

## Sample Agenda for Introducing MECL to Math Supervisors and Curriculum Specialists in a District or State Department of Education (30 minutes)

In large school districts, math supervisors may be the best “gatekeepers” to reaching the teachers and getting them interested in MECL. You may want to set up a meeting to demonstrate some of the features of MECL to a group of math supervisors and/or curriculum specialists.

Folders for the participants of the meeting should contain these items:

- ✓ Information about you and your Center/Council
- ✓ NCEE catalogs
- ✓ Copy of MECL or sample copy of one lesson
- ✓ Essay from MECL about teaching math and economics together
- ✓ Grids showing correlation of the curriculum to NCTM and NCEE standards
- ✓ Workshop evaluation forms from past MECL workshop your Center/Council has hosted
- ✓ Copy of the local district math and social studies outcomes for grades 3-5 that you have referenced to the MECL lessons

Points to make during this meeting:

- Describe MECL’s purpose in teaching economics and mathematics by highlighting the grids correlating the NCTM standards and the NCEE standards to lessons. Make reference to the handouts in the folders.
- Direct the participants to the grids in the book to select appropriate lessons matching district outcomes and standards. If you have not been able to do this in advance of the meeting, ask the participants to see if they find any of their district’s standards in the NCTM grid.
- Describe how the lessons in MECL can engage students above and below grade level in mathematics.
- If computers and the Internet are available, demonstrate the features of the MECL Web site (<http://mathandecon.ncee.net>), using Lesson 3. This lesson has one of the interactives for students. Make sure to show the downloadable Visuals and Activities. Show the assessment, Activity 3.2, to highlight the fact that each lesson has an assessment component. Show the link to the NCEE lessons on *EconEdLink* (<http://www.econedlink.org>) to show the additional support for teachers.

End the meeting by asking how you can arrange to host a workshop for teachers during the next district curriculum day. Offer to train lead teachers who can take the information back to their colleagues.

## **Listing of lessons with a brief description.**

- **Lesson 1: A Season of Goods**

This lesson focuses on goods and services (economics) and basic operations (mathematics). The students review the four seasons of the year and brainstorm goods and services that people often purchase during each season. The students then participate in a matching game, pairing goods and services according to the seasons. Finally, the students work on an activity that requires them to act as consumers on a budget and make decisions to purchase goods and services.

- **Lesson 2: Choices, Choices**

This lesson focuses on decision making (economics) and introduces surveying as a method of data collection (mathematics). After analyzing data on a sample topic, the students use a decision-making grid to help them rank career choices and create fractions using the survey data. You can use this lesson as part of a career unit. It focuses on math-related careers, but you can modify it to cover all types of careers if this fits better into the grade-level curriculum.

- **Lesson 3: What's Hot! What's Not!**

This lesson focuses on exchange and trade (economics) and mean, median and temperatures (mathematics). The students review how to read temperatures on a thermometer and discuss activities associated with various temperatures. They estimate temperatures and find the median and mean of a group of temperatures. They participate in a trading simulation and experience the economic principle that voluntary exchange increases satisfaction.

- **Lesson 4: Pizza on a Budget**

This lesson focuses on budgeting (economics) and basic operations (mathematics). The students participate in a mouth-watering budget activity while they use estimating skills and practice identifying costs and benefits. Using a budget work sheet, they work in small groups to plan a class pizza party. They review basic operations skills using money as they make decisions about refreshments for the party.

- **Lesson 5: The Math Factory**

This lesson focuses on productivity (economics) and multiplication (mathematics). The students learn about physical capital and human capital as they create multiplication-fact review cards. In the first production round, groups of students produce as craftspeople and as specialists. In the second round, they continue to produce as craftspeople and specialists, but they also receive information that helps them to increase their human capital - their skills and knowledge - and their productivity. In the third round, the students get scissors; and this tool, along with their prior experience, once again increases their human capital and productivity.

- **Lesson 6: Bookmark Profit**

This lesson focuses on profit (economics) and basic operations (mathematics). Working in small groups, the students act as companies and produce bookmarks. They decide which resources to purchase to produce their bookmarks. They calculate their costs of production and display their bookmarks for the class. The students then act as consumers and "buy" bookmarks. Based on their "sales," the student companies compute their profit or loss.

- Lesson 7: Go Fly a Kite**  
 This lesson focuses on resources and barter (economics) and geometry (mathematics). After reviewing the concept of bartering, the students roll a four-sided dice to gather some of the resources they will need to build a tetrahedron kite, which is based on the shape of a platonic solid. Then they barter to get the rest of the materials they will need. During this process, the students identify the characteristics of intermediate goods and use these goods to build their kite.
- Lesson 8: Doughnut Dreaming**  
 This lesson focuses on demand (economics) and line graphs (mathematics). The students use a class survey to collect data about the quantity demanded of doughnuts at different prices. They use this data to construct a line graph. They discuss the law of demand and apply it to the graph to understand that at lower prices, the students will purchase more doughnuts.
- Lesson 9: How Much Time?**  
 This lesson focuses on opportunity cost (economics) and graphs (mathematics). The students review terms related to measuring time and convert a time schedule into a pie chart, or circle graph. The students use the circle graph to assist them in making decisions about using time wisely to satisfy the requirements of a school-day schedule, and they consider the opportunity cost of their decisions.
- Lesson 10: Bunches of Brownies**  
 This lesson focuses on resources (economics) and fractions (mathematics). The students use measuring cups to determine equivalent fractions for a recipe. Thinking economically, the students identify the productive resources they would use to make brownies and categorize them as natural resources, human resources or capital goods (resources). The students work in groups to decide how they would divide a pan of brownies equally. Finally, the students determine how much of each ingredient they would need if they wanted to produce additional batches of brownies.
- Lesson 11: Plenty of Pennies**  
 This lesson focuses on interest (economics) and percents (mathematics). The students use pennies to help them compute percents. They convert percent to decimals and figure interest amounts on savings or borrowed money. They role-play to understand that interest is payment for the use of money, and they discover that all financial choices have a cost.
- Lesson 12: Birdly Exchange**  
 This lesson focuses on barter, money and characteristics of money (economics) and fractions and ratios (mathematics). The students will role-play a bartering activity and participate in trading simulations using feathers and birdles (a form of paper money) as mediums of exchange. They will compare their trading experiences to decide why medium of exchange is an important function of money. The students should have some grasp of fractions and ratios, because the lesson introduces exchange rate as a ratio and includes an activity in which the students calculate the exchange rate between U.S. dollars and birdles.

## Why Teach Mathematics and Economics Together?

Teaching mathematics in today's elementary classroom can be both exciting and challenging for an elementary teacher. It can be exciting because we are experiencing a wonderful evolution in mathematics education that recognizes the importance of teaching mathematics in a hands-on, dynamic and applied way. This approach makes learning mathematics fun for teacher and student alike.

Teaching mathematics for an elementary teacher can also be a challenge because the mathematics that should be taught today includes much more than the simple arithmetic that we adults may have experienced in our elementary classrooms.

In the elementary classroom of today, mathematics is a dynamic discipline basic to our information society and includes essential processes such as problem solving, reasoning, communication, connections and representation. (*Principles and Standards for School Mathematics*, Reston, Va.: National Council of Teachers of Mathematics, 2000). *Mathematics and Economics: Connections for Life Grades 3- 5* book helps an elementary teacher strive for thoughtful and creative mathematics instruction by providing 12 model lessons for grades 3 through 5 that give students a great context — economics — for learning mathematics.

Recent research on mathematics education continues to confirm that teaching mathematics in the context of an application is highly effective and that significant, worthwhile and grade-level appropriate content can have considerable influence on student learning. (Iris R. Weiss and Joan D. Pasley, "What is High- Quality Instruction?" *Educational Leadership*, February 2004, pp. 24-28). Primary factors associated with effective lessons were student engagement and interaction with the content.

As it does in many sciences, the discipline of mathematics quite naturally represents a "language" for economics. Economics depends on mathematics to represent relationships, solve problems, and communicate ideas effectively. This real-world context provides a great opportunity for elementary teachers to teach their students current mathematics, while simultaneously offering their students a chance to learn some of the fundamental concepts of economics. Thus, the lessons in this book will help teachers illustrate to their students the real power of mathematics in our world.

Economics teaches students how to be wise producers and consumers, lessons they will use throughout their lives. Although the focus of these lessons is teaching mathematics within the context of economics, the teaching of economics is itself essential. Forty-eight states now have curriculum standards at the elementary level requiring that students be taught economics. Teachers often weave economics concepts into the material of other subjects as they seek to fulfill the responsibility to address their district's elementary curriculum. Not only do the lessons in this book teach mathematics in a compelling way, they are also exciting and relevant approaches to teaching economics concepts that students will use for a lifetime.

The lessons have been designed by master teachers, reviewed by content experts, piloted in elementary classrooms and published with a careful attention to the potential excitement and utility of blending instruction for these two disciplines. All lessons include hands-on activities, encourage class discussions and provide many effective questions teachers can use to review and deepen student understanding. All lessons, even the fanciful, are grounded in familiar activities relevant to the everyday lives of students.

Each lesson includes a Web address for all of the activities and visuals ready to print, further connections to other disciplines, additional suggestions for mathematics and economics activities for students, and links to interesting information and resources. Most of all, students will be excited by these creative activities and that will excite teachers as well.

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**This document contains pages from the publication *Mathematics & Economics: Connections for Life, Grades 3-5* from the National Council on Economic Education (NCEE).**

**If you are interested in purchasing *Mathematics & Economics, Grades 3-5*, visit: <http://store.ncee.net>**

**If you are interested in learning more about NCEE, visit: <http://www.ncee.net>**

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# Content Standards: Mathematics

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## Number and Operations

- Understand numbers, ways of representing numbers, relationships among numbers and number systems.
- Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines and as divisions of whole numbers.
- Recognize and generate equivalent forms of commonly used fractions, decimals and percents.
- Develop fluency in adding, subtracting, multiplying and dividing whole numbers.
- Develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience.
- Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results.

## Algebra

- Use mathematical models to represent and understand quantitative relationships.

## Geometry

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- Use visualization, spatial reasoning and geometric modeling to solve problems.

## Measurement

- Understand measurable attributes of objects and the units, systems and processes of measurement.

## Data Analysis and Probability

- Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.
- Collect data using observations, surveys and experiments.
- Represent data using tables and graphs such as line plots, bar graphs and line graphs.
- Select and use appropriate statistical methods to analyze data.
- Propose and justify conclusions and predictions that are based on data, and design studies to further investigate the conclusions or predictions.

## 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.

## Connections

- Recognize and apply mathematics in contexts outside of mathematics.

## Representation

- Create and use representations to organize, record and communicate mathematical ideas.

### A Correlation of the Lessons with the Mathematics Standards

Standards	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Lesson 9	Lesson 10	Lesson 11	Lesson 12
<b>Number and Operations</b>												
• Understand numbers, ways of representing numbers, relationships ...	●											
• Develop understanding of fractions as parts of unit wholes, as parts ...		●								●		
• Recognize and generate equivalent forms of commonly used fractions, ...											●	●
• Compute fluently and make reasonable estimates.	●		●		●							
• Develop fluency in adding, subtracting, multiplying and dividing ...				●								
• Develop and use strategies to estimate computations involving fractions ...				●		●				●		
• Develop and use strategies to estimate the results of whole-number ...				●								
<b>Algebra</b>												
• Use mathematical models to represent and understand quantitative ...		●										
<b>Geometry</b>												
• Analyze characteristics and properties of two- and three-dimensional ...							●					
• Use visualization, spatial reasoning and geometric modeling to solve ...							●					
<b>Measurement</b>												
• Understand measurable attributes of objects and the units, systems ...			●						●			
<b>Data Analysis and Probability</b>												
• Formulate questions that can be addressed with data and collect, ...		●										
• Collect data using observations, surveys and experiments.								●				
• Represent data using tables and graphs such as line plots, bar graphs ...								●				
• Select and use appropriate statistical methods to analyze data.		●	●									
• Propose and justify conclusions and predictions that are based on data, ...								●				
<b>Problem Solving</b>												
• 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.	●	●			●	●				●		
<b>Connections</b>												
• Recognize and apply mathematics in contexts outside of mathematics.	●	●	●	●	●	●	●	●	●	●	●	●
<b>Representation</b>												
• Create and use representations to organize, record and communicate ...									●			

Selected standards from *Principals & Standards for School Mathematics*

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# Content Standards: Economics

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In the Voluntary National Content Standards in Economics, benchmarks for demand, entrepreneurs, profit and losses are at the eighth grade level. Many district elementary economics curricula introduce these concepts in lower grades, so we included them in these lessons.

## Standard 1

- **Benchmark 1 for 4th grade:**

People make choices because they cannot have everything they want.

- **Benchmark 3 for 4th grade:**

Goods are objects that can satisfy people's wants.

- **Benchmark 4 for 4th grade:**

Services are actions that can satisfy people's wants.

- **Benchmark 5 for 4th grade:**

People's choices about what goods and services to buy and consume determine how resources will be used.

- **Benchmark 6 for 4th grade:**

Whenever a choice is made, something is given up.

- **Benchmark 7 for 4th grade:**

The opportunity cost of a choice is the value of the best alternative given up.

- **Benchmark 8 for 4th grade:**

People whose wants are satisfied by using goods and services are called consumers.

- **Benchmark 9 for 4th grade:**

Productive resources are the natural resources, human resources and capital goods available to make goods and services.

- **Benchmark 10 for 4th grade:**

Natural resources, such as land, are "gifts of nature"; they are present without human intervention.

- **Benchmark 11 for 4th grade:**

Human resources are the quantity and quality of human effort directed toward producing goods and services.

- **Benchmark 12 for 4th grade:**

Capital goods are goods produced and used to make other goods and services.

## Standard 2

- **Benchmark 1 for 4th grade:**

Few choices are all-or-nothing decisions; they usually involve getting a little more of one thing by giving up a little of something else.

- **Benchmark 2 for 4th grade:**

A cost is what you give up when you decide to do something.

- **Benchmark 3 for 4th grade:**

A benefit is something that satisfies your wants.

## Standard 5

- **Benchmark 1 for 4th grade:**

Exchange is trading goods and services with people for other goods and services or for money.

- **Benchmark 2 for 4th grade:**

The oldest form of exchange is barter — the direct trading of goods and services between people.

- **Benchmark 3 for 4th grade:**

People voluntarily exchange goods and services because they expect to be better off after the exchange.

## Standard 6

- **Benchmark 3 for 4th grade:**

Specialization and division of labor usually increase the productivity of workers.

## Standard 8

- **Benchmark 1 for 4th grade:**

Higher prices for a good or service provide incentives for buyers to purchase less of that good or service and for producers to make or sell more of it. Lower prices for a good or service provide incentives for buyers to purchase more of that good or service and for producers to make or sell less of it.

- **Benchmark 1 for 8th grade:**

An increase in the price of a good or service encourages people to look for substitutes, causing the quantity demanded to



decrease and vice versa. This relationship between price and quantity demanded, known as the law of demand, exists as long as other factors influencing demand do not change.

#### Standard 10

- **Benchmark 1 for 4th grade:**

Banks are institutions where people save money and earn interest, and where other people borrow money and pay interest.

- **Benchmark 2 for 4th grade:**

Saving is the part of income not spent on taxes or consumption.

#### Standard 11

- **Benchmark 1 for 4th grade:**

Money is anything widely accepted as final payment for goods and services.

- **Benchmark 2 for 4th grade:**

Money makes trading easier by replacing barter with transactions involving currency, coins or checks.

- **Benchmark 5 for 4th grade:**

Most countries create their own currency for use as money.

#### Standard 15

- **Benchmark 1 for 4th grade:**

When workers learn and practice new skills they are improving their human capital.

- **Benchmark 2 for 4th grade:**

Workers can improve their productivity by improving their human capital.

- **Benchmark 3 for 4th grade:**

Workers can improve their productivity by using physical capital such as tools and machinery.

#### Standard 14

- **Benchmark 3 for 8th grade:**

Entrepreneurs and other sellers earn profits when buyers purchase the products they sell at prices high enough to cover the costs of production.

- **Benchmark 4 for 8th grade:**

Entrepreneurs and other sellers incur losses when buyers do not purchase products they sell at prices high enough to cover the costs of production.

## CONTENT STANDARDS

### A Correlation of the Lessons with the Voluntary National Content Standards in Economics

Standards	Benchmarks	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Lesson 9	Lesson 10	Lesson 11	Lesson 12
<b>Standard 1</b>	1 for 4th grade	Choices	●	●						●			
	3 for 4th grade	Goods	●										
	4 for 4th grade	Services	●										
	5 for 4th grade	Choices determine resource use								●			
	6 for 4th grade	Choices require giving up something		●						●			
	7 for 4th grade	Opportunity cost		●						●			
	8 for 4th grade	Consumers	●										
	9 for 4th grade	Productive resources							●			●	
	10 for 4th grade	Natural resources							●			●	
	11 for 4th grade	Human resources							●			●	
	12 for 4th grade	Capital goods (resources)							●			●	
	<b>Standard 2</b>	1 for 4th grade	Few choices are all-or-nothing decisions		●		●						
2 for 4th grade		Costs				●							
3 for 4th grade		Benefits				●							
<b>Standard 5</b>	1 for 4th grade	Exchange			●								●
	2 for 4th grade	Barter							●				
	3 for 4th grade	Why people trade			●				●				
<b>Standard 6</b>	3 for 4th grade	Specialization and division of labor				●							
<b>Standard 8</b>	1 for 4th grade	Prices provide incentives to buyers							●				
	1 for 8th grade	Law of demand							●				
<b>Standard 10</b>	1 for 4th grade	Banks										●	
	2 for 4th grade	Saving										●	
<b>Standard 11</b>	1 for 4th grade	What is money											●
	2 for 4th grade	Money makes trading easier											●
	5 for 4th grade	Most countries create currency											●
<b>Standard 14</b>	3 for 8th grade	Entrepreneurs, profits					●						
	4 for 8th grade	Entrepreneurs, losses					●						
<b>Standard 15</b>	1 for 4th grade	New skills increase human capital				●							
	2 for 4th grade	Human capital and productivity				●							
	3 for 4th grade	Physical capital and productivity				●							

Selected standards from *Voluntary National Content Standards in Economics*  
National Council on Economic Education, 1997