

Tutor Handbook

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How to be a Good Tutor

Understand and Uphold Expectations for the Student

- Actively participate
- Bring relevant materials including textbook, the syllabus, notes from class, past assignments and tests
- Attend class
- Take notes
- Read the necessary assignments
- Attempt homework problems

Use Knowledge with Empathy, Honesty, and Fun Help Students Become Independent Learners

- Encourage independence – the student needs to put forth an effort
- Encourage the student to take responsibility for his education
 - Attend class, take notes, read the necessary assignments, and attempt homework problems
 - Bring textbook, syllabus, notes from class, past assignments, and tests to sessions
- You should not be a crutch to the student
- Do NOT do the student's work for him. You can provide sample problems to work as examples, but the actual work should be completed by the student. Help him generate his own ideas and answers.
- There are often multiple ways to work a problem. Help the student find the most effective way for him to work out answers to the question.
- Encourage the student to follow his intuition. Build confidence and self-esteem so that he will not doubt his ability.

Develop Learning Relationships and Effective Teaching Strategies

- Don't complicate the system already in motion in the classroom. Build good relationships with the other staff and with the students you are serving. Build your own unique approach to tutoring based upon the needs you assess from the situation.
 - Formally introduce yourself to the teachers, administrators, and other support staff.
 - Make sure the teachers, whose students you will be serving, know that you welcome their input.
 - Try to get to know your student right away. It is good to spend some time getting to know his or her interests and hobbies before jumping right into the tutoring session, because it demonstrates that you truly care about that

student as an individual. If your student does not respond to your questions, offer some information about yourself to put him at ease.

- When you are beginning, plan activities in which the student will definitely succeed. This builds confidence.
- Construct a goal list with your student. He'll be more enthusiastic if he is working toward goals in which he has input.
- Make sure your student knows your name.
- It may also be effective to introduce yourself to the student's family through a letter to his home.
- You are not expected to know all the answers to every question all the time, and you are not the curer of all academic ailments. If a student has procrastinated, cram sessions with you won't produce great results.

Be an Effective Teacher

- Start with the basics. Don't assume a student knows the fundamentals. Games are a good way to make learning basics more fun.
- Don't do the work for the student. Be sure you know how much tutor help is allowed on each assignment.
- Be kind but firm. The student needs to know you are in charge.
- Each student learns in a different way and at a different pace. Form your teaching strategies accordingly.
- Be creative and imaginative.
- Reduce distractions as much as possible.
- Plan more activities than necessary. It's better to run out of time rather than things to do.
- Ask questions that make the student think. Don't just try to get immediate answers.
- Give clear instructions. If necessary, break the assignment into smaller tasks.
- Have the student explain his work. This makes flaws in logic apparent.
- Be a good listener. This will allow you to understand the student's needs.
- Allow for periods of silence. It allows the student time to consider the topic before moving on.
- Talk to the student on his/her level. Be age appropriate.
- Keep explanations simple, and try to teach the same way as the class instructor, so as to not confuse the student.
- After successfully explaining how to complete a certain task, disengage. Allow the student to work on the next task so that he will develop the ability to apply what he is learning independently.
- Journal – make notes of activities and progress at each session
- Be a good coach – provide positive feedback for good behavior and constructive feedback to modify negative behavior.

- End the session well
 - Give a positive assessment of the session
 - Give assignments when necessary, and be sure to schedule the next session
 - Always end with a positive comment

Be a Good Listener

- Give your full attention.
- Use nonverbal communication to express that you are listening (i.e. eye contact and body language).
- Paraphrase: summarize what the student says in your own words to make sure you understand what you are being told (ex. “It seems to me what you are saying is...”).
- Use good questions.
 - Closed-ended questions lead to “yes” or “no” answers (i.e. “Did you finish last week’s homework?”). These work well when you are short on time or are attending to many students at once.
 - Open-ended questions lead to more explanation and cannot be answered with “yes” or “no” responses (ex. “Where do you think you should start on this problem?”). These questions require more thinking and will reveal the student’s strengths and weaknesses in the particular area of study.
 - Do not use questions such as “Do you understand?” Rather, make the student demonstrate his understanding, or lack thereof, by working out another problem.
 - Silence is not a problem. If a student does not answer your question immediately, don’t answer it for him, but allow him time to think.
 - Think only about what the student is saying while he is talking. Don’t prepare what to say next until you have truly listened to what he has to say.

Express Empathy and a Desire to Help Others

- Get to know your student’s emotional, academic, and social needs.

Keep an Open mind

Take Initiative

Express Constant Enthusiasm

- Greet your student in a positive way.
- Your positive outlook on the subject will rub off on the student.
- Be engaged in the session. If you seem uninterested or disconnected, the students may adopt your attitude or feel unable to ask you for help.
- Always begin and end the session on a positive note.

Be Encouraging and Supportive

- Encourage students to ask questions and explore interests. Reassure students that making mistakes and/or asking questions is okay.
- Don't preach. Students react better to someone who is a confidant better than someone who is judgmental.
- Create a safe environment. The shyest student should feel comfortable asking questions, even in group settings.
- Give positive feedback, and reward the student's progress.
- Make your student feel good about himself and his accomplishments.
- Have your student create a notebook to hold all of his notes, worksheets, scrap paper, and assessments. Have the student record his accomplishments at each session.
 - This allows the student to see his own progress.
 - For elementary students, use stars and stickers to encourage positive behavior and reward academic progress.
 - This notebook can be a way to share the student's progress with his parents and teachers.

Build Trust

- Take time to learn about your student, and be willing to share yourself with him. This will make him feel more comfortable opening up to you about the subject, school in general, or even issues outside the topic at hand.
- Maintain regular contact with your student, and be consistent! Trust depends on it.
- Showing belief in the student's abilities will not only build his confidence, it will also create trust.
- Do not be physically or emotionally threatening.
- Respect diversity in backgrounds and belief systems.

Be Reliable

- Be punctual
- Be prepared
 - Know what is expected of you as a tutor.
 - Make sure you know the material that you will be covering. This may mean extra work before the tutoring session.
 - Be prepared for the coming session, but also be prepared to connect the past session with the present. Follow up on the goals you set with the student in the last session. This demonstrates to the student that you care about his success.
 - Some good tools to have and use at tutoring sessions: note cards, colored pencils, markers, calculator, protractor, graphing paper, enrichment ideas that pertain to the current content, book of puzzles, and brain teasers

- Organized
 - Students need structure!

Exhibit Patience and Maintain an Even Disposition

- The only stupid question is one that is not asked.
- Be prepared to answer questions and explain lessons more than once
- Tutoring can be frustrating, but anger has no place in this setting. A positive environment is crucial.

Have a Sense of Humor

- Be able to “lighten up” the situation
- When working with students, you need to be flexible and relaxed.
- Students react well to humor, and are more likely to engage in a tutoring session that is not boring!

Show Respect

- Harassment in any form will not be tolerated.
- Don’t judge a person’s intellect or ability based upon his appearance or age.
- Give the student your undivided attention.
- Be accepting. There will likely be differences between your background and beliefs and that of the student. Respect these differences.

Be a Role Model

- Tutors should be positive examples of the values and ethics of the school.
- Tutors should also be positive examples of respect for other people, enthusiasm for learning, strong work ethic, and a positive attitude!
- Teach through personal experience.
- Respect yourself and strive toward your goals. The student will respect you and want to emulate this behavior.

Learn to be a Good Motivator

- Challenge the student to reach his potential, rather than just getting by.
- Use encouragement, support, and rewards for positive behavior. Constant positive feedback is an excellent motivator for students.
- Create an open environment.
- Give clear expectations.
- Give students assignments that are neither too simple, nor too difficult. Give them a reasonable challenge, and expect them to achieve it. Increase difficulty as time progresses.
- Emphasize learning over grades.
- Help students find personal value and meaning in their school work.

- Students crave boundaries. By being prepared with organized, well-thought-out lessons, you can motivate students to learn.
- Learn what needs your student is attempting to address by coming to the tutoring session. Address those needs in your lesson plans.
- Make sure the student is taking an active role. Don't tell him something when you could help him come to the same conclusion by asking a question.
- Use variety. Don't do the same activity every session. This will cause the student to become uninterested.
- Avoid creating competition amongst students. This creates anxiety.
- Do NOT give in to a student's pleas for answers to his homework. If you are a constant crutch, the student will not be motivated to learn.
 - Ask the student for a possible approach to the problem.
 - Ask him to build on what he knows about the problem.
 - Praise the student for each independent step he takes.

Have Confidence

- Overcome your personal anxieties.
 - You are very valuable. Your purpose in helping the student is sure.
 - Knowing the subject will help you feel comfortable assisting the student.

Humility and honesty

- It's okay not to know an answer. Ask questions. Ask for help.

Professional

- Follow school dress codes, rules, and policies.
- Dress for success.
- Exhibit maturity.
- Use appropriate language (do NOT use curse words, slang words, or crude language).
- Maintain confidentiality – personal information such as medical conditions, handicaps, and test scores should remain between you and the student.
- Show an attitude of compassion, respect, responsibility for your actions, and acceptance of differences.
- Show respect for yourself and others. Be fair and consistent.
- Exhibit credibility through knowledge of the field, by using effective communication, and by doing what is right rather than what is easy.
- Exhibit integrity!
- THINK before you act or speak.
- Be cooperative and use teamwork.

Dealing with Challenging Scenarios

The best way to avoid difficult scenarios is to address them directly and as early as possible. Consequences to the group and individuals should be made clear. Should these behaviors occur, the tutor should address them in a timely manner with the student(s) individually.

There are several types of student behaviors that may have negative impact on the success of the tutor session.

- **Unprepared** – individuals (tutor or student) are unprepared for the session.
 - *Suggestions for Tutor:*
 - The tutor should meet with the student and indicate that being unprepared is unsatisfactory behavior.
 - The tutor can keep weekly notes on students to track phase participation.
- **Under-prepared** – individuals (tutor or student) are only partially prepared for tutor session. Often this presents as a strong effort before break and a struggle after break.
 - *Suggestions for Tutor:*
 - The tutor can bring this to the table as unsatisfactory behavior.
 - Being under-prepared may be an issue of insufficient preparation, inadequate depth of preparation, preparation on different topics, or inadequate generation of issues. The tutor and student should identify the issue and decide how to avoid this problem in the future.
- **Under-participation** – student(s) do not participate or participate in an insignificant way.
 - *Suggestions for Tutor:*
 - The tutor should meet with the student and indicate that meaningful participation is required for a successful tutor session outcome. The tutor may need to suggest ways the student(s) are able to better participate.
- **Disruptions** – activities or behaviors that decrease the effectiveness of group progress.
 - *Suggestions for Tutor:*
 - Sidebar conversations
 - The tutor, or a group member, should bring the discussions back to the topic.
 - Non-content related material is best discussed at the beginning of group or just after break when everyone is settling in and getting ready to start.

- Cell phones and pagers
 - These should be for emergencies only.
 - These should be on “vibrate” only or left with a secretary or other person not in group.
- Personality issues
 - The tutor should meet with the students involved and address the professional behavior expected during group.
- **Distractions** – activities or behaviors that are less severe than disruptions and may affect only one or a few group members.
 - *Suggestions for Tutor:*
 - Tardiness
 - If a student is repeatedly late, the tutor should address this with the student as an unsatisfactory behavior.
 - Individual behaviors such as dress, feet on table, noises, comments
 - The tutor and group should agree on what kind of attire is appropriate for group.
 - The tutor may request feet not be on the table during group.
 - The tutor may counter particular comments by requesting that unprofessional or inappropriate comments be restrained.

The National Tutoring Association Code of Ethics

1. I understand that my role as a tutor is to never do a student's work for him or her.
2. I will give honest feedback to the student I serve and will not insult my student with false hope or empty flattery; I will always demonstrate faith in my student's learning abilities.
3. I understand my relationship to the student is professional and not personal.
4. I will show respect for my student's cultural background and personal value system.
5. I recognize that I may not have all the answers to student's specific questions. In this event, I will seek assistance in finding answers to the student's questions and/or direct the student to an appropriate resource for the information.
6. I will maintain accurate records of tutoring sessions as expected and required.
7. I will respect my student's personal dignity at all times.
8. I will be on time for tutoring appointments, not only out of courtesy, but to be a good example for my students to follow.
9. I will keep all information about the student whom I am assigned confidential.
10. I understand that my ultimate goal is to assist my student in learning how he or she best learns and to help my student develop the skills to achieve his or her best, most efficient learning.
11. I will share any concerns with my supervisor.
12. I will expect to learn along with my student.

13. I will keep current in both subject area(s) and learning methodologies.
14. I will remain flexible to my approach to student learning, respectful of the various learning styles.
15. I will share techniques for improved study skills with my students.



ABOUT STEM CLUB

Vision Statement

The vision of STEM Club is to mold the minds of today for careers in the fields of Science, Technology, Engineering, and Mathematics for tomorrow. We will develop, train, and orient our mentors, tutors, and volunteers to rise up and exceed state educational standards in the classroom.

Mission Statement

To promote the careers of Science, Technology, Engineering, and Mathematics in the public school system.

To entertain students with educational offerings that provide fun learning opportunities.

To constantly strive to increase the awareness of STEM careers while surpassing the expectations of state standards of education.

To involve successful college students in the lives of public school students as positive role models.

Are you looking for a job where you can serve in the surrounding community while working around your busy schedule? If so, being a STEM Club Tutor might be right for you!

We hire both work-study and non-work-study students. Our tutoring program works with the Honors program as leadership related experiential learning, with optional transcript credit. Additionally, there is an opportunity for a \$1000 scholarship with the GrowIndiana AmeriCorps program.

Each tutor will work at one of the 22 schools served by STEM Club, and will commit between eight and twenty hours each week. Each tutor's schedule will be set and will be determined by availability, site needs, and desired scheduling. Additionally, each tutor will automatically be a member of the STEM Club Student Organization.

Qualifications

To work in the STEM Club program, you must have a GPA of 2.5 or higher. A solid understanding of basic math functions is a necessity, and prior experience working with youth or in a community-based setting is preferred.

The ideal STEM Club Tutor works well with a team of other staff members, has excellent communication skills amongst a wide variety of people, as he will be working with children from economically and socially diverse backgrounds. This person is punctual, responsible, and flexible. Because this person works with younger students, it is imperative that he be patient, empathetic, and willing to try new ways of learning.

Duties

As a STEM Club Tutor, you will be required to fulfill the following responsibilities:

- Attend Initial program orientation at the school. There is the possibility of additional paid special activity training sessions.
- Coordinate activities with site team, attend workshops, and submit paperwork in a timely manner.
- Plan and implement enrichment activities under the direction of a Site Coordinator. Assist program teaching staff with homework help and/or tutoring as needed.
- Provide one-on-one or group math coaching to students designated by the Site Coordinator.
- Help maintain site orderliness, and perform other duties as assigned.

Supervision

STEM Club Tutors should be able to complete the necessary tasks with minimal supervision. Direct supervision will be provided by the Site Coordinator. Scheduling



and payroll, on the other hand, will be conducted by the IUPUI STEM Club Coordinators.

Compensation

Wages are competitive and will be based upon experience.

Contact

If you need further information or would like to apply to the STEM Club program, please visit the STEM Club website, <https://stemclub.usg.iupui.edu/>. You may also email us at stemclub@iupui.edu.



Websites

Information about STEM Club, resources, training materials, and manual materials are available at <https://stemclub.usg.iupui.edu/>.

STEM Club fully supports the organization I-STEM Resource Network. I-STEM Resource Network provides a plethora of information that can be used in lesson plans. For more information visit <http://www.istemnetwork.org>.

Additional information about supporting hands-on science activities in the classroom can be obtained from Indiana's Department of Natural Resources. Those interested in learning more about the possibilities of bringing nature to the classroom should visit <http://www.in.gov/dnr/>.

STEM Club Student Organization

STEM Club expansion into IUPUI student organizations will allow for social activities for members in appreciation of activities and an opportunity for leadership experience.

STEM Club Tutors will automatically be counted as members in the organization. Elections for leadership positions will be held in the fall and again in the spring for the following year. Positions include group coordinator, secretary, treasurer, and committee chairs.

Organizational Leadership and Supervision Class

STEM Club Tutors who desire to receive academic credit for tutoring/mentoring and leadership are encouraged to enroll in OLS 399 and OLS 373. These classes are developed to encourage service-learning and leadership in educational institutions. Classroom material will directly relate to the position and will compliment member experience.

POLICY AND PROCEDURES

Emergency Management

An emergency can be defined by an event that disrupts daily procedure in such a way that may cause severe alarm. In the case of an emergency, it is the duty of the mentor to stay calm, follow instructions, and assist in the immediate needs of those involved.

Child Abuse

If a child makes comments, suggestions, or leads to the idea of some mental or physical harm to himself or a sibling, it is the responsibility of the tutor to report the incident. Attempt to retain as much detail when reporting the conversation to the Site Coordinator. The Site Coordinator will take the information to the school principal who will, in turn, report it to proper authorities. The tutor will in many regards be brought in for more questions.

Tutors are required by law to report incidents of child abuse to their Site Coordinators.

Incident Reporting

In the event that a conflict, harassment, or other disruptive sequence occurs, it is the responsibility of the tutor to acquire as many details as possible. By retaining and reporting the details of the event to the Site Coordinator, the tutor will help accurately maintain a safe and healthy environment.

Confidentiality

All knowledge of students at a tutor's designated school shall remain confidential. Any personal information acquired about students should not be made public knowledge. Names and information regarding the students' background should not be discussed off school grounds.

Health and Safety

Under no circumstances are the following permitted within the school premises: firearms, deadly weapons, tobacco products, alcohol, illegal drugs, and explosive devices.

In the event that a tutor is ill and cannot fulfill his job, he must report the coming absence to the Site Coordinator in a timely fashion.

All tutors and students have a right to learn and work in an environment free of sexual harassment, race/color harassment, religious (creed) harassment, national origin harassment, and disability harassment. Any individual that partakes in disrupting the program with harassment will be reviewed for termination.

Dress Code

Tutors are expected to observe standards of common decency in their dress. Tutors shall not wear shirts or apparel that advertise alcohol, sex, racism, tobacco, drugs, weapons, etc. No head coverings are permitted within the building.

Professionalism in the Workplace

Expectations

STEM Club expects that tutors will abide by professional etiquette while working at their designated schools. Below are some, but not all, examples of professional etiquette.

Appropriate behavior

STEM Club Tutors shall maintain a professional attitude in the work place and act as role models for students. We ask that STEM Club Tutors hold themselves to higher standards. Although there are opportunities to interact, socialize, and have fun with the students, we expect a level of maturity.

*Inappropriate behavior will not be tolerated.

Cell phone

In the event that you are expecting an important phone call, it is within reason to have your cell phone turned on. An example of such a situation would be a family member having surgery. In all other occasions your cell phone should be on silent and remain in your pocket or purse. Looking at your cell phone during the work hour is a show of disrespect to the other staff as well as the students you are working with.

Attendance

Individuals are set with a particular work schedule. It is each tutor's responsibility to attend work on those scheduled days. If an absence is necessary, it is the individual's duty to inform the Site Coordinator of his coming absence. It is preferred to give Site Coordinators a week of notice for the expected absence.

IUPUI Academic Schedule

Fall 2010

Mon	Aug 23	Weekday classes officially begin
Mon	Sep 06	Labor Day Holiday (no classes - Academic and Administrative Offices closed)
Sun	Oct 17	Middle of term
Mon	Oct 18 – Oct 19	Fall Break
Wed	Nov 24	Thanksgiving recess begins (no classes)
Sun	Nov 28	Thanksgiving recess ends (no classes)
Mon	Dec 13	Classes end
Fri	Dec 10 – 18	Final Examinations
Mon	Dec 20	Finals end for weekday classes
Wed	Dec 22	Faculty deadline for submitting Fall 2010 grades
Mon	Dec 27	Fall grades available in OneStart
Mon	Dec 27	Transcripts with Fall grades available

Spring Semester 2011

Mon	Jan 10	Classes begin
Mon	Jan 17	MLK Day (no classes)
Mon	Mar 14	Spring Break
Mon	Mar 21	Classes resume
Mon	May 2	Last day of classes
Tues	May 3 – May 8	Finals Examinations

Summer 2011

Wed	May 11	Classes begin
Mon	May 30	Memorial Day (no classes)
Wed	June 22	Classes end
Mon	June 27	Classes begin
Mon	July 4	Independence Day (no classes)
Mon	Aug 8	Classes end



Fall 2010 Payroll Schedule for STEM Club

Pay Period Begin Date	Pay Period End Date	Check Date
7.25.2010	8.7.2010	8.20.2010
8.8.2010	8.21.2010	9.3.2010
8.22.2010	9.4.2010	9.17.2010
9.5.2010	9.18.2010	10.1.2010
9.19.2010	10.2.2010	10.15.2010
10.3.2010	10.16.2010	10.29.2010
10.17.2010	10.30.2010	11.12.2010
10.31.2010	11.13.2010	11.24.2010
11.14.2010	11.27.2010	12.10.2010
11.28.2010	12.11.2010	12.23.2010
12.12.2010	12.25.2010	1.7.2011

Metropolitan School District of Washington Township Policies

Tobacco Use Prohibited

The Board of Education recognizes that the use of tobacco presents a health hazard, which can have serious consequences both for the user and the nonuser and is, therefore, of concern to the Board (POLICY 8455). For purposes of this policy, “tobacco” shall mean all tobacco products including cigars, cigarettes, pipes, snuff, chewing tobacco, or any product made from tobacco whether for smoking, chewing or both, or any other matter or substance that contains tobacco.

To protect students, faculty, staff, patrons, visitors, and others who choose not to use tobacco from an environment offensive or hazardous to them, and because the Board cannot condone the use of tobacco, the Board prohibits the use of tobacco by all person in and on all property owned and/or leased by the District at all times. This prohibition includes all District buildings, grounds, and vehicles, personally owned and leased vehicles, and business vehicles while on District property.

Human Relations

The Washington Township School Community believes it is the duty of the school to provide and maintain an atmosphere of caring and support that will nurture talents, promote dignity, and give equal access to opportunities for all. Every member of this community, including the Board of Education, administrators, faculty, staff, students, parents, and patrons, has the right to receive and the responsibility to treat others with courtesy, honesty, fairness, and respect. Commitment and adherence to these ideals is the cornerstone of good human relations that will empower all to achieve their maximum potential as productive members of society.

Drug-Free and Alcohol Free Workplace

The School District is committed to providing a drug-free workplace and we expect the cooperation of all employees and a similar commitment from them. Pursuant to the Drug-Free Workplace Act of 1988 and the Drug Free Schools and Communities Act Amendments of 1989, the unlawful manufacture, distribution, dispensation, possession, being under the influence of or use of any narcotic drug, hallucinogenic drug, amphetamine, barbiturate, marijuana, anabolic steroid, alcoholic beverage, intoxicant of any kind, any controlled substance as defined under Federal or State law, or any substance represented by any one of the above in the "School District location" is prohibited. Any employee who violates the above rule may be subject to discipline, up to and including termination. As a condition of employment, all employees must abide by this rule.

"School District location" means in any school building and on any school premises; on any school owned vehicle or in any other school approved vehicle used to transport

students to and from school or school activities; of school property at any school sponsored or school approved activity, event, or function, such as a field trip or athletic event, where students are under the jurisdiction of the School District; or during any period of time such employee is supervising students on behalf of the School District or otherwise engaged in School District business.

Dangerous/Deadly Weapons

The Board of Education will not tolerate the possession of weapons, bombs, devices, instruments, materials, or substances animate or inanimate that is used for or are readily capable of causing death or bodily injury by any staff member while on District property, at a school-sponsored event, or on a school vehicle. This includes bringing weapons onto school property in a staff member's vehicle.

Any staff member found possessing a weapon or other device designed to inflict serious bodily harm on District premises, a school vehicle, or on property being used by the District for school purposes may be charged with a felony. This restriction applies to staff members licensed to possess firearms unless serving as a law enforcement officer or a security officer.

Staff members shall report knowledge of dangerous weapons and/or threats of violence by students, staff members, or visitors to the principal or Chief of Security. Failure to report such knowledge may subject the staff member to discipline. A weapon may be brought onto District property for educational purposes under controlled circumstances when authorized by the Superintendent.

Anti-Harassment

It is the policy of the Board of Education to maintain an education and work environment which is free from all forms of unlawful harassment, including sexual harassment. This commitment applies to all District operations, programs, and activities. All students, administrators, teachers, staff, and all other school personnel share responsibility for avoiding, discouraging, and reporting any form of unlawful harassment. This policy applies to unlawful conduct occurring on school property, or at another location if such conduct occurs during an activity sponsored by the District, or if the activity occurs between an employee of the District and a student of the District.

The Board will vigorously enforce its prohibition against harassment based on sex, race, color, national origin, religion, disability, or any other unlawful basis, and encourages those within the District community as well as third parties who feel aggrieved to seek assistance to rectify the problems. The District will investigate all allegations of harassment and in those cases where unlawful harassment is substantiated; the District will take immediate steps to end the harassment. Individuals who are found to have engaged in unlawful harassment will be subject to appropriate disciplinary action.

For purposes of this policy, "District community" means students, administrators, teachers, staff, and all other school personnel, include Board members, agents,

volunteers, contractors, or other persons subject to the control and supervision of the Board.

For purposes of this policy, "third parties" include, but are not limited to, guests and/or visitors on District property (e.g., visiting speakers, participants on opposing athletic teams, parents), vendors doing business with, or seeking to do business with, the Board, and other individuals who come in contact with members of the District community at school-related events/activities (whether on or off District property).

Sexual Harassment

Pursuant to Title VII of the Civil Rights Act of 1964 and Title IX of the Educational Amendments of 1972, "sexual harassment" is defined as:

Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature, when:

- A. Submission to such conduct is made either implicitly or explicitly a term or condition of an individual's employment, or status in a class, educational program, or activity;
- B. Submission or rejection of such conduct by an individual is used as the basis for employment or educational decisions affecting such individual;
- C. Such conduct has the purpose or effect of interfering with the individual's work or educational performance; of creating an intimidating, hostile, or offensive working, and/or learning environment; or of interfering with one's ability to participate in or benefit from a class or an educational program or activity.

Sexual harassment may involve the behavior of a person of either gender against a person of the same or opposite gender. Prohibited acts that constitute sexual harassment may take a variety of forms. Examples of the kinds of conduct that may constitute sexual harassment include, but are not limited to:

- A. Unwelcome sexual propositions, invitations, solicitations, and flirtations.
- B. Physical assault.
- C. Threats or insinuations that a person's employment, wages, academic grade, promotion, classroom work or assignments, academic status, participation in athletics or extra-curricular programs or events, or other conditions of employment or education may be adversely affected by not submitting to sexual advances.
- D. Unwelcome verbal expressions of a sexual nature, including graphic sexual commentaries about a person's body, dress, appearance, or sexual activities; the unwelcome use of sexually degrading language, jokes or innuendoes; unwelcome suggestive or insulting sounds or whistles; obscene telephone calls.
- E. Sexually suggestive objects, pictures, videotapes, audio recordings or literature, placed in the work or educational environment, which may embarrass or offend individuals.
- F. Unwelcome and/or inappropriate touching, patting, or pinching; obscene gestures.

- G. A pattern of conduct, which can be subtle in nature, that has sexual overtones and is intended to create or has the effect of creating discomfort and/or humiliation to another.
- H. Remarks speculating about a person's sexual activities or sexual history, or remarks about one's own sexual activities or sexual history.
- I. Consensual sexual relationships where such relationship leads to favoritism of a subordinate employee with whom the supervisor is sexually involved and where such favoritism adversely affects other employees.

Not all behavior with sexual connotations constitutes unlawful sexual harassment. Conduct must be sufficiently severe, pervasive, and/or persistent such that it adversely affects an individual's employment or education, or such that it creates a hostile or abusive employment or educational environment.

Race/Color Harassment

Prohibited racial harassment occurs when unwelcome physical, verbal, or nonverbal conduct is based upon an individual's race or color and when the conduct has the purpose or effect of interfering with the individual's work or educational performance; of creating an intimidating, hostile, or offensive working, and/or learning environment; or of interfering with one's ability to participate in or benefit from a class or an educational program or activity. Such harassment may occur where conduct is directed at the characteristics of a person's race or color, such as racial slurs, nicknames implying stereotypes, epithets, and/or negative references relative to racial customs.

Religious (Creed) Harassment

Prohibited religious harassment occurs when unwelcome physical, verbal, or nonverbal conduct is based upon an individual's religion or creed and when the conduct has the purpose or effect of interfering with the individual's work or educational performance; of creating an intimidating, hostile, or offensive working and/or learning environment; or of interfering with one's ability to participate in or benefit from a class or an educational program or activity. Such harassment may occur where conduct is directed at the characteristics of a person's religious tradition, clothing, or surnames, and/or involves religious slurs.

National Origin Harassment

Prohibited national origin harassment occurs when unwelcome physical, verbal, or nonverbal conduct is based upon an individual's national origin and when the conduct has the purpose or effect of interfering with the individual's work or educational performance; of creating an intimidating, hostile, or offensive working and/or learning environment; or interfering with one's ability to participate in or benefit from a class or an educational program or activity. Such harassment may occur where conduct is directed at the characteristics of a person's national origin, such as negative comments regarding customs, manner of speaking, language, surnames, or ethnic slurs.

Disability Harassment

Prohibited disability harassment occurs when unwelcome physical, verbal, or nonverbal conduct is based upon an individual's disability and when the conduct has the purpose or effect of interfering with the individual's work or educational performance of creating an intimidating, hostile, or offensive working and/or learning environment; or with one's ability to participate in or benefit from a class or an educational program or activity. Such harassment may occur where conduct is directed at the characteristics of a person's disabling condition, such as negative comments about speech patterns, movement, physical impairments or defects/appearances, or the like.

Threatening and/or Intimidating Behavior

The Board believes that a staff member should be able to work in an environment free of threatening or intimidating speech or actions.

Threatening behavior consisting of any words or deeds that intimidate a staff member or cause anxiety concerning his physical well-being is strictly forbidden. Any student, parent, visitor, staff member, or agent of this Board who is found to have threatened a member of the staff will be subject to discipline and reported to the principal. The principal shall immediately make an oral report to the local law enforcement agency.

School Cancellation

If Washington Township Schools have to be cancelled because of mechanical breakdown or adverse weather conditions and this is known before school begins in the morning, this information will be broadcast over several of the Indianapolis television and radio stations. Decisions to cancel/delay school usually are made by 6:00am.

Video Surveillance

For the safety and protection of our people, property, equipment, and other valuables, video surveillance is being used in many parking lots, buses, and buildings in the MSDWT.



Metropolitan School District of Washington Township 2010-2011 Academic Calendar

Date	Description
August 11, 2010	First Day of School
September 6, 2010	Labor Day – No School
October 28 – 29, 2010	Fall Recess – No School
November 25 – 26, 2010	Thanksgiving Break – No School
December 17, 2010 – January 2, 2011	Winter Break – No School
January 3, 2011	First Day of Spring Semester
January 17, 2011	Dr. Martin Luther King, Jr. Day – No School
February 21, 2011	President’s Day – No School
March 28 – April 1, 2011	Spring Break – No School
April 22, 2011	Flex Day – No School
May 24, 2011	Last Day of School

Metropolitan School District of Washington Township Contact Information

<p>Greenbriar Elementary 8201 Ditch Rd. Indianapolis, IN 46260 Phone: 317-259-5445 Fax: 317-259-5494 Site Coordinator: Arvella Boddie Email Address: aboddie@msdwt.k12.in.us</p>	<p>Fox Hill Elementary 802 Fox Hill Dr. Indianapolis, IN 46228 Phone: 317-259-5371 Site Coordinator: Robin Kee Email Address: rkee@msdwt.k12.in.us</p>	<p>MSD Washington Township 8550 Woodfield Crossing Blvd Indianapolis, IN 46240 Phone: 317-845-9400 Fax: 317-205-3384 Grant Coordinator: Judy Fraps</p>
<p>Spring Mill Elementary 8250 Spring Mill Rd. Indianapolis, IN 46260 Phone: 317-259-5462 Fax: 317-259-5484 Site Coordinator: Ken Gouge Email Address: krkouge@msdwt.k12.in.us</p>	<p>Allisonville Elementary 4900 East 79th St. Indianapolis, IN 46250 Phone: 317-845-9441 Fax: 317-576-5255</p>	<p>Northview Middle School 8401 Westfield Blvd Indianapolis, IN 46240 Phone: 317-259-5421 Fax: 317-259-5424</p>
<p>Nora Elementary 1000 E. 91st St. Indianapolis, IN 46240 Phone: 317-844-5436 Fax: 317-571-7172 Site Coordinator: Jake Skillman Email Address: jskillman@msdwt.k12.in.us</p>	<p>John Strange Elementary School 3660 E. 62nd St. Indianapolis, IN 46220 Phone: 317-259-5465 Fax: 317-259-5469</p>	<p>Eastwood Middle School 4401 E. 62nd St. Indianapolis, IN 46220 Phone: 317-259-5401 Fax: 317-259-5407</p>
<p>Crooked Creek School 2150 Kessler Blvd., West Drive Indianapolis, IN 46228 Phone: 317-259-5478 Fax: 317-259-5453</p>	<p>Westlane Middle School 1307 W. 73rd St. Indianapolis, IN 46260 Phone: 317-259-5412</p>	<p>North Central High School 1801 East 86th Street Indianapolis, IN 46240 Phone: 317-259-5301 Fax: 317-259-5369</p>

INDIANAPOLIS PUBLIC SCHOOLS DRESS CODE POLICY

The ultimate responsibility for a student's dress, grooming, and appearance rests in the first instance with the student and his/her parents or guardians. However, because dress influences how students conduct themselves and dress and conduct directly impact student learning, the Indianapolis Public Schools authorizes the Superintendent to set specific standards for uniform student attire. These standards shall be designed to promote values consistent with the achievement of educational goals. Through its dress and grooming standards, the school district intends to promote community standards of decency, cleanliness, etiquette, decorum and good citizenship as part of its educational mission. Mandated IPS Uniform Dress Code standards are outlined below as part of this policy.

Mandated IPS Uniform Dress Code Specifications

All elementary, middle and high school students in the Indianapolis Public Schools shall, within the specifications indicated below, enforce and follow the mandatory uniform policy beginning in July 2007. All students are required to dress in the proper uniform attire. All students who attend the Indianapolis Public Schools must be in uniform daily. It will be the parents' responsibility to ensure compliance with the uniform policy. It also will be the responsibility of certified and classified staff to ensure that students wear the proper uniform daily.

All students will wear designated school system attire. The clothing may not be altered by slits, cuts, holes, shredded hems, slashes, etc.

High school levels, student identification (ID) cards issued by the school are part of the required uniform and must be worn in a visible location above the waist at all times during the school day and while attending all school sponsored field trips and athletic contests

K-12 ACCEPTABLE DRESS-UP ATTIRE

Students will be allowed to dress up for special, limited days of the year (such as Honors Day and Picture Day) at the discretion of the principal. **The following guidelines apply to dress-up days:**

Girls:

Dresses: Must be no more than 2" (inches) above the knee, must have sleeves, must not show cleavage, and must not be skintight. No spandex, see-through or denim materials.

Skirts: Must be no more than 2" (inches) above the knee. No spandex, see-through or denim materials. Must be worn above the hip.

Pants: Must not be skintight. No spandex, see through or denim materials. Must be worn at the hip.

Blouses/Tops: Must have sleeves. Must be long enough to tuck. No T-shirts, thermal, velour, spandex, see-through or denim materials. No cleavage visible. Must not be skintight. Blouses/top may not extend below jacket (if worn).

Shoes: No athletic shoes.

Boys:

Shirts: Button-up shirt with sleeves. Must not extend below jacket (if worn).

Pants: No athletic pants. No denim. Must be worn at the hip.

Shoes: No athletic shoes.

Tie: Tie optional.

No student shall be considered non-compliant with the uniform dress policy in the following instances:

1. When a student wears a button, armband or other accessory to exercise the right to freedom of expression as provided by law, unless the button, armband or other accessory signifies or is related to: gangs, gang membership or gang activity; hate groups; lewd or profane expressions, symbols or signs; drugs and/or drug use; drinking or alcohol; derogatory statements or expressions; etc. The principal or

- his/her designee will make the official determination of the appropriateness of the button or other expression of speech.
2. When a student wears the uniform of a nationally recognized youth organization, such as the Boy Scouts or the Girl Scouts, on regular meeting days.
 3. When a student wears the uniform of JROTC or other school military programs on the required uniform days.
 4. When a student's parent or guardian has secured a waiver from the uniform policy by following the procedures for obtaining a waiver.
 5. When a student is on campus outside of the normal school hours.

Mandated Attire for Grade 9-12

Males:

<p>A. Pants and/or shorts Solid Colors: navy blue, black or khaki No denim, no blue jeans allowed Note: All shorts are "walking" length and must be limited to 2" (inches) above the knee. No denim or blue jeans allowed in the 9 – 12 school dress attire.</p>	<p>Style</p> <ul style="list-style-type: none"> • Pleated or flat in the front • Fastened at the waist • Pants must be worn with a belt and set above the hip (elastic band pants acceptable)
<p>B. Solid shirts in high school: Arsenal Tech: Solid white, green, red or black Note: Acceptable materials: cotton, polyester, linen, twill, corduroy, and canvas Note: No t-shirts</p>	<ul style="list-style-type: none"> • Straight, buttondown, turtleneck or mock turtleneck collar • Long or short sleeves • May be polo style • No logos larger than 1"x1 1/2" on the shirt other than approved school logo • Shirt must be tucked into pants or shorts at all times (overweight students may be granted permission to wear the shirt outside of pants)
<p>C. Sweaters and Sweater Vests (must be worn over an approved shirt) Arsenal Tech: Solid white, green, red or black Note: No hoods on sweaters worn in school during the school day.</p>	<ul style="list-style-type: none"> • V-neck sweaters • Crew neck • Cardigan • No logos larger than 1"x1 1/2" on the sweaters other than an approved school logo
<p>D. Undershirts: Solid Colors: white, black, red, green.</p>	<ul style="list-style-type: none"> • Long or short sleeves • Must be tucked in at all times
<p>E. Shoes: Any color accepted</p>	<ul style="list-style-type: none"> • Closed toes, closed heel or strap heel
<p>F. Belt (required, unless there are not loops)</p>	<ul style="list-style-type: none"> • No logos
<p>G. Boots any color acceptable</p>	<ul style="list-style-type: none"> • Any style
<p>H. Jackets Colors: Letter jackets in school colors</p>	<ul style="list-style-type: none"> • No logos larger than 1"x1 1/2" on the jackets other than an approved school logo
<p>I. Socks Solid Colors: Black, white, navy blue, khaki, Brown</p>	

Females:

<p>A. Pants, shorts, skirts, capri pants, “walking” length shorts Colors: solid navy blue, black or khaki Note: Solid navy blue or black shorts may be worn under a skirt provided they do not show. No denim or blue jeans allowed in the 9-12 school dress attire.</p>	<ul style="list-style-type: none"> • Fastened at the waist • Pleated or flat in the front • Pants must be worn with a belt and set above the hip (elastic band pants acceptable) • “Walking” length shorts, skirts, shorts and jumper limited to 2” (inches) above the knee.
<p>B. Solid shirts and blouses with collars in grades 9-12. The shirts and blouses should be in the school’s colors: Arsenal Tech: solid white, green, red, or black Note: No t-shirts</p>	<ul style="list-style-type: none"> • Button-down, turtleneck or mock turtleneck collar • Long or short sleeves • May be polo style • No logos larger than 1”x1 1/2” on the shirt other than approved school logo • Shirt must be tucked into pants or shorts at all times (overweight students will need a waiver from the campus administrator to wear the shirt outside the pants)
<p>C. Sweaters/Sweater Vests/fleece jackets/ Sweat shirts (must be worn over an approved shirt with collar showing) Colors: Arsenal Tech: solid white, green, red or black Note: No hoods</p>	<ul style="list-style-type: none"> • V-neck sweaters • Crew neck • Cardigan • No logos larger than 1”x1 1/2” on the sweaters other than an approved school logo
<p>D. Under shirts Colors: Arsenal Tech: solid white, green, red or black</p>	<ul style="list-style-type: none"> • No visible Camisoles or other attire considered by the principal to be “underwear” • Long or short sleeves • Must be tucked in at all times
<p>E. Shoes Any color acceptable</p>	<ul style="list-style-type: none"> • Closed heel • Closed toe • No flip-flops, beach shoes, slippers, house shoes
<p>F. Belt (required with all clothing, Unless there are no loops)</p>	<ul style="list-style-type: none"> • no logos
<p>G. Boots</p>	<ul style="list-style-type: none"> • any color or style acceptable
<p>H. Socks/tights/ pantyhose</p>	<ul style="list-style-type: none"> • No leggings or footless stockings • No stripes, polka dots, fishnet or other designs
<p>I. Accessories</p>	<ul style="list-style-type: none"> • No clothing (such as shawls) to be worn over pants, skirts or shorts

Note: Handbags, purses, pocketbooks, fanny packs and similar items must be no larger than 8.5 x 11 inches (size of a regular sheet of notebook paper), 3 to 4 inches thick, and must not be large enough to contain a regular size textbook. This does not include the size of backpacks and book bags.

IPS Dress Code Implementation Guidelines

RESTRICTED ATTIRE

The following articles of clothing or styles of dress are strictly forbidden while in IPS Schools during the regular school day:

- ∞ No hats worn in building during the school day
- ∞ No denim pants, shirts, shorts, skirts, skorts, capris, jumpers or jackets
- ∞ No oversized pants or shirts
- ∞ No pants worn below the waist or “sagging”
- ∞ No overalls or coveralls
- ∞ No sweatpants/sweat suits, jogging pants/suits, warm-up pants/suits, athletic pants/shorts
- ∞ No knit, nylon, spandex, biking or gym shorts or pants
- ∞ No spandex, nylon or knit tightly fitted clothes
- ∞ No skin tight dresses or tops
- ∞ No tank tops, tube tops, halter tops, mesh tops, midriff tops, spaghetti strap tops
- ∞ No sleeveless tops
- ∞ No shirts made of shiny materials
- ∞ No t-shirts or tall tees
- ∞ No hooded jackets, hooded sweaters, hooded shirts
- ∞ No sunglasses
- ∞ No footless leggings/footies
- ∞ No pajama tops or bottoms
- ∞ No flip flops/slippers/sandals/bare feet/exposed toes or heels
- ∞ No “heelies” or “wheelies” (i.e. gym shoes with skates)
- ∞ No clothing or other item with offensive, lewd, vulgar, obscene or hate language, slogans or pictures
- ∞ No coats worn in the school building during the regular school day unless principals waive the rule because of cold temperatures in the building.
- ∞ No buttons, jewelry or other accessories containing lewd, vulgar, obscene, hate or offensive messages or pictures or which advocate or advertise the use of drugs or alcohol
- ∞ No secret society, fraternity or sorority symbols or lettering
- ∞ No hair rollers, combs, picks, or cosmetology clamps
- ∞ No scarves, head rags, doo-rags, bandanas, sweatbands, hats, caps or other head coverings
- ∞ (**Note:** Approval for certain religious customs are permitted by approval of the school administration, i.e. Muslim female head coverings, Jewish male head covering)
- ∞ No visible undergarments
- ∞ No clothing altered by cuts, slits or holes or that in any way exposes the skin
- ∞ No detachable gold teeth or fangs (**unless required by a dentist with written documentation on file**). **NO GRILLS!**

Anything else the principal or designee deems inappropriate or disruptive to the education environment will be prohibited.

INDIANAPOLIS PUBLIC SCHOOLS 2010-2011 CALENDAR

Dates in the following calendar may be changed if such is necessary to schedule makeup days, for days lost to emergency school closings, in order to meet the minimum number of student instructional days required by state law.

SEMESTER SCHEDULES

First Semester.....Monday, August 9, 2010 through Thursday, December 16, 2010
 Pupils Report.....Wednesday, August 11, 2010 (Pupils attend FULL DAY)
 Second Semester.....Monday, January 3, 2011 through Tuesday, May 24, 2011
 Last Day.....Tuesday, May 24, 2011 (Pupils attend FULL DAY)

PROFESSIONAL ACTIVITY DAYS AND HOLIDAYS

Teachers' Meetings and Work Days.....Monday, August 9, 2010 through Tuesday, August 10, 2010
 Labor Day.....Monday, September 6, 2010
 *Fall Break.....Thursday, October 21 and Friday, October 22, 2010
 Parents In Touch Day.....Wednesday, October 27, 2010 (**Pupils do not attend**)
 Thanksgiving Vacation.....Thursday, November 25, 2010 and Friday, November 26, 2010
 *Winter Break.....Close of school Thursday, December 16, 2010 and reopen Monday, January 3, 2011
 Records and Close Out Day.....Friday, December 17, 2010
 Dr. Martin Luther King, Jr. Day.....Monday, January 17, 2011
 Presidents' Day.....Monday, February 21, 2011
 *Spring Break.....Close of school Friday, March 25, 2011 and reopen Monday, April 4, 2011

*Friday, May 20, 2011. . . . If days must be made up due to school closing, this day will be a day of student attendance. If no such day needs to be made up, this will be a day without student or teacher attendance. Additional make-up days will be scheduled, if needed, beginning Wednesday, May 25, 2011. The Records and Close Out will be adjusted as needed.

Last Day For Pupils.....Tuesday, May 24, 2011 (Pupils attend FULL DAY)
 Records and Close Out Day.....Wednesday, May 25, 2011

END OF GRADING PERIOD

Wednesday, October 20, 2010 Friday, March 11, 2011
 Thursday, December 16, 2010 Tuesday, May 24, 2011
 (Expect report cards approximately one week after the end of the grading period)

SUMMER SCHOOL 2011

Elementary, Middle School, and High School.....Monday, June 13, 2010 through Friday, July 1, 2010

Indianapolis Public Schools Contact Information

<p>Emma Donnan Middle School 1202 East Troy Ave. Indianapolis, IN 46203 Ph: 317-226-4272</p>	<p>Arsenal Technical High School 1500 East Michigan St. Indianapolis, IN 46201 Ph: 317-693-5300</p>	<p>John Marshall Community High School 10101 East 38th St. Indianapolis, IN 46235 Ph: 317-693-5460</p>
<p>H.L. Harshman Middle School 1501 East 10th St. Indianapolis, IN 46107 Ph: 317-226-4101 Fx: 317-226-3444</p>	<p>Broad Ripple Magnet High School for the Arts & Humanities 1115 Broad Ripple Ave. Indianapolis, IN 46220 Ph: 317-693-5700</p>	<p>Northwest High School 5525 West 34th St. Indianapolis, IN 46224 Ph: 317-693-5600</p>
<p>Willard J. Gambold Middle School 3725 North Kiel Ave. Indianapolis, IN 46224 Ph: 317-226-41008</p>	<p>Emmerich Manual High School 2405 Madison Ave. Indianapolis, IN 46225 Ph: 317-226-2200</p>	<p>Shortridge Magnet High School for Law & Public Policy 3401 N. Meridian St. Indianapolis, IN 46208 Ph: 317-226-2810 Fx: 317-226-3725</p>
<p>Arlington Community High School 4825 North Arlington Ave. Indianapolis, IN 46226 Ph: 317-226-2345</p>	<p>George Washington Community High School 2215 West Washington St. Indianapolis, IN 46222 Ph: 317-693-5555</p>	<p>Thomas Carr Howe Community High School 4900 Julian Ave. Indianapolis, IN 46201 Ph: 317-693-5590</p>

Educational Enrichment Activities and Resources

Physical Education Games

Aerobics for Kids

Children in grades 2 and 3 will learn and perform an exciting, easy, and repetitive aerobic routine. The goal is to prevent injury by preparing the body and mind for the physical activity to follow. The participants should feel their heart beat faster, their bodies feel warmer, their rate of breathing increase, and the onset of perspiration.

Equipment: Stereo/DVD player: The song "Conga"

Grade Level: 2nd and 3rd grade

The routine is as follows:

- Play maracas right and left 2 X (32 count)
- Tango right and left 2X (32 count)
- March and wave hands up high and down low 2X (32 count)
- Jump out, out, in, in 4X (32 count)
- Tap right foot forward and back 4X (32 count)
- Walk with attitude forward and back 2X (32 count)
- Tap left foot forward and back 4X (32 count)
- Walk with attitude forward and back 2X (32count)
- Repeat 2X
- On the third round, skip the last walk, and play maracas until the song ends.

Battle Ball

Battle Ball is a fast-paced game that keeps kids moving and having fun. The game also provides opportunities for variations, such as using different sizes and types of equipment in order to change difficulty or changing the skill from throwing to kicking or tolling.

Equipment: Four cones and four playground balls

Grade Level: 2nd through 5th

How to Play:

- To set up, place four balls in center jump circle of a basketball court and one cone on each corner of both free-throw lines.
- Divide the class into four teams.
- Each team will line up on the sideline between the center line and end-lines

- When signaled to begin, the player nearest the center line from each team gets the ball, and the second player from the center line stands next to the cone for his or her team.
- The first player has one attempt to throw the ball from the center jump circle and knock down the cone; after throwing, he or she immediately runs to the end of the line for his team (furthest from the centerline).
- Player two retrieves the ball and resets the cone if necessary, then rotates to the center to throw the ball.
- In the meantime, the next player nearest the center line runs to the cone to retrieve the ball and the cycle repeats so that everyone rotates in this order: next to center line - tending the cone - throwing the ball - furthest from center line.
- If a cone is knocked down, the team receives one point; the first team to 21 points wins.

Dieden, B. (1995). Games to Keep Kids Moving! Parker Publishing Company, Inc. West Nyack, NY.

Math Tricks

Trick 1

This mind-reading trick uses the 'magical' number nine. Performed with the help of a friend, this trick will greatly enhance your act and impress your audience!

Tell your friend to write down any three-digit number he likes, but the digits must decrease in value, such as 9, 7, and 2. He must not let you see what he's written.

Then tell your friend to write the same number backwards underneath the first - that would be 2, 7, and 9. Now, he must subtract this number from the first and tell you only the final digit. In our example, this is 3.

You will immediately be able to tell him that the remaining numbers are 6 and 9, because you will subtract the 3 from the 9 to find the first digit-that will be 6. The middle digit is always 9, no matter what three-digit number your friend chose! There's that sneaky 9 again!

Trick 2

Ask a friend to write down a number. It can be any number she likes (it doesn't matter how many digits) provided the digits do not decrease in value. Your friend should not show you the number until the end of the trick.

Ask your friend to multiply the number she wrote down by 10. Let's pretend your friend chose the number 15689:

15689

156890

Ask your friend to subtract the first number from the second number:

$$\begin{array}{r} 156890 \\ - 15689 \\ \hline 141201 \end{array}$$

Ask your friend to add 9 to the answer:

$$\begin{array}{r} 141201 \\ + \quad 9 \\ \hline 141210 \end{array}$$

Ask your friend to cross out any number except a zero and tell you what the remaining digits are. In our example, the second 1 is crossed out and the remaining numbers are 1,4,2,1 and 0.

You add these remaining digits in your head - they come to 8 - and then subtract the total from 9 to find out what number was crossed out.

Tell your friend the number she crossed out was 1! Mind-reading wins again!

Math Games

Card Games

Use a regular deck of cards (optional: remove face cards for young children). Deal out the cards evenly between game participants. Aces represent one and face cards are ten. Play one of these versions:

Highest Card Wins: This is the traditional game where each player turns over the top card from their own pile and the player with the largest card wins all the cards. In the event of ties, everyone turns over an additional card and the winner takes the larger pile. In this version, students practice numeral recognition, number value, and greater than and less than.

Addition Double War: Follow the rules of War with each player turning over two cards at a time. Players add the value of their two cards and the largest sum wins. Students can practice addition strategies: counting all the “pips” on both cards for the sum, doubles facts, special “tricks” for adding ten and nine, sharing, and making a ten. To make this game a little more challenging, turn over three cards each time and find their sum.

Subtraction Double War: Follow the directions for Addition Double War, only the biggest difference wins. Good opportunity to practice subtraction strategies and facts.

Multiplication Double War: Follow the directions for Addition Double War, only this time the largest product wins. For a student just learning multiplication facts, use two decks of cards, and start with the easiest fact families first, gradually adding the larger numbers.

Fraction War: Each player turns over 2 cards at once and tries to make the largest fraction by laying the cards vertically. For example with a 3 and 5 you can make $\frac{3}{5}$ or $\frac{5}{3}$; if the other person has a 2 and 8, the fraction could be $\frac{2}{8}$ or $\frac{8}{2}$. Variations: only allow fractions less than one or use three cards at a time and create mixed numerals.

Salute: This game helps students practice adding (or multiplying) and finding the missing addend (or factor). This is a game for three players. Remove the face cards from a regular deck of cards (ace represents one). Deal out the cards evenly to two players who sit facing each other; each holds the stack of cards face down. The third player sits where he can see the other two players. When the third player says “Salute,” the two players with cards simultaneously take the top cards off their respective piles and hold them on their foreheads with the face of the card outwards so that they can only see the other person's card. The third player announces the sum (or product for a more advanced version) of the two cards. Each of the two players holding a card tries to be the first to announce the number on his own card (which he cannot see). The winner takes both cards. Rotate players so everyone gets a chance to be the one who says, “Salute” and gives the sum and product.

Pyramid: Discard the face cards, and use the aces to represent one. Lay out a pyramid of face-up cards with one card at the top, two cards overlapping the bottom edge of that card, three cards overlapping the edges of the two cards, and so on, until there are six cards at the bottom of the pyramid. Only cards that are fully uncovered can be used. Pick up and discard cards with number combinations that equal ten. The easiest version is to discard cards in pairs that add up to ten ($2 + 8$, $3 + 7$, etc.) and the ten by itself. Make the game progressively more challenging by allowing any combination of cards that can be strung together in an equation to equal ten (i.e. $9 + 3 - 2$ or $2 \times 3 + 4$). The game can also be played with the face cards with these values: Jack is 11, Queen is 12, and King is 13 (change the target number to 13 for this version).

Slap: Remove the face cards from a deck. Aces are left in and are worth one. Jokers may be left in or discarded. Deal out cards evenly between all players. Players do not look at their cards. Each player in turn flips one card over (in an OUTWARD motion - no peeking) and places it on the middle of the table. When a 10, two cards that add up to 10, or a joker is played, a player can slap the pile and add those cards to their stash. When a player has flipped all the cards in their deck, they shuffle their stash and use that as their deck. Play continues until a time limit is reached or one player has all the cards. The player with the most cards wins. In the event of a tie-slap, the hand in direct

contact with the cards wins. New players or players that have lost their cards can "slap in" to get back into the game. Rules can be revised to include sums of more than 2 cards, new target numbers, additional operations, etc.

Number Tic-Tac-Toe

Use numbers 1 through 9.

Each number may be used only once in a game.

Take turns placing a number in a space on the 9 squared game board (3 squares high, 3 squares wide).

OBJECTIVE: Be the one to get the numbers in any row, column, or diagonal to add up to 15.

Science Games

Oh Deer

1. Place two parallel lines on the floor or ground, ten to twenty feet apart.
2. Count group off in fours (1, 2, 3, 4, 1, 2, ...).
3. Ones become deer. The others are needs of the deer, which are the following:
1. food, 2. water, and 3. shelter.
4. Show the groups what the symbols are for each of the needs, which include: 1. holding hands on stomach for food, 2. holding hands on mouth for water, and 3. holding hands over head for shelter.
5. The groups (both deer and needs) turn their backs to each other and pick a need by placing hands in one of the 3 positions.
6. At your signal (count of three), both groups turn towards each other holding their signs clearly.
7. The deer must then run to "need" that is holding the same sign. Each need may only have one deer.
8. Any deer who find the "need" they are searching for, then takes the "food", "shelter" or "water" back to their side of the lines. Those needs then become deer as well, as deer are able to reproduce if they find what they need. Any deer who does not find what they are looking for, dies and becomes part of the habitat or stays on the need side of the line.
9. Continue play for 10 – 15 rounds. Have a discussion about how the deer population continues to change because of cycle of available needs.

Paper Bridge

Can you build a bridge that holds 100 pennies using 1 sheet of paper and up to 5 paper clips? A bridge must support its own weight (the dead load) as well as the weight of

anything placed on it, such as the pennies (the live load). Your paper bridge must span 20 centimeters (about 8 in.). The sides of your bridge will rest on two books and cannot be taped or attached to the books or the table.

What You Will Need

- 1 sheet of plain paper
- 5 paper clips
- ruler
- 2 books or blocks
- at least 100 pennies or other small weights
- scissors

Make a Prediction

Describe how you think the bridge should be constructed in order to support its dead load plus the live load of the pennies.

Try It Out

1. Discuss possible ideas with your partner before you start building. What can you do to the paper to make it stronger? When you have decided on a design, construct your bridge.
2. Place the bridge across two supports that are 20 cm apart. Remember that the space below the bridge must be clear to allow boats to pass!
3. To test your bridge, load it with pennies one at a time, until it collapses. Record how many pennies your bridge supported.

Explain It

Describe how well your bridge supported its dead load and the live load you placed on it. Was the bridge as strong as you thought it would be? Where did it fail?

Build on It

- Redesign your bridge and test it again, using a new sheet of paper. How does your second attempt compare? How can engineers test their plans for building a full-size bridge?
- Is there a difference in the load your bridge can hold if you put the load in the center of the bridge compared to spreading it out along the bridge? Make a prediction and test it.

Math Cheat Sheet

Article provided by [Sylvan Learning Center](#)

Unless you're an accountant, an engineer, or a math teacher, you've probably forgotten the math lessons you learned in grade school.

Math at the elementary level revolves around learning conceptual frameworks and understanding patterns, in addition to the basic operations of addition, subtraction, multiplication, and division. Younger students begin to understand basic amounts--whole, half, and quarter--as they start to see math expand its significance beyond the classroom. Lessons that focus on estimation, inequalities and averages help your child begin to implement these lessons in the grocery store, on the baseball field and even at the dinner table. If you can solve the problems below, you might be able to keep up with your child--and be a real help with arithmetic homework.

Estimation is the act of finding an approximate answer, not an exact answer.

To round off decimals:

1. Find the place value you want (the "rounding digit") and look at the digit just to the right of it.
2. If that digit is less than five, do not change the "rounding digit" but drop all digits to the right of it.
3. If that digit is greater than or equal to five, add one to the "rounding digit" and drop all digits to the right of it.

To round off whole numbers:

1. Find the place value you want (the "rounding digit") and look to the digit just to the right of it.
2. If that digit is less than five, do not change the "rounding digit" but change all digits to the right of the "rounding digit" to zero.
3. If that digit is greater than or equal to five, add one to the "rounding digit" and change all digits to the right of the rounding digit to zero.

Inequalities are mathematical expressions that show two quantities are not equal. An inequality is used when the exact value of an expression is unknown. Instead of an equals sign, use one of these symbols:

- > greater than
- < less than
- ≤ less than or equal to
- ≥ greater than or equal to

Mean, Median, Mode, Range

Consider the set of numbers: 80, 90, 90, 100, 85, 90.

The **mean** is another term for the average, found by adding a set of numbers and dividing by the quantity of numbers there are in that set.

$$\frac{80 + 90 + 90 + 100 + 85 + 90}{6} = 89 \frac{1}{6}$$

The **median** is the number in the middle. To find the median, put the values in order from lowest to highest. Then find the number that is exactly in the middle.

80 85 90 90 90 100

If there is an even number of values, average the two values in the middle

$$90 + 90 / 2 = 90$$

Notice that there is exactly the same number of values above the median as below it.

The **mode** is the value that occurs most often.

90

The **range** is the difference between the lowest and highest values. The range shows how spread out the data are.

$$100 - 80 = 20$$

Shapes

Polygons are flat, closed figures with three or more sides. The most commonly recognized polygons are triangles, rectangles, and squares. Here are a few terms that may have escaped your memory.

A **quadrilateral**, such as a square or a rectangle, has four sides.

A **pentagon** has five sides.

A **hexagon** has six.

An **octagon** has eight.

The number of sides also determines how many angles a polygon has. A quadrilateral has four angles; a pentagon has five, etc.

Prime and Composite Numbers

A **prime number** is a counting number that only has two factors--itself and one.

A **composite number** has more than two factors, such as 6, whose factors are 1, 2, 3, and 6. The number **1** has only one factor (itself) and is neither prime nor composite.

Basic Math & Pre-Algebra Cheat Sheet

- Natural or counting numbers: 1, 2, 3, 4,...
- Whole numbers: 0, 1, 2, 3,...
- Integers: ...-3, -2, -1, 0, 1, 2, 3,
- Rational numbers: Integers and fractions.
- Irrational numbers: Cannot be written as fractions: or π .
- Prime numbers: Divisible only by 1 and itself: 2, 3, 5, 7, 11, 13 . . . (0 and 1 are not prime or composite.)
- Composite numbers: Divisible by more than just 1: 4, 6, 8, 9, 10, 12 . . .

Properties of Addition and Multiplication

- Closure: All answers fall into original set.
- Commutative: Order does not make any difference: $a + b = b + a$, $ab = ba$.
- Associative: Grouping does not make any difference: $(a + b) + c = a + (b + c)$, $(ab)c = a(bc)$.
- Identity: 0 for addition, 1 for multiplication.
- Inverse: Negative for addition, reciprocal for multiplication.

Order of Operations

1. Work within parentheses (), brackets [], and braces { } from innermost and work outward.
2. Simplify exponents and roots working from left to right.
3. Do multiplication and division, whichever comes first left to right.
4. Do addition and subtraction, whichever comes first left to right.

Rounding Off

1. Underline the place value to which you're rounding off.
2. Look to the immediate right (one place) of your underlined place value.
3. Identify the number (the one to the right).

If it is 5 or higher, round your underlined place value up 1 and change all the other numbers to its right to zeros. If less than 5, leave your underlined place value as it is and change all the other numbers to the right to zeros.

Decimals

- To add or subtract decimals, simply line up the decimal points and then add or subtract as usual.
- To multiply decimals, just multiply as usual and then count the total number of digits above the line that are to the right of all decimal points. Place the decimal point in your answer so that there is the same number of digits to the right of the decimal point as there are above the line.
- To divide decimals, if the number you're dividing by has a decimal, move the decimal to the right as many places as possible and then move it under the division sign just as many places (add zeros if necessary). Move the decimal up to your answer.

Fractions

To add or subtract fractions, you must have a common denominator.

- If two fractions have a common denominator (like fractions), you simply add or subtract the numerator and keep the same denominator. (For example, $1/5 + 2/5 = 3/5$.)
- If two fractions do not have a common denominator (unlike fractions), find a lowest common denominator (LCD), change each of the fractions to equivalent fractions with the new denominator, and then add or subtract the numerators and keep the same denominator. (For example, $1/2 + 1/3 = 3/6 + 2/6 = 5/6$)
- When subtracting mixed numbers, you may have to "borrow" from the whole number. When you borrow 1 from the whole number, the 1 must be changed to a fraction.
- To multiply fractions, simply multiply the numerators and then multiply the denominators. (For example, $2/3 \times 1/5 = 2/15$.) Reduce to lowest terms if necessary.
- To divide fractions, invert the second fraction and then multiply. (For example, $1/5 \div 1/4 = 1/5 \times 4/1 = 4/5$.)

Middle School Math Course of Study

6th Grade Math Course of Study

- **Number**
 - Recognize numbers from 0.001 to 1,000,000 and locate, compare, order, represent, estimate, and identify numbers to 1,000,000 using regular and expanded forms
 - Full understanding of place value to the right and left of 0 - 4 places
 - Understanding of fractions, decimals, mixed numbers and improper fractions with a comprehension of greater than and less than concepts
 - Ability to compare and order all of the above
 - Understanding of ratio, rate, rounding and percentages
 - Identify multiples, factors, composites and prime numbers to 100, mental division and multiplication of numbers with 0's
 - Identify and use integers around them
 - Perform multi-step word problems involving all of the above
- **Measurement**
 - Complete understanding of inches, feet, yards, miles, millimeters, centimeters, meters, kilometers and apply these terms to problem solving activities
 - Use and understand all prefixes of measurement terms

- Understand and use squared units and cubed units along with linear measures
- Be able to make conversions between units - inches to feet etc.
- Select the appropriate units of measurement in problems
- Read and write dates using a variety of methods (Jan. 10, 2002, 02/10/02, etc.)
- Money amounts to \$10,000.00 in making change and in problem solving
- Investigate measures of circumferences, parallelograms, rectangles, triangles and be able to sketch shapes
- Calculate the volume of prisms (rectangular) and understand the rules for calculating volumes and prisms
- **Geometry**
 - Hypothesize, sketch, identify, sort, classify, construct, measure, and apply a variety of geometric shapes and figures and problems
 - Full understanding of geometric properties and relationships
 - Classify triangles and two dimensional shapes by angle and side properties and types (obtuse, isosceles, etc.)
 - Identify the 2-D nets that the solids are represented by and construct the nets for a variety of polyhedra
 - Measure and construct a variety of triangle and angles with the protractor, full understanding of congruence
 - Explore, discover and construct tiling patterns and tessellations that cover a plane
 - Understand the coordinate system on both maps and grids and in a Cartesian plan (first quadrant)
 - Plot points
- **Algebra/Patterning**
 - Identify, create, analyze and extend patterns and describe the rules with two variables and increasing complexity
 - Determine, discuss and defend the pattern rules in all problems of patterns and missing terms
 - Use the estimate and test process for relationships and rules
 - Determine the amount in missing values when given an equation that involves two operations
 - Demonstrate equivalence in equations with the four operations
- **Probability**
 - Design surveys, collect the data and record it appropriately, be able to discuss the findings. Use spreadsheets!

- Construct a variety of graphs, label them appropriately, and state the difference between selecting one graph over another
- Defend your choices of graphs
- Construct line and bar graphs
- Construct scatter plots and be able to discuss them
- Analyze and interpret data in a variety of graphs and more complex levels, etc.
- Use tree diagrams and explain the data
- Conduct probability experiments and apply logical reasoning to the outcomes
- Examine the results of experiments involving probability

7th Grade Math Course of Study

• **Number**

- Give factors, multiples, integer amounts and square roots for numbers
- Compare and order decimals, fractions and integers
- Add and subtract integers
- Be able to perform multi-step word problems for all of the above operations
- Add, subtract, multiply and divide fractions and convert between fractions, decimals and percentages
- Explain and justify a variety of procedures for the above related concepts in problem solving

• **Measurement**

- Use measurement terms appropriately, be able to measure a variety of items at home and at school
- Be able to solve more complex problems with measurement estimations and problems using a variety of formulas
- Estimate and calculate areas for trapezoids, parallelograms, triangles, prisms and circles using the correct formulas
- Estimate and calculate volumes for prisms, and sketch prisms (rectangular) given the volumes

• **Geometry**

- Hypothesize, sketch, identify, sort, classify, construct, measure, and apply a variety of geometric shapes, figures and problems
- Sketch and construct a variety of shapes given the dimensions
- Create and solve a variety of geometric problems
- Analyze and identify shapes that have been rotated, reflected, and translated, and describe those that are congruent
- Determine if shapes/figures will tile a plane (tessellate)

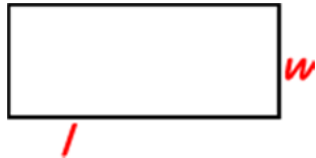

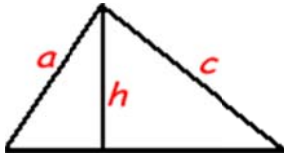
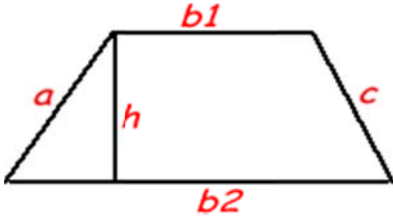
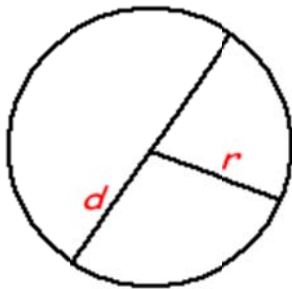
- Analyze tiling patterns
- **Algebra/Patterning**
 - Extend, analyze and justify the explanations for patterns and their rules on a more complex level
 - Be able to write algebraic equations/expressions and write statements to understand simple formulas
 - Evaluate a variety of simple linear algebraic expressions at a beginning level – 1 variable and first-degree
 - Be able to solve and simplify algebraic equations with the four operations
 - Substitute natural numbers for variables when solving algebraic equations
- **Probability**
 - Design surveys, collect and organize more complex data and identify and explain patterns and trends in data
 - Construct a variety of graphs and label them appropriately and state the difference between selecting one graph over another
 - Defend your choices of graphs
 - Make more accurate predictions
 - Understand the importance of statistics on decision making and provide real life scenarios
 - Describe collected data in terms of mean, median and mode, and be able to analyze any bias
 - Make inferences, predictions and evaluations based on interpretations of data collection results
 - Be able to predict possible outcomes based on background information
 - Apply the rules of probability to games of chance and sports

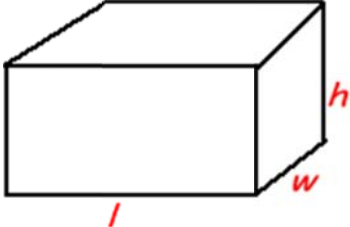
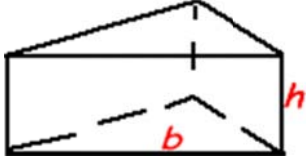
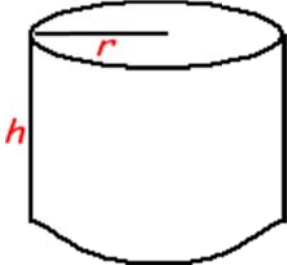
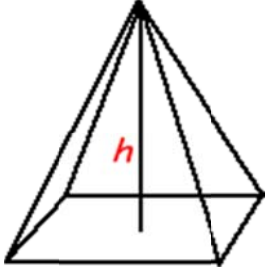
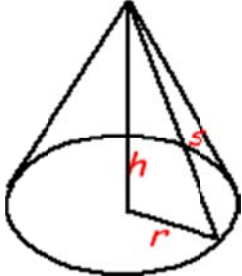
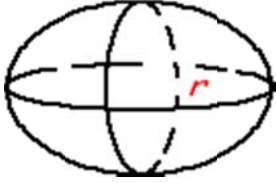
8th Grade Math Course of Study

- **Number**
 - Give factors, multiples, integer amounts and square roots for numbers
 - Applications for the above related concepts in problem solving
 - Measurement
 - Use measurement terms appropriately, and be able to measure a variety of items at home and at school
 - Be able to solve more complex problems with measurement estimations and problems using a variety of formulas
 - Estimate and calculate areas for trapezoids, parallelograms, triangles, prisms, and circles using the correct formulas
 - Estimate and calculate volumes for prisms, and sketch prisms (rectangular) given the volumes

- **Geometry**
 - Hypothesize, sketch, identify, sort, classify, construct, measure, and apply a variety of geometric shapes, figures and problems
 - Sketch and construct a variety of shapes given the dimensions
 - Create and solve a variety of geometric problems
 - Analyze and identify shapes that have been rotated, reflected, and translated, and describe those that are congruent
 - Determine if shapes/figures will tile a plane (tessellate)
 - Analyze tiling patterns
- **Algebra/Patterning**
 - Extend, analyze and justify the explanations for patterns and their rules on a more complex level
 - Be able to write algebraic equations/expressions and write statements to understand simple formulas
 - Evaluate a variety of simple linear algebraic expressions at a beginning level – 1 variable and first-degree
 - Be able to solve and simplify algebraic equations with the four operations
 - Substitute natural numbers for variables when solving algebraic equations
- **Probability**
 - Design surveys, collect and organize more complex data, and identify and explain patterns and trends in data
 - Construct a variety of graphs, label them appropriately and state the difference between selecting one graph over another
 - Defend your choices of graphs
 - Make more accurate predictions
 - Understand the importance of statistics on decision making, and provide real life scenarios
 - Describe collected data in terms of mean, median and mode, and be able to analyze any bias
 - Make inferences, predictions and evaluations based on interpretations of data collection results
 - Be able to predict possible outcomes based on background information
 - Apply the rules of probability to games of chance and sports

6th – 8th Grade Math Cheat Sheet

Shapes	Formula
	<p>Rectangle: Area = Length X Width $A = lw$</p> <p>Perimeter = 2 X Lengths + 2 X Widths $P = 2l + 2w$</p>
	<p>Parallelogram Area = Base X Height $a = bh$</p>
	<p>Triangle Area = 1/2 of the base X the height $a = 1/2 bh$ Perimeter = $a + b + c$ (add the length of the three sides)</p>
	<p>Trapezoid $A = \left(\frac{b1 + b2}{2}\right)h$ Perimeter = area + $b1 + b2 + c$ $P = a + b1 + b2 + c$</p>
	<p>Circle The distance around the circle is a circumference. The distance across the circle is the diameter (d). The radius (r) is the distance from the center to a point on the circle. (Pi = 3.14) $d = 2r$ $c = \pi d = 2 \pi r$ $A = \pi r^2$ ($\pi = 3.14$)</p>

	<p>Rectangular Solid Volume = Length X Width X Height $V = lwh$ Surface = $2lw + 2lh + 2wh$</p>
	<p>Prisms Volume = Base X Height $v = bh$ Surface = $2b + Ph$ (<i>b is the area of the base P is the perimeter of the base</i>)</p>
	<p>Cylinder Volume = $\pi r^2 \times \text{height}$ $V = \pi r^2 h$ Surface = $2\pi \text{ radius} \times \text{height}$ $S = 2\pi rh + 2\pi r^2$</p>
	<p>Pyramid $V = 1/3 bh$ <i>b is the area of the base</i> Surface Area: Add the area of the base to the sum of the areas of all of the triangular faces. The areas of the triangular faces will have different formulas for different shaped bases.</p>
	<p>Cones Volume = $1/3 \pi r^2 \times \text{height}$ $V = 1/3 \pi r^2 h$ Surface = $\pi r^2 + \pi rs$ $S = \pi r^2 + \pi rs$ $= \pi r^2 + \pi r\sqrt{r^2 + h^2}$</p>
	<p>Sphere Volume = $4/3 \pi r^3$ $V = 4/3 \pi r^3$ Surface = $4\pi r^2$ $S = 4\pi r^2$</p>

Middle School Math Glossary of Terms

Term	Definition
Absolute Value	The distance of a number from zero; the positive value of a number
Acute Angle	A positive angle measuring less than 90 degrees
Acute Triangle	A triangle each of whose angles measures less than 90 degrees
Additive Identity	The number zero is called the additive identity because the sum of zero and any number is that number.
Additive inverse	The additive inverse of any number x is the number that gives zero when added to x . The additive inverse of 5 is -5.
Adjacent angles	Two angles that share both a side and a vertex.
Angle	The union of two rays with a common endpoint, called the vertex.
Arc	A portion of the circumference of a circle.
Area	The number of square units that covers a shape or figure
Associative property of addition	$(a + b) + c = a + (b + c)$
Associative property of multiplication	$(a \times b) \times c = a \times (b \times c)$
Average	A number that represents the characteristics of a data set.
Axis of symmetry	A line that passes through a figure in such a way that the part of the figure on one side of the line is a mirror reflection of the part on the other side of the line.
Base	The bottom of a plane figure or three-dimensional figure.
Bisect	To divide into two congruent parts.
Box and whisker plot	A type of data plot that displays the quartiles and range of a data set.
Cartesian coordinates	A system in which points on a plane are identified by an ordered pair of numbers, representing the distances to two or three perpendicular axes.
Central angle	An angle that has its vertex at the center of a circle.
Chord	A line segment that connects two points on a curve.
Circle	The set of points in a plane that are a fixed distance from a given point, called the center.
Circumference	The distance around a circle.
Coefficient	A constant that multiplies a variable.
Collinear	Points are collinear if they lie on the same line.
Combination	A selection in which order is not important.
Common factor	A factor of two or more numbers.
Common multiple	A multiple of two or more numbers.
Commutative property of addition	$a + b = b + a$.
Commutative property of multiplication	$a \times b = b \times a$.
Complementary angles	Two angles whose sum is 90 degrees.
Composite number	A natural number that is not prime.
Cone	A three-dimensional figure with one vertex and a circular base.
Congruent	Figures or angles that have the same size and shape.
Constant	A value that does not change.
Coordinate plane	The plane determined by a horizontal number line, called the x -axis, and a vertical number line, called the y -axis, intersecting at a point called the origin. Each point in the coordinate plane can be specified by an ordered pair of numbers.
Coplanar	Points that lie within the same plane.

Counting numbers	The natural numbers or the numbers used to count.
Counting principle	If a first event has n outcomes and a second event has m outcomes, then the first event followed by the second event has n times m outcomes.
Cross product	A product found by multiplying the numerator of one fraction by the denominator of another fraction and the denominator of the first fraction by the numerator of the second.
Cube	A solid figure with six square faces.
Cylinder	A three-dimensional figure having two parallel bases that are congruent circles.
Data	Information that is gathered.
Decimal number	The numbers in the base 10 number system, having one or more places to the right of a decimal point.
Degree	A unit of measure of an angle.
Denominator	The bottom part of a fraction.
Dependent events	Two events in which the outcome of the second is influenced by the outcome of the first.
Diagonal	The line segment connecting two nonadjacent vertices in a polygon.
Diameter	The line segment joining two points on a circle and passing through the center of the circle.
Difference	The result of subtracting two numbers.
Digit	The ten symbols, 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The number 215 has three digits: 2, 1, and 5.
Distributive property	$a(b + c) = ab + ac$
Dividend	In $a / b = c$, a is the dividend.
Divisor	In $a / b = c$, b is the divisor.
Ellipse	The set of all points in a plane such that the sum of the distances to two fixed points is a constant.
Equation	A mathematical statement that says that two expressions have the same value; any number sentence with an $=$.
Equilateral triangle	A triangle that has three equal sides.
Equivalent equations	Two equations whose solutions are the same.
Equivalent fractions	Fractions that reduce to the same number.
Error of measurement	The difference between an approximate measurement and the actual measure taken.
Evaluate	To substitute number values into an expression.
Even number	A natural number that is divisible by 2.
Event	In probability, a set of outcomes.
Exponent	A number that indicates the operation of repeated multiplication.
Factor	One of two or more expressions that are multiplied together to get a product.
Factoring	To break a number into its factors.
Face	A flat surface of a three-dimensional figure.
Formula	An equation that states a rule or a fact.
Fraction	A number used to name a part of a group or a whole. The number below the bar is the denominator, and the number above the bar is the numerator.
Frequency	The number of times a particular item appears in a data set.
Frequency table	A data listing which also lists the frequencies of the data.
Graph	A type of drawing used to represent data.
Greatest common factor (GCF)	The largest number that divides two or more numbers evenly.
Horizontal	A line with zero slope.

Hypotenuse	The side opposite the right angle in a right triangle.
Identity property of addition	The sum of any number and 0 is that number.
Identity property of multiplication	The product of 1 and any number is that number.
Improper fraction	A fraction with a numerator that is greater than the denominator.
Independent events	Two events in which the outcome of the second is not affected by the outcome of the first.
Inequality	A mathematical expression which shows that two quantities are not equal.
Infinity	A limitless quantity.
Inscribed angle	An angle placed inside a circle with its vertex on the circle and whose sides contain chords of the circle.
Inscribed polygon	A polygon placed inside a circle so that each vertex of the polygon touches the circle.
Integers	The set of numbers containing zero, the natural numbers, and all the negatives of the natural numbers.
Intercept	The x-intercept of a line or curve is the point where it crosses the x-axis, and the y- intercept of a line or curve is the point where it crosses the y-axis.
Intercepted arc	The arc of a circle within an inscribed angle.
Interpolation	A method for estimating values that lie between two known values.
Intersecting lines	Lines that have one and only one point in common.
Inverse	Opposite. -5 is the additive inverse of 5, because their sum is zero. $\frac{1}{3}$ is the multiplicative inverse of 3, because their product is 1.
Inverse operations	Two operations that have the opposite effect, such as addition and subtraction.
Irrational number	A number that cannot be expressed as the ratio of two integers.
Isosceles triangle	A triangle with at least two equal sides.
Least common denominator	The smallest multiple of the denominators of two or more fractions.
Least common multiple	The smallest nonzero number that is a multiple of two or more numbers.
Like fractions	Fractions that have the same denominator.
Line	A straight set of points that extends into infinity in both directions.
Line of symmetry	Line that divides a geometric figure into two congruent portions.
Line segment	Two points on a line, and all the points between those two points.
Locus	A path of points.
Logic	The study of sound reasoning.
Lowest terms	Simplest form; when the GCF of the numerator and the denominator of a fraction is 1.
Mean	In a data set, the sum of all the data points, divided by the number of data points; average.
Median	The middle number in a data set when the data are put in order; a type of average.
Midpoint	A point on a line segment that divides the segment into two congruent segments.
Mixed number	A number written as a whole number and a fraction.
Mode	A type of average; the number (or numbers) that occurs most frequently in a set of data.
Multiple	A multiple of a number is the product of that number and any other whole number. Zero is a multiple of every number.
Multiplicative identity	The number 1 is the multiplicative identity because multiplying 1 times any number gives that number.
Multiplicative inverse	The reciprocal of a number.
Mutually exclusive events	Two or more events that cannot occur at the same time.

Natural numbers	The counting numbers.
Negative number	A real number that is less than zero.
Normal	Perpendicular.
Number line	A line on which every point represents a real number.
Numerator	The top part of a fraction.
Obtuse angle	An angle whose measure is greater than 90 degrees.
Obtuse triangle	A triangle with an obtuse angle.
Octagon	A polygon with 8 sides.
Odd number	A whole number that is not divisible by 2.
Operation	Addition, subtraction, multiplication, and division are the basic arithmetic operations.
Opposites	Two numbers that lie the same distance from 0 on the number line but in opposite directions.
Ordered pair	Set of two numbers in which the order has an agreed-upon meaning, such as the Cartesian coordinates (x, y), where the first coordinate represents the horizontal position, and the second coordinate represents the vertical position.
Origin	The point (0, 0) on a coordinate plane, where the x-axis and the y-axis intersect.
Outcome	In probability, a possible result of an experiment.
Parallel	Two lines are parallel if they are in the same plane and never intersect.
Parallelogram	A quadrilateral with opposite sides parallel.
Pentagon	A five-sided polygon.
Percent	A fraction, or ratio, in which the denominator is assumed to be 100. The symbol % is used for percent.
Perimeter	The sum of the lengths of the sides of a polygon.
Permutation	A way to arrange things in which order is important.
Perpendicular	Two lines are perpendicular if the angle between them is 90 degrees.
Pi	The ratio of the circumference of a circle to its diameter.
Plane	A flat surface that stretches into infinity.
Point	A location in a plane or in space, having no dimensions.
Polygon	A closed plane figure made up of several line segments that are joined together.
Polyhedron	A three-dimensional solid that is bounded by plane polygons.
Positive number	A real number greater than zero.
Power	A number that indicates the operation of repeated multiplication.
Prime number	A number whose only factors are itself and 1.
Probability	For an experiment, the total number of successful events divided by the total number of possible events.
Product	The result of two numbers being multiplied together.
Proper fraction	A fraction whose numerator is less than its denominator.
Proportion	An equation of fractions in the form: $a/b = c/d$
Protractor	A device for measuring angles.
Pyramid	A three-dimensional figure that has a polygon for its base and whose faces are triangles having a common vertex.
Pythagorean Theorem	The theorem that relates the three sides of a right triangle: $a^2 + b^2 = c^2$
Quadrant	One of the quarters of the plane of the Cartesian coordinate system
Quadrilateral	A polygon with 4 sides.
Quotient	The answer to a division problem.
Radius	The distance from the center to a point on a circle; the line segment from the center to a point on a circle.

Range	In statistics, the difference between the largest and the smallest numbers in a data set.
Rate	A ratio that compares different kinds of units.
Ratio	A pair of numbers that compares different types of units.
Rational number	A number that can be expressed as the ratio of two integers.
Ray	part of a line, with one endpoint, and extending to infinity in one direction.
Real numbers	The combined set of rational numbers and irrational numbers.
Reciprocal	The number which, when multiplied times a particular fraction, gives a result of 1
Rectangle	A quadrilateral with four 90-degree angles.
Rectangle	A quadrilateral with four 90-degree angles.
Regular polygon	A polygon in which all the angles are equal and all of the sides are equal.
Repeating decimal	A decimal in which the digits endlessly repeat a pattern.
Rhombus	A parallelogram with four equal sides.
Right angle	An angle whose measure is 90 degrees.
Right triangle	A triangle that contains a right angle.
Root	The root of an equation is the same as the solution to the equation.
Rotation	A transformation in which a figure is rotated through a given angle, about a point.
Sample space	For an experiment, the sample space includes all the possible outcomes.
Scale drawing	A drawing that is a reduction or enlargement of the original.
Scalene triangle	A triangle with three unequal sides.
Scattergram	A graph with points plotted on a coordinate plane.
Scientific notation	A method for writing extremely large or small numbers compactly in which the number is shown as the product of two factors.
Set	A well-defined group of objects.
Similar	Two polygons are similar if their corresponding sides are proportional.
Simplifying	Reducing to lowest terms.
Skew lines	Lines that are not in the same plane and that do not intersect.
Slope	The steepness of a line expressed as a ratio, using any two points on the line.
Solution	The value of a variable that makes an equation true.
Sphere	A three-dimensional figure with all points in space a fixed distance from a given point, called the center.
Square	A quadrilateral with four equal sides and four 90 degree angles.
Square root	The square root of x is the number that, when multiplied by itself, gives the number, x .
Statistics	The science of collecting, organizing, and analyzing data.
Stem and leaf plot	A technique for organizing data for comparison.
Straight angle	An angle that measures 180 degrees.
Supplementary angles	Two angles are supplementary if their sum is 180 degrees.
Surface area	For a three-dimensional figure, the sum of the areas of all the faces.
Terminating decimal	A fraction whose decimal representation contains a finite number of digits.
Translation	A transformation, or change in position, resulting from a slide with no turn.
Transformation	A change in the position, shape, or size of a geometric figure.
Transversal	A line that intersects two other lines.
Trapezoid	A quadrilateral that has exactly two sides parallel.

Tree diagram	A diagram that shows outcomes of an experiment.
Triangle	A three-sided polygon.
Unit price	Price per unit of measure.
Variable	A letter used to represent a number value in an expression or an equation.
Vertex	The point on an angle where the two sides intersect.
Vertical angles	A pair of opposite angles that is formed by intersecting lines.
Volume	A measurement of space, or capacity.
Whole numbers	The set of numbers that includes zero and all of the natural numbers.
X-axis	The horizontal axis in a Cartesian coordinate plane.
X-intercept	The value of x at the point where a line or curve crosses the x-axis.
Y-axis	The vertical axis in a Cartesian coordinate system.
Y-intercept	The value of y at the point where a curve crosses the y-axis.
Zero	The additive identity; the number that, when added to another number n, gives n.
Zero property of multiplication	The product of zero and any number is zero.

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RECOGNITION

The STEM Mentors Manual could not be completed without the enrichment activities, policies, procedures, and resources provided by the following organizations:

21st Century Community Learning Centers



GrowIndiana AmeriCorps



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