

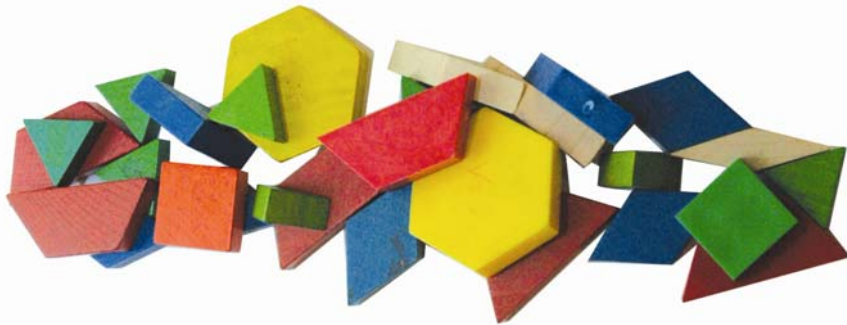
# Theme in the Math Curriculum

UCDS students explore math concepts through the daily Math Vitamin®. Theme is woven into stories that the children follow over several math activities. Specific skills are introduced and using math manipulatives and more conventional techniques, children go about solving the problem in a multi-step process. Below is a selection of Math Vitamins from each level. *Form* was the broader theme for the foundation of the curriculum for these skills.

## Early Elementary

This year, teachers were creating curriculum around birds in the classroom, science lab, and the library. Looking at the forms of bird's nests, here are some examples of math problems:

### Pattern Blocks



Welcome to a soaring new year! Can you believe summer is ending and a new year is *FORMing*? Time really flies just like those incredible birds that you made. In nature, birds build nests that vary from a simple collection of materials on the ground to elaborate refuges up high. Today you get to use pattern blocks to design your own unique nest. Record what you formed on your math vitamin sheet.

### Pattern Blocks

Thursday Hi my name's Robin! Wheew, you sure worked hard on those nests! I know just how you feel, I always work my hardest and do my best to make a nest that's not only strong, but also looks superfly! I'm really into symmetry right now! Join me making this nest. See if you can build the second side to my nest (match what I've already done!)

## Cuisenaire Rods



Robin and Jay just ran into Baby Eagle after completing their symmetrical nest. Hi, Baby Eagle! Hi, Baby Eagle! We're so exhausted from building our nest! Help out Baby Eagle by collecting twelve sticks and building a layered nest. Record your nest. Then try out other nest FORMS using Baby Eagle's sticks. Which nest do you think is the strongest nest? Coziest nest?

## Cuisenaire Rods

Yesterday Baby Eagle brought his new friends Robin and Jay to see his family's nest. Wow Baby Eagle, exclaimed Robin, When you eagles build nests, you don't mess around! An eagle nest is strong enough to hold a person! That's because we use triangles and triangles help form really strong nests. Use the Cuisenaire Rods to make at least three different triangles. Record what you build.

## Base Ten Blocks



Coming in fast is Frida the Peregrine Falcon! These birds are the fastest flyers on earth reaching speeds of 200mph while diving for food! In the wild they prefer to nest on the ledges of cliffs. They have adapted to city life however and will nest on the ledges of tall buildings. Look at all these tall buildings! So many fabulous places for my family to live! Using the Base ten blocks, fill in the city form. If you were Frida, where would you put a nest?

## First and Second Grades

The read-aloud at this level was *The Miraculous Journey of Edward Tulane* by Kate DiCamillo. Through the story students explored the idea of character transformations. In math they investigated geometry and measurement while building the main character, Edward, forming clothes that he had lost along the journey.

Well, now that we know the length of Edward's ears, we are planning to reconstruct all of him. Just think! Each of us with our very own Edward! To start, we need to find the PERIMETER of each body part. Use a ruler to measure the distance around each body

shape to find its total perimeter. Use the patterns to measure each part. Record your thinking on the pattern sheets. (The perimeter is the distance around a shape or form. Draw picture of the perimeter with an equation.)

How much tag board? It's nearly time to construct a paper Edward of your own! First we need to know how much of the special tag board we will need to order to create each paper Edward. Each sheet of tag board measures 11 x 17 in. If you fit Edward's body parts on the paper in the most efficient way, what are the least amount of tag board sheets you will need to build your own Edward? What is the area of the unused sections of tag board? (Do we want them to reference their old sheets, or remind them of the dimensions of each part?) 2 ears = 11 in. x 2 in. Head = 5 in. x 7 in. Torso = 12 in. x 9 in. Legs = 8 in. x 3 in. arms 9 in. x 3 in.

## Third and Fourth Grades

At this level, the book *Gossamer* by Lois Lowry was the idea behind some of the Math Vitamins. *Gossamer* is a story about an ethereal young creature that learns to form dreams to be delivered to humans. The art of Andy Goldsworthy and the architecture of Frank Gehry were inspiration for further explorations of form. Folding paper and exploring surface area were the themes for these explorations.

"You have a gossamer touch." Thin Elderly said. Littlest One let her fingers flutter and linger over more of the woman's objects in the house. "There are photographs. I like those. They're in frames on tables in the parlor." Thin Elderly said "describe touching a photograph"... "Like this" she raised one small hand and touched... Littlest One has touched many items that she wants to replicate back at the Heap like the dice. Choose one of the objects and help Littlest One create a flat paper pattern from centimeter grid paper that would cover the surface of the item. When you are done with your pattern, calculate the area of each rectangle in the pattern. What is the surface area of the entire shape?

Good old Andy Goldsworthy is back at his workshop planning his newest stone creation. At his site there are only two kinds of slate available: short pieces (singles) and long pieces (doubles). He wants to see how many different ways he can construct walls between one and ten units long. "There's only one way to make a single," he says, "because it's just a single stone. But there are TWO ways to make a two." Andy creates a chart and explores all the possible combinations of stones. "There are three ways to make a three: three singles, a single with a double and a double with a single." Help Andy finish his chart. How many ways are there to make each length? Do you notice a pattern?

Frank Gehry uses paper to make architecturally interesting buildings. The problem is that he has VERY helpful assistants who sometimes clean up TOO much: they recycled his new doghouse design! All he can remember is that his doghouse had: 1) a rectangular base 2) a sloped roof and 3) one of the sides had two right angles, an acute angle and an obtuse angle. The rest is up to you to decide! Most of your angles will be right angles, but the sloped roof will take some creativity! Design this in a way that a single sheet of paper

could be folded to make it. All doghouses need to be approved by the permitting office, so make your designs in your math journal for now. What are the side lengths and the total surface area of your design?

## Fourth and Fifth Grades

Reading *The Outcasts of 19 Schuyler Place* by E. L. Konigsburg, fourth and fifth graders began a discussion of the issues associated with revitalizing downtowns or locating your business in the suburban mall. This inspired a ‘Moving Up or Moving Out?’ project, with students designing and building different forms of office buildings, along with many conversations centered on urban sprawl, sustainability, and environmental impacts.

### Office Blocks

Modular offices are made from large cube-shaped units. An environmental company that specializes in “green” materials is constructing small office buildings by connecting together 4 specially prepared units. They have hired you to create a catalog to show off all of the different office configurations that are possible.

Your job is to use connecting cubes to model all of the different structures that could be built with only four cubes (remember that the same arrangement of cubes can sit on the ground in more than one way, each producing a unique office design). You can make overhanging designs but you should make sure that each structure stands on its own.

Record your designs on isometric grid paper.

Next, find the least expensive 4-unit office configuration given the following cost details: A cube costs \$10,000. A cube that needs a foundation (touches the ground) costs an extra \$750. All vertical outside faces of the units must contain a window that costs \$500 each. Prepare a chart showing the costs for each different office configuration so that you can include these in the catalog.

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