Dear Parents and Caregivers:

As we continue our implementation of the new Indiana Academic Standards, you may notice some changes to instruction and testing. If students meet these new, rigorous high standards, they will have better career choices in their lives, and the nation will be more competitive in today's global economy. You are an essential partner in the education of your child and your support is appreciated. You can find the National PTA's Parents' Guides to Student Success at http://pta.org/parents/content.cfm?ItemNumber=2583&RDtoken=12597&userID=. Although Indiana is one of 5 states that did not adopt the Common Core standards, this resource also applies to our curriculum.

A New Emphasis

For students, one of the standards' most important new requirements is that correct answers alone will not be enough. Correct answers are very important, but along with them there is a new set of "mathematical practices" that teachers will expect from students. This is part of their preparation for 21st century jobs. This letter is about these mathematical practices.

Mathematical Practices

In today's environment, there are "habits of mind" that students need to develop and use when they employ math strategies, talk about the math they are learning, and solve problems. These practices help them learn the content and describe how students should be able to use the mathematics they learn in the world. These skills are important to employers who want to hire people who can solve problems and make sense of things. These are the eight Standards for Mathematical Practice.

Parent support: Encourage your child to think back to what has been learned. Did he/she solve similar problems before? Urge your student to keep trying, to consult a classmate, or to look for help online to make sense of the problem.

1. Make sense of problems and persevere in solving them.

There are several important behaviors to look for to meet this standard. Students should not give up if a problem is unfamiliar or hard! They search their memories for a similar problem or for what they already learned that might help. They explain the problem to themselves and try to visualize it. If one strategy does not work, they try another.

Parent support: Encourage your child to think back to what has been learned. Did he/she solve similar problems before? Urge your student to keep trying, to consult a classmate, or to look for help online to make sense of the problem.

2. Reason abstractly and quantitatively.

When students "reason quantitatively" they use tools to help them make sense. They may create a model with objects or use a model to explain their thinking. They may make a chart or a table to figure out what is happening. Students must also be able to think

logically about the numbers and symbols in the problem. To do this, they need to know what each symbol stands for and how they are all related. If students are working on a word problem, they should be able to represent it with an expression or an equation. If they are working on a numbers-only problem, students should be able to think of a situation the numbers could represent.

Parent support: Ask questions such as, have you tried to draw a picture of the problem? How does the picture show what the words in the problem mean? Does it help you see what you could do to get an answer?

3. Construct viable arguments and critique the reasoning of others.

Students are expected to be able to make and defend a mathematical point. Why would doing this help us get the answer? They justify their conclusions, are able to communicate to others what they think and why they think that. They also must be good listeners so they are able to follow other students' reasoning about solving a problem and be able to say whether that reasoning makes sense to them or leaves questions. Mathematical argument is not like an everyday argument. It is based on mathematical points.

Parent support: Ask your children whether they can explain their work to you. It will give them practice communicating and clarifying their thoughts. Do not be afraid to ask them to clarify what they say.

4. Model with mathematics.

Students are able to apply the mathematics they know to a real life situation. They might apply proportional reasoning to help plan a dinner or party or analyze a problem in the community. They know which are the important quantities in a situation and can set up a mathematical problem or equation to get an answer. They should then return to the question and explain what their answer means in the situation.

5. Use appropriate tools strategically.

Students have a number of tools at their disposal to help with mathematics. They can use drawings, tables, charts, graphs, and/or words to help them find solutions. They should consider which tool might best show others what they want them to understand. While a table might be a good way for a chef to see the amounts of recipe ingredients needed for different size groups, a graph is a better representation for the public to see the rise or decline of crime or homelessness. Some tools can get you to a correct answer but are very tedious. Students should look for efficient tools.

6. Attend to precision.

Students should be precise (a) in their communication so others understand what they mean; (b) in their calculations; and (c) in their explanations of what the work or data they

are presenting means. They should use the precise language of mathematics, use terms accurately, and label their work with care.

7. Look for and make use of structure.

Students should look closely at a problem to figure out if there is a pattern or structure that will help them. Mathematical structures include the number sequence, the place value system, properties of operations, and patterns that can be generalized, such as the formulas for finding area or the inverse relationships of addition and subtraction and of multiplication and division. They may ask themselves, "Would making parallel lines help with a geometry problem?", "Are these all square numbers?", "What do I know about equivalence that could help me with this fraction problem?".

8. Look for and express regularity in repeated reasoning.

This is closely related to the last practice. Students look for results that happen over and over again and decide that there is a repeated decimal or figure out how to generalize a shortcut. They can recognize similarities and patterns that emerge in repeated trials.

Resources:

- mathforum.org/students
- http://www.ixl.com
- https://www.illustrativemathematics.org