Process Standards Rubric

Five Strands of Math – Drills Big Book

Number and Operations • Algebra • Geometry • Measurement • Data Analysis & Probability

All Five Strands of Math

Expectations Instructional programs from pre-kindergarten through grade 12 should enable all students to:	Warm-up 1	Timed Drill 1	Timed Drill 2	Warm-up 2	Timed Drill 3	Timed Drill 4	Warm-up 3	Timed Drill 5	Timed Drill 6	Warm-up 4	Timed Drill 7	Timed Drill 8	Warm-up 5	Timed Drill 9	Warm-up 6	Timed Drill 10	Timed Drill 11	Review A	Review B	Review C
GOAL 1: Problem Solving																				
• build new mathematical knowledge through problem solving;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• solve problems that arise in mathematics and in other contexts;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• apply and adapt a variety of appropriate strategies to solve problems;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• monitor and reflect on the process of mathematical problem solving.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GOAL 2: Reasoning & Proof																				
• recognize reasoning and proof as fundamental aspects of mathematics;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• make and investigate mathematical conjectures;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• develop and evaluate mathematical arguments and proofs;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• select and use various types of reasoning and methods of proof.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GOAL 3: Communication																				
• organize and consolidate their mathematical thinking through communication;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• analyze and evaluate the mathematical thinking and strategies of others;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• use the language of mathematics to express mathematical ideas precisely.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GOAL 4: Connections																				
• recognize and use connections among mathematical ideas;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• recognize and apply mathematics in contexts outside of mathematics.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GOAL 5: Representation																				
• create and use representations to organize, record, and communicate mathematical ideas;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• select, apply, and translate among mathematical representations to solve problems;	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• use representations to model and interpret physical, social, and mathematical phenomena.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Teacher Guide

Our resource has been created for ease of use by both TEACHERS and STUDENTS alike.

Introduction

Our resource offers ready-to-use worksheet activities for students in grades three to five. Math concepts outlined by the NCTM are presented in a way that encourages students to learn and review important concepts. Our resource can be used effectively for whole-class, small group and independent work. This book's exercises vary in difficulty and content so as to provide teachers and students with a variety of teaching and learning opportunities. Included are challenging problem-solving drills which will push the boundaries of critical thought and demonstrate to students the importance of mathematical problems in Number & Operations, Algebra, Geometry, Measurement, and Data Analysis & Probability using real world situations. Visual models are included to assist visual learners. Teachers may also choose to use mathematics manipulatives along with the exercises included in this book to help address the needs of kinesthetic learners.

How Is Our Resource Organized?

STUDENT HANDOUTS

Reproducible **drill sheets** make up the majority of our resource.

The **drill sheets** contain challenging problem-solving tasks in drill form, many centered around 'real-world' ideas or problems, which push the boundaries of critical thought and demonstrate to students why mathematics is important and applicable in the real world. It is not expected that all activities will be used, but are offered for variety and flexibility in teaching and assessment. Many of the drill sheet problems offer space for reflection, and opportunity for the appropriate use of technology, as encouraged by the NCTM's *Principles & Standards for School Mathematics*.

The **drill sheets** Big Book can be used in correlation with the separate **task sheets** Big Book that matches with this particular grade band.

The **NCTM Content Standards Assessment Rubric** (*pages 6-10*) is a useful tool for evaluating students' work in many of the activities in our resource. The **Reviews** (*pages 30-32, 50-52, 70-72, 90-92, and 110-112*) are divided by grade and can be used for a follow-up review or assessment at the completion of the unit.

PICTURE CUES

Our resource contains three main types of pages, each with a different purpose and use. A **Picture Cue** at the top of each page shows, at a glance, what the page is for.

Teacher Guide

* Information and tools for the teacher

Student Handout

* Reproducible drill sheets

Easy Marking™ Answer Key

* Answers for student activities

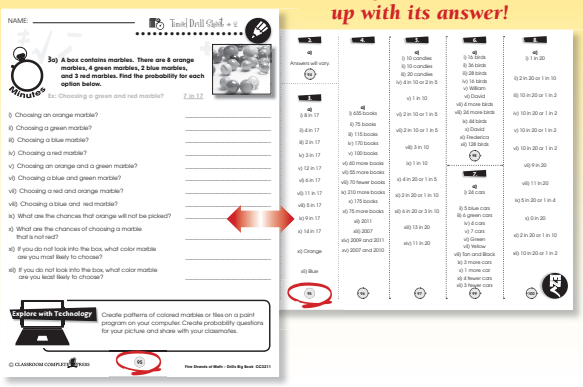
Timed Drill Stopwatch

* Write the amount of time for students to complete the timed drill sheet in the stopwatch. Recommended times are given on the contents page.

EASY MARKING™ ANSWER KEY

Marking students' worksheets is fast and easy with our **Answer Key**. Answers are listed in columns – just line up the column with its corresponding worksheet, as shown, and see how every question matches up with its answer!

Every question matches up with its answer!



Principles & Standards

Principles & Standards for School Mathematics outlines the essential components of an effective school mathematics program.

The NCTM's Principles & Standards for School Mathematics

The **Principles** are the fundamentals to an effective mathematics education. The **Standards** are descriptions of what mathematics instruction should enable students to learn. Together the **Principles and Standards** offer a comprehensive and coherent set of learning goals, serving as a resource to teachers and a framework for curriculum. Our resource offers exercises written to the NCTM **Process** and **Content Standards** and is inspired by the **Principles** outlined below.

Six Principles for School Mathematics

Equity

EQUITY: All students can learn mathematics when they have access to high-quality instruction, including reasonable and appropriate accommodation and appropriately challenging content.

Curriculum

CURRICULUM: The curriculum must be coherent, focused, and well articulated across the grades, with ideas linked to and building on one another to deepen students' knowledge and understanding.

Teaching

TEACHING: Effective teaching requires understanding what students know and need to learn, and then challenging and supporting them to learn it well.

Learning

LEARNING: By aligning factual knowledge and procedural proficiency with conceptual knowledge, students can become effective learners, reflecting on their thinking and learning from their mistakes.

Assessment

ASSESSMENT: The tasks teachers select for assessment convey a message to students about what kinds of knowledge and performance are valued. Feedback promotes goal-setting, responsibility, and independence.

Technology

TECHNOLOGY: Students can develop a deeper understanding of mathematics with the appropriate use of technology, which can allow them to focus on decision-making, reflection, reasoning, and problem solving.

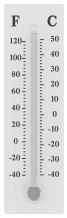
Our resource correlates to the six Principles and provides teachers with supplementary materials, which can aid them in fulfilling the expectations of each principle. The exercises provided allow for variety and flexibility in teaching and assessment. The topical division of concepts and processes promotes linkage and the building of conceptual knowledge and understanding throughout the student's grade and elementary school career. Each of the drill sheet problems help students with their procedural proficiency skills, and offers space for reflection and opportunity for the appropriate use of technology.

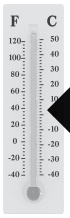
 NAME: _____

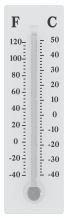
10a) Color in the blank thermometers to show the temperatures given.

Ex:  **32°F/0°C**

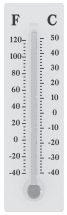
i)  12°F/–11°C

ii)  45°F/7°C

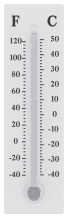
iii)  23°F/–5°C

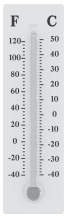
iv)  –4°F/–20°C

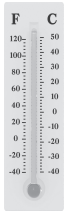
v)  –10°F/–23°C

vi)  63°F/17°C

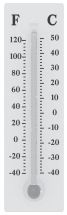
vii)  90°F/32°C

viii)  100°F/38°C

ix)  40°F/4°C

x)  50°F/10°C

xi)  75°F/24°C

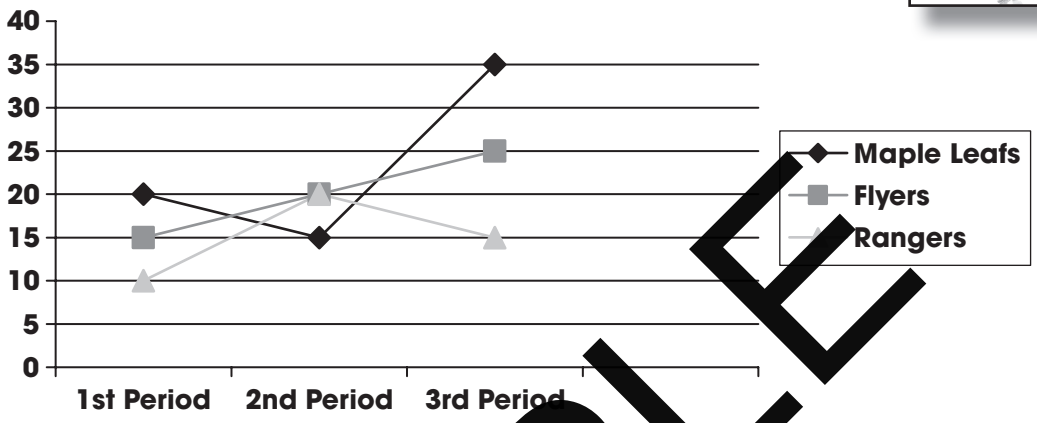
xii)  21°F/–6°C

xiii)  60°F/15°C

NAME: _____

Minutes

14a) This graph shows the number of shots on net that each hockey team shot during one hockey game.



i) What would be a good title for this graph? _____

ii) What increments does the scale on the graph go up by? _____

iii) How was the scale on the graph chosen? _____

iv) Who had the most shots on goal in total? _____

v) Who had the fewest shots on goal in total? _____

vi) Who had the most shots on net in the first period? _____

vii) Who had the fewest shots on net in the first period? _____

viii) Who had the most shots on net in the second period? _____

ix) Who had the fewest shots on net in the second period? _____

x) What prediction might you make about how each team will shoot in their next game? _____

xi) What is the median for the Flyer's shots on net? _____

xii) What is the range for the Ranger's shot on net? _____