FEATURES TO ENGAGE STUDENTS

At the Center for Mathematics and Teaching, we know that all students have the potential to achieve in mathematics, believe that the development of mathematics should reflect the connectedness of Big Ideas into a coherent whole, and make mathematics inviting and inclusive to more students. Many features in *MathLinks* programs engage students in problems and routines that will help them experience success as they see the beauty and utility of mathematics and see themselves as "do-ers" of mathematics.

LOCATIONS OF THE FEATURES REFERENCED IN THIS SECTION

Print	Portal
Teacher Edition • Unit Planning Information (TE-UPI) • Annotated Answer Key, including Student Packet and lesson notes (TE-AK) **Program Information** (PI)	**Portal Landing Page** (LP) **Grade 6 Unit Resources** → <Unit number> (UR) • Teacher Edition • Student Packet • Other Resources for Students (OR-S) ✓ Essential Skills (ES) ✓ Math Talks (MT) ✓ Nonroutine Problems (NP) ✓ Tasks (T) ✓ Projects (P) ✓ Technology Activities (TA) **Grade 6 General Resources** (GR)

HANDS-ON ACTIVITIES

Building conceptual understanding is at the heart of every *MathLinks* Core course, and many lessons employ hands-on methods to engage students in attaining this goal. Here are some examples for Grade 6. (TE-AK)

- Unit 1 (**Statistics**): Students learn about measures of center and spread through a Name Score activity where they move around the room as human data points.
- Unit 2 (**Factors and Multiples**): Students preview the greatest common factor concept by building rectangles with square tiles to learn about factors, primes, composites, and square numbers.
- Unit 3 (**Ratio Representations**): Students use picture cards for an intuitive understanding of comparing ratios, leading to the creation of tape diagrams as a tool to problem-solve with ratios.
- Unit 4 (**Division**): Students solve rate problems while doing a card sort.
- Unit 5 (**Percent**): Students practice skills by manipulating puzzle pieces and by playing a card game.
- Unit 6 (**Expression**s): Students review vocabulary and important unit topics with card sorts and a puzzle.
- Unit 7 (**Inputs and Outputs**): Students build growing geometric patterns with square tiles, keep track of data in tables, graph the data on the coordinate plane, and write rules using words and algebraic symbols
- Unit 8 (**Solving Equations**): Students do the same hands-on review activities for Unit 8 topics as in Unit 6.
- Unit 9 (**Area and Volume**): Students use dot paper drawings, with the option of cutting them out, to derive the area formulas of geometric figures. Students also use tangram pieces to form figures for which they apply their knowledge of area formulas. Students use nets of solids to understand surface area.
- Unit 10 (**The Number Line and the Coordinate Plane**): Students use cards and a number line to play an integer game, and review important unit topics with True-False-Explain cards.

ACTIVITY ROUTINES

Activity Routines are recurring features in *MathLinks*, designed to engage students in problem-solving and practice. Activity Routines are accessible to a wide range of learners and learning styles. Planning for Different Users (TE-UPI) identifies Activity Routines that are especially appropriate for English learners, struggling learners, and enrichment.

This chart shows the location of the routines throughout the course. Detailed instructions for each Activity Routine, along with introductory sample activities, can be found in General Resources on the Teacher Portal. We recommend that teachers use these samples to establish classroom norms and procedures prior to using these activities in the units.

GRADE 6: ACTIVITY ROUTINES

Unit / Domain →	1 SP	2 NS	3 RP	4 NS	5 RP	6 EE	7 EE	8 EE	9 G	10 NS
Big Square Puzzles			TE-AK NP		TE-AK	TE-AK		TE-AK		
Four in a Row		NP	NP	NP	NP	NP	ES	NP	NP	
Match and Compare Sorts	TE-AK	TE-AK				TE-AK	TE-AK	TE-AK	TE-AK	
Math Talks	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT
Open Middle Problems	ES				NP	ES	NP	ES NP	ES	NP
Poster Problems	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK
Why Doesn't It Belong?	TE-AK	TE-AK		TE-AK	TE-AK		TE-AK		TE-AK	
The *MathLinks* Rubric	TE-AK T	TE-AK T	TE-AK T	TE-AK T	T	TE-AK T	TE-AK T	TE-AK T	TE-AK T	T
Computational Fluency Challenge	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK	TE-AK

Unit Planning Information (TE-UPI),
Annotated Answer Key (TE-AK),
Essential Skills (ES), Math Talks (MT), Nonroutine Problems (NP), Tasks (T)

TECHNOLOGY ACTIVITIES

While not technology-driven, *MathLinks* promotes the use of technology for the exploration of concepts. Some technology experiences are built into lessons (TE-UPI,TE-AK), and a Technology Activities component (TA) appears in Unit Resources on the Portal. TA suggestions include a link, and many come with a *MathLinks* worksheet as a companion to facilitate deeper thinking and connect it to a *MathLinks* lesson.

All *MathLinks* TAs are open source and available to all at the time of the 2025 printing of the program. We invite users to contact us with updates to the availability or other open-source activities they find useful.

GRADE 6: TECHNOLOGY ACTIVITIES

Unit Domain	Title	Technology Required
1 SP	What's My Number	Desmos
	What's in a Name?	Desmos
	Creating Histograms	Desmos
	Strength in Numbers	Desmos
	Human Stopwatch	Desmos
2 NS	Factor Game	NCTM – Illuminations
	Product Game	NCTM - Illuminations
3 RP	Bad Date	Open source (video)[1]
	Paint	Desmos[1]
	Ratio Rumble	Open source (requires Flash)
	Click Battle	Desmos
	Sugar Packets	Open source (3-Act Math)
4 NS	Missing Can Problem	Open source
	Exploring Fraction Division	Open source[1]
5 RP	Des-Farm	Desmos[1]
	Percentages	Open Middle Website
	Related Percentages	Open Middle Website
6 EE	Order of Operations Exploration	Desmos calculator[1]
	Equivalent Expressions	Desmos[1]
	Distributive Property: Open Middle Theme	Geogebra
	Expressions and Equations	Open Middle Website
7 EE	Robots: What a Point in a Scatter Plot Means	Desmos[11]
	Battle Boats ("primary grades" version)	Desmos
	Visual Patterns	Open source
	Graphing Calculator Exploration: Points and Lines	Desmos calculator[1]
	Function Machine	Open source[1]
8 EE	Solve Me Mobiles	Open source
	Solving One-Step Equations	Desmos[1]
	Expressions and Equations	Open Middle Website
9 G	Polygraphs (Shape Bucket, Triangles, Polygons)	Desmos
	Area and Perimeter of Rectangles	Geogebra[1]
	Exploring Triangle Area with Geoboards	Desmos
	Area of Common Polygons	Geogebra[1]
	3D Calculator	Geogebra[1]
10 NS	Inequalities on the Number Line	Desmos[1]
	Coordinate Plane	Desmos[1]
	The (Awesome) Coordinate Plane Activity	Desmos[1]
	Polygraph: Points	Desmos[1]
	Mini Golf Marbleslides	Desmos
	Collect the Coconuts	Desmos

[1]Followup worksheet included

PUZZLES, GAMES, AND CARD SORTS

Puzzles, games, and card sorts add variety and encourage student interaction as students develop skills and practice concepts. These activities frequently require copying a Reproducible (TE-UPI or UR)

GRADE 6: PUZZLES, GAMES, AND CARD SORTS

Unit Domain	Puzzles	Games	Card Sorts
1 SP			These Are – These – Aren't (TE-AK) Waqueyzaquey (TE-AK) Match and Compare Sort (TE-AK)
2 NS	Number Puzzles (NP)	The Factor Game (TE-AK) The Product Game (TE-AK) Four-in-a-Row (NP)	Match and Compare Sort (TE-AK)
3 RP	Big Square Puzzles (TE-AK) Ratio Puzzles (NP) I Have, Who Has? (TE-AK)	Four-in-a-Row (NP)	Paint Mixtures (TE-AK) Measurement Systems (TE-AK)
4 NS		Four-in-a-Row (NP)	Rate Problems (TE-AK)
5 RP	Big Square Puzzle (TE-AK)	Rummy Game: Fraction, Decimal, and Percent (TE-AK) Four-in-a-Row (NP)	
6 EE	Big Square Puzzle (TE-AK)	Four-in-a-Row (NP) Two Card Games (NP)	Match and Compare Sort (TE-AK) Match 'Em Up (TE-AK)
7 EE		Battling Ships (ES) Four-in-a-Row (ES)	Match and Compare Sort (TE-AK) Animals Card Sort (NP)
8 EE	Big Square Puzzle (TE-AK) Target Practice (ES) Equation Puzzle (NP)	Four-in-a-Row (NP) Equation Memory Game (NP)	Match and Compare Sort (TE-AK) Match 'Em Up (TE-AK)
9 G	Tangram Puzzles (ES) Tangram Polygons (NP)	Four-in-a-Row (NP)	Match and Compare Sort (TE-AK) Solid Sort (NP)
10 NS	Battling Ships (TE-AK)	Back and Forth (TE-AK) X Marks the Spot (ES, NP) Order It! (NP)	True-False Explain (TE-AK)

Unit Planning Information (TE-UPI),
Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Unit Resources (UR), Essential Skills (ES), Nonroutine Problems (NP)

REAL-LIFE PROBLEMS AND MATHEMATICAL INVESTIGATIONS

Real-life problems and mathematical investigations provide natural opportunities to work on the Common Core Standards for Mathematical Practice in the context of grade-level mathematics. These problems sometimes create a "need to know," and sometimes provide opportunities to apply math concepts to meaningful and interesting work. Rubric-worthy problems in Student Packets are good formative assessment options, and Tasks in Other Resources are good summative assessment options.

GRADE 6: REAL-LIFE AND MATHEMATICAL PROBLEMS

Unit Domain	**Print** (TE-AK) Opening Problems, Lessons, Practice	**Portal** (UR → OR-S)
1 SP	Beach Cleanup[1] Practice 1 (Bobbie's card playing) Practice 2 (Moffett Middle School) Practice 6: The Football Team Revisited	Choosing a Service Project (T) Conduct a Survey (P) Ages of Presidents (P)
2 NS	The Locker Problem[1]	Where do They Fit? (T)
3 RP	Nana's Chocolate Milk[1] The Assembly The Grain Grocer Slime	The Toothpaste Problem (T) Our Heritage Through Food (P)
4 NS	Chocolate Bars Practice 11: Extend Your Thinking	A Triple Celebration (T) Artistic Division (T) Why are Parks Good for Communities (P)
5 RP	Growth Spurts[1] Text Messaging	Priya's Budget (T) Building a House (T) Painting Rooms (P)
6 EE	The Problem of 4s[1] Perimeter of a Rectangle Practice 3: Extend Your Thinking	One Grain of Rice (T) Create Your Own Menu (P)
7 EE	The Keychain Fundraiser[1] Raising Money for Music[1] A Committee Decision Running Practice 9: Extend Your Thinking	Soccer Fundraiser (T) Pineapple Party (T) A Savings Problem (P)
8 EE	Leticia's Training	Interpreting Equations (T) Recycling Plastic Bottles (T)
9 G	Which Rug is Bigger?[1] Who Needs More Paint? The Food Drive	Baseball Packaging Problem (T) Construct a Box (P) How Many Plastic Bottles? (P)
10 NS		Sea Diving (T)
G	House Plans[1] A Basketball Court[1]	Reading a Map (T)

Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Essential Skills (ES), Nonroutine Problems (NP), Tasks (T), Projects (P)

[1]Extensions or follow-ups are included.

DEALING WITH DATA

MathLinks includes a variety of experiences that are intended to help students become critical consumers of data. This knowledge is essential for many future careers and important for everyone in the digital age and a thriving democracy. In many instances, this work involves data about themselves, which generally increases engagement. Data experiences are located in data-driven lessons and problems, Math Talks that focus on data, Projects, Tasks, and EGAD Puzzles (Explore, Generate, and Analyze Data) in Puzzles and Games.

GRADE 6: DATA EXPERIENCES

Unit **Domain**	**Print** (TE-AK) Opening Problems, Lessons, Practice	**Portal** (LP, UR → OR-S)
1 **SP**	The entire unit focuses on data experiences. Some examples are: Beach Cleanup Name Scores, Name Scores Revisited Practice 1 (Bobbie's card playing) Practice 2 (Moffett Middle School) Practice 4: Extend Your Thinking Three Data Displays Practice 6: The Football Team Revisited Poster Problems: Statistics	Choosing a Service Project (T) Conduct a Survey (P) Ages of Presidents (P) Data Talks A: Teen behaviors (MT) Data Talks B: Teen behaviors (MT) Data Talks C: Interpreting a bar graph (MT) EGAD (LP)
2 **NS**		Data Talks A: Teen behaviors (MT) Data Talks B: Teen behaviors (MT)
3 **RP**		Data Talks A: Cost of a food item – slow reveal (MT) Data Talks B: Teen behaviors (MT)
4 **NS**		Why are Parks Good for Communities (P) Data Talks A: Population – slow reveal (MT) Data Talks B: Teen behaviors (MT)
5 **RP**	Text Messaging	Data Talks A: Life expectancy – slow reveal (MT) Data Talks B: Teen behaviors (MT)
6 **EE**		Data Talks A: Water usage – slow reveal (MT) Data Talks B: Teen behaviors (MT)
7 **EE**	A Committee Decision	Data Talks A: NBA Salaries – slow reveal (MT) Data Talks B: Teen behaviors (MT)
8 **EE**		Recycling Plastic Bottles (T) Data Talks A: Cereal Consumption (MT) Data Talks B: Teen behaviors (MT)
9 **G**	Spiral review	How Many Plastic Bottles (P) Data Talk A: Olympic medals (MT)
10 **NS**		Data Talks A: Height vs shoe size (MT) Data Talks B: Incomplete table – occupations (MT) Data Talks C: Incomplete chart – countries (MT) Data Talks D: Incomplete circle graph - sports (MT) Data Talks E: Incomplete bar graph – power sources (MT) EGAD (LP)

Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Portal Landing Page (LP), Math Talks (MT), Tasks (T), Projects (P)

MATHEMATICS AND THE ENVIRONMENT

Environmental education is important because it provides the knowledge and understanding necessary to address global issues such as climate change, pollution, and habitat destruction. Many students today are concerned about these issues and may be motivated by problems associated with the environment. *MathLinks* includes several references or problems that call attention to environmental challenges in the context of grade-level mathematics. We invite teachers to launch discussions based on these problems as time permits. See more about connections to the environment in General Resources on the Teacher Portal.

GRADE 6: CONNECTIONS TO ENVIRONMENTAL ISSUES

Unit Domain	**Print** (TE-AK, TE-UPI) Opening Problems, Lessons, Practice	**Portal** (LP, UR → OR-S)
1 SP	Beach Cleanup[1] (TE-AK)	Choosing a Service Project (T)
4 NS		Why are Parks Good for Communities (P)
5 RP	Poster Problems (Buddy Benches - made from plastic cap recycling) (TE-AK)	Painting Rooms (P)
6 EE		Data Talk A: Water Used to Make Various Food Items (MT)
8 EE		Recycling Plastic Bottles (T)
9 G		How Many Plastic Bottles? (P)
10 NS	What is Sea Level (TE-UPI)	

Unit Planning Information (TE-UPI),
Annotated Answer Key, including Student Packets and Lesson Notes (TE-AK),
Math Talks (MT), Tasks (T), Projects (P)

STUDENT IDENTITY AND CULTURE

At the Center for Mathematics and Teaching, we believe that all students have the ability and deserve the opportunity to learn the mathematics that will make them capable and confident problem solvers and put them on the pathway to college and career readiness. To accomplish this, we believe that students must see themselves as "do-ers of mathematics". In addition to engaging students with features previously cited in this section, *MathLinks* empowers student effort and success through:

- An inclusive classroom of students pictured on the front of each Student Packet. These students "join" the class on slide decks with problem-solving ideas and opportunities to critique the reasoning of others.
- Self-assessment opportunities in every unit (e.g., Monitor Your Progress, unit Reflection pages, the *MathLinks* Rubric)
- References to accomplished role models (e.g. Jean-Michel Basquiat, an accomplished New York City non-conformist artist (Unit 1); Michelle Obama, First Lady and author (Unit 2); James Baldwin, civil rights activist (Unit 3); Maya Angelou, poet (Unit 5); Evelyn Cisneros, ballerina (Unit 5); Lin-Manuel Miranda, musician and actor (Unit 8); Tecumseh, Shawnee chief and warrior (unit 9)
- Data talks where students may use personal experiences to analyze data about teens.