

# **SCIS-Pudong Lower School Mathematics Parent Guide**

*Created by SCIS-Pudong Mathematics Committee, 2018*

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## **I. Myths and Facts**

*Adapted from the Canadian Ministry of Education and Ontario District School Boards*

**Myth:** The math my child is learning in school is “new”.

**Facts:** Your child is learning the same math facts and formulas you did—such as  $2 \times 2 = 4$ , and the circumference of a circle is  $2\pi r$ . But the way math is taught has evolved in recent decades. Today's math learning emphasizes the development of understanding of concepts and skills, so that your child is able to apply these confidently in new situations. It also focuses on developing critical thinking, problem solving, and communication skills. Your child is learning some topics and skills that you may not have learned in elementary school. These include data management and probability, and how to use calculators and computers to help model and solve math problems. What your child is learning in math class, and how your child is learning, are equipping your child for success in today's knowledge-based economy and our global world.

**Myth:** Now that we have calculators, students don't need to know how to add, subtract, multiply, and divide, nor do they need to memorize the “math facts” (such as  $7 \times 6 = 42$ ).

**Fact:** Knowing how to add, subtract, multiply, and divide are essential math skills and a major emphasis in the SCIS math curriculum. Automatic recall of math facts is needed in higher-level math. Games where children need to keep track of a score or that require automatic recall of math facts are a fun way to practice. Look for opportunities where your child can develop fluency. It takes time. This is a key area where you can help your child at home, by encouraging lots of practice in a variety of ways.

**Myth:** People who were taught math the old way can't make sense of today's math.

**Fact:** You can learn alongside your child and strengthen your own math skills in the process. Ask your child to explain and show you what the class is learning. Children are great teachers and explaining math concepts and procedures to you will help your child to understand them better. Also, ask your child's teacher for suggestions on how to quickly learn the strategies your child is using.

**Myth:** Children learn math best when the teacher simply shows them how to do it.

**Fact:** Students learn best when they are active participants in the learning process. They learn by participating in conversations, asking questions and being curious and skeptical.

**Myth:** You have to be good at memorizing to be good at math.

**Fact:** It is important for your child to be able to quickly recall math facts. But memorization is only one approach. When your child understands the concepts and procedures involved in number operations, and the relationships between addition, subtraction, multiplication, and division, he/she will find it much easier to remember math facts and learn new ones. Math is more about *thinking* than it is about memorizing.

**A video explaining common core math:**

Why Common Core math problems look so weird: <https://youtu.be/tBkQAxtIJXA>

## **2. Today's Math Classroom**

*Adapted from the Canadian Ministry of Education and Ontario District School Boards*

Students used to spend almost all their time working at their desks, with the teacher at the blackboard and with little discussion. Math classes today look, sound, and feel quite different.

**How and Why it's Different**

If you peeked inside your child's math class, here are some things you would notice:

- students working on their own, in pairs, in small groups, independently and with teacher direction
- students engaged in a wide variety of tasks — practicing skills, solving problems about real-life situations, playing games, and applying math concepts to design challenges
- students using a variety of physical and digital learning tools as they explore math ideas and solve problems
- students using a variety of tools, including paper and pencil, chart paper and markers, and digital devices, to write and record their math thinking
- students talking about connections they have made personally or exploring new math concepts and skills
- students sharing their strategies for solving a problem

Learning math involves understanding concepts and procedures, acquiring skills, and applying math processes. Each of these aspects of learning requires different learning and teaching strategies. As well, individual students learn differently. It's important for students to have opportunities to learn in a variety of ways.

### 3. Helping Your Child Learn Mathematics

*Adapted from the US Department of Education, the Canadian Ministry of Education, and Ontario District School Boards*

What kind of attitude do you have toward math? Do you believe that math skills are important job and life skills? Do you see math as useful in everyday life? Or do you dread doing things that involve math—figuring out how much new carpet you'll need, balancing the checkbook, reading the technical manual that came with the DVD player? How you answer these questions indicates how you may be influencing your child's attitudes toward math—and how he approaches learning math.

Although parents can be a positive force in helping children learn math, they also can undermine their children's math ability and attitudes by saying things such as: "Math is hard," or "I'm not surprised you don't do well in math, I didn't like math either when I was in school," or "I wasn't very good in math and I'm a success, so don't worry about doing well." Although you can't **make** your child like math, you can encourage her to do so, and you can take steps to ensure that she learns to appreciate its value both in her everyday life and in preparing for her future. You might point out to her how fortunate she is to have the opportunity to learn mathematics today—when mathematics knowledge can open the door to so many interesting and exciting possibilities.

In everyday interactions with children, there are many things that parents can do—and do without lecturing or applying pressure—to help children learn to solve problems, to communicate mathematically and to demonstrate reasoning abilities. These skills are fundamental to learning mathematics.

Let's look closely at what it means to be a problem solver, to communicate mathematically and to demonstrate mathematical reasoning ability.

**A problem solver** is someone who questions, finds, investigates and explores solutions to problems; demonstrates the ability to stick with a problem to find a solution; understands that there may be different ways to arrive at an answer; and applies math successfully to everyday situations. You can encourage your child to be a good problem solver by including him in routine activities that involve math—for example, measuring, weighing, figuring costs and comparing prices of things he wants to buy.

**To communicate mathematically** means to use mathematical language, numbers, charts or symbols to explain things and to explain the reasoning for solving a problem in a certain way, rather than just giving the answer. It also means careful listening to understand others' ways of thinking and reasoning. You can help your child learn to communicate mathematically by asking her to explain what she must do to solve a math problem or how she arrived at her answer. You could ask your child to draw a picture or diagram to show how she arrived at the answer.

**Mathematical reasoning ability** means thinking logically, being able to see similarities and differences in objects or problems, making choices based on those differences and thinking about relationships among things. You can encourage your child's mathematical reasoning ability by talking frequently with him about these thought processes.

#### Some Important Things Your Child Needs to Know About Mathematics

You can help your child learn math by offering her insights into how to approach math. She will develop more confidence in her math ability if she understands the following points:

##### 1. Problems Can Be Solved in Different Ways.

Although most math problems have only one answer, there may be many ways to get to that answer. Learning math is more than finding the correct answer; it's also a process of solving problems and applying what you've learned to new problems.

## 2. **Wrong Answers Sometimes Can Be Useful.**

Accuracy is always important in math. However, sometimes you can use a wrong answer to help your child figure out why she made a mistake. Analyzing wrong answers can help your child to understand the concepts underlying the problem and to learn to apply reasoning skills to arrive at the correct answer. Ask your child to explain how she solved a math problem. Her explanation might help you discover if she needs help with number skills, such as addition, subtraction, multiplication and division, or with the concepts involved in solving the problem.

## 3. **Take Risks!**

Help your child to be a risk taker. Help him see the value of trying to solve a problem, even if it's difficult. Give your child time to explore different approaches to solving a difficult problem. As he works, encourage him to talk about what he is thinking. This will help him to strengthen math skills and to become an independent thinker and problem solver.

## 4. **Being Able to Do Mathematics in Your Head Is Important.**

Mathematics isn't restricted to pencil and paper activities. Doing math "in your head" (mental math) is a valuable skill that comes in handy as we make quick calculations of costs in stores, restaurants or gas stations. Let your child know that by using mental math, her math skills will become stronger.

## 5. **It's Sometimes OK to Use a Calculator to Solve Mathematics Problems.**

It's OK to use calculators to solve math problems—sometimes. They are widely used today and knowing how to use them correctly is important. The idea is for your child not to fall back on the excuse, "I don't need to know math—I've got a calculator." Let your child know that to use calculators correctly and most efficiently, she will need a strong grounding in math operations—otherwise, how will she know whether the answer she sees displayed is reasonable!

## **What Parents Can Do to Help their Child with Mathematics**

*Listen to your child's thinking and ask questions*

- Why do you think that?
- Can you explain how you got that?
- How do you know?
- Does your answer make sense?
- Can you solve it a different way?
- What information are you given? What are you asked to find?
- What is happening in the problem? Can you draw a picture of the situation to help you solve it? What other ways could you represent the problem? (e.g., make a model, act it out, write a number sentence or equation, organize the data in a table, etc.)
- What do you know by looking at the diagram?
- What strategies have you used before that you might try here?
- Is there another way you might have solved this problem?

*Notice/reinforce strategies used at school*

- Don't tell your child a strategy. The strategy will come with understanding and practice. If your child is stuck, help them make sense of the problem by asking questions.
- Ask your child word problems as they come up in everyday life.
- Always ask, "WHY?"

*Encourage your child to always check the accuracy of his/her work*

- By checking, your child will practice skills, build understanding, and become more self-reliant.
- Ask your child to explain why the solution is correct or incorrect.

*Talk aloud as you solve everyday problems of all kinds*

- Discuss alternative approaches and solutions with your child.
- Modeling how to solve a problem with your child will give your child more ideas and strategies.

## **4. Resources**

Websites to support at home:

<https://nzmaths.co.nz/families>

[http://figurethis.nctm.org/fc/family\\_corner\\_math.htm](http://figurethis.nctm.org/fc/family_corner_math.htm)

<http://bedtimemath.org/bedtime-math-for-families/>

<https://www.khanacademy.org/signup?isparent=1>

<http://www.dreambox.com/>

<https://www.freckle.com/math/>

Note on IXL: We are not providing subscriptions to IXL as it does not align with our SCIS-Pudong Mathematics Philosophy of conceptual-based teaching. However, if a parent would like to purchase a subscription, they are welcome to do so understanding that it is not supported by the SCIS-Pudong Mathematics Committee.

## **5. SCIS-Pudong Mathematics Philosophy**

At SCIS-Pudong, we believe students need challenging and authentic learning experiences in which they take risks and apply their mathematical knowledge in real world contexts. Therefore, the Lower School Mathematics program provides constructive opportunities for students to be challenged and supported to think deeply about and reflect upon the problems they are solving. Our program supports the development of 21<sup>st</sup> century skills, as students are continually encouraged to explore, extend, explain and evaluate their mathematical thinking through open-ended problem solving and questioning. Students are expected to use a variety of strategies and justify their answers explaining the processes they used. Through a differentiated, inquiry-based, student-centered workshop approach, students of all levels and abilities are engaged, supported and challenged.

The aims of our Mathematics program are to present opportunities and learning experiences for students to learn subject specific skills, as well as make interdisciplinary connections. Students will develop a deep understanding of the academic vocabulary needed to talk about mathematics and to fluently communicate mathematical ideas. This includes the use of a variety of numerical, visual, written and oral representations. Additionally, students are encouraged to participate in ongoing collaboration while refining and questioning each other's thinking and understanding.

Within the mathematics program students focus specifically on the development of conceptual understanding, procedural literacy and problem solving. In the Lower School, Mathematics is imbedded into the Primary Years Programme (PYP) units of inquiry, as well as taught in a subject specific context. In addition to the IB Learner Profile attributes, the five essential elements of the PYP including: knowledge concepts, skills, attitudes and action inform planning, teaching and assessing of mathematics throughout the Lower School. SCIS teachers seek to provide opportunities for all students to have access to the highest quality mathematics teaching and learning.

## **6. SCIS-Pudong Mathematics Standards**

The Lower School Mathematics Program at SCIS is based on the Common Core State Standards developed by the Common Core State Standards Initiative. Grade level specific objectives guide the Mathematics curriculum in effort to provide students with the mathematical knowledge and understanding necessary to be successful in the 21<sup>st</sup> century. Additionally, keeping in line with the philosophy of the Primary Years Programme, the mathematics curriculum at SCIS is driven by concepts and skills, as a means to achieve subject specific objectives. Therefore, the curriculum is divided into process standards, as well as content specific standards. The Content Standards outline the big mathematical ideas that all students should know and be able to do at each grade level. The Process Standards allow students an opportunity to apply thinking skills such as acquisition of new knowledge, comprehension, application, analysis, synthesis, evaluation, dialectical thought and metacognition. There is a critical relationship between the Process and Content Standards and it is the combination of these two standards that will give students mathematical power. Neither will develop mathematically proficient students when used in isolation. SCIS teachers are expected to use instructional practices that provide opportunities for students to experience both Process and Content Standards on a regular basis. Teachers will develop assessments that evaluate student understanding and mastery of both content and process standards.