<b>3</b>	<b>1</b>
<b>1</b>	235	345	56	6	46
5	<b>4</b>	156	16	26	<b>3</b>
3	13	<b>2</b>	<b>4</b>	<b>5</b>	6

Twins

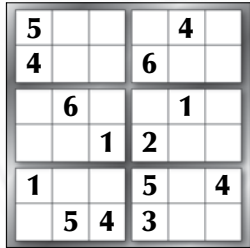
#### Step 3

				<b>1</b>	<b>5</b>
<b>6</b>				<b>4</b>	
(45)	<b>6</b>	(45)	<b>2</b>	<b>3</b>	<b>1</b>
<b>1</b>	<del>(23)</del>	<del>(34)</del>			
	<b>4</b>				<b>3</b>
		<b>2</b>	<b>4</b>	<b>5</b>	

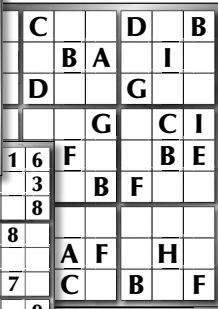
## How to Use This Book

### Leveled Puzzles

#### Beginning



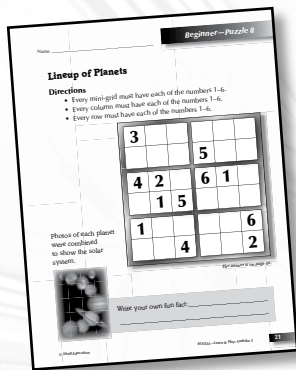
#### Intermediate



#### Challenging

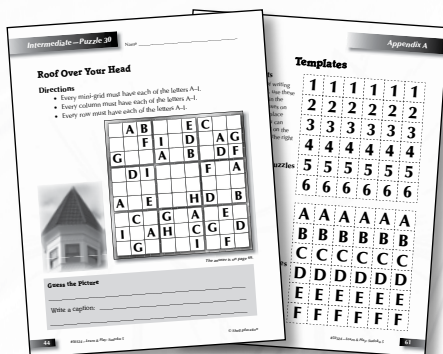
- The Sudoku puzzles in this book are divided into three levels: beginning, intermediate, and challenging. Each level has a specific puzzle variation. There are 15 puzzles for each level. That makes a total of 45 puzzles in this book.
- As students move through each level, the puzzles get more difficult. When math teachers created these puzzles, they progressively decreased the number of hints within each variation. They also analyzed the difficulty of each puzzle by the types of logic needed to solve it. Puzzle solvers solved the puzzles to ensure there was one correct solution for each puzzle. In addition, each level of *Learn & Play: Sudoku* was field tested in classrooms.

### Themes of Puzzles



- Each of the three levels has a content-area theme tied to state and national standards. The beginning puzzles have a science theme. The intermediate puzzles have a math theme, and the challenging puzzles have a social studies theme.
- All the math themes are tied to the Curriculum Focal Points as identified by the National Council of Teachers of Mathematics.
- Throughout each section, the titles, images, and captions relate to the theme.

### Special Additions



- Special additions are included within each section of puzzles. Some pages have fun facts related to the images. On other pages, students get to write their own fun facts. The last five puzzles in each section show close-ups of pictures. Students should guess what the picture is and write a new caption.
- The appendices include templates, a list of photograph sources, and the answer key. The answer key shows the completed puzzles for your reference.

## Puzzle Variations at Each Grade Level

	Easy or Beginner		Medium or Intermediate		Hard or Challenging	
	Variation	Hints	Variation	Hints	Variation	Hints
<b>First Grade</b>	1 x 1 with pictures	3–1	2 x 2 with pictures	11–8	2 x 2 with numbers	8–5
<b>Second Grade</b>	2 x 2 with pictures	11–8	2 x 2 with numbers	7–5	2 x 2 with letters	6–4
<b>Third Grade</b>	2 x 2 with pictures	6–4	2 x 3 with letters	20–18	2 x 3 with numbers	17–14
<b>Fourth Grade</b>	2 x 3 with letters	17–15	2 x 3 with numbers	15–13	3 x 3 with numbers	44–40
<b>Fifth Grade</b>	2 x 3 with numbers	12–10	3 x 3 with letters	40–36	3 x 3 with numbers	36–32

## Correlations

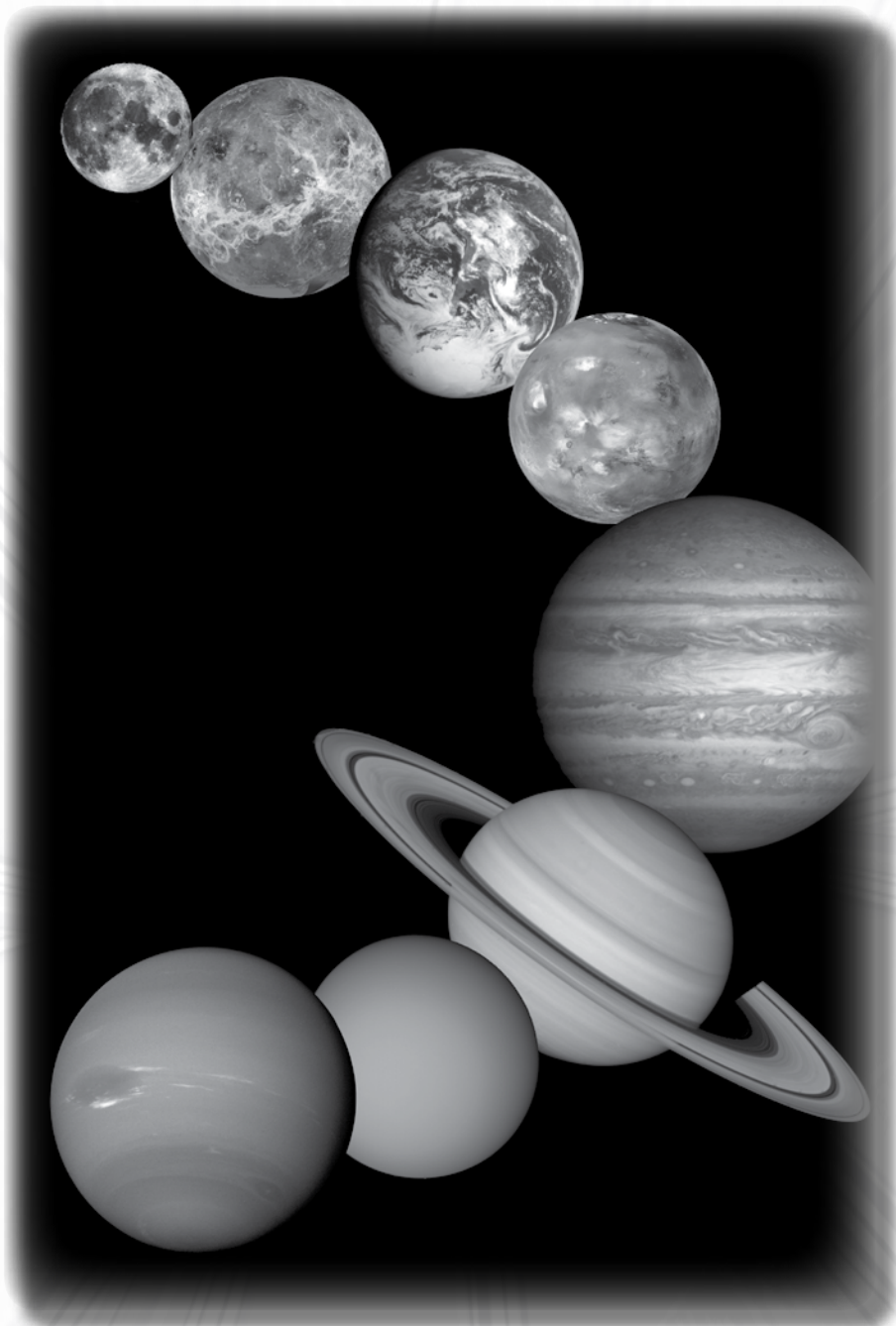
The activities in this book meet the following standards:

- Students understand and apply basic principles of logic and reasoning.
- Students effectively use mental processes that are based on identifying similarities and differences.
- Students apply basic trouble-shooting and problem-solving techniques.
- Students apply effective decision-making techniques.
- Students use trial and error and the process of elimination to solve problems.

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A correlation of these standards for your state can be printed directly from the Shell Education website: <http://www.shelleducation.com>. If you require assistance in printing correlation reports, please contact Customer Service at 1-800-877-3450.

**Solar System**



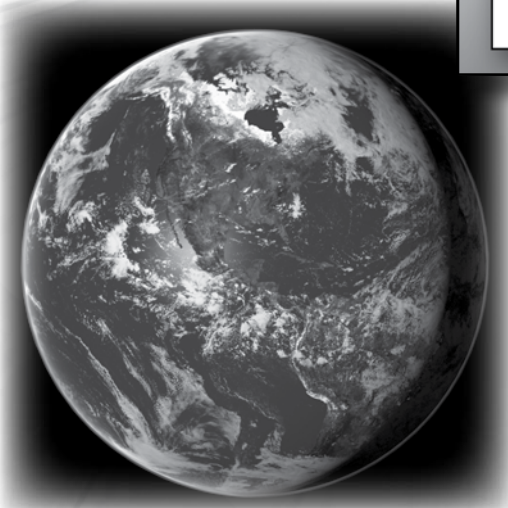
# View from Afar

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

			<b>1</b>	<b>3</b>	
<b>4</b>		<b>1</b>			<b>2</b>
	<b>5</b>		<b>4</b>		
<b>1</b>		<b>6</b>			<b>3</b>
			<b>3</b>	<b>2</b>	
	<b>2</b>	<b>3</b>			<b>1</b>

*The answer is on page 65.*



This is what Earth looks like from outer space.



Name \_\_\_\_\_

## Full Moon

### Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

<b>2</b>	<b>1</b>			<b>3</b>	
		<b>4</b>	<b>1</b>		<b>2</b>
	<b>2</b>				<b>3</b>
		<b>5</b>			
<b>1</b>					<b>4</b>
	<b>5</b>		<b>6</b>	<b>2</b>	

*The answer is on page 65.*



There is a full moon once during each lunar cycle.

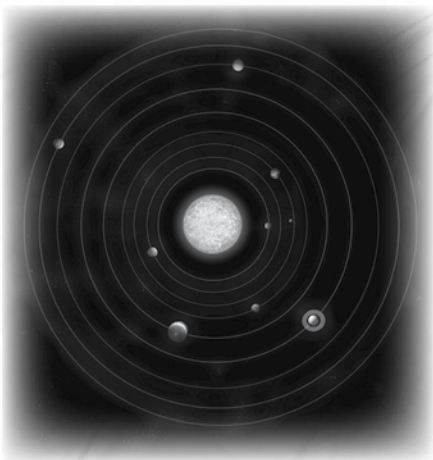
# Ring Around the Sun

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

	<b>5</b>			<b>1</b>	<b>6</b>
<b>2</b>	<b>1</b>		<b>3</b>		
			<b>6</b>	<b>3</b>	<b>1</b>
		<b>1</b>			<b>2</b>
<b>6</b>					<b>4</b>
		<b>4</b>			

*The answer is on page 65.*



All of the planets revolve around the sun.

Name \_\_\_\_\_

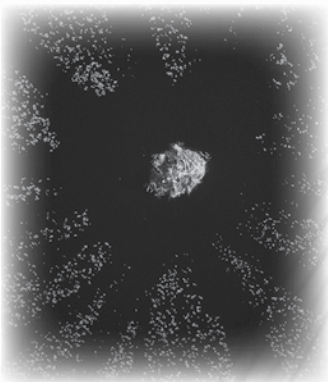
# Rocky Flight

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

5				4	
4			6		
	6			1	
		1	2		
1			5		4
	5	4	3		

*The answer is on page 65.*



Asteroids are huge rocks that orbit the sun.

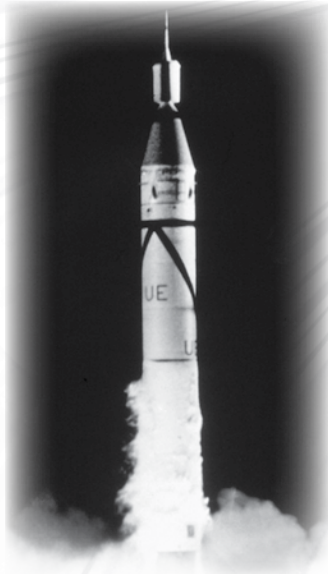
# Blast Off!

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

<b>3</b>		<b>5</b>			<b>6</b>
	<b>4</b>	<b>6</b>			<b>3</b>
<b>4</b>				<b>5</b>	
<b>5</b>					<b>1</b>
			<b>1</b>		<b>5</b>
		<b>1</b>		<b>3</b>	

*The answer is on page 65.*



This rocket is launching toward space and will travel 83 million miles away.

Name \_\_\_\_\_

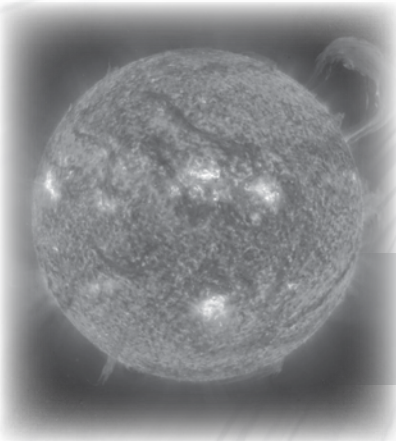
# Hot Spot!

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

		<b>2</b>	<b>3</b>	<b>4</b>	
	<b>3</b>				
		<b>1</b>	<b>5</b>		
	<b>2</b>			<b>3</b>	
<b>4</b>		<b>6</b>			
	<b>1</b>			<b>6</b>	

The sun's surface has a temperature of 6,000 degrees celsius.



The sun is one of more than 100 billion stars in our galaxy.

*The answer is on page 65.*

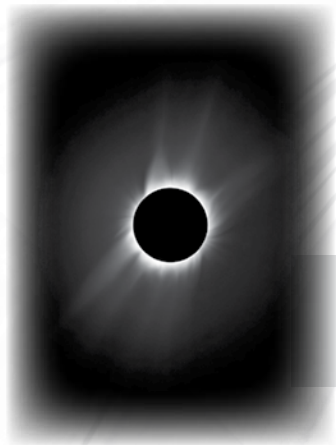
## Cover Up

### Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

	<b>3</b>			<b>5</b>	
		<b>6</b>		<b>1</b>	
		<b>2</b>			
	<b>6</b>		<b>4</b>	<b>2</b>	
	<b>2</b>				<b>5</b>
		<b>1</b>	<b>6</b>		

When the moon eclipses the sun, everything turns dark.



*The answer is on page 66.*

The moon is the only extraterrestrial body people have visited.

Name \_\_\_\_\_

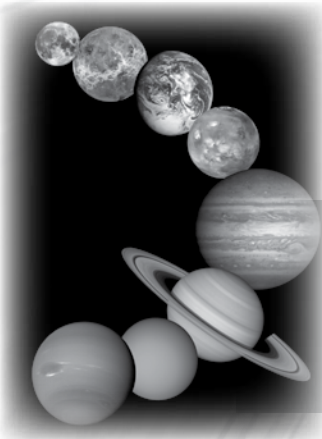
## Lineup of Planets

### Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

<b>3</b>					
			<b>5</b>		
<b>4</b>	<b>2</b>		<b>6</b>	<b>1</b>	
	<b>1</b>	<b>5</b>			
<b>1</b>					<b>6</b>
		<b>4</b>			<b>2</b>

Photos of each planet are combined to show the solar system.



*The answer is on page 66.*

Write your own fun fact: \_\_\_\_\_

\_\_\_\_\_

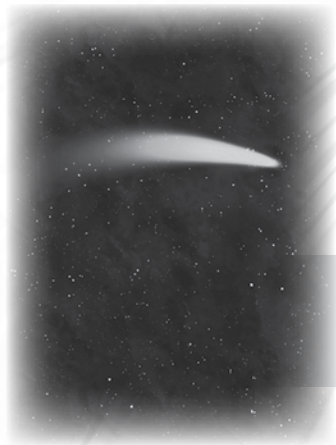
## Streaking!

### Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

<b>6</b>		<b>3</b>		<b>2</b>	<b>5</b>
	<b>2</b>		<b>1</b>		
					<b>1</b>
				<b>5</b>	
	<b>6</b>	<b>5</b>	<b>2</b>		
		<b>1</b>			

This comet is streaking toward the sun.



Halley's comet is visible to the naked eye.

*The answer is on page 66.*



Name \_\_\_\_\_

# Farsighted

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.

2		3	1		4
	5			6	
	1		2		
		2	5	1	
1					

We look through a telescope for a closer view of the sky.



The answer is on page 66.

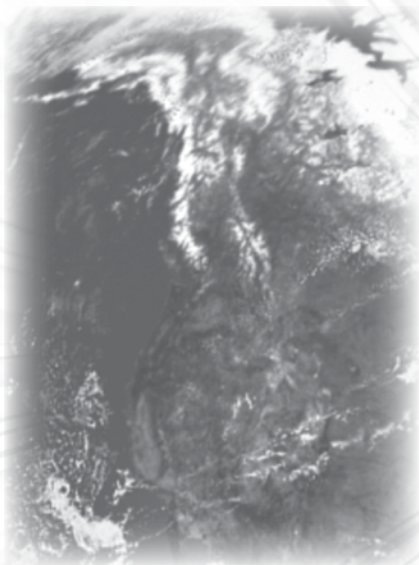
Write your own fun fact: \_\_\_\_\_

\_\_\_\_\_

# All Around Us

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.



	4	1			
2		6			
			6	1	
				5	
		3		4	
6					

*The answer is on page 66.*

### Guess the Picture

What is this picture? \_\_\_\_\_

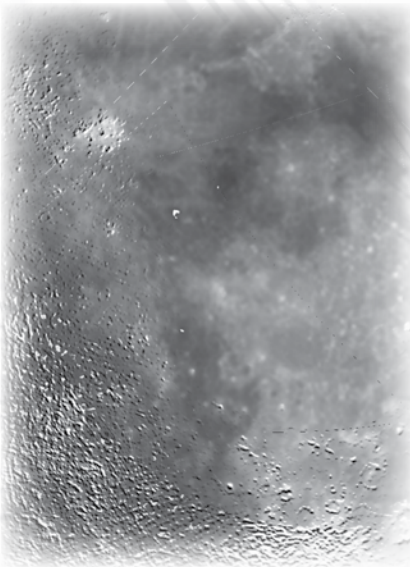
Write a caption: \_\_\_\_\_

Name \_\_\_\_\_

# Almost Dark

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.



	6				5
		4		1	
2					
		5		3	
	5		2	6	
	1				

The answer is on page 66.

## Guess the Picture

What is this picture? \_\_\_\_\_

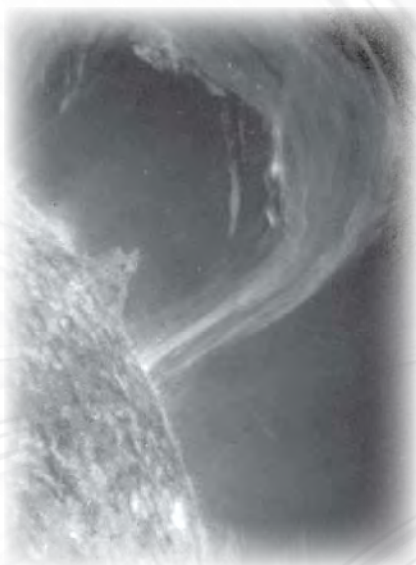
Write a caption: \_\_\_\_\_

\_\_\_\_\_

# Big Ball of Fire

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.



			<b>5</b>		
		<b>3</b>		<b>2</b>	
	<b>6</b>				
<b>3</b>		<b>5</b>			
		<b>1</b>			<b>6</b>
<b>4</b>				<b>3</b>	<b>1</b>

*The answer is on page 67.*

## Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

Name \_\_\_\_\_

# Looking Glass

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.



2			5		
1		6			
			1		
	3				
	2			3	
			6		5

The answer is on page 67.

## Guess the Picture

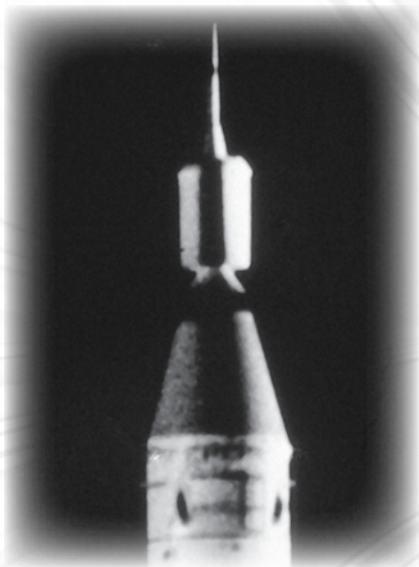
What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

# On Its Way

## Directions

- Every mini-grid must have each of the numbers 1–6.
- Every column must have each of the numbers 1–6.
- Every row must have each of the numbers 1–6.



		<b>4</b>			<b>3</b>
	<b>6</b>				<b>4</b>
	<b>1</b>			<b>5</b>	
<b>2</b>			<b>1</b>		
			<b>6</b>	<b>2</b>	
<b>5</b>					

*The answer is on page 67.*

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

\_\_\_\_\_

**3-D Geometry**



# Glassy Vision

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

<b>G</b>	<b>E</b>			<b>A</b>			<b>H</b>	<b>D</b>
<b>A</b>		<b>H</b>			<b>B</b>			<b>E</b>
	<b>B</b>			<b>F</b>	<b>E</b>	<b>G</b>		<b>A</b>
	<b>G</b>	<b>B</b>		<b>E</b>	<b>I</b>			
	<b>D</b>		<b>A</b>		<b>H</b>		<b>G</b>	<b>B</b>
<b>C</b>	<b>A</b>			<b>B</b>		<b>E</b>		
<b>E</b>		<b>D</b>	<b>C</b>				<b>B</b>	<b>I</b>
<b>I</b>	<b>F</b>		<b>B</b>		<b>A</b>		<b>E</b>	
	<b>C</b>			<b>I</b>				<b>G</b>

The answer is on page 67.



This glass pyramid is the entrance to the Louvre in Paris.



Name \_\_\_\_\_

## Melting Cubes

### Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

F		D	G		E	I		C
	I			F	B	H		E
H		E	C					G
	G		H		D	A		
I		H		G			C	B
	D	F		E			I	
	C				H			A
		A		B		C		D
D		B	F		A		G	

The answer is on page 67.



As ice cubes melt, they lose their cube shape.

# Danger Ahead

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

D	G		B		C	A		E
	C			E		F		G
		E	G				I	C
E	I			A		H		B
H		A	C		E			
				H			C	
C		B	E		G			F
	E	D			A		B	
G		F	H		D	C		I

The answer is on page 67.



Pyramid-shaped traffic cones are a common sight on roads.

Name \_\_\_\_\_

## Victorian Style

### Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

C	B		E			D	F	
E	D		F	C		H	I	
		H	D					G
	G	E			C	B	A	
H			B	G	F	E	C	
F	C			E				
	I		C	D				E
		D			H	A		C
B		C			E			I

The answer is on page 68.



Houses are made up of many different shapes.

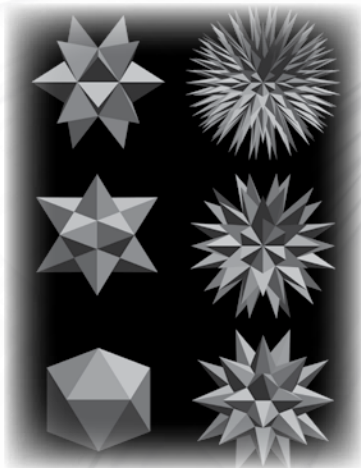
# Star Light, Star Bright

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

			I			E	F	
B		I	E		H	G		D
	D	F	B					C
G	B			I	F	D		
				G			C	
F	E	A			C	H	G	I
H		G		D		C		E
D	F					A	B	G
	I		G				D	

The answer is on page 68.



These 3-D geometric star shapes have many angles, sides, and faces.

Name \_\_\_\_\_

## Sandy Shapes

### Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

	<b>E</b>	<b>A</b>	<b>C</b>			<b>D</b>		<b>B</b>
	<b>D</b>			<b>B</b>	<b>A</b>		<b>I</b>	
<b>F</b>			<b>D</b>			<b>G</b>		
<b>A</b>	<b>F</b>	<b>B</b>			<b>G</b>		<b>C</b>	<b>I</b>
			<b>H</b>	<b>F</b>			<b>B</b>	<b>E</b>
	<b>H</b>				<b>B</b>	<b>F</b>		
<b>B</b>	<b>C</b>	<b>F</b>	<b>G</b>					
<b>I</b>			<b>B</b>	<b>A</b>	<b>F</b>		<b>H</b>	
			<b>I</b>	<b>C</b>		<b>B</b>		<b>F</b>

These pyramids are in the Sahara Desert.



The ancient Egyptians built pyramids as tombs for the pharaohs and their queens.

The answer is on page 68.

# Many Cubes!

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

C		G	A	H			D	I
	H			I		A		
A		I	G			B		
G	A					D		E
		H	E		G		B	
F			I		C	H		G
H		A				G	E	B
	I	B	C				H	
			B	E	H			

A Rubik's Cube is made up of many cubes within a larger one.

The answer is on page 68.



The Rubik's Cube is believed to be the world's best-selling toy, with some 250,000,000 cubes sold worldwide.

Name \_\_\_\_\_

# Yummy in My Tummy!

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

<b>C</b>		<b>B</b>	<b>D</b>			<b>E</b>		<b>I</b>
<b>H</b>				<b>E</b>	<b>C</b>			
		<b>D</b>	<b>F</b>				<b>A</b>	<b>C</b>
	<b>C</b>	<b>H</b>			<b>I</b>	<b>A</b>		
<b>E</b>			<b>A</b>	<b>C</b>		<b>H</b>		<b>D</b>
	<b>B</b>		<b>H</b>			<b>C</b>		
<b>B</b>	<b>I</b>		<b>G</b>	<b>H</b>		<b>F</b>		<b>A</b>
		<b>G</b>		<b>F</b>		<b>I</b>	<b>D</b>	
	<b>D</b>		<b>I</b>	<b>B</b>			<b>C</b>	

Scoops of ice cream and the cone are all examples of spheres.



The answer is on page 68.

Write your own fun fact: \_\_\_\_\_

\_\_\_\_\_

# Roll the Dice

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

I	A		H		B			
		D	F			G	B	
			G		D	I	H	
D			B			H		G
B		H		D		E		F
A		C	E		G		D	I
	I				F			B
		E	I			A	G	
	D			E	C	F		

Cube-shaped dice are used in many games.



The answer is on page 68.

Dice have been used in many parts of the world since before recorded history. They were probably originally made from the ankle bones of a hooped animal, like oxen.



Name \_\_\_\_\_

# Pyramid Parts

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.

I	A	H		G	D		F	
E			B	H		I		D
		D					A	
	D			E		C		A
A	I		H		C			
H				D		G	I	
		A	I		H	F		C
	F	I		C	E		G	
	H					E		I

Cutting this pyramid into slices creates four 3-D shapes.



The answer is on page 69.

Write your own fun fact: \_\_\_\_\_

\_\_\_\_\_

# Cold Treat

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.



D					I		F	B
C	F				G	E		
I		A		B		C		D
	I		A		C		E	
	G	H				D		C
		D	B	G				
				H		B	I	E
G	B			I			C	
	A	I		C		F		

The answer is on page 69.

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

Name \_\_\_\_\_

# Roll 'Em

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.



E	I				G	F	C	
		C	D		A	G		
A			C				D	B
C		H		I	B			D
	A						G	
	D	B	A				H	F
H	E			A		D		
		A	E	D		C	F	
					F	H		

The answer is on page 69.

## Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

\_\_\_\_\_

# Cold Chunks

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.



A	F			G		I		
		G	H		D			E
	H		A			B	G	
C		F			I			H
	B	A	E				I	
H			F		G		D	A
	I			F		D		B
G		C		D			F	
		B		H	C	A		

The answer is on page 69.

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

Name \_\_\_\_\_

# Shining Bright

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.



A		H		E		I		B
		B	A		G		E	
		E				G		D
F	H			G		B		
	A		I		H	E	C	
G				C		H		
H		G		A				E
	D		E		B		G	
E		A				F		I

The answer is on page 69.

## Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

# Roof Over Your Head

## Directions

- Every mini-grid must have each of the letters A–I.
- Every column must have each of the letters A–I.
- Every row must have each of the letters A–I.



	A	B			E	C		
		F	I		D		A	G
G			A		B		D	F
	D	I				F		A
							C	
A		E			H	D		
	C		G		A		E	
I		A	H		C	G		D
	G				I		F	

The answer is on page 69.

## Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

**Early American History**



## Exploring New Lands

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

4		7		2			3	6
9	3				5		1	
		5				8		
	6		2	8		1	5	
			5	6	3			7
5		4			7		2	
2	4	1		3	6			5
		6				2		8
8	7			5				

*The answer is on page 70.*



Christopher Columbus  
landed in the Bahamas on  
October 11, 1492.



Name \_\_\_\_\_

## We Have Visitors

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

	3				2		1	
8		1		7		6		9
	6		4		8		7	
4		7		2		1		
	1			5		4		8
5		3		6		2		7
	7			8		3		6
3		6		4		9		
	5		9		6		4	

*The answer is on page 70.*



A Native American council meets about the arrival of the explorers.

## New England Colonies

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

		<b>9</b>			<b>1</b>	<b>5</b>		
		<b>3</b>			<b>9</b>	<b>7</b>	<b>1</b>	<b>4</b>
<b>1</b>	<b>4</b>		<b>3</b>	<b>7</b>				<b>9</b>
<b>4</b>				<b>5</b>			<b>7</b>	<b>3</b>
			<b>4</b>		<b>6</b>	<b>1</b>		
<b>8</b>	<b>5</b>	<b>1</b>		<b>9</b>			<b>2</b>	<b>6</b>
<b>6</b>	<b>9</b>		<b>5</b>			<b>8</b>		
		<b>4</b>			<b>2</b>			<b>7</b>
	<b>1</b>			<b>6</b>			<b>9</b>	

The answer is on page 70.



The New England colonies were New Hampshire, Massachusetts, Connecticut, and Rhode Island.

Name \_\_\_\_\_

## Staying Afloat

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

		<b>8</b>				<b>7</b>		<b>1</b>
<b>4</b>		<b>7</b>		<b>9</b>	<b>3</b>	<b>8</b>		
<b>3</b>				<b>8</b>			<b>4</b>	<b>5</b>
	<b>9</b>		<b>5</b>	<b>7</b>			<b>8</b>	
<b>6</b>				<b>2</b>		<b>1</b>		
<b>8</b>	<b>7</b>	<b>2</b>			<b>9</b>	<b>3</b>	<b>5</b>	
	<b>3</b>	<b>4</b>	<b>8</b>		<b>2</b>			<b>9</b>
				<b>3</b>			<b>2</b>	
<b>2</b>			<b>4</b>	<b>5</b>			<b>7</b>	

The answer is on page 70.



Cod fishing in the New England colonies was a way of providing food for the colonists in the region.

## Middle Colonies

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

<b>4</b>			<b>5</b>		<b>3</b>	<b>8</b>		<b>9</b>
<b>8</b>	<b>3</b>	<b>1</b>	<b>6</b>		<b>7</b>		<b>4</b>	
	<b>2</b>						<b>7</b>	<b>6</b>
		<b>2</b>		<b>4</b>			<b>5</b>	
		<b>6</b>	<b>3</b>	<b>5</b>	<b>1</b>			
<b>1</b>						<b>7</b>	<b>6</b>	<b>4</b>
	<b>7</b>			<b>3</b>	<b>2</b>			<b>5</b>
<b>2</b>		<b>5</b>	<b>4</b>			<b>6</b>	<b>3</b>	
	<b>1</b>					<b>2</b>		

The answer is on page 70.



The middle colonies were New York, New Jersey, Pennsylvania, and Delaware.

Name \_\_\_\_\_

## Bread Basket

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

		5	4	8			1	
8		4	2		1	5		7
7								
1				7		8		
4		7	3		8	2		1
				5				9
5			7	1			4	
3		1			6	7		5
6		9		4			3	

This is a colonial farm near Baltimore, Maryland.



The answer is on page 70.

The middle colonies were called the “bread basket” because grain was plentiful.

## Southern Colonies

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

		<b>3</b>	<b>4</b>			<b>6</b>		<b>9</b>
<b>6</b>					<b>3</b>	<b>7</b>		
	<b>7</b>		<b>1</b>		<b>6</b>		<b>3</b>	<b>2</b>
<b>9</b>	<b>2</b>						<b>4</b>	<b>3</b>
			<b>5</b>					
<b>4</b>	<b>1</b>		<b>2</b>		<b>9</b>		<b>6</b>	
<b>3</b>								<b>5</b>
<b>1</b>		<b>7</b>	<b>3</b>		<b>2</b>		<b>8</b>	<b>6</b>
	<b>5</b>		<b>7</b>		<b>4</b>		<b>2</b>	

The southern colonies were Maryland, Virginia, North Carolina, South Carolina, and Georgia.



The answer is on page 71.

Write your own fun fact: \_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

## Rice Farming

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

1	4	7	5		3			
	2					4		5
			4	1		9		
	9	3	6		1	7		4
7		4			5		8	
	5						9	2
				5			2	1
5		2			8		7	
	8		2		6			

Rice was a cash crop on plantations in Georgia.



The answer is on page 71.

Tobacco, rice, corn, and indigo were cash crops grown on plantations in the southern colonies. Plantations were large farms that grew only single crops and sold them for a profit.

## Phillis Wheatley

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

							<b>3</b>	
		<b>6</b>			<b>5</b>	<b>2</b>		
	<b>3</b>	<b>4</b>		<b>8</b>			<b>5</b>	<b>9</b>
<b>6</b>	<b>4</b>	<b>1</b>				<b>3</b>	<b>7</b>	
			<b>3</b>	<b>2</b>	<b>4</b>			
	<b>8</b>	<b>3</b>		<b>7</b>			<b>9</b>	
<b>3</b>			<b>5</b>		<b>8</b>	<b>9</b>		<b>7</b>
<b>7</b>		<b>9</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>5</b>		
<b>4</b>								<b>1</b>

Phillis Wheatley was a slave who became colonial America's first black poet.



The answer is on page 71.

Write your own fun fact: \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

## Am I Not a Man?

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.

		<b>8</b>		<b>5</b>	<b>7</b>		<b>1</b>	<b>6</b>
					<b>4</b>			<b>3</b>
<b>3</b>	<b>4</b>		<b>1</b>					<b>8</b>
	<b>6</b>	<b>2</b>		<b>4</b>			<b>8</b>	
		<b>3</b>	<b>5</b>			<b>6</b>		
<b>8</b>	<b>5</b>		<b>9</b>	<b>2</b>	<b>6</b>		<b>7</b>	
<b>7</b>	<b>8</b>		<b>4</b>		<b>1</b>			<b>9</b>
				<b>7</b>				
		<b>1</b>	<b>6</b>		<b>2</b>		<b>5</b>	

The answer is on page 71.



This illustration showing a slave in chains asks an important question.

## Seafood

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.



	3	1		6	7			
		5			3	6		1
8			1			5		
2	8		4			1		
			9				2	4
		4		3		8	6	
			3		5		9	6
6	2					4		8
9	5				2			

The answer is on page 71.

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

Name \_\_\_\_\_

## Chains of Inequity

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.



7	9		5		4			6
							4	8
	8	1	3	6		5	2	
5		8				7		
					7			3
	1		2	3			5	
8		3				6		
	7			4				5
2		6	9	1				

*The answer is on page 71.*

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

\_\_\_\_\_

## Found

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.



					7		4	
4	2	6		8				7
		3			9		8	5
9				6			1	
		8		9		4	7	
	4			3	5			
			3			9	6	2
		7				8		
3	6	9	4	2				

The answer is on page 72.

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

Name \_\_\_\_\_

## Poems on Various Subjects

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.



6					1		8	
			9		3	2		6
3	4		2				1	5
	5	7			2	1	3	
4				7				
9		1	8			7		2
	1		3		8			
7		4						
	8		7		6			

*The answer is on page 72.*

### Guess the Picture

What is this picture? \_\_\_\_\_

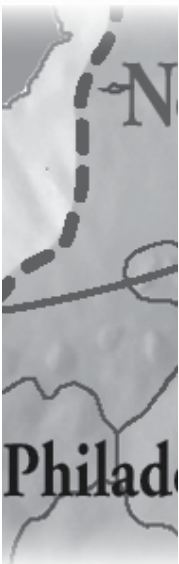
Write a caption: \_\_\_\_\_

\_\_\_\_\_

## A Diverse Center

### Directions

- Every mini-grid must have each of the numbers 1–9.
- Every column must have each of the numbers 1–9.
- Every row must have each of the numbers 1–9.



		7	1	9	4			
3		8					1	
			3	8	6			
8	3					2		6
4		2					3	
	5					7		1
				3		6	9	4
1	4		5		9		8	
				6		1		5

The answer is on page 72.

### Guess the Picture

What is this picture? \_\_\_\_\_

Write a caption: \_\_\_\_\_

## Templates

### Picture Cut Outs

**Directions:** Instead of writing the numbers in pencil, use these cutout numbers to fill in the puzzle. Cut out the boxes on the dotted lines. Then place them in the puzzle. You can then move them around on the puzzle until you find all the right spaces!

### Beginning Puzzles

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6

### Letter Cut Outs

### Intermediate Puzzles

A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I

# Templates (cont.)

Number Cut Outs

1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9

Challenging Puzzles

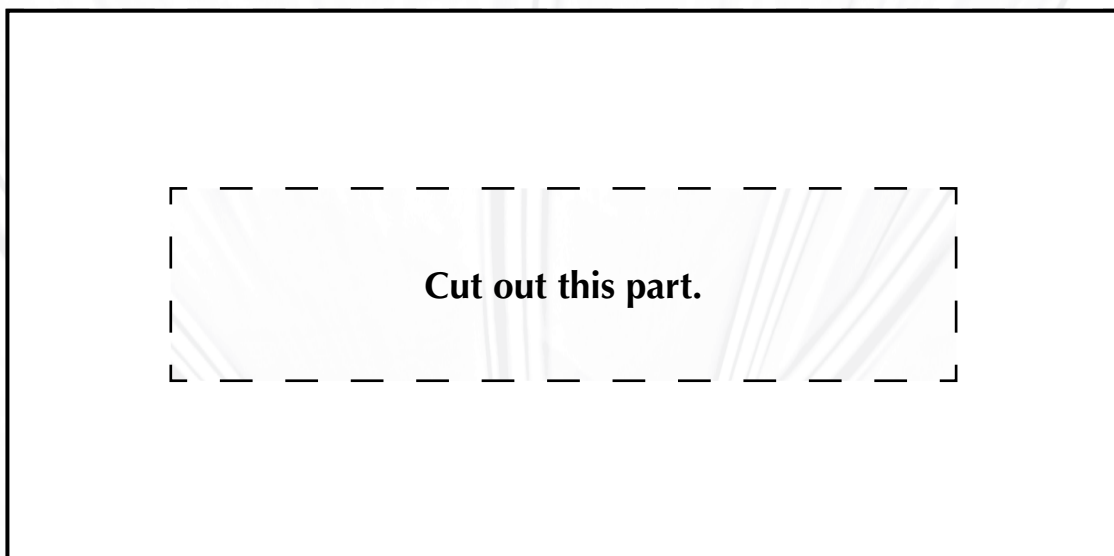


# Templates (cont.)

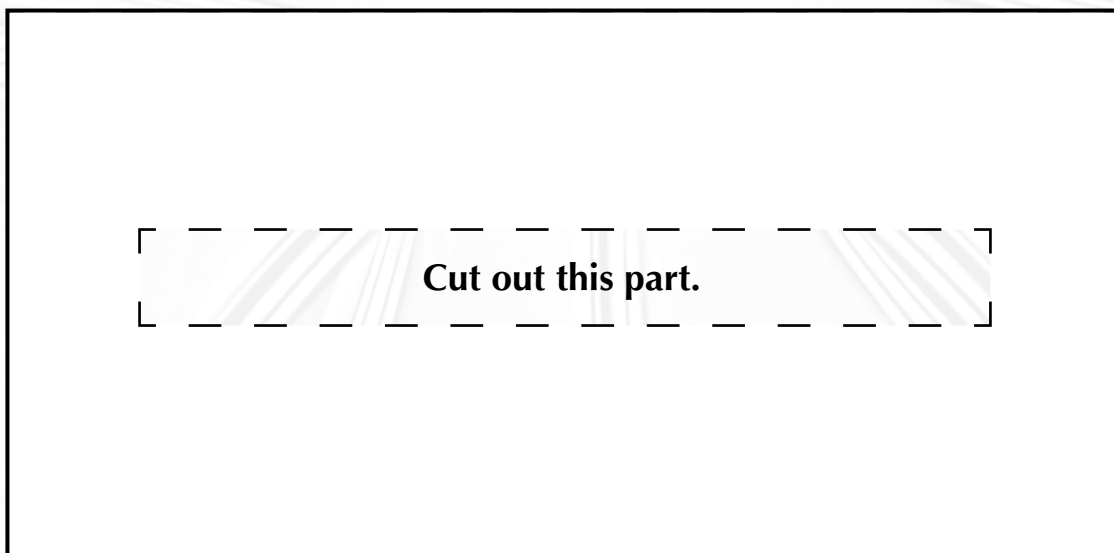
## Puzzle Blocker 2

**Directions:** Cut out the rectangle. Then make a window by cutting along the dotted line.

### For Beginning Puzzles



### For Intermediate and Challenging Puzzles



# Photograph Sources

Page	Puzzle Title	Photograph Source
14	View from Afar	Antonio Petrone/Shutterstock, Inc.
15	Full Moon	Steve Snowden/Shutterstock, Inc.
16	Ring Around the Sun	William Attard/Shutterstock, Inc.
17	Rocky Flight	Photos.com
18	Blast Off!	Photos.com
19	Hot Spot!	NASA
20	Cover Up	McCarthy/Shutterstock, Inc.
21	Lineup of Planets	NASA
22	Streaking!	M. E. Mulder/Shutterstock, Inc.
23	Farsighted	Germany Feng/Shutterstock, Inc.
24	All Around Us	Antonio Petrone/Shutterstock, Inc.
25	Big Ball of Fire	Steve Snowden/Shutterstock, Inc.
26	Almost Dark	William Attard/Shutterstock, Inc.
27	Looking Glass	Germany Feng/Shutterstock, Inc.
28	On Its Way	Photos.com
30	Glassy Vision	Michael Mattox/Shutterstock, Inc.
31	Melting Cubes	James Bramwell/Shutterstock, Inc.
32	Danger Ahead	Ana de Sousa/Shutterstock, Inc.
33	Victorian Style	Galina Barskaya/Shutterstock, Inc.
34	Star Light, Star Bright	Ziggy Folkmanis/Shutterstock, Inc.
35	Sandy Shapes	Andre Klaassen/Shutterstock, Inc.
36	Many Cubes!	Charles Allen/Shutterstock, Inc.
37	Yummy in My Tummy!	Thomas M. Perkins/Shutterstock, Inc.
38	Roll the Dice	zimmytws/Shutterstock, Inc.
39	Pyramid Parts	Cre8tive Images/Shutterstock, Inc.
40	Cold Treat	Thomas M. Perkins/Shutterstock, Inc.
41	Roll 'Em	zimmytws/Shutterstock, Inc.
42	Cold Chunks	Charles Allen/Shutterstock, Inc.
43	Shining Bright	Ziggy Folkmanis/Shutterstock, Inc.
44	Roof Over Your Head	Galina Barskaya/Shutterstock, Inc.
46	Exploring New Lands	Library of Congress, Prints and Photographs Division
47	We Have Visitors	Library of Congress, Prints and Photographs Division
48	New England Colonies	Teacher Created Materials
49	Staying Afloat	Library of Congress, Prints and Photographs Division
50	Middle Colonies	Teacher Created Materials
51	Bread Basket	Library of Congress, Rare Book and Special Collections
52	Southern Colonies	Teacher Created Materials
53	Rice Farming	Library of Congress, Prints and Photographs Division
54	Phillis Wheatley	Library of Congress, Prints and Photographs Division
55	Am I Not A Man?	Library of Congress, Rare Book and Special Collections
56	Seafood	Library of Congress, Prints and Photographs Division
57	Chains of Inequity	Library of Congress, Rare Book and Special Collections
58	Found	Library of Congress, Prints and Photographs Division
59	Poems on Various Subjects	Library of Congress, Prints and Photographs Division
60	A Diverse Center	Rzymu/Shutterstock, Inc.

# Answer Key

View from Afar (page 14)

2	6	5	1	3	4
4	3	1	5	6	2
3	5	2	4	1	6
1	4	6	2	5	3
6	1	4	3	2	5
5	2	3	6	4	1

Full Moon (page 15)

2	1	6	4	3	5
5	3	4	1	6	2
6	2	1	5	4	3
3	4	5	2	1	6
1	6	2	3	5	4
4	5	3	6	2	1

Ring Around the Sun (page 16)

4	5	3	2	1	6
2	1	6	3	4	5
5	4	2	6	3	1
3	6	1	4	5	2
6	3	5	1	2	4
1	2	4	5	6	3

Rocky Flight (page 17)

5	3	6	1	4	2
4	1	2	6	3	5
2	6	5	4	1	3
3	4	1	2	5	6
1	2	3	5	6	4
6	5	4	3	2	1

Blast Off! (page 18)

3	2	5	4	1	6
1	4	6	5	2	3
4	1	3	6	5	2
5	6	2	3	4	1
2	3	4	1	6	5
6	5	1	2	3	4

Hot Spot! (page 19)

5	6	2	3	4	1
1	3	4	6	5	2
3	4	1	5	2	6
6	2	5	1	3	4
4	5	6	2	1	3
2	1	3	4	6	5

# Answer Key *(cont.)*

Cover Up (page 20)

1	3	4	2	5	6
2	5	6	3	1	4
4	1	2	5	6	3
3	6	5	4	2	1
6	2	3	1	4	5
5	4	1	6	3	2

Farsighted (page 23)

2	6	3	1	5	4
4	5	1	3	6	2
3	1	6	2	4	5
5	2	4	6	3	1
6	4	2	5	1	3
1	3	5	4	2	6

Lineup of Planets (page 21)

3	5	6	2	4	1
2	4	1	5	6	3
4	2	3	6	1	5
6	1	5	3	2	4
1	3	2	4	5	6
5	6	4	1	3	2

All Around Us (page 24)

3	4	1	2	6	5
2	5	6	4	3	1
4	3	5	6	1	2
1	6	2	3	5	4
5	2	3	1	4	6
6	1	4	5	2	3

Straking! (page 22)

6	1	3	4	2	5
5	2	4	1	3	6
3	5	2	6	4	1
1	4	6	3	5	2
4	6	5	2	1	3
2	3	1	5	6	4

Almost Dark (page 25)

3	6	1	4	2	5
5	2	4	3	1	6
2	3	6	1	5	4
1	4	5	6	3	2
4	5	3	2	6	1
6	1	2	5	4	3

# Answer Key *(cont.)*

Big Ball of Fire (page 26)

6	2	4	5	1	3
5	1	3	6	2	4
1	6	2	3	4	5
3	4	5	1	6	2
2	3	1	4	5	6
4	5	6	2	3	1

Looking Glass (page 27)

2	4	3	5	1	6
1	5	6	3	4	2
4	6	2	1	5	3
5	3	1	2	6	4
6	2	5	4	3	1
3	1	4	6	2	5

On Its Way (page 28)

1	5	4	2	6	3
3	6	2	5	1	4
6	1	3	4	5	2
2	4	5	1	3	6
4	3	1	6	2	5
5	2	6	3	4	1

Glassy Vision (page 30)

G	E	F	I	A	C	B	H	D
A	I	H	G	D	B	F	C	E
D	B	C	H	F	E	G	I	A
H	G	B	D	E	I	C	A	F
F	D	E	A	C	H	I	G	B
C	A	I	F	B	G	E	D	H
E	H	D	C	G	F	A	B	I
I	F	G	B	H	A	D	E	C
B	C	A	E	I	D	H	F	G

Melting Cubes (page 31)

F	A	D	G	H	E	I	B	C
C	I	G	D	F	B	H	A	E
H	B	E	C	A	I	F	D	G
B	G	C	H	I	D	A	E	F
I	E	H	A	G	F	D	C	B
A	D	F	B	E	C	G	I	H
G	C	I	E	D	H	B	F	A
E	F	A	I	B	G	C	H	D
D	H	B	F	C	A	E	G	I

Danger Ahead (page 32)

D	G	I	B	F	C	A	H	E
B	C	H	A	E	I	F	D	G
A	F	E	G	D	H	B	I	C
E	I	C	D	A	F	H	G	B
H	B	A	C	G	E	I	F	D
F	D	G	I	H	B	E	C	A
C	H	B	E	I	G	D	A	F
I	E	D	F	C	A	G	B	H
G	A	F	H	B	D	C	E	I

# Answer Key *(cont.)*

Victorian Style (page 33)

C	B	G	E	H	I	D	F	A
E	D	A	F	C	G	H	I	B
I	F	H	D	B	A	C	E	G
D	G	E	H	I	C	B	A	F
H	A	I	B	G	F	E	C	D
F	C	B	A	E	D	I	G	H
A	I	F	C	D	B	G	H	E
G	E	D	I	F	H	A	B	C
B	H	C	G	A	E	F	D	I

Star Light, Star Bright (page 34)

A	G	H	I	C	D	E	F	B
B	C	I	E	F	H	G	A	D
E	D	F	B	A	G	I	H	C
G	B	C	H	I	F	D	E	A
I	H	D	A	G	E	B	C	F
F	E	A	D	B	C	H	G	I
H	A	G	F	D	B	C	I	E
D	F	E	C	H	I	A	B	G
C	I	B	G	E	A	F	D	H

Sandy Shapes (page 35)

H	E	A	C	G	I	D	F	B
C	D	G	F	B	A	E	I	H
F	B	I	D	E	H	G	A	C
A	F	B	E	D	G	H	C	I
G	I	D	H	F	C	A	B	E
E	H	C	A	I	B	F	D	G
B	C	F	G	H	D	I	E	A
I	G	E	B	A	F	C	H	D
D	A	H	I	C	E	B	G	F

Many Cubes! (page 36)

C	F	G	A	H	B	E	D	I
B	H	D	F	I	E	A	G	C
A	E	I	G	C	D	B	F	H
G	A	C	H	B	F	D	I	E
I	D	H	E	A	G	C	B	F
F	B	E	I	D	C	H	A	G
H	C	A	D	F	I	G	E	B
E	I	B	C	G	A	F	H	D
D	G	F	B	E	H	I	C	A

Yummy in My Tummy (page 37)

C	F	B	D	A	G	E	H	I
H	A	I	B	E	C	D	F	G
G	E	D	F	I	H	B	A	C
D	C	H	E	G	I	A	B	F
E	G	F	A	C	B	H	I	D
I	B	A	H	D	F	C	G	E
B	I	C	G	H	D	F	E	A
A	H	G	C	F	E	I	D	B
F	D	E	I	B	A	G	C	H

Roll the Dice (page 38)

I	A	G	H	C	B	D	F	E
C	H	D	F	I	E	G	B	A
E	B	F	G	A	D	I	H	C
D	E	I	B	F	A	H	C	G
B	G	H	C	D	I	E	A	F
A	F	C	E	H	G	B	D	I
H	I	A	D	G	F	C	E	B
F	C	E	I	B	H	A	G	D
G	D	B	A	E	C	F	I	H

# Answer Key *(cont.)*

Pyramid Parts . . . (page 39)

I	A	H	C	G	D	B	F	E
E	G	F	B	H	A	I	C	D
C	B	D	E	I	F	H	A	G
F	D	B	G	E	I	C	H	A
A	I	G	H	F	C	D	E	B
H	C	E	A	D	B	G	I	F
G	E	A	I	B	H	F	D	C
B	F	I	D	C	E	A	G	H
D	H	C	F	A	G	E	B	I

Cold Treat (page 40)

D	H	G	C	E	I	A	F	B
C	F	B	D	A	G	E	H	I
I	E	A	H	B	F	C	G	D
B	I	F	A	D	C	G	E	H
A	G	H	I	F	E	D	B	C
E	C	D	B	G	H	I	A	F
F	D	C	G	H	A	B	I	E
G	B	E	F	I	D	H	C	A
H	A	I	E	C	B	F	D	G

Roll 'Em (page 41)

E	I	D	H	B	G	F	C	A
F	B	C	D	E	A	G	I	H
A	H	G	C	F	I	E	D	B
C	F	H	G	I	B	A	E	D
I	A	E	F	H	D	B	G	C
G	D	B	A	C	E	I	H	F
H	E	F	I	A	C	D	B	G
B	G	A	E	D	H	C	F	I
D	C	I	B	G	F	H	A	E

Cold Chunks (page 42)

A	F	E	C	G	B	I	H	D
B	C	G	H	I	D	F	A	E
I	H	D	A	E	F	B	G	C
C	G	F	D	A	I	E	B	H
D	B	A	E	C	H	G	I	F
H	E	I	F	B	G	C	D	A
E	I	H	G	F	A	D	C	B
G	A	C	B	D	E	H	F	I
F	D	B	I	H	C	A	E	G

Shining Bright (page 43)

A	G	H	C	E	D	I	F	B
D	F	B	A	I	G	C	E	H
C	I	E	H	B	F	G	A	D
F	H	C	D	G	E	B	I	A
B	A	D	I	F	H	E	C	G
G	E	I	B	C	A	H	D	F
H	C	G	F	A	I	D	B	E
I	D	F	E	H	B	A	G	C
E	B	A	G	D	C	F	H	I

Roof Over Your Head (page 44)

D	A	B	F	G	E	C	I	H
E	H	F	I	C	D	B	A	G
G	I	C	A	H	B	E	D	F
C	D	I	B	E	G	F	H	A
H	B	G	D	A	F	I	C	E
A	F	E	C	I	H	D	G	B
F	C	D	G	B	A	H	E	I
I	E	A	H	F	C	G	B	D
B	G	H	E	D	I	A	F	C

# Answer Key *(cont.)*

Exploring New Lands (page 46)

4	1	7	9	2	8	5	3	6
9	3	8	6	4	5	7	1	2
6	2	5	3	7	1	8	9	4
7	6	3	2	8	4	1	5	9
1	9	2	5	6	3	4	8	7
5	8	4	1	9	7	6	2	3
2	4	1	8	3	6	9	7	5
3	5	6	7	1	9	2	4	8
8	7	9	4	5	2	3	6	1

We Have Visitors (page 47)

7	3	5	6	9	2	8	1	4
8	4	1	3	7	5	6	2	9
2	6	9	4	1	8	5	7	3
4	9	7	8	2	3	1	6	5
6	1	2	7	5	9	4	3	8
5	8	3	1	6	4	2	9	7
9	7	4	2	8	1	3	5	6
3	2	6	5	4	7	9	8	1
1	5	8	9	3	6	7	4	2

New England Colonies (page 48)

2	7	9	6	4	1	5	3	8
5	6	3	2	8	9	7	1	4
1	4	8	3	7	5	2	6	9
4	2	6	1	5	8	9	7	3
9	3	7	4	2	6	1	8	5
8	5	1	7	9	3	4	2	6
6	9	2	5	3	7	8	4	1
3	8	4	9	1	2	6	5	7
7	1	5	8	6	4	3	9	2

Staying Afloat (page 49)

9	6	8	2	4	5	7	3	1
4	5	7	1	9	3	8	6	2
3	2	1	7	8	6	9	4	5
1	9	3	5	7	4	2	8	6
6	4	5	3	2	8	1	9	7
8	7	2	6	1	9	3	5	4
7	3	4	8	6	2	5	1	9
5	1	6	9	3	7	4	2	8
2	8	9	4	5	1	6	7	3

Middle Colonies (page 50)

4	6	7	5	2	3	8	1	9
8	3	1	6	9	7	5	4	2
5	2	9	8	1	4	3	7	6
9	8	2	7	4	6	1	5	3
7	4	6	3	5	1	9	2	8
1	5	3	2	8	9	7	6	4
6	7	8	1	3	2	4	9	5
2	9	5	4	7	8	6	3	1
3	1	4	9	6	5	2	8	7

Bread Basket (page 51)

9	2	5	4	8	7	6	1	3
8	3	4	2	6	1	5	9	7
7	1	6	5	3	9	4	2	8
1	9	3	6	7	2	8	5	4
4	5	7	3	9	8	2	6	1
2	6	8	1	5	4	3	7	9
5	8	2	7	1	3	9	4	6
3	4	1	9	2	6	7	8	5
6	7	9	8	4	5	1	3	2



# Answer Key *(cont.)*

Southern Colonies (page 52)

2	8	3	4	7	5	6	1	9
6	9	1	8	2	3	7	5	4
5	7	4	1	9	6	8	3	2
9	2	5	6	8	7	1	4	3
7	3	6	5	4	1	2	9	8
4	1	8	2	3	9	5	6	7
3	6	2	9	1	8	4	7	5
1	4	7	3	5	2	9	8	6
8	5	9	7	6	4	3	2	1

Rice Farming (page 53)

1	4	7	5	9	3	2	6	8
3	2	9	8	6	7	4	1	5
8	6	5	4	1	2	9	3	7
2	9	3	6	8	1	7	5	4
7	1	4	9	2	5	3	8	6
6	5	8	7	3	4	1	9	2
4	7	6	3	5	9	8	2	1
5	3	2	1	4	8	6	7	9
9	8	1	2	7	6	5	4	3

Phillis Wheatley (page 54)

9	2	5	4	1	7	8	3	6
8	7	6	9	3	5	2	1	4
1	3	4	2	8	6	7	5	9
6	4	1	8	5	9	3	7	2
5	9	7	3	2	4	1	6	8
2	8	3	6	7	1	4	9	5
3	1	2	5	6	8	9	4	7
7	6	9	1	4	2	5	8	3
4	5	8	7	9	3	6	2	1

Am I Not a Man? (page 55)

2	9	8	3	5	7	4	1	6
5	1	6	2	8	4	7	9	3
3	4	7	1	6	9	5	2	8
1	6	2	7	4	3	9	8	5
9	7	3	5	1	8	6	4	2
8	5	4	9	2	6	3	7	1
7	8	5	4	3	1	2	6	9
6	2	9	8	7	5	1	3	4
4	3	1	6	9	2	8	5	7

Seafood (page 56)

4	3	1	5	6	7	9	8	2
7	9	5	8	2	3	6	4	1
8	6	2	1	9	4	5	7	3
2	8	9	4	7	6	1	3	5
3	1	6	9	5	8	7	2	4
5	7	4	2	3	1	8	6	9
1	4	7	3	8	5	2	9	6
6	2	3	7	1	9	4	5	8
9	5	8	6	4	2	3	1	7

Chains of Inequity (page 57)

7	9	2	5	8	4	3	1	6
3	6	5	1	7	2	9	4	8
4	8	1	3	6	9	5	2	7
5	3	8	4	9	1	7	6	2
9	2	4	6	5	7	1	8	3
6	1	7	2	3	8	4	5	9
8	4	3	7	2	5	6	9	1
1	7	9	8	4	6	2	3	5
2	5	6	9	1	3	8	7	4

# Answer Key *(cont.)*

Found (page 58)

8	9	5	2	1	7	3	4	6
4	2	6	5	8	3	1	9	7
1	7	3	6	4	9	2	8	5
9	3	2	7	6	4	5	1	8
6	5	8	1	9	2	4	7	3
7	4	1	8	3	5	6	2	9
5	8	4	3	7	1	9	6	2
2	1	7	9	5	6	8	3	4
3	6	9	4	2	8	7	5	1

Poems on Various Subjects (page 59)

6	9	2	4	5	1	3	8	7
1	7	5	9	8	3	2	4	6
3	4	8	2	6	7	9	1	5
8	5	7	6	9	2	1	3	4
4	2	3	1	7	5	6	9	8
9	6	1	8	3	4	7	5	2
2	1	6	3	4	8	5	7	9
7	3	4	5	2	9	8	6	1
5	8	9	7	1	6	4	2	3

A Diverse Center (page 60)

5	2	7	1	9	4	8	6	3
3	6	8	7	5	2	4	1	9
9	1	4	3	8	6	5	2	7
8	3	1	9	4	7	2	5	6
4	7	2	6	1	5	9	3	8
6	5	9	8	2	3	7	4	1
7	8	5	2	3	1	6	9	4
1	4	6	5	7	9	3	8	2
2	9	3	4	6	8	1	7	5