WSU Mentor Training Curriculum

WSU Pierce County Extension

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Sue Lerner, Martha Aitken, Curtis Moulton,
Brad Gaolach, Alexis Holzer, George Aszklar and Sarah Peckinpaugh

Inspire the Next Generation of Engineers!

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Inspire the Next Generation of Engineers!

Lesson 1:
Introduction to K-12 Mentoring for Engineers

WSU STEM Mentors Project:

Congratulations! You are about to make a difference in a young person's life.

When you ask an engineer what inspired them to choose an engineering career, it often is an individual such as a teacher or friend, or an experience like touring a manufacturing business, flying in a plane or visiting a construction site…or having a **mentor**.

Aerospace in the Puget Sound:

The aerospace industry in the Puget Sound area is comprised of over 700 manufacturing businesses. Currently there is a shortage of local workers to fill key industry jobs, including high paid engineering positions. Over the next 5 years, these companies face retirement of 50% of their engineers leaving even more jobs unfilled. Ensuring a robust workforce for the future is critical to maintaining the industry and the economic wellbeing of the region. We can accomplish that through a pipeline of education, and job skills training for local youth to meet the region's workforce needs.

WSU Extension:

As the outreach arm of Washington State University, the state's Land Grant University, WSU Extension engage citizens with knowledge and education that can be applied to issues affecting their community through our offices in every county. We are well known for our adult volunteer programs where we train and manage volunteers to conduct programming in the community such as Master Gardeners, Beach Watchers and 4-H Youth Development. The 4-H program, for example, has 5600 adult volunteers offering youth development programming to 85,000 kids in Washington. Our faculty and staff produce the curricula for training the volunteers and the curricula and structure for engaging the youth. Using this model, we have created a curricula to help engineers engage effectively with school-aged youth while inspiring and helping them set their sights on engineering degrees.

For the STEM Mentors Program we have created a curricula to introduce age-appropriate mentoring/coaching, effective teaching methods and youth protection procedures to engineers, providing them with enough training to make them effective and successful in the classrooms or after school programs.

STEM Mentors Pilot:

The Clover Park School District, City of Lakewood, Communities in Schools, Pierce County and local businesses clearly modeled their commitment to the community through Promise partnerships, making STEM education a priority and supporting both vocational and engineering prep programming. This created ideal environment to develop and test a program to train volunteer engineers to be effective STEM mentors in classroom and after school programs. As our first group of STEM Mentors – test pilots, so to speak – you will help us test and refine the curriculum so that it can be shared around the region.

On behalf of WSU's STEM Mentor team, we thank you for inspiring the next generation of engineers!

Curt Moulton, County Director, WSU Snohomish County Extension
Martha Aitken, Senior Associate for Urban Extension, WSU Pierce County Extension
Brad Gaolach, Urban Sustainability Specialist, WSU Extension
Alexis Holzer, Assistant Director, Economic Development, WSU
Sue Lerner, Curriculum Specialist, WSU Extension
Sarah Peckinpaugh, STEM Program Coordinator, WSU Pierce County Extension

For more information please contact: Martha Aitken, aitkenm@wsu.edu, 253-798-3259 or Curt Moulton , moultonc@wsu.edu, 425-357-5051

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BENEFITS TO MENTORS: Why become a mentor?

Mentoring gives you the extraordinary opportunity to facilitate a mentee's personal and professional growth by sharing knowledge you learned through years of experience. While the primary intent of your mentoring role is to challenge the mentee to think in new and different ways, the mentee is not the only one who gains from the arrangement. As a mentor, there are various ways you can benefit as well.

Enhance your skills. The experience you gain by mentoring someone can facilitate your own professional growth, making you more of an asset to your organization. Mentoring allows you to strengthen your coaching and leadership skills by working with individuals from different backgrounds and with different personality types. Your ability to manage people different from you is a valuable skill, especially as the workplace continues to grow more diverse.

Improve your performance. One mentor we interviewed said that mentoring gave him a new perspective and engagement in his own job. Mentoring can give you a fresh perspective on your performance as you strive to provide appropriate and accurate guidance to your mentee. Being a mentor can motivate you, too, and contribute to the success of your entire organization

Create a legacy. By becoming a mentor, you create a legacy that has a lasting impact on your mentee and the engineering field. Not only will you gain the satisfaction of helping to develop future talent, the knowledge you foster in your mentee can inspire new ideas for generations to come. Furthermore, through mentoring, you can help carry on your organization's legacy by passing on its values and mission to your mentee.

Although mentoring can be a truly rewarding experience, becoming a mentor is a big decision and one that should not to be taken lightly. The benefits to you, your company, and your mentee are well worth your effort.

BENEFITS TO STUDENTS:

- At its most basic level, mentoring helps because it guarantees a young person that there is someone who cares about them. A child is not alone in dealing with the challenge of learning STEM curriculum.
- Think back. Did you know how to study for a test or make plans for college? Do you remember wanting your first car or looking for a part-time job? Simple things that seem easy or straightforward to you now may appear to be a complete mystery to a young person.
- Mentors provide their mentees with an experienced friend who is there to help in any number of situations.

Support for education:

- Mentors help keep students in school.
- Students who meet regularly with their mentors are 52% less likely than their peers to skip a day of school and 37% less likely to skip a class (Public/Private Ventures study of Big Brothers Big Sisters).
- Mentors help with homework and can improve their mentees' academic skills.

Support with day-to-day living:

- Mentors help improve a young person's self-esteem.
- Youth who meet regularly with their mentors are 46% less likely than their peers to **START** using illegal drugs and 27% less likely to start drinking (Public/Private Ventures study of Big Brothers Big Sisters).
- About 40% of a teenager's waking hours are spent without companionship or supervision. Mentors provide teens with a valuable place to spend free time.
- Mentors teach young people how to relate well to all kinds of people and help them strengthen communication skills.

Mentoring – What is the research evidence for its effectiveness?

STATISTICS AND RESEARCH:

Research confirms what we know anecdotally or intuitively — that mentoring works.

The 2013 study "The Role of Risk: Mentoring Experiences and Outcomes for Youth with Varying Risk Profiles," examined mentoring program relationships, experiences and benefits for higher-risk youth, and among the findings determined:

The strongest program benefit, and most consistent across risk groups, was a reduction in DEPRESSIVE SYMPTOMS — a particularly noteworthy finding given that almost one in four youth reported worrisome levels of these symptoms at baseline.

Findings also suggested gains in social acceptance, academic attitudes and grades.

In addition to benefits in specific domains, mentored youth also experienced gains in a greater number of outcomes than youth in the comparison group.

Overall, the study's results suggest that mentoring programs can be beneficial for youth with a broad range of backgrounds and characteristics. Tailoring the training and support that is available to matches based on the specific risks youth face has the potential to produce even stronger benefits.

A Public/Private Ventures project funded by the Bill & Melinda Gates Foundation and distributed by MDRC, the study involved more than 1,300 youth, drawn from seven programs serving young people in Washington State. Oversight and support for the project were provided by Washington State Mentors.

VIEW THE FULL STUDY

VIEW THE EXECUTIVE SUMMARY

This report builds on existing research, including a research brief published by Child Trends and titled "Mentoring: A Promising Strategy for Youth Development" found that youth who participate in mentoring relationships experience a number of positive benefits.

In terms of educational achievement, mentored youth have better school attendance; a better chance of going on to higher education; and better attitudes toward school. In terms of health and safety, mentoring appears to help prevent substance abuse and reduce some negative youth behaviors.

On the social and emotional development front, taking part in mentoring promotes positive social attitudes and relationships. Mentored youth tend to trust their parents more and communicate better with them.

Mentoring and Academic Achievement:

High school graduation is an economic imperative in today's global economy driven by knowledge and innovation. Mentoring is a positive youth development strategy that supports the Grad Nation goal of attaining a 90 percent high school graduation rate by the Class of 2020. Research has shown that mentoring has significant positive effects on two early indicators among high school drop-outs: high levels of absenteeism (Kennelly & Monrad, 2007) and recurring behavior problems (Thurlow, Sinclair & Johnson, 2002). A landmark Public/Private Ventures evaluation of Big Brothers Big Sisters programs showed that students who meet regularly with their mentors are 52 percent less likely than their peers to skip a day of school. An analysis of mentoring program evaluations conducted by Jekielek, Moore and Hair found that youth in mentoring relationships present better attitudes and behaviors at school and are more likely to attend college than their counterparts.

Dropping out of school is not a singular event but rather the culmination of a long process of disengagement. It is critical that intervention efforts aimed at students with a disproportionate number of risk indicators for dropping out of high school reach students young enough. Children between 9 and 15 are commonly at important turning points in their lives. It is during this time that they may permanently turn off from serious engagement in school life and turn to a variety of risky behaviors that can limit their chances of reaching productive adulthood. Encouragingly, this is also the

age bracket during which preventative intervention is most successful and youth are most capable of envisioning a positive future and plotting the steps they need to take to reach their goals. They are at the right stage of development to best absorb and benefit from the skills of a strong mentor (Rhodes and Lowe, 2008).

A recent highly-comprehensive study conducted by Communities In Schools and the National Dropout Prevention Center at Clemson University identified a variety of predictive risk factors for dropping out. The report states that while there is no single risk factor that causes dropping out, each additional risk factor an individual faces increases the likelihood of dropping out. Some of the key, alterable risk factors the study cites are:

- Teen parenthood;
- Substance abuse;
- Criminal behaviors;
- Lack of self-esteem;
- Poor school performance/Grade retention;
- Absenteeism;
- Discipline problems at school;
- Low educational expectations/Lack of plans for education beyond high school; and
- Lack of interaction with extracurricular activities.

There are also numerous external risk factors for dropping out, such as gender, socioeconomic status, level of parental education, involvement with child welfare services, living in a single parent home and having a parent in prison. Given that the more risk factors a student faces the more likely he/she is to drop out, we can extrapolate that interventions aimed at reducing and removing these alterable risk factors will be more successful at preventing students from dropping out.

Mentoring by a caring adult over a prolonged period of time has been shown in countless academic studies to be effective in combating these risk factors. A number of studies have revealed a correlation between a young person's involvement in a quality mentoring relationship and positive outcomes in the areas of school, mental health, problem behavior and health (DuBois & Karcher, 2005; Rhodes, 2002; Zimmerman, Bingenheimer & Behrendt, 2005).

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Lesson 2:
Building a Successful Mentoring Relationship

Qualities of a Successful Mentor:

Mentors first need to develop trust before they can make a difference in the lives of the youth. A study conducted by Big Brothers Big Sisters concluded there are ten primary approaches to building friendship and developing trust:

- Be a friend.
- Have realistic goals and expectations.
- Have fun together.
- Give your mentee voice and choice in deciding on activities.
- Show patience if the progress is slow.
- Respect the trust your mentee places in you.
- Remember that you are responsible for building this relationship.
- Arrive on time and follow the plans
- Hold confidences, but report concerns about a student's safety

What stands in the way of a successful relationship?

- Approaching the relationship with narrow, specific goals aimed at changing the youth's behavior.
- Not meeting with your mentee on a regular consistent basis.
- Bringing in gifts on a consistent basis. It is better to focus on your time together than what you buy or bring for them.
- Trying to fix all of the problems in a child's life. Talk to your Mentoring Leader or school staff if you think your mentee needs more help than mentoring can bring.
- Trying to be a substitute parent or be a disciplinarian

Source: CISL Mentor Guide

Stages of a Mentoring Relationship:

Stage 1: Developing Rapport and Building Trust:

- Most critical of the 3 stages.
- At this stage, it is critical to be consistent and predictable with your mentee. Try not to miss meetings.
- Establish confidentiality. Discuss your role with your mentee. Remind them that what they share with you is in confidence as long as what they tell you is not going to harm them or someone else.
- Getting started. The first meeting is about getting acquainted and having fun.
- Mentee may test you at this stage by acting aloof, missing school that day, being sarcastic, etc.

Stage 2: Working Towards Goals:

- By the fourth or fifth meeting, you should be developing a friendship and begin making progress on goals.
- Your relationship will be tested. It will have its ups and downs, so it is important to affirm your commitment to the relationship.
- At the close of each meeting give positive feedback.

Stage 3: Closure:

- Acknowledge the close of the relationship at least 2 meetings before you end for the year.
- Deal with the feelings of transition. There is always a chance the student (or you) will move or be unavailable.

Source: CISL Mentor Guide

The following surveys will assist everyone involved in this mentoring relationship to get to know more about each other.

Mentor Survey:

Name: Click here to enter text.

Company for whom you work: Click here to enter text.

Position: Click here to enter text. Gender: ☐ Male ☐ Female

Favorite subject in school: Click here to enter text.

Where did you go to school: Click here to enter text.

Where did you grow up: Click here to enter text.

What are your strengths?
Click here to enter text.

What are your challenges?
Click here to enter text.

What do you do in your position/what is your typical work day?
Click here to enter text.

What do you like to do when you are not working/what are your hobbies?
Click here to enter text.

Why do you want to be a mentor?
Click here to enter text.

What do you expect from your mentee?
Click here to enter text.

What do you expect from your mentee's teacher?
Click here to enter text.

What do you want to pass on to your mentee?
Click here to enter text.

What do you expect from the WSU mentoring team?
Click here to enter text.

Teacher Survey:

Name: Click here to enter text.

Grade Currently Teaching: Click here to enter text.

Number of Students: Click here to enter text.

What have you already taught/ what do the students already know about STEM?
Click here to enter text.

What are you teaching now about STEM?
Click here to enter text.

What teaching strategies work well with your students?
Click here to enter text.

What do you believe the students need to learn/hear to increase their interest in STEM?
Click here to enter text.

What questions do you believe your students might ask their mentor?
Click here to enter text.

What would you like the mentors to assist with?
Click here to enter text.

What do you expect from the mentors that will work with your students?
Click here to enter text.

What support will you provide for mentors who work with your students?
Click here to enter text.

Elementary Student Survey:

Name: Click here to enter text.

Age:Click here to enter text. Grade: Click here to enter text. Gender: ☐ Male ☐ Female

Favorite subject: Click here to enter text.

Least favorite subject: Click here to enter text.

Favorite food: Click here to enter text.

Favorite candy: Click here to enter text.

Favorite drink: Click here to enter text.

What would you like your mentor to know about you?
Click here to enter text.

What are the school activities you are in?
Click here to enter text.

What are your favorite things to do when not in school?
Click here to enter text.

How do you help out at home and in the community?
Click here to enter text.

What do you want to be when you grow up? Why?
Click here to enter text.

What do you think engineers do?
Click here to enter text.

Middle School and High School Student Survey:

Name: Click here to enter text.

Age: Click here to enter text. Grade: Click here to enter text. Gender: ☐ Male ☐ Female

Current favorite subject: Click here to enter text.

Least favorite subject: Click here to enter text.

Favorite food: Click here to enter text.

Favorite candy: Click here to enter text.

Favorite drink: Click here to enter text.

What would you like your mentor to know about you:
Click here to enter text.

What is something that makes you curious:
Click here to enter text.

Name someone you admire and explain why:
Click here to enter text.

What school activities that are you involved in:
Click here to enter text.

What are your favorite things to do when not in school:
Click here to enter text.

What are your responsibilities at home:
Click here to enter text.

What do you want to do for a career and why:
Click here to enter text.

What do you think engineers do:
Click here to enter text.

What do you expect from your mentor:
Click here to enter text.

What do you hope to learn from your mentor:
Click here to enter text.
Thank you for providing this information.

Building Trust and Addressing the Achievement Gap:

Confidentiality:

One of the most effective ways to maintain a good relationship with your student is to respect their privacy and remember that any personal information they share with you should be kept in confidence. Mentors are not to contact their mentees parent. If there are concerns or messages that need to be delivered, the mentor should contact the Mentor Leader.

Confidentiality is the ethical principal guiding the mentoring relationship between a youth, the parent/guardian, the mentor and the school staff in which the mentor agrees to hold confidential any information shared in the course of the program unless:

- It is reasonably believed that there is danger of suicide or homicide.
- If there is an indication of child abuse or extreme neglect.

In each of the above cases, talk with a school staff person and the Mentor Leader/Teacher immediately.

The Achievement Gap:

Most national studies show that about 33% of students drop out of school each year, but for many years this percentage includes a disproportionate number of African America and Hispanic. The drop-out rate for African American and Hispanic students is 54%. Dropping out of school is a process, not an event. Our mentors play a key role in helping to close this gap.

Source: CISL Mentor Guide

The Importance of Cultural and Religious Awareness:

1. Culture is a system of beliefs, values, and assumptions about life that guide behavior and are shared by a group of people. It includes customs, language, and material artifacts. **Dropping out of school is a process not an event. A student's culture and system of beliefs play an unavoidable role in that process.**

2. **Self-Awareness:** We all have our own patterns of behavior, expectations, assumptions and values. We have all had different experiences in learning about cultural differences. We should recognize that there is not one experience that serves as a universal experience for everyone. Try to avoid making **cultural assumptions based on only your experience. Be aware that besides race and ethnicity, socioeconomic class is also a factor in an individual's culture and system of beliefs.**

3. **Answering questions about religious beliefs:** Before answering your mentee's questions about religion, consider the age of the student. Middle and high school students may be able to distinguish between a personal view and the official position of the school; very young children may not. In any case, you may answer at most with a brief statement of personal belief--but may not turn the question into an opportunity to proselytize for or against any religion. You may neither reward nor punish students because they agree or disagree with your religious views.

Source: CISL Mentor Guide

Assessing Your Mentee's Skills and Abilities:

Ask mentee what they want to work on. When they've narrowed down the goal to what you agree is reasonable, talk about how they would know they had accomplished their goal.

Ask mentee why they think they have trouble learning their goal subject? What skills do they need to learn?

Talk with the teacher

Ask mentee to show you some of their school work to see what they already know. For each goal, ***discuss*** what steps would have to be taken to achieve it. List them in order.

Plan an activity that would demonstrate the student's level of skill in accomplishing each step, for example: If the goal is to do better in math problem solving, you may list some steps to improve their success

1. Read the problem aloud and try to picture it in your mind.
2. Draw some pictures showing the problem like a comic strip
3. Explain each picture aloud
4. Identify what the problem is asking and write it in a number sentence
5. Identify which operation is necessary to solve the problem
6. Solve the problem

Ask student to demonstrate each activity and stop when it gets too hard. Fill in the gaps with your help.

Setting Goals with Your Mentee(s):

Setting goals may be handled differently depending upon the number of students are in your group of mentees. It is recommended that you adapt this goal setting process to your situation.

Why we set goals:

- Goals are an objective measurement of our program needed for our data collection/reporting to our funders.
- Goals give both mentor and mentee a measure of success and helps to give the relationship purpose and drive
- Your student should meet their personal, academic and college/career goal by the end of the school year
- Setting more than one goal in any/all of these categories is fine as long as one goal in each category is met by the end of the school year.

How to set goals:

- Goals should be set primarily by the mentee with guidance from the mentor. Avoid the temptation to set a goal based on your personal experience or school/teacher feedback.
- Use the Champions Mentor Activity Guide to help set goals.

Types of goals:

- You should set goals to work on throughout the year; an academic/school goal and a college/career goal.
- Students should try to meet these goals by the end of the year. Keep that timeline in mind while setting the goals.
- Consider setting a mid-point goal if you are starting at the beginning of the school year.
- Goals should be stated in the positive: "I will…." Instead of "I will stop…"
- Goals should follow the "SMART" criteria listed below (also in the Activity Guide)

Smart: Do you know what exactly needs to happen?
Measurable: How will you know that something has changed?
Attainable: Is this likely to happen, or do you need to break it down into smaller steps?
Result-oriented: Will you really benefit from achieving this goal?
Time-limited: What is the "due date" for getting it done?

Examples:

- Bad: "I will stop eating junk food." (stated in the negative)
- Better: "I will make healthier food choices." (stated in the positive but not specific enough)
- Best: "I will eat at least five fruits and veggies a day at least five out of seven days a week for one month." (stated in the positive and meets "SMART" criteria)
- Once met, this goal is ready for evaluation and possible continuation

Lesson 3:
Mentoring at a School: 1-1, Small Groups, Class

What to Expect at School:

Introduction to School Life

First Day:

- On your first day, a school staff person, a Mentor Leader, or the school contact person may be there to introduce you to your mentee(s) and direct you to the location in which you will meet the students. Regardless, you should always check in at the school office first thing. The school may ask you to sign in and wear a badge.
- Each time you meet during the student school day you check in at the school office.

During the year:

- You are encouraged to talk with your student's teacher to gain a better understanding of their gifts and needs. Ask the teacher the best way to communicate with them. Some like email, others would rather have a face to face discussion during their planning time.

At the end of the school year, you will know you have made a difference in your student's life if they:

- Reach their goals
- Develop new communication and life skills
- Appear more confident and self-assured
- Talk about improved relationships at home
- Show a more positive attitude about school
- Raise their grades
- Miss fewer days at school
- Show more respect for teachers
- Talk honestly and openly about their future
- Start thinking about careers, especially in STEM subjects

Roles and Responsibilities at School:

Teachers:

- Instruction and classroom climate
- Student safety
- Responding to mentor's questions
- Providing input about appropriate student activities

Principal:

- School wide curriculum, instruction, safety
- School wide climate and operations
- Communicating with parents and public

Office Manager:

- School office operations, student records
- Greeting the public
- Support to staff

• Getting Information about the School from the Website: An Example

- **This is a screen shot of the Clover Park School Districts Website Every school district and most schools have their own websites.**
- **On the main page you will see the significant dates that are coming up along with important announcements for all the schools. You will also find links to different important policies that the schools are focusing on and information on possible school closers.**

Clover Park School District Volunteer Guidelines (including confidentiality and liability): Every school district has similar Guidelines for volunteers

CLOVER PARK SCHOOL DISTRICT POLICY

Maintaining Professional Volunteer/Student Boundaries:

This policy has been put in place for staff, students, volunteers, and community members to protect children from inappropriate conduct by adults.

The Clover Park School District Board of Directors expects all volunteers to maintain the highest professional, moral and ethical standards in their interactions with students. The interactions and relationships between volunteers and students should be based upon mutual respect and trust, an understanding of the appropriate boundaries between adults and students in and outside of the educational setting, and consistency with the educational mission of schools.
An inappropriate boundary invasion means an act, omission, or pattern of such behavior by a school employee or volunteer that does not have an educational purpose and results in abuse of the volunteer/student professional relationship. Examples of inappropriate boundary invasions by staff members may include, but are not limited to the following:

(1) Any type of inappropriate physical contact with a student or any other conduct that might be considered harassment under the Board's policy on Harassment and Sexual Harassment of Students;
(2) Showing/sharing pornography to/with a student;
(3) Socializing where students are consuming alcohol, drugs or tobacco;
(4) Banter, allusions, jokes or innuendos of a sexual nature with students;
(5) Disclosing intimate personal, sexual, family, employment concerns, or other private matters to one or more students;
(6) Maintaining personal contact with a student outside of school by phone, to include text messaging, email, Instant Messenger, or Internet chat rooms, social networking websites, or letters without including/notifying a member of the Communities in Schools of Lakewood staff;
(7) Giving a student a ride alone in a vehicle;
(8) Invading a student's privacy without cause.

Reporting Violations:

Students and their parents/guardians are strongly encouraged to notify the principal, school mentor contact, or a Communities In Schools of Lakewood staff member if they believe a volunteer may be engaging in conduct that violates this policy. Volunteers and staff members are required to promptly notify the principal, school mentor contact, or a CISL staff member if they become aware of a situation that may constitute a violation of this policy. Staff and volunteer violations of this policy may result in disciplinary action up to and including dismissal. The violation may also be reported to the state Office of Professional Practices. Violations involving sexual or other abuse will also result in referral to Child Protective Services and/or law enforcement in accordance with the Board's policy on Reporting Child Abuse and Neglect.

In order to ensure that your mentoring relationship gets off to a good start, it is a good idea to set some basic expectations of all involved. At one of your first meetings, try to complete this Agreement. It will take some discussion to decide what will work best for all involved.

WSU Mentor/Leader Agreement and Negotiated Expectations:

Mentor Name:	Leader Name:
Name of business/company:	Name of school
Contact Information: (check preferred contact method) ___ Office Phone: _____ ___ Cell Phone: _____ ___ Other Phone: _____ ___ E-mail: _____	Contact Information: (check preferred contact method) ___ Office Phone: _____ ___ Cell Phone: _____ ___ Other Phone: _____ ___ E-mail: _____
If you have a last minute change in schedule or need to cancel, contact me via:	If you have a last minute change in schedule or need to cancel, contact me via:

Discuss all topics below and initial when completed

Regular Time Commitment: Frequency (ex. weekly, daily) Day(s) of the week: Time: Location: Mentor Initials_____	Leader Initials_____
I will be on time Mentor Initials_____	I will be prepared for your arrival Leader Initials____
I will inform you in advance if I have any schedule changes - not at the last minute. Mentor Initials_____	I will inform you in advance if I have any schedule changes - not at the last minute. Leader Initials____
I will support the objectives of your classroom or program and respect you as the leader in the presence of students. Mentor Initials_____	I will support your activities and respect that you are volunteering your time to help the students. Leader Initials_____
I will do my best to manage student behavior, but it is not my responsibility to discipline students. Mentor Initials_____	I will support you in managing students and will handle all student disciplinary issues. Leader Initials_____
I will not be in the room alone with students	I, or another member of our staff, will be present

Mentor Initials_____	when you are in the room with the students. Leader Initials_____
We will work together to plan activities. Mentor Initials_____	Leader Initials_____
I am not required to provide supplies. I will discuss supplies in advance and I will work with you to make sure that supply costs stay within your budget. Mentor Initials_____	I will not expect you to provide supplies for your activities. I will provide you with supplies that are within my budget for projects we have planned. Leader Initials_____
Working together may take some negotiating. We will communicate honestly and respectfully when providing input, and will resolve small problems in a timely manner. Mentor Initials_____	Leader Initials_____
I will appreciate constructive feedback to help me relate to students and to be a successful mentor. Mentor Initials_____	I will provide constructive feedback to help you relate to students and to be a successful mentor. Leader Initials_____

Additional items to be negotiated as needed:

Mentor Initials_____	Leader Initials_____
Mentor Initials_____	Leader Initials_____
Mentor Initials_____	Leader Initials_____

We enter into this arrangement with the best of intentions, to help inspire and empower students.

_____ _____

Mentor Signature and Date Leader Signature and Date

Suggested Mentor Guidelines:

Gift Giving:

The greatest gift you can give is your time. The desire to give your student gifts is natural but you should resist the temptation, unless what you are giving is related to their personal or academic growth, and costs less than $10.00. For example, if the child mentions that their birthday is coming up, you could ask them what craft they'd like to do with you and you could bring materials to make something for the meeting that is near their birthday.

Food and Drink:

Please refrain from bringing food. Your mentee may be on a restricted diet or have food allergies. An exception might be if the guardian gave permission for the mentee to share food or to bring a treat for a holiday or birthday to share.

Phones, cell phones, email and social media:

Phone numbers, addresses and/or e-mail addresses may not be exchanged. If you want to write to your mentee you can send it to the Mentor Leader who will forward it to the student. The exchange of phone/cell phone numbers is prohibited. Contact with your mentee via social media (Facebook, Twitter, etc.) is prohibited as well. Students are not allowed to use a cell phone during the school day anywhere on campus, so remember to place yours on silent when meeting with your mentee.

Additional Meetings with Students:

Parents and students aren't always fully aware of program guidelines. Requests may be outside of the program limits. Explain that the program does not allow you to have a student in your car, meet the student in another location, or spend extra time with the student outside of school. Attending school sponsored activities that your mentee is involved in (band concerts, plays, field trips, etc.) is permitted.

Transportation:

Mentors are not permitted to transport their mentees. If you are meeting with your mentee during an after school program/ activity they will have prearranged transportation. Please contact your school mentor contact or the Mentor Leader for any questions you may have.

Meeting Places:

Chose public places (classrooms, cafeteria, hallway, library, courtyard) to meet with your mentee. Avoid private rooms. Always meet with the door open.

Source: CISL Mentor Guide

Classroom Observation:

It often helps to observe in the classroom before actually jumping in. Below you will find some suggestions about what to look for during your observation.

1. A good lesson usually provides the students with a clear idea of what they are going to learn. Did you see evidence that the students understood what they were supposed to learn? What evidence did you see?

2. What teaching strategies did the teacher use to help the students learn?
   (examples: lecture, reading aloud, visuals, activities, experiences, etc)

3. Was this lesson one in a series? If so, could you tell what had been taught previously on which this lesson was built? If so, how could you tell?

4. How did the teacher check during the lesson to see if the students were following the lesson and learning what they were supposed to learn? Observe the students to see if they are engaged in the lesson? Write what you saw the teacher and students do.

5. What strategies did the teach use to keep the students interested in the lesson?

6. What did the teacher do about behavior disruptions? If you saw no disruptions, what did the teacher do to prevent them?

Common Core State Standards:

Washington Common Core State Standards can be found at Common Core State Standards & other curriculum information.

Common Core is a real-world approach to learning and teaching. Developed by education experts from 45 states, these K-12 learning standards go deeper into key concepts in math and English language arts. The standards require a practical, real-life application of knowledge that prepares Washington students for success in college, work and life.

Common Core provides:

- Consistent learning expectations for all students.
- Clear standards that focus on understanding over memorization.
- Emphasis on the critical topics students need to succeed after high school.
- Faster testing results with a better, more focused online assessment system.

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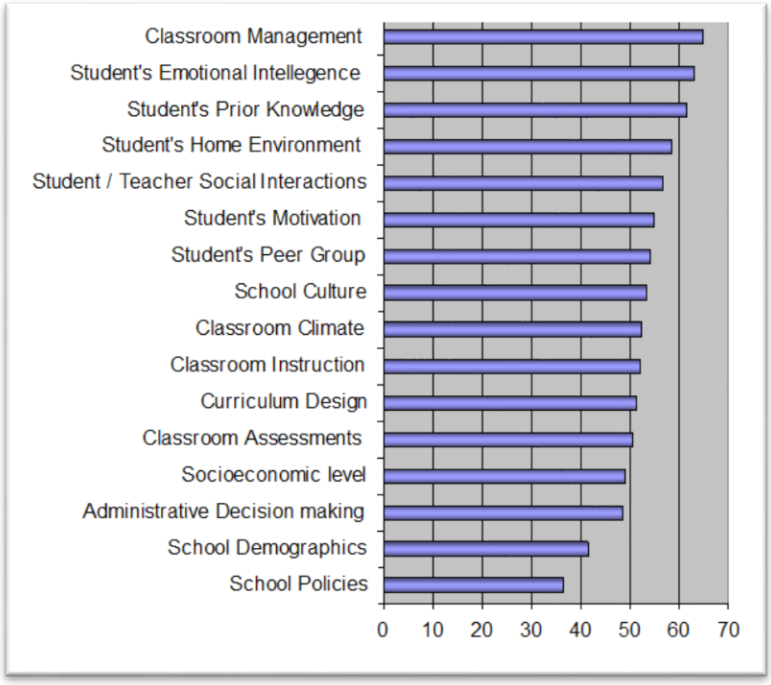
Lesson 4:
Mentoring/Teaching Skills and Strategies

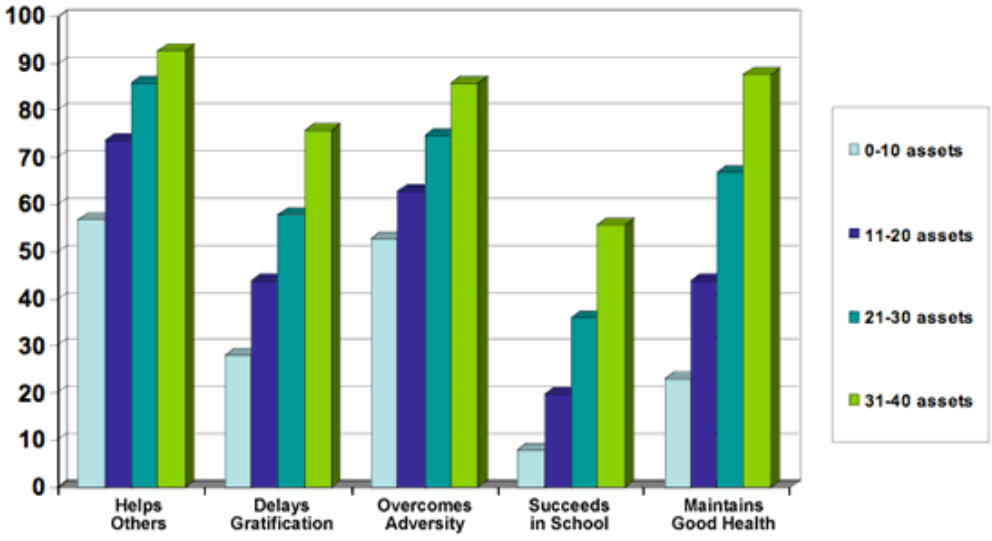
What Factors Promote Learning?:

Research reveals the factors impacting the highest percentage of students.



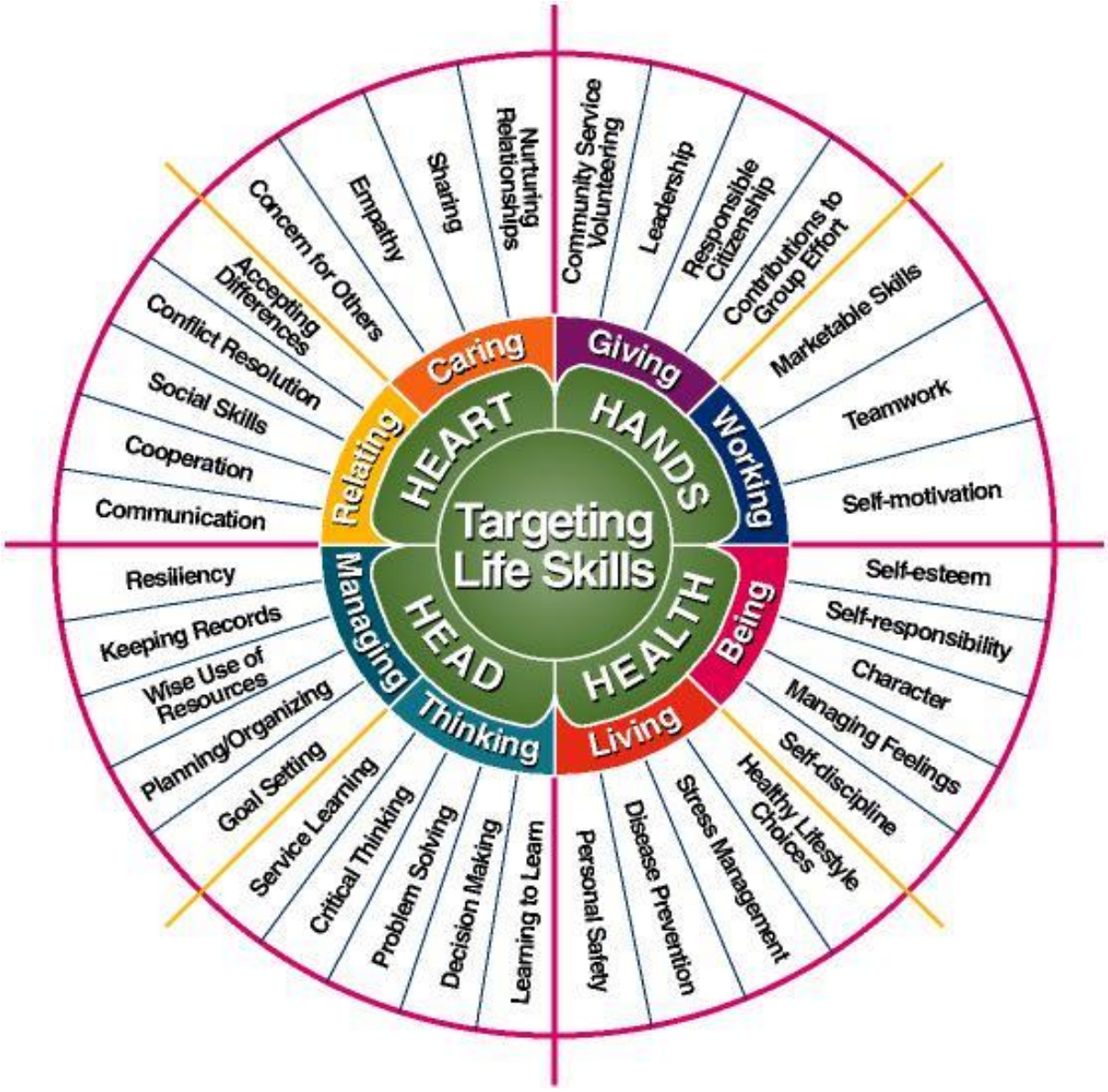
Psychology and Educational Practice, Herbert Walberg (2002)

What are the factors (assets) within each student, their family and their school/community that promote school success? This research evidence is the basis of effective practices in the field of youth development as exemplified by 4-H curriculum.



Search Insitute, www.search-institute.org, 2004

The 4-H Life Skills wheel demonstrates an application of the 40 Assets within the 4-H programs. A well prepared student will demonstrate all skills but probably excel in some over others. STEM instruction will focus on Relating, Managing, Working and Thinking skills.



Youth Development:

CHARACTERISTICS OF 5-8 YEAR OLDS:

From Ohio State University Extension 4-H http://ohioline.osu.edu/4h-fact/0015.html

Physical:

- Are mastering physical skills
- Have better control of large muscles than small muscles
- Slow, steady growth

Social:

- Are learning how to be friends and may have several "best friends" at a time
- Opinions of peers are becoming more important. Often care more about being successful in front of peers than parents.
- Are beginning to better observe other people
- Are beginning to experience empathy for others, but still learning about and wrapped in self
- Are family-oriented
- Dependence on another adult besides parent becomes a new experience

Emotional:

- See fairness as "the golden rule." Cooperative games are especially enjoyable. Competition with others is inappropriate.
- Seek parental or adult approval but are becoming emotionally steadier and freer from parents
- Tend to behave in ways to avoid punishment
- Like to play games. Rules and rituals become paramount, but not yet ready to accept losing.

Intellectual:

- Generalize from their own experiences. Very concrete at this age–like to see it, hear it, taste it, feel it, smell it.
- More interested in process than the final product. Will continue working on a project rather than completing it.
- Base their thinking in reality and accuracy
- Are learning to sort things into categories and series
- Are beginning to develop a sense of cause-effect
- Handle well only one mental operation at a time
- Can distinguish between reality and fantasy–but still afraid of scary figures
- Enjoy activities that are real and tangible. You must demonstrate an activity – not just describe it verbally.

CHARACTERISTICS OF 9-12 YEAR OLDS:

Physical:

- Experience steady increases in large muscle development, strength, balance and coordination. Growth is slow for most children of this age range.
- Are quite active with boundless energy. Activities should encourage physical involvement.
- Are maturing at differing rates between the sexes
- Are increasing in manual dexterity; small muscle coordination

Social:

- Generally see adults as authority and follow rules out of respect for adults
- Believe punishment should be a direct consequence of misbehavior
- Want to know how they have improved and what they should do to be better next time
- Don't like comparisons with others
- Feel loyal to group, club, gang. Enjoy code language and passwords
- Identify with same-sex group. May prefer to be with members of the same sex.
- Prefer working in groups in cooperative activities
- Expand and use reasoning skills to solve problems, negotiate and compromise with peers
- Individual evaluation by an adult is preferable to group competition where only one can be the best

Emotional:

- View right behavior as "obeying rules set by those in authority"
- Accept parent/family beliefs
- Admire and imitate older boys and girls. Success should be emphasized; failures mimized
- Are developing decision-making and leadership skills.
- Are making some movement toward taking responsibility for own actions
- Emphasize the similarities between self and friends
- Are beginning to question parental authority
- Look to adults for guidance and approval
- Find comparisons with the success of others difficult and eroding of self-confidence. Still don't handle competition well
- Strong need to feel accepted and worthwhile

Intellectual:

- Vary greatly in academic abilities, interest and reasoning skills
- Concrete thinkers–like to see, feel, smell, hear or taste
- Have increased attention span, but have many interests which change rapidly
- Are beginning to think logically and symbolically. Still prefer concrete ideas
- Are learning to use good judgment
- Judge ideas in absolutes–right/wrong; great/gross; fun/boring
- Want to use their skills to explore and investigate the world
- Have interest in collections and hobbies
- May express feelings through creative writing. Like to share thoughts and reactions

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CHARACTERISTICS OF 13-15 YEAR OLDS:

Physical:

- Exhibit a wide range of sexual maturity and growth patterns between genders and within gender groups. This is a time of great developmental variety.
- Experience rapid changes in physical appearance; makes teens uncomfortable.
- Growth of hands and feet, nose and ears may be faster than arms or legs and face, causing concern for appearance and clumsiness and embarrassment.

Social:

- Are interested in activities involving the opposite sex; learning to co-exist with the opposite sex
- Are looking more to peers than parents. Seek peer recognition.
- Seek acceptance and trust from peers and adults.
- Search for adult role models; may belong to fan clubs
- Tend to reject ready-made solutions from adults in favor of their own
- Begin to question authority and family values; testing values.

Emotional:

- Compare themselves to others, but would rather have adults compare them to their past performance.
- Are concerned about physical development and emerging sexuality
- See themselves as always on center stage; emotions on a roller-coaster ride.
- Are working on forming a sense of continuity between inner and outer self
- Body changes can set up situations of great embarrassment
- Are concerned about social graces, grooming and being liked by friends
- Abandon view of parents as all-powerful
- Strive for independence, yet want and need parent's help
- Need information for making decisions, but still think in all-or-nothing terms.
- Seek privacy from adults/parents
- Want to be part of something important; service projects are of great interest
- Need to be re-assured that some uneasiness about self is normal at this time.

Intellectual:

- Find justice and equality to be important
- Moving from concrete to thinking abstractly and hypothetically.
- Are developing skills using logic. Understand cause-effect
- Can solve problems that have more than one variable. Enjoy mental problems.
- Can imagine consequences. Can think about thinking.
- Are ready for in-depth, long-term experiences. Like physical activity.
- Have moved from fantasy to realistic focus on their life's goals
- Challenge assumptions or ready-made solutions provided by adults.
- Want to explore the world beyond their community; concerned for environment

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CHARACTERISTICS OF 16-18 YEAR OLDS:

Physical:

- Are concerned about body image, but more comfortable with their adult appearance
- Exhibit smaller range in size and maturity among peers than other ages; they "fit" their bodies better and are less awkward and clumsy
- Tend to have realistic view of limits to which body can be tested
- Some late-maturing boys still experience growth spurts at this time
- Able to perfect some athletic abilities during intense training and competition

Social:

- Tend to romanticize sexuality; but are moving toward a more realistic understanding. Dating increases
- Search for intimacy; test sexual attractiveness to others
- Willing to make commitments; Can commit to follow through with service
- See adults as fallible but they want adults to provide consistency to their lives
- Desire respect; friendships at this stage are intense, close and long-lasting
- Renegotiate relationships. At this stage, teens are very much wrapped up in themselves
- Want to take on adult leadership roles; want to be recognized as individuals

Emotional:

- Desire respect, independence and identity. still seek status and approval of peer group
- Are beginning to accept and enjoy their own uniqueness
- Look for confidence of others in their decisions
- Develop their own set of values and beliefs
- Take on multiple roles. Gain autonomy
- Are introspective. Can see self from viewpoint of others
- Take fewer risks than earlier age groups
- Can initiate and carry out their own tasks without the supervision of others
- Search for career possibilities
- Desire a role in determining what happens in their world; increasing responsibility

Intellectual:

- Are mastering abstract thinking. Find it difficult to compromise on important issues
- Can imagine impact of present behavior on the future
- Enjoy demonstrating acquired knowledge
- Are apt to reject goals set by others
- Can consider many perspectives of a given issue.
- Develop theories to explain how things happen or work
- Create new possibilities from information
- Will lose patience with meaningless activities; time is too precious to waste

Experiential Learning:

Experiential learning is the process of finding meaning through direct experience. Many people may find that they learn better by doing rather than by watching or reading. Below are some questions that you can ask to guide your mentees to the meaning of the activity you are doing with them.

Sharing what you did:

1. What did you like about this activity?
2. What part of this activity was hardest to do?
3. How did you decide what to choose?
4. What was the most fun about doing this activity?
5. How did it feel to do this activity?
6. How did your group work together?
7. What happened during this activity?
8. What did you observe?
9. What does it feel like to pretend to _____?
10. What kinds of _____ did you discover?
11. How did you learn _____?
12. What help did you get?
13. How did feel about successfully being able to _____?
14. What are some decisions you had to make to carry out this activity?
15. What steps did you go through before you made your decision?
16. How do you feel about _____ before the activity? After the activity?
17. What did you learn about _____?
18. What was the easiest to do?
19. Why do you think everyone in your group didn't agree about _____?
20. How did you feel about this game?
21. What was it like to have to make quick decisions?
22. How did you keep track of everyone's ideas?
23. Do you think you get more ideas working alone or in a group? Why?
24. How did you feel about you role?
25. If you did not know _____ before, how did you figure it out?
26. How do you feel about doing _____?
27. What were some of the things that were hard to understand when you started _____?
28. What kinds of feelings did you have when the group members argued?
29. What did you observe about the way the groups disagreed (or agreed)?
30. What did you do to plan and conduct the activity?
31. What did you learn about conducting an activity?
32. How was this different from _____?
33. Tell us about your experience doing _____?
34. What surprised you about _____?
35. What skills do you need to have in order to _____?
36. How did you use you various senses to learn?
37. Why do you think people have different ideas about what is correct?

Processing what's important:

1. What did you learn about yourself by doing this activity?
2. Why is it important to know _____?
3. How did you group decide to _____?
4. What did you learn as a group that you might not have learned alone?
5. What were some common themes or thoughts you heard?
6. How were each person's viewpoints the same? How were they different?
7. What is your favorite way of _____?
8. Why is it important to think through and decide _____?
9. What problem came up over and over?
10. What was this a fun way to learn _____?
11. How does having fun help you learn?
12. What would you do if _____ were to happen?
13. How did you work together with your group to _____?
14. What did your learn about making decisions?
15. What did your learn about communicating with others?
16. What types of communication helped you make your decisions? Why?
17. How have _____ been important in your life?
18. Why is it important for others people to know _____?
19. What was hard about trying to _____?
20. How did others help you _____?
21. Why is it important to be able to _____?
22. How so you tell the difference between _____?
23. Why is it important to _____?
24. What was easy or difficult about working with a group to _____?
25. What did you do if everyone in the group didn't agree on _____?
26. What did the "leader" do to make you feel he or she was the group leader?
27. Why is it important to learn the proper way to _____?
28. What was the most challenging or difficult part of this activity?
29. What did you learn from this activity that you did not know before?
30. How did this differ from the way you are usually taught at school?
31. Give an example of a challenge you had and what you did to solve it?
32. What works best to get people involved and excited about doing this type of activity?
33. Why is learning with others sometimes more fun than learning alone?
34. What suggestions would you have for someone who wanted to _____?
35. What made this a good activity?

Generalizing (So What?):

1. How will learning _____ help you?
2. What other situations like this have you experienced?
3. Why is knowing _____ important?
4. Why is it important that each person has his/her own view?
5. When have you had to _____ before?
6. Where can you find resources (books or knowledgeable people) to help you make some of your decisions about_____?
7. When else have you had fun and learned new things at the same time?
8. Why is it important to have plenty of information before making decisions?
9. When do you make decisions that require everyone in the group to agree?
10. What do you do when you don't agree with the group?
11. What did you learn about your own skill in making decisions?
12. What did you learn about your own skill in communicating with others?
13. Describe five ways in which new ideas are communicated to you?
14. In what ways do people help each other learn new things?
15. What are some ways you like to learn?
16. Where can you go to find information you may need to _____?

Communication with Your Mentee:

Good communication is key in any relationship. The mentoring relationship is no different. Below you will find some tips for implementing "active listening" within your mentoring relationship.

Paraphrasing/Reflective Listening:

Reflecting Content:

- Paraphrase or repeat back what the mentee has said, using your own words, so that the mentee knows that they are being heard.
- Reflecting content can also give them the chance to correct you, sending the message that you care about understanding their experience or point of view. You also model being able to tolerate being wrong and corrected.
- Example: "You didn't want to go back to school after the fight because everyone would stare at you, is that what you are saying?"
- Example: "Sounds like your brother and sister get all the attention from your parents because they are younger…"

Reflecting Emotion:

- Do this so that your mentee knows that you understand and empathize with their experience and This helps them develop a language to identify their own feelings.
- You also send a message that it's okay for them to feel what they feel.
- Reflect or mirror back to your mentee the underlying feelings that they might be expressing.
- Example: "You seem embarrassed and angry that the kids in school might stare at you and wonder about your fight."
- Example: "Sounds like you feel hurt and jealous that your mom seems to give more attention to your brother and sister."

Summarizing:

Summarizing goes one step further as it attempts to condense and crystallize the main point of what the mentee has been talking about over a period of time – and then reflects that back to the person/mentee.

Mentors can use this technique to…

1. Structure the meeting by recalling the content of the previous meeting(s) and asking a question which engages the mentee to look more in depth at what they have told you.
2. Condense the mentee's content, especially if the content has been confusing or scattered.
3. Draw connections between different elements of the mentee's story/life experiences.

Asking Questions:

Questions can help get a mentee to tell you more and also show that you are interested in the details of their life. Too many questions, especially close-ended (yes or no answer questions) might shut a mentee down. Close-ended questions aren't necessarily bad, but open-ended questions encourage more dialog and expression by mentee.

Examples of open-ended questions:

1. How do you get along with your mom?
2. What is difficult about math for you?
3. How did you feel when your friend made fun of you?

Examples of closed-ended questions:

1. Does you mom get mad at you often?
2. Do you like school?

3. Did you get angry?

Nonverbal Communication:

Messages and Cues:

- Is your mentee fidgeting, scowling, trembling or smiling? Are they clenching their fist, averting their eyes or forcing a smile? What does their non-verbal language communicate? Does what they are saying match their non-verbal language?
- You can reflect back to your mentee any non-verbal cues that you notice as well as what is verbally stated.

Other Communication:

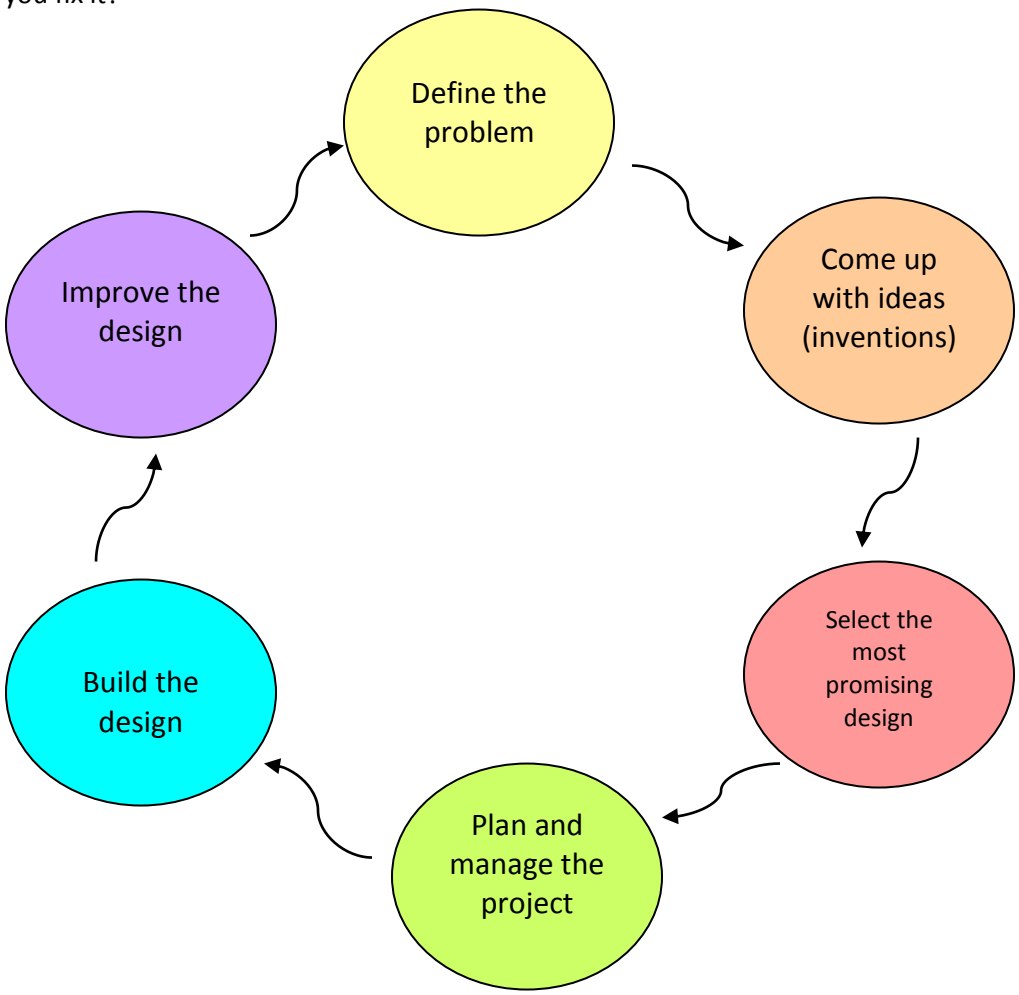
Decision-Making:

- Help your mentee explore all possibilities and come to a conclusion on their own.
- Explore pros and cons of a particular situation or idea.
- Reflect that it's okay to feel ambivalent or confused.
- Speak of their ambivalence and ask them to delay a decision until they feel sure about what is best for them.
- Avoid the temptation to lecture or give unsolicited advice.

How to Teach Design Theory and Prototyping:

Steps in Engineering Design Process:

1. Define the problem:
   - What is the problem that needs an answer?
2. Come up with ideas (inventions):
   - Brainstorm a list of ideas on ways to solve the problem.
3. Select the most promising design:
   - Pick the solution that makes the most sense to you.
4. Plan and manage the project:
   - What do you need?
   - Is there anything you need to be safe?
5. Build the design
6. Improve the design:
   - What went wrong?
   - How can you fix it?



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Engineering Design Process:

The engineering design process is a series of steps that engineers use as a guide to solve problems. Some engineers may have adapted these steps to fit in with what they do every day; however, we have come up the basic steps that are almost always included. With these steps, anyone can be an engineer and solve problems like they do every day.

Step one is to define the problem. Before an engineer can solve the problem, they need to know what the problem is first. To do this they think about what the need is, what is their goal, who is the customer is, if there are any limitations to the problem, if there are any special problems. Once these questions are answered they can fully understand what the problem is.

The next step is to brainstorm ways to solve the problem. In this step it is good to have the mind set that no idea is a bad idea and to just think of every possible solution. Once they cannot think of any more possible solutions, the next step is to pick the solution that will best answer the problem. Engineers do this by going through their list of ideas and seeing if they are realistic or if they meet all the aspects of the problem.

After the solution that best solves the problem is picked, then they plan out how they will go about making the solution chosen. Engineers think about the supplies that they may need such as what kinds of tools, if they need extra people to help, or if they need a larger space. They also think about any potential safety concerns that could possibly arise, for example, if the tools required can hurt someone or if someone has a medical condition that could hinder them if they helped.

The second to last step in the engineering process is to actually build a prototype of the solution to see if it actually solves the problem. And finally, they will take the prototype and test it to see if it solves the problem and what they can do to improve what they have made.

An example for a young child could be how to make a sandwich. The child would work through the steps of the engineering design process to solve the problem. Step one is already answered, how to you make a sandwich? Step two is where they would list all of the possible ways to make a sandwich, such as, putting the meat on the outside of the bread, or the bread in the middle of the peanut butter and jelly, etc. It is important for the adult who is helping the child to not contribute ideas and to let the child learn on their own. Then the child should pick the best idea that they come up with and start to plan out what they needed to make the sandwich. For example, if the child thought that the bread in the middle of the peanut butter and jelly was the best way to make a sandwich, they would need peanut butter, jelly, bread, a knife, a plate, and probably a towel. Then the child would build the sandwich and see if there was anything that went wrong when building the sandwich and how they could make it better.

Good Website for activities: http://www.teachengineering.org/engrdesignprocess.php

Lesson 5:
Managing Student Behaviors

Classroom Behavior Management:

GREETING THE GROUP or CLASS FOR THE FIRST TIME:

The first time you meet the group or class is the best time to set ground rules for the behavior you want from students. You will want to know what rules and procedures the teacher has already established for the following:

- Quieting the students and getting their attention
- Answering questions (raising hands or not?)
- Distributing materials
- Working in teams/groups
- Rewarding good behavior
- Consequating inappropriate behavior (plans for special
- education students or those who find it hard to be still)
- Moving about the room
- Moving outside (lines, groups, noise, etc.)

You may choose to follow the procedures previously set by the teacher, or you may do things differently. IF YOU ESTABLISH YOUR PROCEDURES THE FIRST TIME YOU MEET, and you REINFORCE THEM CONSISTENTLY, you have the best chance for appropriate behaviors by your students.

QUIETING THE GROUP AND GETTING THEIR ATTENTION:

- Identify a signal for quiet (use the teacher's, IF it works)
- At first, use the signal often, and immediately reward those who follow it
- Consequate those who do not quiet down and pay attention
- (identify the desired behavior and delegate the solution to teacher)
- Some students need extra structure

POSING QUESTIONS:

The most effective questioning strategies promote WHOLE-GROUP RESPONSES that give the educator an indication of what the students know. For example, use one of the following ON YOUR SIGNAL:

- Thumbs up, down, side
- Point to the answer on the chalkboard
- Show your answer on a card
- Stand up
- Touch your nose, ear, head, etc.

WHEN INDIVIDUAL RESPONSES ARE REQUIRED: to ensure that all students have equal opportunities to respond, place each student's name on a popsicle stick or paper and select from these when an individual answer is required. Place the names of those students who have answered in a separate container. When all have had a turn, then start over with all the names again.

DISTRIBUTING MATERIALS:

Try to delegate responsibility to students. You must train them and reinforce the training. You can use responsibilities as rewards for good behavior and/or to maintain engagement for students who have difficulty being still.

- Place materials at the center of tables. Teach students not to touch until you give directions to do so.
- Place materials at a central table. Identify students on each team to be "go getters" and "returners".

WORKING IN TEAMS OR GROUPS:

Some activities require students to work in teams. If students are not already organized this way, you will need to establish some new teams for use only during our lessons. Discuss this with the teacher in advance, and ask the teacher to reorganize the students before you arrive each time, if possible.

Organizing the class into teams allows you to engage more students during the lesson. Each group can prepare to compete with one another for:

- Best behavior
- Fastest workers
- Highest quality of product
- Most creative
- Competition has its place, but too much isn't good.

REWARDING GOOD BEHAVIOR:

Teach the behavior you want and the signal you will use.

- Clearly define it. Model it.
- Practice it.
- Identify non examples.
- Praise good behavior often
- Provide lots of opportunities to practice good behaviors
- Can use a point system

CONSEQUATING INAPPROPRIATE BEHAVIOR:

- At first, ignore inappropriate behaviors and obviously praise
- good behaviors.
- One or two reminders (preferably not in public)
- Move closer in proximity to up the awareness of the student
- Seat the student closer to you and away from others
- Remove the student from the group for a short time
- Make a plan with the student and teacher

MOVING STUDENTS ABOUT THE ROOM:

Establish a travel pattern (clockwise or counterclockwise) around the outside perimeter of the desks.
Students will get up and move in a routine manner, on your signal, walking.

MOVING STUDENTS OUTDOORS:

- Safety is foremost concern. Students should walk in a line quietly. To maintain quiet, you can direct
- Group lip synch
- Tiptoe through halls, stomp outside
- Follow the leader game

Lesson 6:
Program Evaluation and Progress Monitoring

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Benchmarks:

Purpose: This document should be used to focus the curriculum and direct what is measured in evaluation.

Program Goal: Students declare their college major in a STEM discipline and they report that a STEM Mentor influenced their career choice

P.1 Primary Benchmark: At high school graduation, the average math and science test scores for the student body are increasing

P.1.1Sub Benchmark: Mentored students report that STEM Mentor has helped them achieve improved benchmark math and science scores

P.1.2 Sub Benchmark: Mentors report using skills and information taught in training to build effective student relationships and successfully support students in achieving this benchmark

P. 2 Primary Benchmark: At the end of eighth grade, an increasing percentage of students have met the Common Core State Standards in mathematics (see Addendum A) and sciences (see Addendum B)

P.2.1 Sub Benchmark: Mentored students report that STEM Mentor has helped them achieve improved benchmark math and science scores

P.2.2 Sub Benchmark: Mentor using skills and information taught in training to build effective student relationships and successfully support students in achieving this benchmark

P.3. Primary Benchmark: At the end of 4th grade, an increasing percentage of students have met the grade 4 Common Core State Standards in mathematics (see Addendum C) and science (see Addendum D)

P.3.1 Sub Benchmark: Mentored students report that STEM Mentor has helped them achieve improved benchmark math and science scores

P.3.2 Sub Benchmark: Mentor using skills and information taught in training to build effective student relationships and successfully support students in achieving this benchmark

Operation Goal: STEM Mentor program is adopted in school districts around Washington State by 2019

O.1 Primary Benchmark: STEM Mentor curriculum is fully self-contained and accessible for use by other educators

O.1.1 Sub Benchmark: Curriculum has been fully articulated, pilot tested, operationally evaluated and revised as necessary

O.1.2. Sub Benchmark: Feedback loops from stakeholders have been incorporated to evaluate Program activities and inter-relationships

O.1.3 Sub Benchmark: All STEM Mentor curriculum and supporting resources are available online

Prepared by Curt Moulton and Sue Lerner 11.15.13

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This curriculum is designed to promote student learning of the Common Core State Standards listed below.

Addendum A: Common Core State Standards in Mathematics Grade 8

The Number System
Know that there are numbers that are not rational, and approximate them by rational numbers.
Expressions and Equations
Work with radicals and integer exponents.
Understand the connections between proportional relationships, lines and linear equations. Analyze and solve linear equations and pairs of simultaneous linear equations.
Functions
Define, evaluate and compare functions.
Use functions to model relationships between quantities.
Geometry
Understand congruence and similarity using physical models, transparencies or geometry software. Understand and apply the Pythagorean Theorem.
Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.
Statistics and Probability

Investigate patterns of association in bivariate data.

MS-PS1 Matter and Its Interactions http://www.nextgenscience.org/msps1-matter-interactions

MS-PS2 Motion and Stability: Forces and Interactions
http://www.nextgenscience.org/msps2-motion-stability-forces-interactions

MS-PS3 Energy http://www.nextgenscience.org/msps3-energy

MS-PS4 Waves and Their Applications in Technologies for Information Transfer
http://www.nextgenscience.org/msps4-waves-applications-technologies-information-transfer

Addendum B: Common Core State Standards in Sciences Grade 8

Life Sciences: Storyline

http://www.nextgenscience.org/sites/ngss/files/MS%20LS%20DCI%20Storyline%204%209%2013.pdf

MS-LS1 From Molecules to Organisms: Structure and Processes
http://www.nextgenscience.org/msls1-molecules-organisms-structures-processes

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics http://www.nextgenscience.org/msls2-ecosystems-interactions-energy-dynamics

MS-LS3 Heredity: Inheritance and Variation of Traits
http://www.nextgenscience.org/msls3-heredity-inheritance-variation-traits

MS-LS4 Biological Evolution: Unity and Diversity http://www.nextgenscience.org/msls4-biological-evolution-unity-diversity

ESS: Earth and Space Sciences

Middle School (6–8) Storyline
http://www.nextgenscience.org/sites/ngss/files/ESS%20MS%20Storylines%20DCI%204.9.13.pdf

MS-ESS1 Earth's Place in the Universe http://www.nextgenscience.org/msess1-earth-place-universe

MS-ESS2 Earth's Systems http://www.nextgenscience.org/msess2-earth-systems

MS-ESS3 Earth and Human Activity http://www.nextgenscience.org/msess3-earth-human-activity

ETS: Engineering, Technology, and Applications of Science

Middle School (6–8) Storyline
http://www.nextgenscience.org/sites/ngss/files/MS%20ETS%20Storyline%20-%20DCI%20and%20Topic-6.13.13.pdf

MS-ETS1 Engineering Design: Students who demonstrate understanding can define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
http://www.nextgenscience.org/msets1-engineering-design

Addendum C: Common Core State Standards in Mathematics Grade 4

Operations and Algebraic Thinking

Use the four operations with whole numbers to solve problems.

Gain familiarity with factors and multiples.

Generate and analyze patterns.

Number and Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers.

Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations — Fractions

Extend understanding of fraction equivalence and ordering.

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Understand decimal notation for fractions, and compare decimal fractions.

Measurement and Data

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit
Represent and interpret data.

Geometric measurement: understand concepts of angle and measure angles.

Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Addendum D: Common Core State Standards in Science Grade 4

Inspire the Next Generation of Engineers!

4-PS3-1 Energy: Students who demonstrate understanding can use evidence to construct an explanation relating the speed of an object to the energy of that object. *[Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.*

4-PS3-2 Energy: Students who demonstrate understanding can make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. *[Assessment Boundary: Assessment does not include quantitative measurements of energy.]*

4-PS3-3 Energy: Students who demonstrate understanding can ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [*Assessment Boundary: Assessment does not include quantitative measurements of energy.*]

4-PS3-2 Energy: Students who demonstrate understanding can make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. [*Assessment Boundary: Assessment does not include quantitative measurements of energy.]*

4-PS3-3 Energy: Students who demonstrate understanding can ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [*Assessment Boundary: Assessment does not include quantitative measurements of energy.]*

4-PS3-4 Energy: Students who demonstrate understanding can apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [*Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]*

4-PS4-1 Waves and Their Applications in Technologies for Information Transfer: Students who demonstrate understanding can develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] *[Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]*

4-PS4-2 Waves and Their Applications in Technologies for Information Transfer: Students who demonstrate understanding can develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. *[Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]*4-PS4-3 Waves and Their Applications in Technologies for Information Transfer: Students who demonstrate understanding can generate and compare multiple solutions that use patterns to transfer information.* *[Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]*

Inspire the Next Generation of Engineers!

4-LS1-1 From Molecules to Organisms: Structures and Processes: Students who demonstrate understanding can construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] *[Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]*

4-LS1-2 From Molecules to Organisms: Structures and Processes: Students who demonstrate understanding can use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. [Clarification Statement: Emphasis is on systems of information transfer.] *[Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]*

4-ESS1-1 Earth's Place in the Universe: Students who demonstrate understanding can identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] *[Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]*

4-ESS2-1 Earth's Systems: Students who demonstrate understanding can make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] *[Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]*

4-ESS2-2 Earth's Systems: Students who demonstrate understanding can analyze and interpret data from maps to describe patterns of Earth’s features. [Clarification Statement: Maps can include topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

4-ESS3-1 Earth and Human Activity: Students who demonstrate understanding can obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

4-ESS3-2 Earth and Human Activity: Students who demonstrate understanding can generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] *[Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]*

Lesson 7:
Online Resources

School Districts Involved and STEM Activities Available:

Clover Park School District:

Elementary Schools:

1. Beachwood Elementary School
2. Carter Lake Elementary School
3. Clarkmoor Elementary School
4. Custer Elementary School
5. Dower Elementary School
6. Evergreen Elementary School
7. Greenwood Elementary School
8. Hillside Elementary School
9. Idlewild Elementary School
10. Lake Louise Elementary School
11. Lakeview Hope Academy
12. Oakbrook Elementary School
13. Oakwood Elementary School
14. Park Lodge Elementary School
15. Southgate Elementary School
16. Tillicum Elementary School
17. Tyee Park Elementary School

Middle Schools:

1. Hudtloff Middle School
2. Lochburn Middle School
3. Mann Middle School
4. Woodbrook Middle School

High Schools:

1. Clover Park High School
2. Lakes High School
3. Lakewood Career Academy
4. Harrison Preparatory School

STEM Activities Available:

1. MESA
2. Science Club
3. Science Showcase

More Mentoring Strategies and Activities:

Although you will usually be engaged in the student's academic goals, we hope you will develop a good relationship with your mentees. Some of the following suggestions may be useful during "down" times or when you feel the relationship with your mentee could be improved.

1. Play chess, checkers, cards or board games.(check what is available in the library)
2. Select a book to read together
3. Teach the beginning alphabet of a foreign language
4. Work on the computer-create a calendar
5. Help research and design an extra credit report
6. Write an original story together
7. Teach how to give a good handshake and practice
8. Encourage your student to try out for school activities-band, drama, sports etc.
9. Research Mt. Rainer, earthquakes and talk about a family emergency plan
10. Research some career options on the internet and in the library
11. Read the paper together and discuss current events
12. Talk about what to expect in high school/middle school
13. Talk about your friends
14. Decorate a t shirt
15. Play hangman
16. Talk about positive ways to spend time out of school
17. Share your life experiences
18. Share your career experiences
19. Talk about your family pet and responsible pet ownership (tags, nutrition, etc).
20. Start a newspaper/blanket/toy drive for the Humane Society.
21. Practice age appropriate spelling words
22. Discuss dream jobs
23. Talk about random acts of kindness and then do one!
24. Discuss favorite movies, books, music.
25. Talk about and compare your favorite heroes
26. Start a journal
27. Help your youth get organized
28. Talk about healthy habits
29. Help your student develop daily, weekly, monthly goals
30. Look up famous people and their quotes
31. Tell your student what you liked to do in school
32. Practice debating
33. Talk to your student about ways to get academic help at school
34. Talk about ways to learn about hobbies (magazines, newspaper, etc.)
35. Celebrate your successes

Source: CISL Mentor Guide

How to Help Students Prepare for a STEM Career Now!

Elementary:

- Pay attention when learning math and science
- Do your best on your homework and class work
- Join a club in a STEM field

Middle School:

- Take challenging math and science classes
- Also take computer/technical classes
- Develop strong study skills
- DO your homework
- Start thinking about what high school classes to take
- Begin to think about college
- Join a club in a STEM field

High School:

- Join a club in a STEM field or do an internship in your STEM interest
- DO your homework
- Develop strong study skills
- Take the ACT or SAT (pay attention to math score)
- Classes to take:
    - AP English Language
    - AP English Literature
    - Writing for College
    - Advanced Algebra II, w/Trigonometry
    - Precalculus
    - AP Calculus A/B and B/C
    - AP Statistics
    - AP Biology
    - AP Chemistry
    - AP Physics
    - AP Government and Politics
    - AP US History
    - AP World History
    - Intro to Engineering
    - Principles of Engineering
    - Practicum
    - Advanced Practicum
    - Sustainable Design
- Clubs to Join (if at your school):
    - MESA
    - National Honor Society
    - Interact
    - Key Club
    - Science Club
    - Knowledge Bowl

Overall, you want to challenge yourself and learn good study skills and habits because getting a degree in a STEM field is challenging; you want to be as prepared for it as you can.

Parent Guide:

STEM Mentor Program – After School

It's not too early to be thinking about a high paying career for your student! The STEM Mentor program helps improve math and science skills that can qualify students for engineering careers in aerospace, computer science and health care.

The Washington State University STEM Mentor program will be part of your child's after school program this year. A mentor from a local manufacturer or aerospace business, with special training from WSU, will be present in the classroom on a regular basis throughout the year. They will engage students in activities that help them apply math and science concepts and learn about engineering careers. Each child will be part of a student team that creates a project for the school's spring Science Fair.

Pierce County is home to a thriving aerospace industry designing and manufacturing parts *and* maintaining and flying civilian and military planes. Engineers design the parts and manufacturing processes that drive the industry. Understanding math and science is critical for youth with possible interests in going into an engineering career. With a college engineering degree, students can expect to find a well-paying job close to home. The average annual wage for all STEM occupations, such as engineers, is $77,880 compared to the U.S. salary average of $43,460.

STEM = Science Technology Engineering and Math

1. *What can you expect?* ***Mentors can help bring math and science alive in the after school classroom***
   - The classroom mentor will be from a local business, have supplemental youth education training, be under the direction of the classroom teacher, required to adhere to school and district policies and be a registered Communities In Schools volunteer
   - The mentor will share what he does in his job, share how he uses math and science in his work, lead projects that demonstrate how to design using math and science skills, and mentor science project teams
   - Your student will share with you what has been learned in math and science
2. *What is your role?* ***Parents can help their youth experience positive success – it's very important for building self-confidence***
   - Encourage your student to share with you what going on in school math and science classes
   - Be willing to listen, inquire and answer questions about math and science activities going on in class
   - Encourage your student to complete homework and ask for help when needed *(You don't need to know the answers, but you can help them figure out how to find the answers.)*
   - During family time and outings point out consumer products (e.g. furniture, electronics, cars) and community structures (e.g. homes, building, bridges) and ask your student how engineers and scientists may have been involved designing and building them
   - Attend classroom open houses and the spring Science Fair
3. *Who to Contact if You Have Questions?* ***It is best to get answers to questions and resolve issues when they first arise.***
   - If your student has a subject matter question or is falling behind, contact the classroom teacher
   - If you have a comment or concern about the mentor, contact the classroom teacher or the Communities in Schools Coordinator for your school
   - If you have a comment or concern about the STEM Mentor training course, contact Washington State University Extension (Martha Aitken, 253-798-3259)

Please fill out and return the program evaluation that you receive after the Science Fair

Sources: Youth and Families with Promise: 4-H Mentoring, Parenting Guide, Thomas R. Lee, Utah State University Extension, 2006 ; Written by Curt Moulton, WSU Extension, 8/2013

Helpful Links for Mentors and Students:

Students:

How to grow your professional network:

Below are some links to information on what networking is and how to go about creating and growing your own network.

- *Why You Need to Network*
- *Rules of Networking*
- *Job Search and Career Networking*
- *How To Build A Powerful Professional Network*

Links:

- *College Prep*
- *STEM Career*
- Help with Science Homework:
  - *Middle School*
  - *High School*
  - *More*
- Financial Support Opportunities
- *Washington College and University STEM Programs*
- STEM Scholarships:
  - *STEM Career Scholarships Page*
- Forms:
  - *Elementary Student Survey*
  - *Middle and High School Student Survey*

Mentors:

- *Clover Park Communities in Schools*
- *Teach Engineering*
- *Service Learning projects for STEM*
- *Student STEM Work*
- *Google Apps for STEM*
- *Teaching in the 21st Century*
- *ASCD store of online Professional Development*
- *Classroom clips*
- *Middle school STEM class*
- *Planning new STEM middle school in Vancouver, WA*
- *What Is a STEM School?*
- *STEM Schools-critical components*
- *High School Fab Lab-Project Based Learning*
- *HS teacher teaches students to make biofuel (Doing scientific research in class)*
- *Students in STEM classrooms-Toppenish High School*