



Supporting General Education Classroom Teachers of Braille-Reading Students.

Subject Specific Information – Secondary

Students who use braille in high school often times have had experience with the medium and are familiar with the strategies and skills involved with using braille. As a high school teacher it is important that these students have access to materials that are being used in class so that they do not fall behind. Classroom teachers need to work with the Teacher of the Visually Impaired (TVI) to ensure that the notes, the textbooks, and other materials are readily available to the student. In many cases if you are expecting a braille user in your class, it is vital that you begin this process as early as possible to avoid the situation of having to manually produce materials into braille.

English

English

If you are a secondary English teacher with a braille-reading student in your class, you probably have many questions about how to teach this student. Remember, you are a trained teacher in this subject area. All you will need are pointers, guidelines and strategies for teaching your braille-reading student in your inclusive classroom.

Considerations in Planning for Instruction in English

When planning for your English lesson, begin by reminding yourself about the unique learning processes of your braille-reading student. For example, suppose you are teaching a unit on how to use graphic organizers, such as webs and flow charts, to develop and understand story plots. You may show your class examples of different types of graphic organizers. While the majority of your students will be able to develop an understanding of graphic organizers simply by looking at them, your braille-reading student will need to explore the webs in a more sequential tactile manner in order to develop the same holistic understanding of it.

It is important that you take a proactive approach when creating your English curriculum. While planning your lesson, ask yourself, "How will my braille-reading student access the concepts learned in today's lessons?" Make sure that you have an answer to this question before you teach your lesson.

Strategies for Learning

Consider the following strategies when developing your English lessons.

- Use a discovery approach in your learning. Encourage your braille-reading student find answers to questions and problems.
- Use a hands-on approach to teaching. Provide your braille-reading students with real objects to explore.
- Relate the real life experiences of your braille-reading student to concepts being learning in your English class.
- Encourage lots of dialogue during the learning process. Pair your braille-reading student with a peer to discuss issues and problems.
- Verbalize all information that is written on the board or on posters. Pair your braille-reading student with a peer who can read notes from the board for your student to braille.
- Provide an electronic copy of your notes to your braille-reading student if they use high-tech devices, such as a braille notetaker or computer.
- Touch base with your braille-reading student during your class to make sure that he or she is actively participating in your lesson activities.
- Prepare your braille-reading student for any upcoming fieldtrips. It may be necessary for him or her to be orientated to the fieldtrip site ahead of time.
- Prepare all braille and tactile materials ahead of time so that they are handed out to your student at the same time as the rest of the students in your class.

Social Studies Tools for Learning

Your braille-reading student will use specific tools to access your science curriculum. Your student's TVI will help you understand how these tools are used. The following is a list of possible tools that may be used by your braille-reading student in your class.

- Slate and Stylus, Perkins Braille or other electronic braille notetaker for reading and writing.
- Computer with Jaws or other speech program.
- Social Studies textbooks or informational books available in braille.
- Tactile graphics.

Additional Resources

As you teach your course, it is likely that you will have many questions about teaching specific concept skills to your braille-reading student. Remember, you are not alone! Discuss your questions with your students TVI, as he or she will likely have suggestions and resources to guide you along your journey. There are also many resources that you can access on-line.

Mathematics

As the math teacher of high school students, you probably have many questions about how to include your braille-reading student in your lessons. First of all, give yourself the credit that you deserve. You are

a trained who is qualified to teach students in your subject area. Just like with any student, it is your responsibility to teach math to your braille-reading student. However, you will need additional pointers, guidelines and strategies that will help you in developing math instruction that your braille-reading student can access and learn from. Remember, you are not alone in this journey. There are many people and resources that will help you teach your braille-reading student in your inclusive classroom setting. Your student's TVI should become a very important resource through your course.

Considerations in Planning for Instruction in Mathematics

When planning for your high school math lesson, keep in mind the following important point about the power of learning through vision. Your vision is like a digital camera, allowing you to quickly 'chunk' visual information into your memory. When you display a math problem on the board, the majority of your students will be able to see the problem in its entirety. Unlike a digital camera, the learning process of your braille-reading student will be constructed in parts, kind of like a puzzle. In order for your braille-reading student to see the entire math problem as your sighted students, he or she will need to sequentially put the pieces of this problem together through either tactile or auditory means.

It will be important for you to be proactive in including your braille-reading student in your math lesson. While planning your lesson, ask yourself, "How will my braille-reading student access the concepts that will be learned in today's lessons?" Make sure that you have an answer to this question before you teach your lesson.

Math Strategies for Learning

There are many simple strategies that you can use to help your braille-reading student put the 'pieces of the math puzzle' together. The following list of learning strategies will help you in your teaching process. Some of these strategies can even be used with your entire class:

- Include your braille-reading student in all of your lessons and teach them the same concepts as the rest of the students in your class. Never assume that this student will not be able to learn a concept because of their vision.
- Ensure that your braille-reading student understands the concepts and steps of the operation through low-tech tools, such as manipulatives, the abacus and braille before using high-tech devices.
- Verbalize anything that you write on the board. Give specific and detailed verbal instructions. Verbalize what you are looking at rather than saying "this problem over here" or "who can tell me what's wrong with the answer on the board." Your student will need to know what the problem is before he or she can attempt to understand and answer such a question.
- Encourage plenty of dialogue about the concepts being learned. For example, your braille-reading student can be paired with his or her peer to discuss or manually show to solve a problem.
- Relate math concepts to things that are already familiar to your braille-reading student. Integrate math concepts, such as geometry, with orientation and mobility practice.
- Provide opportunities for your braille-reading student to show you how to solve a math problem using their manipulatives. This strategy can also be used for test taking.

- Class notes can be provided from you or from a friend and brailled for the student as soon as possible. The best situation is to have the notes brailled ahead of time so that he or she can follow your lesson.
- Ensure all handouts and notes are transcribed and ready to hand out with the materials for the rest of the class. Consider how concept gaps can develop if students don't have the necessary materials they need for their learning.

Collaborating with the Teacher of Students with Visual Impairments

Your student's TVI should be an important resource for you. A qualified teacher of students with visual impairments has the necessary skills and resources and should be used in the planning of your math unit. The best way to use the knowledge of your TVI is to have him or her actively involved in your math lessons. Some high school math teachers prefer their students TVI to be part of the math lesson, either working directly with the study or taking on a small group with your braille-reading student. Although this transdisciplinary approach to learning may take more collaboration, it is by far one of the best methods in support any braille-reading student in the math classroom. In any case, it will be important for both of you to collaboratively plan the student's IEP and plan for math lessons.

Math Tools for Learning

Your student's TVI will help you outline some of the tools your student will need for them to help them access your math curriculum. The following is a list of math tools that may be used by your student.

- Manipulatives
- Cramer's Abacus
- Tactile ruler or measuring tape
- Tactile or brailled number line
- Graphing pegboard (used with thumb tacks and rubber bands)
- Tactile drawing board with tracing wheel
- Low Tech devices, such as a slate and stylus or Perkins Brailier.
- High tech devices, such electronic braille notetakers.
- Talking or speech output calculators
- Tactile graph paper, clocks,

Using High-Tech devices in the Secondary Math Classroom

There are many high-tech devices that a braille-user can use to access the secondary math curriculum. Braille-users can now use talking calculators and speech-to-text scientific and graphing calculators to aid them in their work. Like any student, your braille-reading student should understand the concepts of the basic steps of a math problem before resorting to high tech devices that will do the calculations for them. If your braille-reading student uses such technology, it will be important for you to make sure that they truly understand the concepts that you are teaching them.

The Nemeth Code

The [Nemeth Code](#) is a tactile representation of the math and science materials. This code is different from the literary braille code. Your elementary braille-reading student may be learning how to read and

write using the Nemeth Code. Don't worry, it is not your job to teach this code. Your student will be instructed to use this code by his or her TVI.

The most ideal way for your student to learn the braille-code is by being introduced to the tactile symbol at the same time as the rest of your students are being introduced to the same symbol in print. For instance, if you are teaching your students the symbol for the negative sign (-), your braille reading student should be introduced to the Nemeth symbol at the same time. Teach students the entire Nemeth code symbol before learning about how they are used in a mathematical context can be a meaningless endeavor. However, if your student has been using braille for a while, then he or she will likely have experience using and working with the Nemeth Code.

Additional Resources

It is likely that you will continue to have questions about teaching mathematics to your braille-reading student. Remember, you are not alone. In fact, this area of learning is of great interest to many educators working with visually impaired students. Your student's TVI will have many resources that will help you. However, there are many rich Internet resources that you can access yourself. As nervous as you are now, with a little bit of practice, you will be able to effectively teach mathematics to your elementary braille-reading student.

Music

Music is often of interest to students at a secondary level. Students who are blind or visually impaired are also often interested in music in a variety of formats. Many braille-reading students will be interested in playing a musical instrument or in vocal or choral music.

Students who read braille may also be interested in using the braille code that represents music and this will also be important in music theory courses. There are many resources that can be accessed by a student with an interest in braille music.

The text for choral music should be available in braille. It may be helpful to provide the student with an audio tape for practice with the words and music in advance and throughout practice. A friend in the chorus may be able to provide some tactile cues corresponding to the conductor's directions by touching the student lightly on the hand or arm with a variety of signals depending on the choral director's directions.

Physical Education

As a physical education teacher, you likely are already aware of the health and wellness benefits of activity and movement. In addition, your physical education class provides students with opportunities to practice cooperation, teamwork, spatial awareness, body awareness, balance, coordination, agility

and focus. At this time, you may be feeling unsure about your abilities to teach a visually impaired student in a dynamic PE class. First, take a deep breath and remind yourself that you are a trained professional who is able to teach a PE class and as such, you already have the basics to teach your braille-reading student in your physical education class.

The need to teach students with visual impairments movement skills:

As you may be aware, vision is required to safely and efficiently move through different environments. Naturally then, having a visual impairment reduces movement efficiency causing your braille-reading student to extend additional energy to perform tasks that involve gross motor movements. If this student is not provided with the opportunity to learn adequate biomechanics, such as balance and coordination, even simple daily living tasks may become an onerous and exhausting job for him or her to accomplish. This is why it is important that your braille-reading student is given equal opportunity to participate in physical education class. Your student's teacher of student with visual impairment will help you in creating adaptations so that your braille-reading student can participate equally in your physical education class.

The following information will provide you with strategies to teach and include your braille-reading student in the inclusive PE setting.

Considerations in Planning for Instruction in Physical Education

When planning your PE lesson, it will be necessary for you to think about the unique learning process of your braille-reading student. Consider how easy it is for your class to learn from watching you demonstrate the technique of kicking a soccer ball. Visual demonstrations provide your students with immediate information about how this action is carried out. In fact, the majority of students in your class will be provided with additional incidental learning opportunities from observing this technique while watching a soccer game. Your braille-reading student will not have the same quick and incidental learning experiences as the rest of your students. Instead, he or she will need to be taught specific movement skills in sequential chunks in order to understand the entire skill.

Physical Education Strategies for Learning

There are many ways in which you can help your braille-reading student participate in meaningful physical activities in your inclusive PE class. The following is a list of simple strategies.

Safety Strategies

- Ask your student's TVI specific questions about the nature of your braille-reading student's visual impairment. It will be good to know if there are any safety concerns with the potential of being hit on the head with a ball.
- Orient your braille-reading student to their gym space prior to your lesson. This will be especially important at times when significant changes are made to the gym floor plan, such as temporarily setting up gymnastics equipment.

Skill Teaching Strategies

- Teach movement skills in a sequential order. Instruct your braille-reading student in gross motor skills before teaching fine motor skills. For example, the simple action of throwing a ball starts with the gross motor skill of taking a step and preparing the muscles in your legs, back, shoulder and arm to throw the ball. The final movement of letting the ball roll from the tips of your fingers is a fine motor skill.

Spatial and Body Awareness Teaching Strategies

- Encourage your braille-reading student verbalize where his or her body is in relation to an object or person. Encourage him or her to use descriptive vocabulary, such as above, under, beside, to the left/right, on top, beneath, to help him or her verbalize where their body is in space.
- Use balance boards to teach body and spatial awareness. Balance board activities will also allow your student to practice their reaction skills.
- Teach games that allow your braille-reading student different ways his or her body can move in space. Games that require your braille-reading student to pretend that they are different animal will encourage him or her to explore different movements in a fun way and safe way.
- Spend time showing your braille-reading student how to perform a movement or skill. You could pair your braille-reading student with a peer to practice these skills.

Other Strategies

- Consider using high contrast or audible balls.
- Verbalize any demonstrations of skills that you are teaching.

There are many other strategies and suggestions for teaching physical education to braille-reading students in the inclusive setting. Remember, you can always ask your TVI questions about where to get these resources.

Challenging PE Activities

There may be times in which your braille-reading student simply cannot participate in a physical activity. This is okay. For many braille-reading students, the idea of participating in activities that require good visual-motor coordination, such as Doctor Dodge Ball or volleyball, is a very frustrating or even scary thought. Realize, however, that this does not mean that your braille-reading student should be excused from learning about these types of sport. There are many social implications attached to simply knowing how a sport is played. Consider, for example, the amount of hockey dialogue that takes place during hockey season. If your braille-reading student is not familiar with this game, he or she will have a difficult time taking part in such typical social interactions among elementary school children.

If you feel that your braille-reading student cannot inclusively participate in an activity, consider providing the following adaptations for their learning:

- Teach your student the basic rules of the game.

- Show your student the basic movements used in the sport. Provide your braille-reading student with opportunities to practice these basic skills and movements individually, in pairs or small groups.
- Take your braille-reading student on a field trip to a sports game or encourage them to listen to the game on the radio or TV.
- Assign your student the task of researching the history of the sport that you are teaching in your class. Allow them to do a presentation about what they learned during one of your classes.

Student Volunteers or Peer Helpers in your PE Classroom

Some elementary schools encourage students from the local high schools to volunteer their time in the elementary PE class. While the idea of having a high school student volunteer who is excited about PE and willing to help is welcomed by most classroom teachers, it is important to remember that you are the one with the expertise in teaching. The following is a list of guidelines on how to use student volunteers who work with braille-reading students in the PE class.

- Provide training time to show your peer helper how to work with your braille-reading student.
- Give direct and specific directions to your peer helper so that he or she is not left to make decisions about how to adapt an activity for your braille-reading student.
- Pay attention to where your high school student volunteer works with your braille-reading student. Asking your student volunteer to work in a different room without your supervision can quickly become a question of liability. Remember, you are responsible for the safety of your students in the PE class.
- Provide opportunities for your high school student volunteer to work with a little group of two to three students rather than only working with your braille-reading student.

Games for the Visually Impaired

There are many highly competitive games and activities that are played by visually impaired athletes from around the world. The following links will provide information about Paralympics sports for the visually impaired.

- [Goal Ball](#)
- [Running](#)
- [Cycling](#)
- [Skiing](#)
- [Swimming](#)

Science

You have the wonderful job of providing your students with opportunities to discover science. Teaching science concepts to your braille-reading students can be a wonderful experience. The following information is designed to help you develop strategies and techniques to help your braille-reading

student discover the world through your class. You may be feeling a little uneasy about teaching a braille-reading student in an inclusive setting. After all, most of your teaching methods are visual in nature. Take a deep breath and remember that you are not alone in your journey. There are many resource and people that can help you develop a curriculum that will include your braille-reading student. Your student's TVI will likely become a partner in your lesson planning.

Considerations in Planning for Instruction in Science

When planning for your elementary science lesson, keep in mind the unique learning process of your braille-reading student. Much of the science class is visual. Students view pictures, charts and graphs that demonstrate a scientific process that otherwise would be impossible to view in its entirety. Consider the ease in learning the process of metamorphosis by examining a diagram and pictures of the process from larva to butterfly. Viewing such a chart using tactile or auditory means, your braille-reading student will need to explore each step of the metamorphosis individually to create a whole understanding of the process, similar to putting together a puzzle to create a whole picture.

It will be important for you to be proactive in including your braille-reading student in all of your science classes. While planning your lesson, ask yourself, "How will my braille-reading student access the concepts that will be learned in today's lessons?" Make sure that you have an answer to this question before you teach that lesson.

Science Strategies for Learning

You can help your braille-reading student put together the pieces of the puzzle in a sequential and concrete way. Many of the following strategies can be used with your entire class.

- Before starting your class, ask yourself this question, "how am I going to include the entire class, including my braille-reading student, in this lesson?" You have the knowledge and skills to teach science, and with some adaptations and guidance, you will be able to effectively include your braille-reading student in a meaningful way.
- Use a discovery approach in your learning. Encourage your braille-reading student to find answers to questions and problems.
- Provide models of concepts for your student to manually explore. Your student's TVI can help you get some of these resources..
- Set aside time for your braille-reading student to explore any equipment for upcoming science experiments, demonstrations or field trips. This will allow him or her to practice using equipment or moving in new environments before the class.
- Verbalize all information that is written on the board or on posters. Pair your braille-reading student with a peer who can read notes to him.
- Provide an electronic copy of your notes to your braille-reading student if they use high-tech devices, such as a braille notetaker or computer. Be prepared to give them your notes ahead of or at the same time as the rest of the class.
- Speak with your braille-reading student about topics of upcoming science learning concepts. Try to be a detective and figure out any gaps in your student's understanding. Doing this will offer valuable information about the 'pieces of the puzzle' that your student has and the pieces that are missing.

- Allow your braille-reading student to sit close to you when you are demonstrating an activity. If the materials are safe to touch, let your student explore any equipment and supplies at appropriate times during your presentation.
- Encourage ample dialogue about concepts that are learned in your science class. Pair your student with a peer to discuss and solve problems.
- If possible, consider adapting science tool to make them more tactile. Mark measuring tools, such as rulers and beakers, with glue from a glue gun.
- Try to keep science lab materials in the same, accessible place.

Science Tools for Learning

Your braille-reading student will use specific tools to access your science curriculum. Your student's TVI will help you understand how these tools are used. The following is a list of possible tools that may be used by your braille-reading student in the science class.

- Slate and Stylus, Perkins Braille or other electronic braille notetaker for reading and writing.
- Computer with Jaws or other speech program.
- Science textbooks or informational books available in braille.
- Tactile rulers and measuring tape. You may need to adapt some of the science materials by yourself, such including tactile markers on a beaker measuring guide or thermometer.

Additional Resources

As you work with your braille-reading student, it is likely that you will continue to have questions about teaching science to your student. Although you may feel a little hesitant in your skills, remember that you are not alone. Other elementary educators have had similar questions and concerns. Your TVI will provide you with as many resources as you need.

Social Studies

As the social studies or history teacher, it is your responsibility to teach the secondary social studies and history curriculum to all of your students, including your braille-reading student. You may be feeling a little concerned, as you may not feel like you know where to start. Take a deep breath and remind yourself that you already have the most important skill – knowing how to teach in your subject area. The following information will help you in developing teaching strategies and adaptations when planning for your social studies and history lessons. There are many resources and people that will help you along the way. Your student's TVI will be one of the most important resources in helping you develop an accessible curriculum for your braille-reading student.

Considerations in Planning for Instruction in Social Studies

When planning for your social studies lesson, begin by reminding yourself about the unique learning processes of your braille-reading student. If you are teaching a unit about Canada's geography, you will likely need to give your class a map to review. Consider the ease in learning about the features of Canada's landscape simply by looking at this map. You probably have a map of Canada hanging up on

your classroom wall right now. Consider the extent of incidental learning that is happening every time your students look at that map. The learning process of your braille-reading student will be a little different. Your braille-reading student will need to explore the map in tactile sequential pieces to develop the same holistic understanding of it, similar to putting pieces of a puzzle together to view a whole picture.

It is important that you take a proactive approach when creating your social studies lessons. While planning your lesson, ask yourself, “How will my braille-reading student access the concepts learned in today’s lessons?” Make sure that you have an answer to this question before you teach your lesson.

Strategies for Learning

The following strategies will help your braille-reading student access your social studies curriculum.

- Use a discovery approach in your learning. Encourage your braille-reading student find answers to questions and problems.
- Use a hands-on approach to teaching social studies. Provide your braille-reading students with real objects to explore.
- Relate the real life experiences of your braille-reading student to concepts being learned in your social studies class.
- Encourage lots of dialogue during the learning process. Pair your braille-reading student with a peer to discuss issues and problems.
- Verbalize all information that is written on the board or on posters. Pair your braille-reading student with a peer who can read notes from the board for your student to braille.
- Provide an electronic copy of your notes to your braille-reading student if they use high-tech devices, such as a braille notetaker or computer.
- Speak with your braille-reading student about topics of upcoming social studies units. Be a detective and try to look for any gaps in your student’s understanding.
- Frequently touch base with your braille-reading student during your class to make sure that he or she is actively participating in your lesson activities.
- Prepare your braille-reading student for any upcoming fieldtrips. It may be necessary for him or her to be orientated to the fieldtrip site ahead of time.
- Advise your student TVI of any books or materials needed in alternate format, such as electronic or braille. Make sure that these materials are ordered a head of time, so that your braille-reading student can access them at the same time as the rest of the students in your class.

Social Studies Tools for Learning

Your braille-reading student will likely use specific tools to access your social studies and history curriculum. Your student’s TVI will help you understand how these tools are used. The following is a list of possible tools that may be used by your braille-reading student in the social studies class.

- Slate and Stylus, Perkins Brailier or other electronic braille notetaker for reading and writing.
- Computer with Jaws or other speech program.
- Social Studies textbooks or informational books available in braille.
- Tactile maps, charts or graphs.
- Hands on materials such as representatives of artifacts seen in pictures or at a museum.

Additional Resources

It is likely that you will continue to have questions about strategies and methods of teaching concepts in social studies and history to your braille-reading student. Although you may feel a little hesitant in your skills, remember that you are not alone. Your TVI will provide you with as many resources as you need. You can also find rich resources on-line.