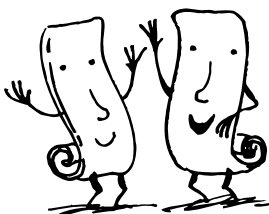
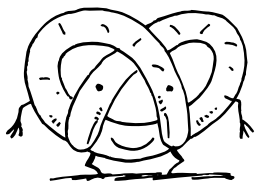
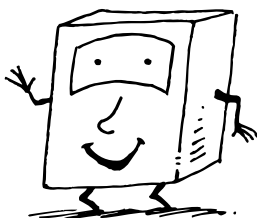
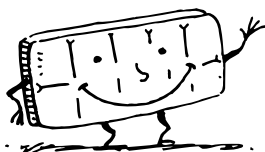
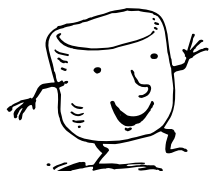


Table of Contents



Introduction	3
---------------------------	---

Pasta

<i>Pasta Polygons (perimeter, area)</i>	5
<i>Using Your Noodle (logic, mathematical reasoning)</i>	11
<i>Pasta Possibilities (multiples, multiplication and division facts)</i>	15
<i>Pasta-a-Plenty (number and operation sense, measurement equivalents)</i>	18

Popcorn

<i>Popcorn Popularity (data collection, data analysis, graphs)</i>	23
<i>Popped Squares and Trying Triangles (number patterns, number sense)</i>	28
<i>Popcorn Predictions (volume, measurement, estimation)</i>	32
<i>Cracker Jack Calculations (weight measurement, ratio)</i>	36

Marshmallows

<i>Mad about Marshmallows (factorials, combinations, permutations)</i>	40
<i>Sticky Shapes (properties of three-dimensional geometric objects)</i>	43
<i>Prime Marshmallows (factors, prime numbers)</i>	47
<i>Marshmallow Fractions (fractions)</i>	51

Chocolate

<i>M&M Math (data collection, averages, graphs)</i>	55
<i>Chocolate Pie Graphing (data analysis, fractions, percentages, graphs)</i>	59
<i>Chocolate Bar Rubbings (fractions, equivalent fractions)</i>	64
<i>Mighty Malted Milk Balls (estimation, calculation, measurement)</i>	68

Cereal

<i>Pink Hearts, Blue Moons (algebraic equations)</i>	72
<i>Sweet Transformations (transformational geometry)</i>	76
<i>Loop Abilities (probability, ratio)</i>	80
<i>Stacking Loops (number and place value)</i>	84

Pretzels

<i>Pretzel Problems (standard and nonstandard measurement)</i>	88
<i>Pretzel Patterns (geometric shapes and patterns)</i>	93
<i>Pretzel Puzzlers (logic, mathematical reasoning)</i>	98
<i>Pretzels and Protractors (recognizing, creating, and measuring angles)</i>	102

Fruit Strips

<i>Fruit All Around (circumference, diameter, metric measurement)</i>	107
<i>Munchable Mobius Strip (Mobius strip, topology)</i>	111
<i>Shadow Shapes (triangles, angles, quadrilaterals)</i>	115
<i>Measure and Munch (standard and nonstandard measurement)</i>	118

Appendix

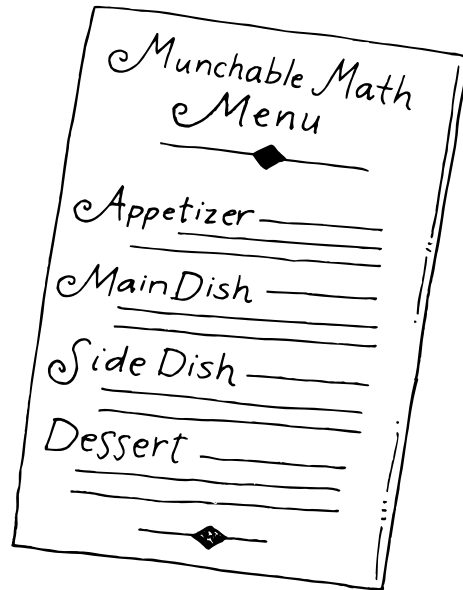
<i>Recipes</i>	122
<i>Glossary</i>	123
<i>Recommended Books</i>	126
<i>Index</i>	127

Introduction

Munchable Math's unique format is designed to supplement any math program for grades 4–6, providing reinforcement of basic math skills through hands-on applications. Since food is the major focal point of each lesson, the activities are motivational and practical because they relate to everyday life.

This collection of 28 experimental math skill lessons is organized into seven food units. Each lesson begins with a specific math objective and includes the following sections:

- The **Appetizer** provides introductory information designed to prepare students and whet their appetite. This section also includes a list of key math terms for students to record in a math dictionary. (A reproducible glossary of all these math terms is provided on pages 123–125.) Use this section's whole-group instruction to outline what students need to know to complete each "independent investigation."
- The **Main Dish** is the independent activity (the main lesson). This section tells how to get students started and includes preparation instructions and management tips. It also features reproducible activity instructions and recording sheets for student use. In advance, gather the necessary investigation materials, and place them at a center with copies of the student reproducibles.
- **Side Dishes** are extensions or variations of the main lesson or other related ideas. "Serve" these activities a la carte, or combine them with the Main Dish.
- The **Dessert** tops off each lesson with literature links, additional food-related ideas, and suggestions to strengthen the home-school connection.
- The **Appendix** features recipes, a glossary, a recommended books list, and a math terms index.



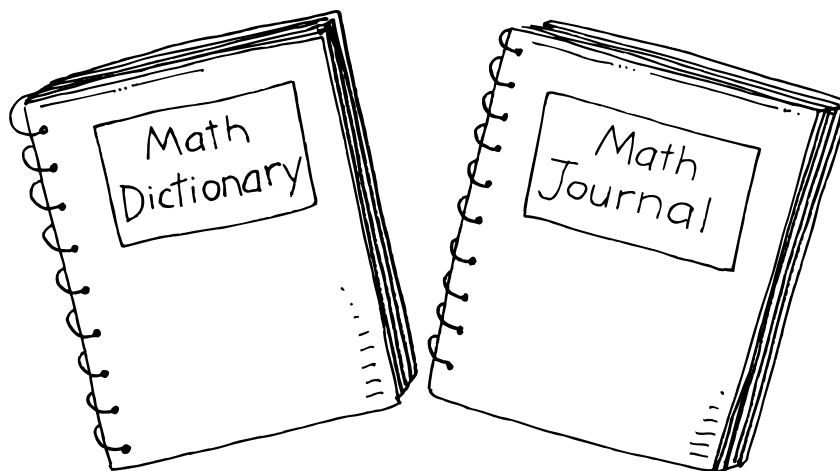
Math Standards

The independent investigations in *Munchable Math* provide experiences that reinforce all content and process areas of the National Council of Teachers of Mathematics standards, including the following:

- number and operation
- patterns, functions, and algebra
- geometry and spatial sense
- measurement
- data analysis, statistics, and probability
- problem solving
- reasoning and proof
- communication
- connections
- representations

Math Dictionaries and Math Journals

Math journals are an effective teaching tool, both as a reference and as a place to reflect on mathematical processes. Have each student use two spiral notebooks, three-ring binders, or three-prong brief folders. One will be for a math dictionary, in which students alphabetically record definitions and examples of math vocabulary provided throughout these lessons. The other will be for a math journal, in which students reflect on the independent investigations. Each lesson in *Munchable Math* includes math vocabulary (in the Appetizer section) and reflective writing prompts (following the student reproducibles). Post the questions at the learning center, and have students answer them at the end of the independent investigation.



Food Items

Send a general informational letter to parents before presenting the first lesson. Ask parents to inform you if their children have any food allergies. Invite parents to donate food items for any of the investigations. Also, ask if they are able to assist with some of the lessons. Assure parents that they will receive advance notice when a particular food item or their assistance is needed.

Because students will be handling the food items throughout these activities and may want to eat the food (with the exception of uncooked pasta), have them wash their hands before each investigation. Generally, students may eat the food when they have completed each activity.

PASTA POLYGONS

Objective

Students will calculate the perimeter and area of pasta polygons.

Appetizer

Materials

- overhead projector
- transparent ruler (for the overhead projector)

Vocabulary: perimeter, area, polygon

Introduce the concepts of perimeter and area to students by drawing a picture of a baseball diamond on an overhead projector. Ask students how a baseball player and a groundskeeper look at a baseball diamond differently. The baseball player is concerned with the distance between the bases, either for running or throwing. The groundskeeper is concerned with the space inside the diamond, for maintaining the grass within the bases. Use this analogy to define the terms *perimeter* and *area*. Explain that a diamond is an example of a *polygon*. Use a transparent ruler to measure the distance—to the nearest inch (centimeter)—between the bases, and show students how to find the area.

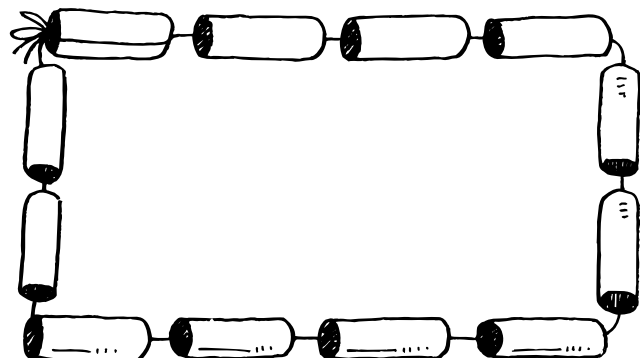
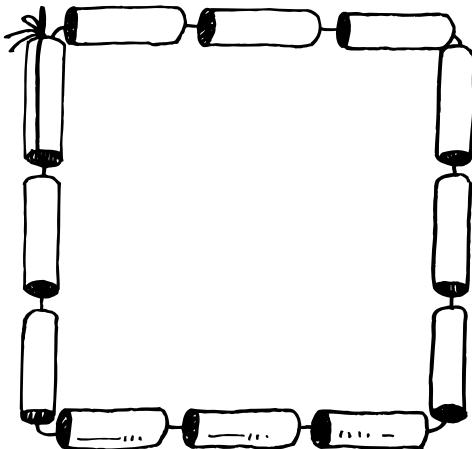
Invite students to define the terms *perimeter*, *area*, and *polygon* in their math dictionary.

Main Dish

Have each student use the Pasta Polygons reproducibles (pages 6–9). Students will measure the perimeter and area of polygons and investigate the relationship between the two types of measurement. Students will discover that although polygons may have the same perimeter, they do not necessarily have the same area.

Management Tips

- Quantities are for tubular pasta pieces that are approximately 1" (2.5 cm) in length.
- Fill plastic bags with 20 pieces of pasta per student.
- The square inch and square centimeter grids on pages 8–9 can be photocopied on transparencies and used on the overhead projector for demonstration purposes.
- Show students how to loop the end of the string around a piece of pasta and tie a knot to prevent the pasta from slipping off. Be sure the pasta pieces are not too tightly placed together. Students will need to manipulate the pasta on the string.
- Copy the Pasta Polygons reflection questions (page 10).



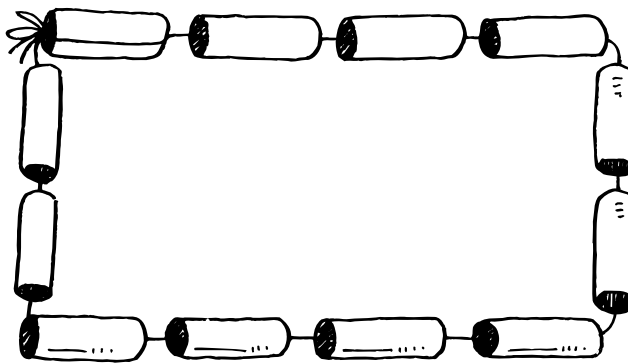
Pasta Polygons

Materials

- bag of pasta (20 pieces per student)
- string
- ruler

Independent Investigation

1. String an even number of pasta pieces (12–20) on a string. Loop the end of the string around a piece of pasta and tie a knot to prevent the pasta from slipping off.
2. Create a polygon using your string of pasta pieces. Write the name of your polygon on your Pasta Polygons recording sheet. Draw a picture of your polygon in the “Drawing” column. Use your ruler to measure the perimeter of the polygon to the nearest inch (centimeter) and record the measurement in the “Perimeter” column.
3. If your polygon has four sides (e.g., square, rectangle), calculate its area by multiplying the length by the width. If it has more than four sides, lay your polygon on the square inch (cm) grid and count the squares to determine its area. Record that number in the “Area” column.



4. Use the same string of pasta pieces to create a different polygon. Write the name of the polygon and draw a picture of it on your recording sheet. Measure and record the perimeter. Multiply or use the square inch (cm) grid to find the area. Record these numbers on your recording sheet.
5. Create two more polygons, each with a different number of pasta pieces, and repeat the directions in step 4.
6. Answer the reflection questions in your math journal.

Pasta Polygons

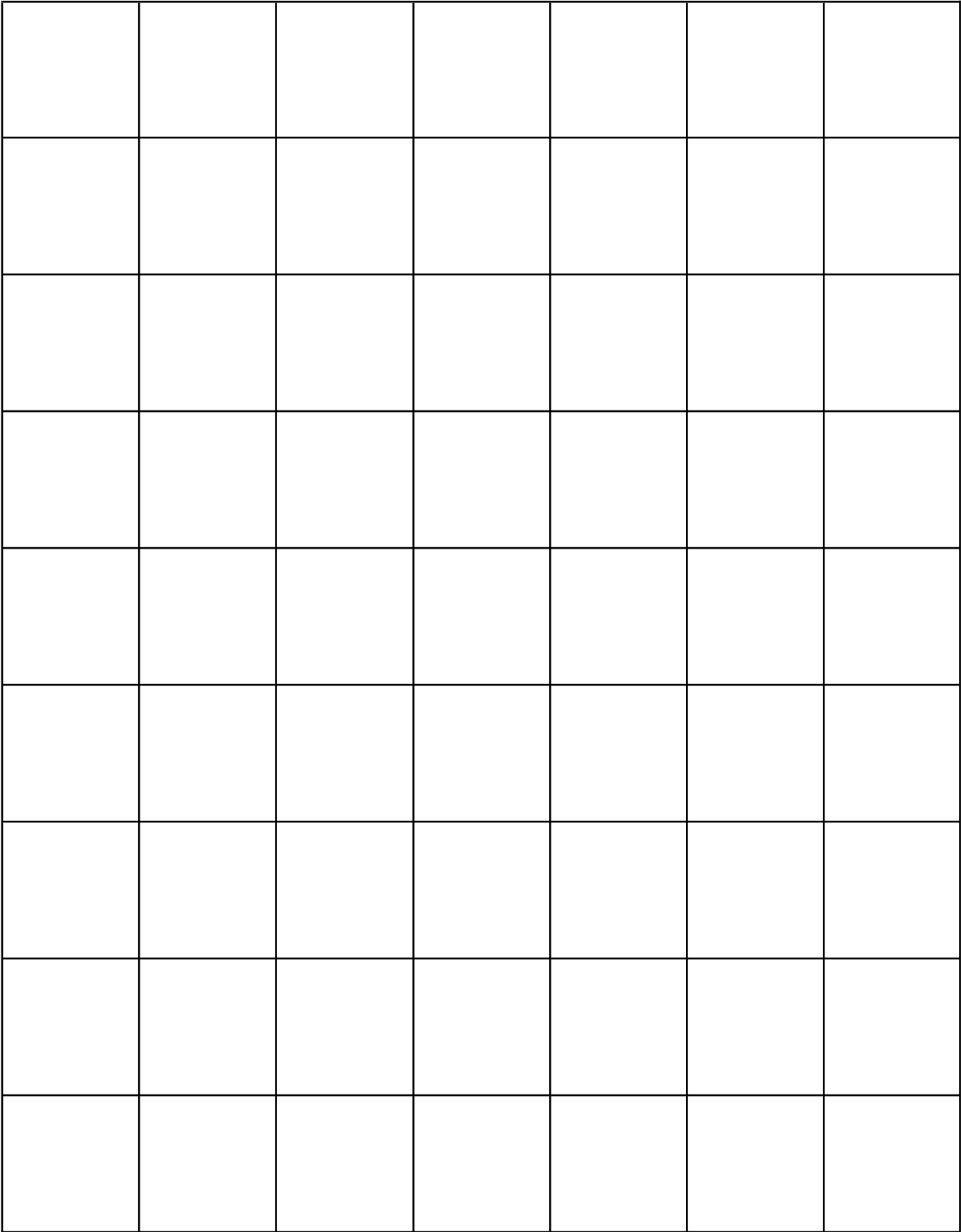
Recording Sheet

Name _____ Date _____

	Polygon Name	Drawing	Perimeter	Area
1				
2				
3				
4				

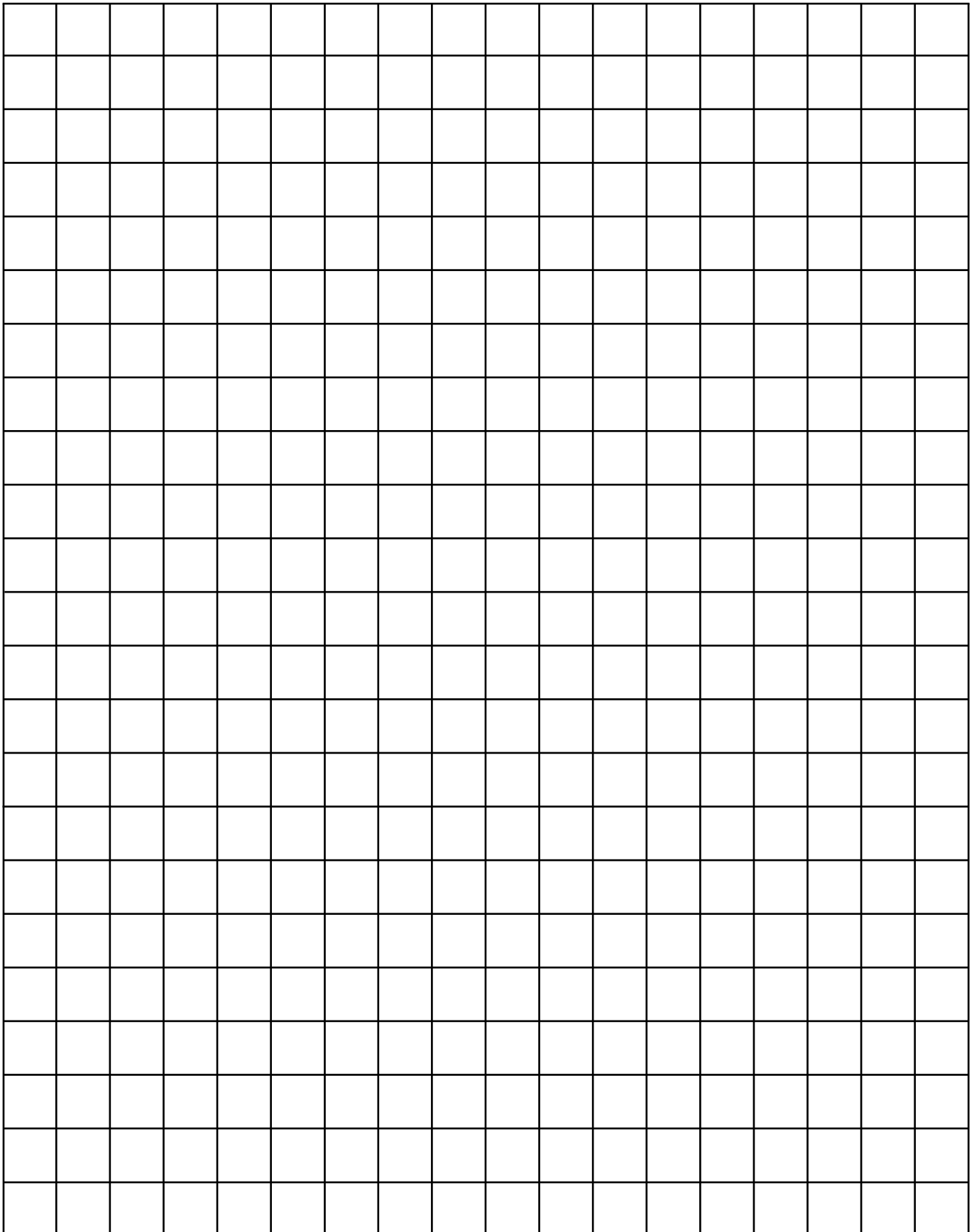
Pasta Polygons

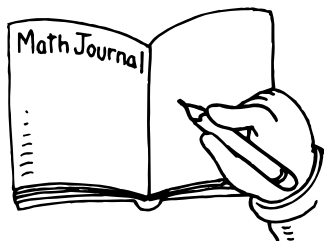
Square Inches Grid



Pasta Polygons

Square Centimeters Grid





Reflection Questions for Math Journals

1. Must two shapes with the same perimeter have the same area? Explain your answer and give examples to support it.
2. Name at least three real-life situations in which you would need to know a polygon's perimeter or area.

Side Dishes

- Invite students to draw polygons on graph paper and find each shape's perimeter and area. Challenge them to draw many shapes that have the same perimeter but different areas.
- Challenge students to examine their activity results and see if they can find a pattern or relationship between a polygon's perimeter and its area. Whether or not they find a relationship, have them explain their findings and support these findings with examples.

Dessert

- Invite students and their families to measure the perimeter and area of at least ten polygon-shaped objects in their home. Recommend they measure items such as books, mirrors, tables, rugs, and beds. Ask students to record their results, bring them to school, and share them with the class.
- Ask students what ingredients they think are in pasta and how they think pasta is made. Then, read aloud *Pasta Factory* by Hana Machotka. This book takes readers on a guided and colorful tour of the Tutta Pasta factory, providing a detailed description of how pasta is made.
- Read aloud *How Big Is a Foot?* by Rolf Myller. This book is about a king who wants to give a special gift to his queen, who has everything. He decides to give her a bed (which has not yet been invented). He orders his apprentice carpenter to build a bed, 3 feet wide and 6 feet long. Banished from the kingdom because the bed is too small, the carpenter solves his measurement problem and later builds a bed fit for a queen. Invite students to calculate the perimeter and area of the queen's bed and of their own bed.

