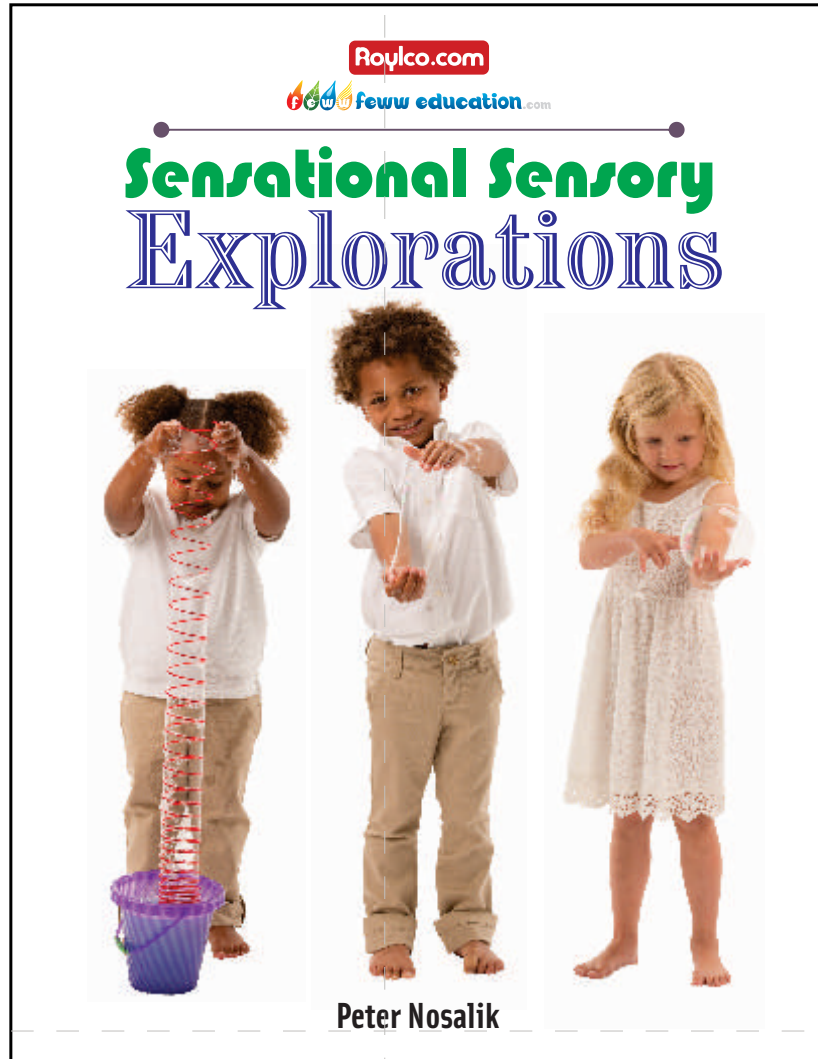


# Sensational Sensory Explorations



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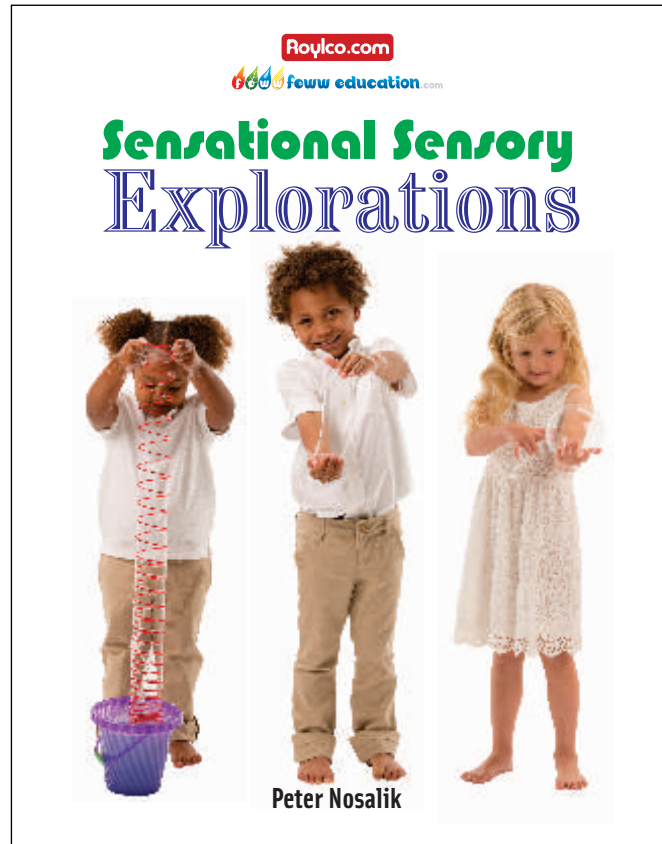
## Introduction:

I want to tell you about an experience I had just over twenty years ago. I was invited to observe a child development experiment that focused on a range of developmental abilities in babies; from babies who were just starting to crawl to babies who were just starting to walk.

It sounds like a bizarre experiment. The researchers built a special ledge and painted it a soft green. The ledge was about 4 feet high, 6 feet long and 3 feet wide. They then placed a large sheet of shatterproof glass over top of the ledge that extended it another 3 feet. The idea was that the mother stood at the edge of the glass while the baby was placed on the green painted ledge. The mother positioned herself so that her face was at the same level as the baby and called to her child. The researchers had hypothesized that if a child trusted its mother enough, they would crawl right off the ledge and onto the glass towards the mother's smiling face. The researchers were exploring how children learned to trust others.

In my simple mind, it was absolutely the wrong way to go about it. The whole premise seemed designed to trick the baby. It seemed kind of mean. What I learned from the experience was not to trust psychological researchers.

The results of the experiment were pretty obvious to any preschool teachers. It isn't a matter of trust. It's a matter of experience. A child learns from falling down that you can't crawl on empty space. Babies, preschoolers, school-age kids, teenagers, young adults, regular adults and the elderly all learn through their senses. They learn what they like and what they don't like. They discover pleasure and they discover pain. Some experiences need to be repeated until they can be appreciated while others are immediately recognized as good or bad.



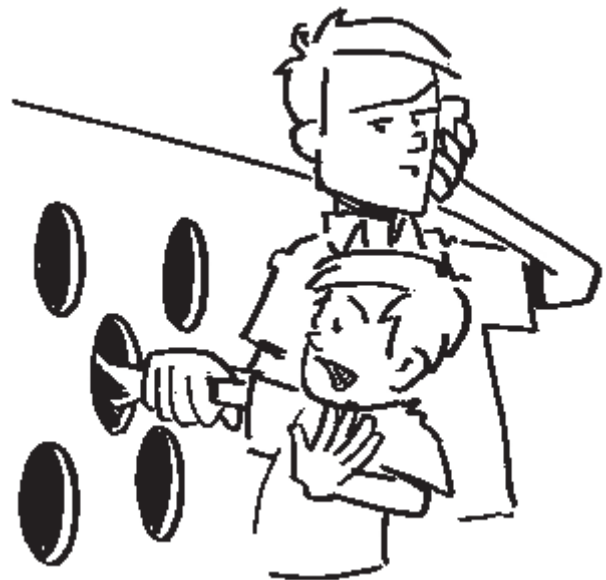
Let me tell you another story. Twenty years ago I worked with the first children's museum created in Toronto, Canada. It was a great place, but not really my idea of a "museum." It was more like the most awesome preschool ever built. There was a stage to perform plays and get dressed up. There was a story tree. There was an art centre, water play pond, an amazing sand play pit and probably the best building block area I have ever seen in my life. I worked as the volunteer art resource specialist. Right across from the art studio (which in my point of view was often neglected by the museum staff because it was too "messy") was a wall covered with little doors. There were 10 rows of 16 doors arranged from knee high to waist high. Inside each door was a black piece of velvet that the child had to stick his or her hand through in order to grab an object. Inside the cubby holes were things like a replica fossil, an antique bell, a miniature glass globe, a walnut, a preserved leaf, a tiny dragon figurine, etc. Remember, there were ten rows of 16 cubby holes so you needed 160 specimens to fill the wall and each day about 15 of them went home with one child or another. After a while some of the specimens got pretty lame. I remember seeing one of the Museum Director's pill bottles in one of the cubby holes.

One day I was working with a bunch of kids making a tower hat. It's a fun project, the results are really impressive and it's relatively inexpensive. However, if I'm being completely truthful, my job was more about teaching the kids and their parents and caregivers how to apply glue rather than fundamental design principles.

I had hit a slow period and was working with two sisters who were skilled gluers so there wasn't really much for me to do, and I happened to notice a young father with his son. The dad was busy talking on the phone while his son was staring in horror at the wall of cubby holes. The father absent-mindedly tapped the son on his little shoulder as a form of encouragement to open the door and reach in the cubby hole. The child refused to move. The father tapped again. The son actually grabbed one of his hands with the other and pulled back as he leaned into his father's legs. It was a remarkable moment to me. I saw a father encouraging a child to reach forward at the same time as the child retreated back to the safety of the man who was encouraging him to take the risk in the first place. It was one of those moments when I really appreciated the challenge in a father/son relationship.

The father finally hung up the phone and reached down for his son's hand. He then took the child's hand, opened one of the cubby holes and tried forcing the hand inside. Again, it was another moment of father/son relationship clarity. The harder the father tried to force the child to put his hand in the black box, the more the boy resisted. It became loud and uncomfortable for everyone within a twenty foot radius.

Finally I couldn't take it anymore and tried to help out with the situation. "He's doing it right." I told the Dad. The father looked at me like I was some kind of monster interfering with his important parental life lesson. "You'd have to be crazy to stick your hand inside a black box without knowing what's on the other side. Your kid is one of the smart ones." I added that last part because I didn't want to get punched in the nose.



We all learn everything through our senses. It is my belief that we need to build up experiences before we can start to understand how symbols such as numbers, words and images, have any real meaning. I assume that the little boy had learned from one or more bad experiences not to put his hand or any other body part into something that he could not see. He had learned from experience to be more cautious than trusting.

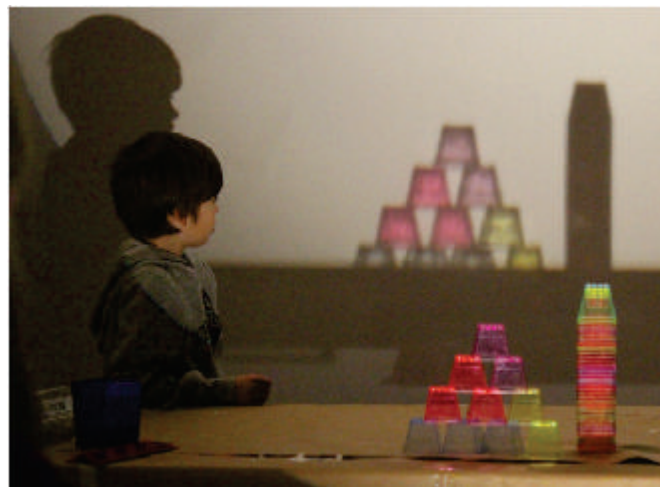
I met a special child a few years ago. He was normal in absolutely every way. He had loving parents. He lived in a beautiful home furnished with almost everything he could possibly want. He went to a very pleasant school and had a few good friends. His life was pretty good. But it wasn't always that way. For the first five years of his life he lived with his biological parents who kept the baby in a room that for all practical purposes was a prison cell. They neglected almost every aspect of his development except that he was relatively clean and fed. When the police took the child from the "home" one officer remarked that there wasn't a single toy in the room. Ten years later the young man had recovered well, however, he really could not read, understand mathematics or function as part of a group. It was a remarkable and frustrating case. There is nothing physically or physiologically wrong; his brain is perfectly normal. Yet according to several doctors and developmental experts who examined the boy when he was first rescued, he will never really be able to read, write, understand mathematics or develop deep personal relationships. The fundamental part of his brain that learns was never "turned on." Over the years when I talked and worked with the boy, I always had the strange impression that I was talking to an actor. It was a terrible sensation. Never once did he respond naturally or spontaneously to something I said or did. There was always a hesitation, followed by a response, followed by another hesitation where he waited for my response to see if he had "gotten it right" with his response. I have to admit that I never really got a sense of the boy as a person. It was so sad to me that a child's personality and potential could be erased by neglecting them in the early years. His adoptive parents are wonderful. They love him and have created a really wonderful life together as a family, but that won't be enough. The developmental specialist who worked with this student told me that he will never really bond with anyone, his parents or friends or coworkers, let alone the other students in his grade or his teacher. There will always be something missing.



This sad example brings up a lot of questions. What role does sensory exploration play in the development of personality and the ability to form relationships and engage in learning activities? The short answer is, we simply don't know. There have been very few examples of children raised without sensory input (thank god), so it is difficult to fully appreciate the role that sensory exploration plays. There have been examples of children who were "raised by wolves" but despite the hardships that these children faced, they still had lots of sensory input.

My goal with this presentation is to give you a framework for developing activity areas in your classroom that appeal to children's senses. I believe in this approach because I believe that all young children learn best through their senses. After a while children will develop their own unique learning style, but while they are young, you have an opportunity to stimulate these senses and really contribute to how they will continue to learn as they mature.

I love the learning centre approach to the education of young children. I love setting up a classroom like an interactive museum where there are chances to play and interact with materials and other students and adults. This approach allows children to return to a centre over and over again until they become proficient. When a student becomes proficient at a task, whether that task is building or dressing up or drawing or painting, they become confident in their skills. When they are confident, they are more likely to challenge themselves. When they start to challenge themselves academically, the entire world of education opens up to them. Allow your students to succeed at anything and watch as they become successful at everything.



## Key Considerations in Learning Centres

When you create a centre in your classroom, consider these critical elements:

1. Safety
2. Objective
3. Achievability
4. Budget
5. Results

Let's review each element in more details.

### Safety

Children need to test boundaries. That means testing the boundaries of parents, teachers, babysitters and the materials around them. I once saw a child accidentally drop a small remote control car that he had brought into school that morning. When it hit the hard floor, it made a sickening crack sound. He was so worried that he had broken it, he started crying. The teacher ran up to him and tried comforting him, but he would not stop crying. She said what we all would say in the same situation,

"Let's see if it still works." So they put the car on the floor and tried it out. Unbelievably, the car drove around without a care in the world. The boy stopped crying and started laughing.

The next thing I knew, he again "accidentally" dropped the car. It didn't make the same cracking sound, but again, he started to cry because he thought he had broken it. This time the crying seemed a bit forced. Sure enough, when he tested it, the car still drove around as if nothing had happened.

The third time he dropped it, he didn't maintain the "accidental" posture. Instead, he purposefully dropped it from a slightly higher position. He continued dropping it from higher and higher positions until he effectively smashed it to pieces. Some of the kids in the class cheered. Almost everyone was relieved when the car finally smashed.

I've thought of this scene many times since. At the time I didn't really understand what was going on. He was so distraught when he thought he broke his car, yet when he found out that he hadn't broken it, he set out to make sure it got broken. I didn't understand. A few of the teachers talked about it and theorized that after he had gone through the emotional loss the first time he had thought he had broken the car, he had already resigned himself that it was gone, so actually destroying it wasn't such a big deal.

I don't believe that is what happened. I believe that children test and test and test people and materials until they break. They need to know their limits and breaking something is the ultimate test. When we think about the centres we create, we need to do two things. First, we need to make them sturdy enough so they won't break easily or hurt children. Second, we need to instil in students a sense of respect for their classroom, their fellow students and the materials we provide them.



Personally, I am a little dubious of Dollar Store material. The toys and materials from a Dollar Store are absolutely not tested to the same standard as material you buy from an established educational supplier. That being said, I recognize that a Dollar Store is probably one of the places where it is convenient to buy materials. Please be careful.

One of the big influences on my educational philosophy was Bev Bos. She helped pioneer the centre approach to classrooms. She believed in encouraging children to self-regulate long before it became a standard approach to the education of young children. Likewise, she was naturally talented at designing play areas for children that helped direct their attention without having to provide step by step instructions. Bev's favourite school supplier was a hardware store. I'll admit to buying materials from hardware and kitchen supply stores. I think both types of stores sell products that are reliable, unique and affordable. That being said, you still need to ensure that these items are safe for children. I, for instance, would not give a child a ball peen hammer, but Bev Bos did. When I visited her at her school in Roseville, California and asked what happened if a child hit his thumb with the hammer, she simply said, "It usually happens only once." While I understand that and respect her attitude, I'm not so sure a lot of the parents I know would appreciate it if their child came home from school having learned that lesson the hard way. So let's compromise and try to create the safest environment possible by purchasing or making the safest materials possible.





Two further points about safety:

1. I attended a national conference a few years ago and went to a session on using light tables in the classroom. The presenter talked about an art activity that she liked doing on the light table. She explained that children enjoyed the process of finger painting more than they enjoyed taking the finished product home. Process versus product. I get that. So she created an activity where the children finger painted directly on the surface of her light table. After describing the basics of the activity, she finished off by saying, "Be careful not to let the kids paint too close to the edge of the table or the paint will flow down the side of the glass and into the internal workings of the light table and that's hard to clean up."

What? I thought. Glass? Wet paint? Electricity? That idea seems like a recipe for disaster. I really wanted to put up my hand and ask her to explain, but I couldn't summon up the courage. Lucky for me, there was a teacher who had a lot of courage. She raised her hand and simply said, "That sounds really dangerous to me."

The presenter responded, "Well, no one's died yet." While I'm glad that's the case, my reaction was, *Come on!* We need to think these things through. Don't use real glass in your light table and there really shouldn't be a way for any liquid to seep through the surface and into the internal electronics. Normally I would say that this is basic safety, but not everyone knows how to operate electronic appliances. I heard of one instance where a teacher opened a sealed light table and shoved in paper that her kids had finger painted in order to "see what would happen." A fire happened. We need to respect the materials and equipment in exactly the same way as we teach students to respect the materials and equipment.

2. The last thing that I want to say about safety was taught to me by an architect in a wheel chair. I was part of the exhibit design committee that was opening a large children's museum. Everyone I worked with was experienced, motivated, imaginative and inspirational. It was an amazing experience.

Near the end of the process, the museum director hired an accessibility consultant. His job was to look at all of the plans and drawings we had made over a year and a half and tell us how we could make them more accessible to handicapped people.



The first thing he had issue with was a silly exhibit that allowed children to make tunnels and forts from spandex stretched over different frameworks. I have to be honest, I didn't like that exhibit. It required a huge amount of space and I didn't think it would engage children or their caregivers. Our accessibility consultant wanted some major changes to make it wheelchair accessible. We had to increase the aisle width by 10 cm (4 inches) which was a surprisingly big deal. In frustration I said, "Children's wheel chairs are not that wide. Why do we need to increase the aisle widths?" He patiently explained that the width was intended for parents and caregivers to get through in their wheelchairs if the child got stuck, whether their child was in a wheelchair or not. I started to understand the rationale, but I also started getting very frustrated.

And then the consultant said something truly brilliant. He said, "I have a bigger concern about this exhibit."

*Here we go, I thought. He's going to nitpick something else that will be difficult and expensive to change.* Instead, he simply said, "It isn't dangerous enough."

That got my attention. The exhibit wasn't dangerous at all. What did he mean?

He started talking about interactive exhibits for children. He said that there should be an underlying risk. There needed to be tension between what you expected to happen and what actually happened. That was interesting, I thought.

I remembered back to a recent classroom experience where I gave a bunch of 4 year olds some big corrugated cardboard building blocks that resembled large bricks. They would build walls and towers and at some point the wall or tower came crashing down. That's what they enjoyed. They enjoyed building, but they really liked it when the building came crashing down. We all want that tension between what we expect to happen and what actually happens. That's why action and horror movies are popular. Likewise, we want the thrill of a safe roller coaster ride. There's lots of examples of experiences that can be viewed as dangerous, but really aren't. When it comes to museum quality experiences in the classroom, I love the idea that there is tension between what we think will happen and what actually happens, but it always needs to be a safe tension even if it doesn't feel that way.



## Objective

Each of your classroom museum experiences needs to have an objective. There are a lot of cool ideas out there. It's easy to look at Pinterest or YouTube and find really fun ideas that could be incorporated into a classroom activity centre, but some of the coolest ideas don't really have any educational value or are simply not practical.

Always start with your objective. What are you trying to teach your students? Once you answer that question, you are halfway towards achieving your exhibit.

My starting point is to integrate aspects of the curriculum into the learning centre. Right now I'm focusing a lot of effort on developing math skills. Think about what you want the kids to learn and then design your centre around that objective.



## Achievability

Ambitious activity centres can be fun, but hard to develop. I worked on developing a centre that explores the concept of gravity. It's a beautiful centre, but it's really hard to make and it takes up a lot of space. It took me about 6 days to develop it. In the same amount of time I could have made at least ten other centres that were probably more age appropriate. I believe that teachers often underestimate the value of their time. I absolutely hate seeing teachers cut out shapes for arts and crafts. It is such a huge waste of time. I've heard them say over and over that they do it while watching TV, so the time they spent on cutting doesn't count. I don't agree with that. Teachers, just like every other profession, need quality time to relax.



If you know that you've got to cut out a whole bunch of assorted size circles for a snowman craft you are making, you won't really relax. Forget about the labour intensive craft and go out for a nice walk. Personally, I don't like art that's so focused on parts that teachers cut out, but I understand that parents value this type of art project. But let's set that aside. When you've got spare time, let's use it to really develop some interesting ideas. I know that once you start developing activity centres that have a goal beyond the obvious, you'll see the value of achievement-based centres and start to imagine even more interesting centres.

## Budget

Activity centres can be expensive. I like to plan my budget around materials and products that can do double or triple duty. A product has more value if you can use it in different ways. I'm going to give you suggestions and examples so you can see how I use simple products in different ways to increase the value of that product.



To stretch a budget, I understand why teachers shop at Dollar Stores. I have bought many things at the Dollar Store and I'm occasionally amazed at how useful they are. That being said, there is a risk to the Dollar Store. I've bought a lot of stuff that inspired me while I was in the store, only to get it home and realize I don't have a use for it. Now, I only buy what I need and I go back if I need something else. Developing this self-discipline isn't easy, but I know that I'm saving money because I'm not wasting it on materials that I won't ever use and will soon forget.

Don't get me wrong. I'm not cheap. Every couple of months I blow the bank to create something really interesting. I research an idea and I create a little prototype. Once I've got the design, I'll order materials and supplies and build a centre. It's very rewarding. I may only put out that centre for a week or two, but I know I'll use it over and over again. If it is strong enough, I'll lend out my exhibits. When I get the gravity centre done, I will lend it to my colleagues. It will be just too good to keep to myself. Years ago I realized that if I create two really good centres a year, in five years I'll have 10 amazing experiences to share with the students. That adds a lot of life to a "normal" classroom. Conferences are great places to get inspired.

Finally, forget everything I've said. You can create cool stuff even if you don't have a lot of money. I will describe a building block that can be made with clear plastic cups and flexible drinking straws. It's cool and inexpensive. I'm using good quality materials to make these blocks, but you can make them out of cups you probably already have. Cool doesn't mean expensive and expensive doesn't mean effective, but every once in awhile it's really great to create something amazing!



## Results

The last thing to consider when creating your sensory activity centres is the effect it has on your students. You want them to be engaged and excited. My goal is to create centres that children want to show their parents. I love it when a Mom or Dad comes to the school to pick up their child and the child leads them to a centre to explain what's going on. It is such a wonderful opportunity for parents to see what their child has learned. Over and over again, I have watched as parents suddenly realize that their child is primed for learning. When they see that the child is capable and ready to learn, the learning will continue at home. The trick to having a parent as a teaching partner is to show that parent that the child is ready to learn, Learn, LEARN!

**Let's start exploring the Senses!**

I want to discuss the seven basic sensory systems and later on I will add another sense:

The Auditory System deals with how we hear with our ears.

The Visual Systems deals with how we see with our eyes.

The Tactile System deals with how we feel through the nerves on the skin of our bodies.

The Olfactory System deals with how we smell with our nose.

The Gustatory System deals with how we taste with both our tongue and nose.

The Vestibular System deals with how we know where we are in space, what is up or down and what is left or right. Let me expand on this for a moment. Stick out your arms on either side of your body. Close your eyes and touch your nose. You are using your Vestibular system to navigate your arms through space to touch your nose. There are no other senses involved until the tip of your finger touches the tip of your nose. Remember, your right arm is controlled by the left side of your brain while your left arm is controlled by the right side of your brain. To expand on this a little further, blink your right eye. That was controlled by the left side of your body. You need your vestibular system working well to do things as important as tracking words on a page when you are reading. The vestibular system is critical to learning.

The Proprioceptive System deals with how we position our bodies with our muscles, joints, tendons and nervous system. When you throw or catch a ball, you are using your proprioceptive senses. When you print and type, you are using your proprioceptive system. Can you type without looking at the keyboard? I bet you can. Give it a try.

Let's explore each of these senses individually and then start to combine them for amazing sensory experiences.



**The Auditory System: Silent Symphony**

I like to think of students as rocket ships ready to blast off and experience the entire universe! When we develop an activity centre in the classroom, they can be either launch pads or landing zones. I think of a launch pad as something that encourages students to further explore the materials and concepts on their own with relatively little direction from the teacher. A landing zone is more specific. For landing zones, I have specific objectives that I want the children to understand and master before moving on.

For our Auditory activity centre, let's start with a launch pad and see where that takes us!

Our Silent Symphony is designed to amaze students while teaching them a couple of different things. All you need are some coat hangers, string and a chopstick. Start with those materials and then add more or encourage your students to explore on their own.

In addition to coat hangers, I use our F66529 Geometric Bubble Forms.

The process is very simple. Start with a length of string about 1 metre (1 yard) long. Ask students to wrap the ends around the two index fingers on either hand. After they wrap one end of the string around their right index finger and the opposite end of the string around their left index finger, they need to bend over slightly and stick their fingers into their ears.

Next, hang the coat hanger or Geometric Bubble Form in the middle of the string. Make sure it swings freely and doesn't bump up against anything. Ask another student to gently tap the coat hanger with the chopstick. What happens? The vibrations from the gentle tap travel up the string and are amplified in the student's ears. It sounds like a beautiful bell.

Extend the activity by hanging other objects from the string. Have a range of materials available with a hole in them to thread the string through. Tap each one in turn and listen for the sound they make. What materials work well? What materials don't work at all? Some of the answers may be surprising. For instance, metal works very well while plastic and wood don't work at all. Glass works a little bit.

Form the coat hangers into interesting shapes. How does the shape of the coat hanger change the sound they make? Try to perform a concert. Start with three students, A, B and C. Wrap one string around child A's right index finger and the other end around student B's left index finger. Wrap a string around student B's right index finger and wrap the other end around student C's left index finger. Finish off by wrapping student C's right index with one end of string and the other end to Student A's left index finger. Hang objects from each of the loops and experiment with making musical sounds. Once you understand the basic configuration, you can connect strings between students in many, many different configurations to create spectacular soundscapes that are practically silent to other people in the room.

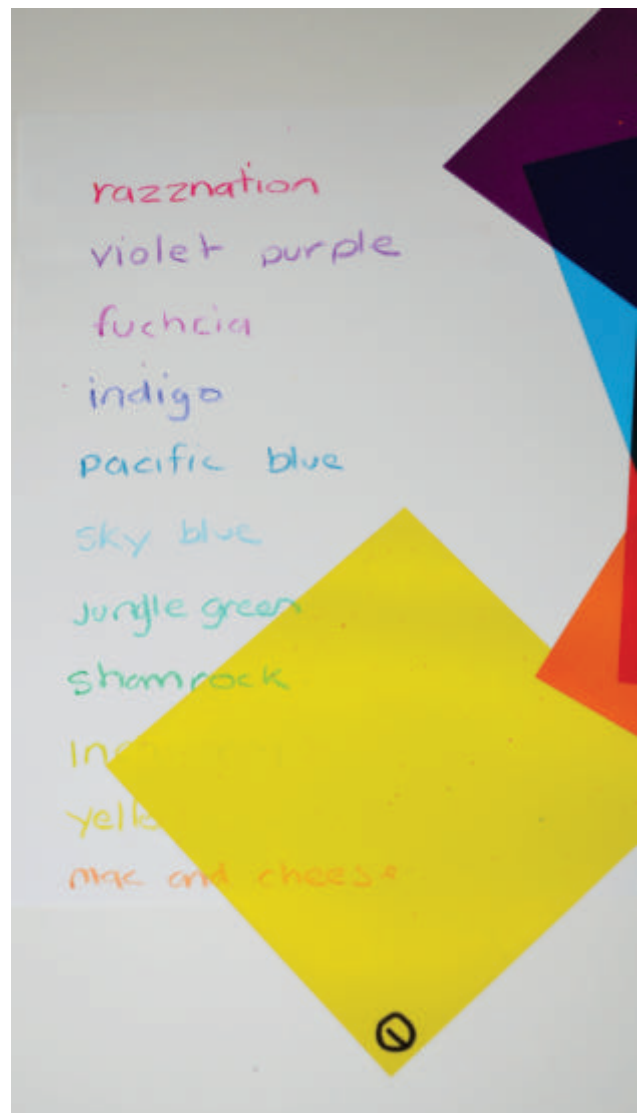


**The Visual System: Seeing is Believing**

There are all kinds of obvious ways to explore our sense of sight. You can go on-line and look for optical illusions. One of my favourite illusions is to look at a picture of an oddly coloured rainbow. If you stare at it intensely for 20 seconds and then look at a blank sheet of white paper, you see a normally coloured rainbow that isn't really there. See page 13b for illustrations. The reason for this is because when we stare closely at an image the colours receptors in our eyes grow tired. When we look away, instead of seeing an afterimage of the object we stared at, we see the complementary colours for a few seconds until our receptors clear up. It's a great way to explore how the eye works.

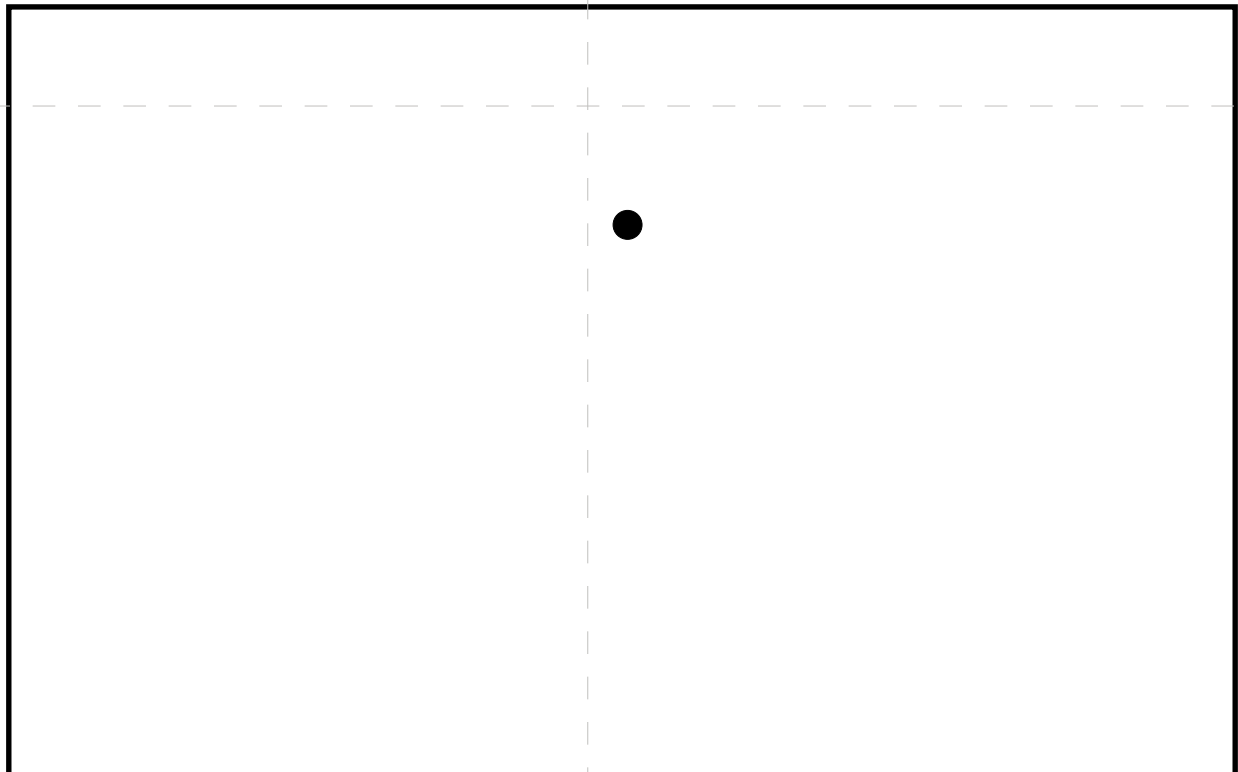
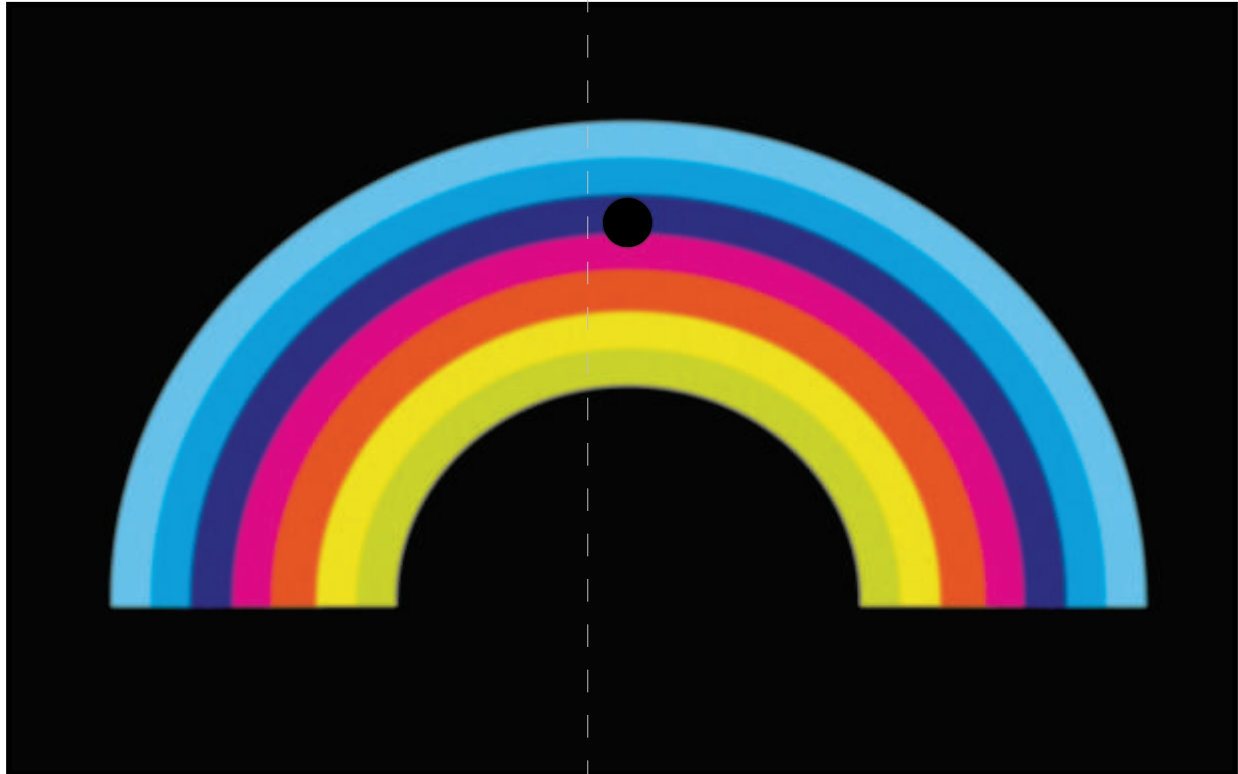
We need to understand that there are physiological mechanisms at work in some of our senses. For instance, our sense of sight is the result of a highly complex system of rods and cones, nerves and lenses. Our eyes are really, really complicated but they can be fooled. There are lots of examples of this on the internet. We need to explore our senses in order to learn when we can trust what we see, hear, feel, taste, etc., and when we cannot trust what we sense.

I want to look at something specifically designed for young children. Let's explore our sense of colour vision. I'm personally interested in this because I happen to be colour blind. I've been to lots and lots of classrooms, especially for young children, where colour is taken for granted. The teachers seem to assume that everyone can see colours, yet, if you teach more than 22 students, chances are that at least one of them has some impairment of their colour vision. One in every twelve boys is colour blind and one in every two hundred girls is colour blind. It's an important thing to understand if you are using colours in your instructions.



**Seeing is Believing: Rainbow Illusion**

Stare at the black dot in the rainbow for 20 seconds and stare at the black dot in the white box to see the naturally coloured rainbow appear out of nowhere!





Years ago we created a colour blindness test that teachers can use to help identify students who may be colour blind. It's important to know if any of your students can't see specific colours. The kit is designed to help teachers assess their students in a fun way. Check out our R59421 Color Vision Perception Kit. It wasn't enough for us to identify colour blind students; we wanted to be able to give colour blind students a chance to "see" what normally sighted students see. Likewise, we wanted to give students an opportunity to experience what it was like to be colour blind. We created cards with a standard colour vision test on one side and on the flip side, we wanted to give kids the chance to experience colour blindness. When you lay a coloured filter over top of the scribbles on the back side of the card, a picture is revealed.

I want to give you a chance to teach your students how to make their own hidden pictures. You will need a big box of crayons, white paper and some see through sheets of coloured plastic. Tip: Our kit comes complete with these colour filters, but you can also purchase coloured report covers at your local office supply store. Start by making small marks with all of your crayon colours. Lay the sheets of coloured plastic over top and see which colours "disappear" and which stand out. Use the disappearing colours to draw scribbles on your sheet of paper and use the colours that pop out to draw a picture. Add some more scribbles if your picture becomes too obvious.

Use this technique to encourage kids to make their own hidden masterpieces that they can take home to their parents. It's fun to give the kids small pieces of the coloured plastic sheets so parents can "scan" the artwork to reveal the hidden picture.



## The Tactile System: Touchless Touch

I think we take our senses for granted more often than not. Maybe that's the way it should be, but I think there is an opportunity to explore and develop our senses when unexpected things happen. We can take away our senses temporarily in order to appreciate them more or develop other senses that will compensate.

One of my favourite activities involves soap bubbles. Here is a very easy and inexpensive activity that feels a little like magic when it's really chemistry.

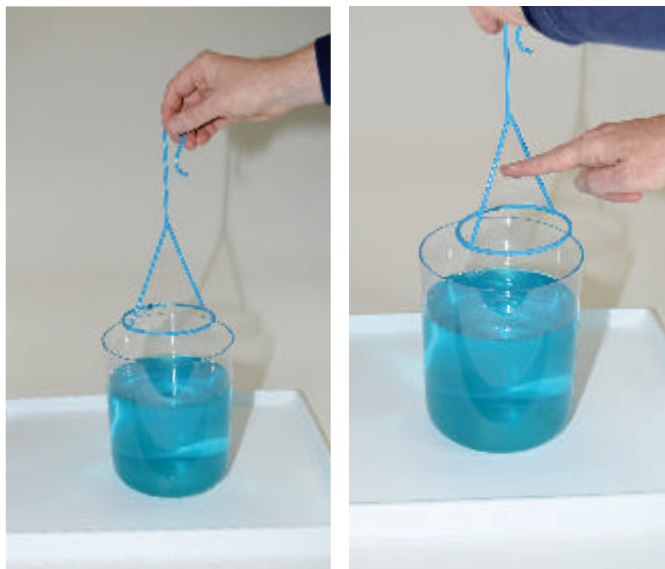
Start with a good quality bubble solution. I've tried for years to make homemade bubbles that will last long enough to use in experiments and demonstrate principles to students. I tried all of the different kinds of recipes on the internet and really couldn't develop anything that was good enough at a reasonable budget. I remember one instance where in desperation I went to our local university and talked to a professor of chemistry who specialized in soap. I walked into his office and he proudly showed me a bubble he had blown and put inside a glass case more than two years previously. I was impressed. When I asked him what the secret to long lasting bubbles was, he told me that it was easy. It's all about the glycerine you use. When I asked him what he used, he simply told me he used nitro-glycerine. He told me this as if it was something I should have known. I told him I worked with teachers and students. He said that he had used his formulation with many, many students. *Okay, I thought, there is a difference between university students studying chemistry and preschoolers studying finger paint.* That distinction, I found, was lost on him. Over the subsequent years I worked with a different chemical engineer to make a reliable, affordable and interesting bubble solution. Check out our F66525 Demonstration Bubble Concentrate. You mix 3 parts cold water to one part bubble solution. The bubbles aren't permanent, but they will last long enough to demonstrate interesting principles to your students.

Here is an experiment to get students to focus on their sense of touch. Start with some bubble solution. Dip a bubble blower into the solution and pull it out. Instead of buying boring, everyday bubble blowers, I like dipping unusual things into the solution. My favourite is a Slinky. Put the whole Slinky into the solution and slowly pull it out. You will see that a "bubble tunnel" forms around the slinky. It's beautiful.



Ask a student to touch the bubble film and describe how it feels. Encourage two, three or more students to try feeling the bubble as it vanishes in front of their eyes. Some kids will say that they could feel the bubble burst. Others will have a harder time identifying the sensation.

Next, ask the same students to repeat the experiment, but with a slight difference. I dip my hand into the bubble solution and then ask the children to hold out their "poking" finger while I coat the finger in bubble solution by gently rubbing my wet hand over the child's finger. I've gotten pretty good at this. When a child tries to poke the bubble film with their now-wet finger, it doesn't pop. Instead the finger goes right through the film. It's hard to feel the finger pass through the film because it has the same texture as the already-wet finger. I've noticed that students in quiet classrooms report feeling the bubble film more often than kids in loud rooms. I'm not sure why this is, but I suspect that it has to do with the amount of sensory input they are receiving. My theory is that the more information they are receiving, the less able they are to differentiate the small details.



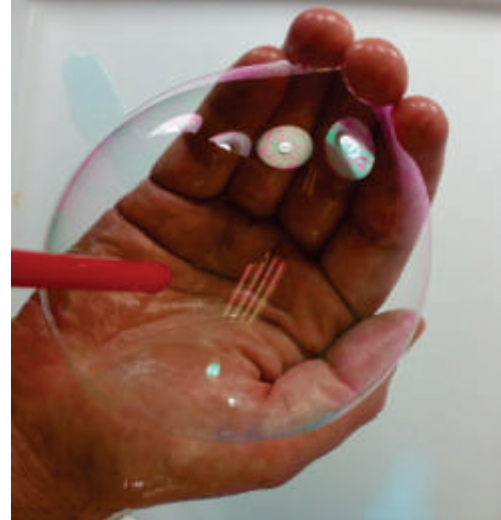
There is more you can do with bubbles. For instance, look for objects in the classroom that could be used to make bubbles. Test them by submerging the objects into the bubble solution and see if they make bubbles when you blow on them. What works and what doesn't work? Objects with a closed hole of any shape, like the pancake flipper, work well, while objects without

a closed hole, like the potato masher, won't work.

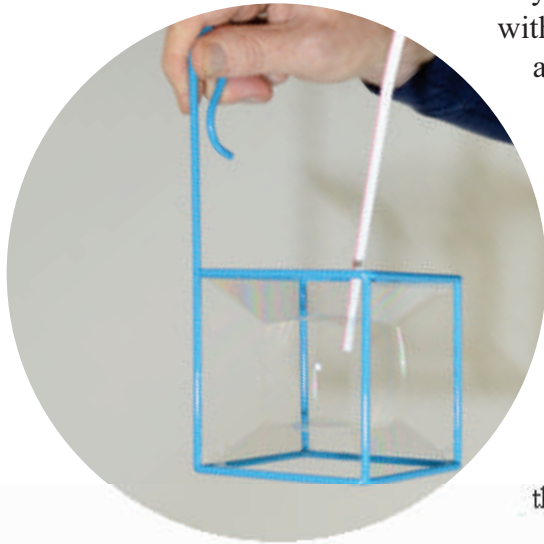
You can make your own bubble blowers just with a chenille stem twisted into a closed shape. Make a heart, an oval or a square chenille stem bubble blower. What shape bubble will these form? If you guessed a sphere, you are right! Bubbles always form the shape with the least amount of surface area needed to enclose the amount of air you blew into it. The best shape is a sphere.



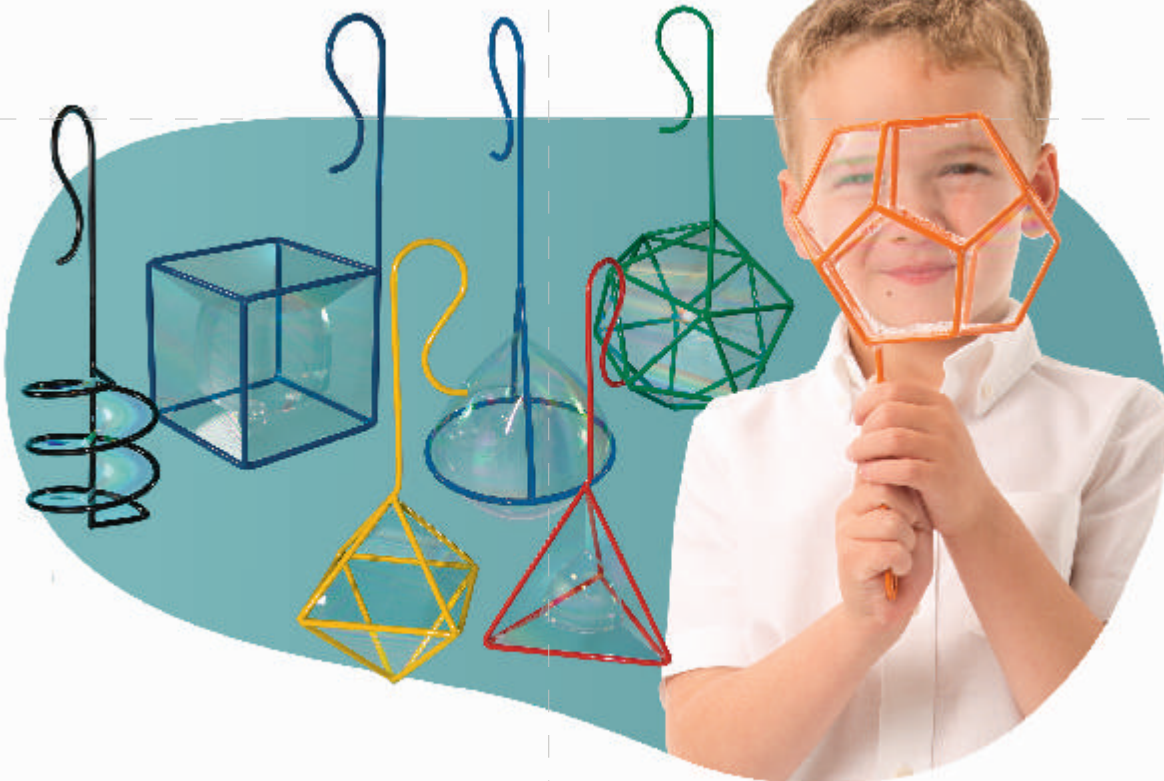
You can make a bubble without any bubble blower. Simply dip your hand into the bubble solution and dip a straw into the bubble solution. Press the wet end of the straw into the palm of your hand and blow. Keep blowing until you have squeezed all of the air out of your lungs. The size of the bubble will correspond to your lung capacity. The more air your lungs hold, the bigger your bubble will be!



Make more dynamic bubbles by using our F66529 Geometric Bubble Forms or create your own shapes with R6085 Straws and Connectors.



There are many different ways to make these base forms. Once you have the final shape, try manipulating the interior bubbles and soap film by inserting the end of a drinking straw into the bubble solution and then blowing on the interior shapes. You can make a cube inside a cube or a pyramid inside a pyramid! Use the forms as regular bubble wands, too. Take them outside and children can swing them to produce a cascade of bubbles or simply blow on them to make large sized bubbles.



**The Olfactory System: You Ain't Nothing but a Bloodhound!**

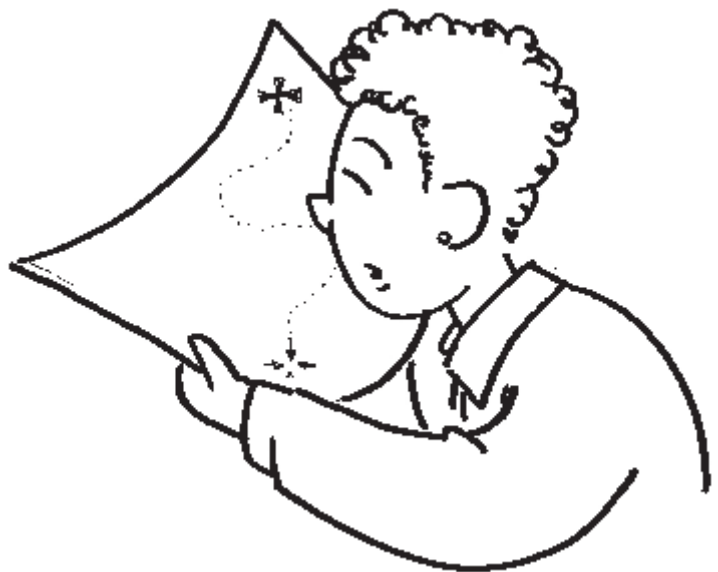
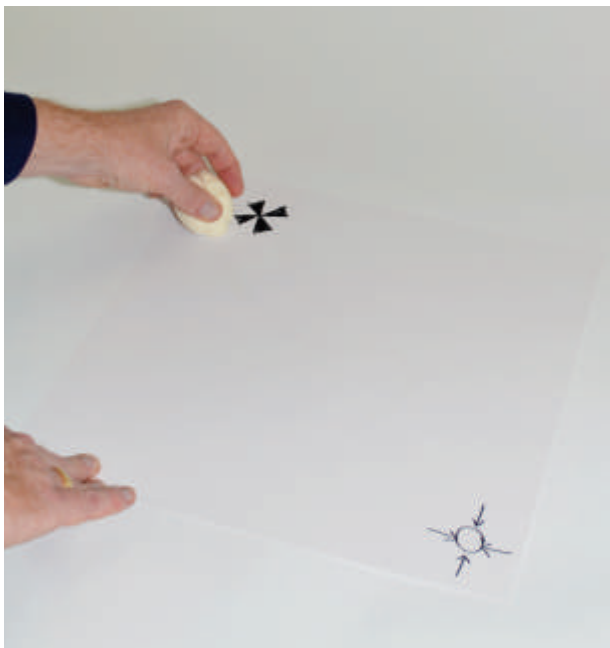
We often neglect our sense of smell. Of all of our senses, smell seems to be the rudest. I'll talk more about smell later, but let me describe an activity that made me change the way I think about smell.

Imagine for a moment that you are a bloodhound. You use your sense of smell very differently from your other senses. You can smell things on the ground that are no longer there. Years ago one of my teacher colleagues wanted to test her students' sense of smell. She believed that they could smell much better than they thought they could. She worked to create a game where there was a scented path on a large sheet of paper and she asked her students to follow the path with nothing but their nose. She invited me into her class to see the results. It was really wonderful seeing the kids follow a path that they couldn't see.

When I asked her how she did it, she described a ridiculously time-consuming and expensive process. I wanted to see if I could help her by making the whole thing a lot easier.

I started by creating a smell pastel using unscented soap. I microwaved it for 30 seconds. We've all seen what happens when you microwave an Ivory bar soap. It melts in a weird foam-like way because there is a lot of air in soap which bubbles when heated. It's interesting, but not really very useful. I was using a different brand of soap, but it still foamed up in the microwave. I found that if I microwaved it for 30 seconds and then stirred it, I could get it to become almost liquid after a few 30 second sessions. I then added about half a small bottle of liquid extract. For this activity, you need to use a clear extract. Stir it until the liquid is fully incorporated into the soap and the soap is starting to solidify. Next, press the hot soap into a mould. Let it completely harden.

Use the pastel to draw a path onto a large sheet of paper or cardboard. Have a starting point and a finishing point. Blindfold a student and let them smell the starting point. It may take a few tries, but they will become aware enough of the trail left by the pastel to follow the path just like a bloodhound follows a path outdoors. It's really a wonderful experiment because it helps kids realize that they have hidden talents that they had never explored.



**The Gustatory System: A Rose by Any Other Name Tastes Funny!**

Taste is a hard sense to explore. Not only am I reluctant to ask kids to try eating foods because of things like allergies, sensitivities and dietary restrictions, I also find that kids are very fussy when it comes to food. I remember when I was in grade three, our teacher served us canned octopus packed in oil. I tried a little piece because everyone was trying it, and I still remember exactly what it was like. I can't imagine a teacher doing that now and it makes me a little sad. Don't get me wrong; I'm not a huge fan of canned octopus, but it was a good experience.

Smell and taste work together. I'm not really going to focus on taste because it's a really problematic area for teachers working with younger children. I suggest talking to kids about taste during snack time. Ask them to describe the flavour of their snacks. You can extend this by talking about the texture of food. Is the food crunchy, soft, smooth or tough. Don't forget to talk about liquids, too. Milk is a really hard flavour to describe, but it's fun to explore these taste issues.

I have two experiments for taste. The first is tied into our sense of smell. The second focuses on the temperature of food.

I recently had nose surgery and completely lost my sense of smell while my nose was healing. It took two weeks before the dressing was removed and suddenly I could smell again. I've tried to replicate this sensation by plugging my nose, but it doesn't work as well. I think it's extreme to encourage your students to get nose surgery in order to develop their awareness of their sense of smell.

Instead, try this simple experiment. Take a small piece of food, like a thin apple slice or small cube of mild cheese, and one of our Scent Sort cups from our R62301 Scent Sort Match-Up Kit. Blindfold a child and ask them to take a piece of the food and hold it away from his or her mouth. Next, instruct the student to take a big breath, blow it out and before breathing in, put the piece of food on his or her tongue while you place the scent cup under their nose. While breathing in through the nose, taste the food. What does it taste like? Remove the cup and continue chewing the food.



A normal person will find that the food doesn't taste like anything while breathing in the scent from the cup. The strong scent simply overwhelms the sense of taste. Once the cup has been removed or when the child is breathing out rather than in through the nose, the food will re-exert its flavour. It's a cool way to demonstrate how smell and taste are very connected.

At this point I want to make a personal observation. I have noticed that sour flavours aren't affected the same way by smell as mild and milky flavours. It's almost like sour is somehow different from taste—it's almost more like a feel than a flavour.

For the second flavour experiment, see how temperature affects taste.

Mix the exact same amount of cold, room temperature and hot water with the same amount of sugar. Taste each one. Which one is the sweetest and which one is the least sweet? Can you explain it? The simple reason is that the temperature of the food we eat reacts with our taste buds. Cold food is harder to taste because it "freezes" our taste buds. Hot foods are easier to taste.

You can try a similar experiment by letting popsicles melt. Start with two of the same flavour popsicles. Let one melt completely. Cut the frozen popsicle into individual pieces for each child to taste (pop the pieces back into the freezer to make sure the pieces are really cold). Let the children taste the frozen pieces and then let them taste a teaspoon of the melted pieces. How are they the same and how are they different? Chances are the children will find the melt popsicles to be too sweet. It's a good experiment to show that frozen foods like popsicles and ice cream contain way more sugar than we expect.



**The Vestibular System: Walk Like an Egyptian Alligator!**

One of my favourite things to do with children involved a swing set. Most classrooms don't have indoor swings, so you need to take this outside to the playground. Instead of sitting on the swing, ask the student to lay with their tummy on the swing seat and arrange a sheet of paper and some paint on the ground. Instead of swinging back and forth, ask the student to paint a picture. When students start to get good at painting upside down, place a longer sheet of paper under the swing and encourage them to swing up and down to cover the sheet of paper as they move back and forth.

For a simpler activity, we created our R62010 Body Poetry: Animal Action Cards. Each card depicts an animal on the front and different animal track patterns on the back. As a class, hop like a frog, waddle like a penguin or flutter like a hummingbird. Rotate between different animals and continue moving about the classroom or playground for at least fifteen minutes. This activity is especially good for students who are apt to sit for long periods of time. If your students are too calm or sedate, get them up and moving by walking like animals!



If you have a boisterous class that can benefit from a calming influence, try classroom yoga. Here is an experiment that I did a long time ago. I bought two different sets of yoga cards for kids and I made one additional set of cards myself. One set that I bought was extremely cute. It was called Yoga Pretzels and featured whimsical illustrations of kids doing simple yoga poses. Another set featured adults doing the poses. The set I made featured photographs of a child doing the poses. I wasn't really proud of this set because I'm not a very good photographer and I took pictures of just one student who was good at yoga.





Here's what I found. The cards featuring the adorable illustrations of kids doing yoga were a complete waste of money. I really like them, but when the kids looked at the poses, they told me they were impossible to do. Next, I showed them the other set of cards I purchased featuring adults doing the poses. Again, the kids thought they were impossible to do. When I asked them why, they explained that adults can do lots of things that kids can't. In desperation, I showed them the cards I had made featuring photographs of the student doing the poses. To my amazement, all of the kids started arranging their bodies as soon as they saw the photograph of the child in the pose. It was an eye opening moment for me. I showed the exact same pose as an illustration and with a photograph of an adult doing the pose. The kids looked at them and were defeated before even trying. When I showed them a photo of a child doing the same pose, my students immediately got into it. That was a powerful lesson for me. I learned that kids impose limits on what they can do and all it takes to break through those limits is seeing another child do it.



After I had that realization, I started using the same trick to encourage kids to try all kinds of activities from math and science projects to arts and crafts to movement and physical activities. I don't think this is peer pressure, I think it's an anything-you-can-do-I-can-do-too attitude. It can be a powerful force in the classroom.

Later I created our R62011 Body Poetry: Yoga Cards to help calm hyper children by using beautiful photographs of children doing yoga poses. Use these cards to calm children and help them focus their mental concentration while holding the poses.



## Proprioceptive System: Beautiful Balance

It feels like knowing how to position your body in space is something that comes naturally. In fact, most teachers I talk to don't even know what the Proprioceptive system is or what it does. I completely understand that all of our senses can develop naturally; however, if we work at developing each sense, they can all become even stronger.

A ballet dancer, a carpenter, an astronaut, a sailor and a surgeon all have finely developed proprioceptive systems. They need to be able to balance themselves while doing other complicated tasks. Some children who are especially skilled at controlling their body movements often get their special skills overlooked. Their special talents are not as obvious as other children's, but let's keep in mind that some of the highest paid people in the world, professional athletes, are gifted in their proprioceptive skills.

On the other end of the spectrum, kids who struggle with their sense of balance can be helped if their proprioceptive system is exercised from an early age.

One simple activity centre involves an easy-to-make prop. We can use this centre to help kids understand gravity and force, too! Start with some clean and dry water bottles. Find some sticks that can be inserted into the opening of the water bottle. I used broom handles that I bought at the Dollar Store and cut them down. Fill the bottle with sand and insert the stick. Wrap the opening with thick, clear tape. If you are concerned about the bottle leaking or cracking if it falls on the ground, wrap the bottle in clear or duct tape to reinforce it. If you make more than one balance stick, the sticks can be various heights and you can fill the bottles with something other than sand. You can also position the bottles at various heights on the stick to change the centre of balance.

Let the children balance the balance sticks upright with nothing other than the palm of their hands. After a few tries the children should start to notice that it is easier to balance a stick with a heavier weight at the very top than a lighter weight or a weight distributed closer to the "hand-end". The reason for this is simple. The heavier an object is, the more inertia it has. Inertia means that an object at rest wants to stay at rest. The more inertia something has, the harder it is to move. Inertia is directly related to weight. Heavy objects don't want to move. When you have your balance stick upright, the weight at the top wants to stay in one place, so it's easier to control. Of course gravity is trying to pull it down, but as long as you can counter the effects of gravity you can control the movement of the stick fairly easily.

To step this activity up, try balancing on one foot or the tip toes of one foot. Balancing is so important for younger children to master that we developed a kit around balancing. Our R62013 Stepping Stones Exercise Balance Kit is great on its own, but amazing when used with these homemade balance sticks. We have printed poses on cards that the children can do while standing on plastic "stones" printed to look like real stones. It's a lot of fun and can really help identify students who are struggling with their proprioceptive sense.



## Further Sensory Explorations

Sensory explorations really come to life when you combine different senses. This is not to say that you need bells and whistles to tweak each sense at the same time. In fact, using subtle sensory input can be extremely effective because the kids need to focus on it rather than being overwhelmed by it.

Let's start by creating a classroom centre that focuses on literacy. I'm sure you already have a classroom library and/or a reading centre. My goal is to broaden the appeal of that centre in your classroom to make it appeal to as many of your students as possible.

## Literacy Centre

I love doing a lot with literacy and sensory exploration for two simple reasons. First, letters are just constructed symbols. There is no meaning behind the letter symbols other than the meaning we give these symbols. Children simply need to memorize each symbol and understand how the symbols work together. Let's make it as easy for children to experience letters as possible by giving them many different ways to explore these letters.

I like to encourage the kids to make their own literacy hut. There is something really wonderful about having an area in the classroom where children can go and read or look at books in privacy. I've experimented with all kinds of tents, forts, huts and enclosures and came up with my favourite. I start by asking kids to make a hut out of our R6085 Straws and Connectors. I've found that children who really enjoy active play like building in the block area take ownership of the literacy area when they contribute to building it. Straws and Connectors is one of my favourite products. I use Straws and Connectors to build rocket ships, boats and airplanes for imaginative play. Likewise, I use Straws and Connectors to make bubble wands, drying racks and even marble mazes. The more ways we find to use Straws and Connectors, the more comfortable students are with designing projects that feature them.



For the literacy area, students make a simple hut and then I give them organza fabric to cover it. Try encouraging kids to weave the organza around the openings in the hut. Organza is the perfect material because it is lightweight, it comes in beautiful colours, it's inexpensive and you can see through it. I like to be able to monitor the kids without invading their space, so it's important to me that the hut provides a physical barrier, but does not create a visual barrier.

There are other ways to decorate the Straws and Connectors hut. Children can paint on paper and then you can use a hole punch to cut two holes in the top. Thread the straws through the two holes as the kids build their structures. I like to reinforce these holes by covering the top of the paper in clear tape before punching in the holes. Try using our R15212 Color Diffusing Paper to decorate with liquid water colour. You can talk about mixing colours by using just primary colours and you can talk about evaporation by talking about how the water from the paint dries. If you want to add a really cool element to this project, add letters to each of the sheets of paper. I like using R55006 Alphabet Sponges, but instead of applying paint, I apply glue and then sprinkle glitter over top. Later on I will put these sheets into our R59040 Wipe Clean Worksheet Covers and encourage children to trace over these letters with crayon. The texture of the glitter makes tracing over the letters interesting for kids.

You can also decorate the Straws and Connectors literacy hut by string letter beads onto yarn and hanging the garland over the hut. I love using one of our R5601 Plastic Lacing Needles to string our letter sponges onto yarn and using that as a giant garland. At the beginning of the year I show the kids how to do this and occasionally throughout the year I will pull off all of the letter sponges and ask for a volunteer to re-string them. It is a great way to develop hand dexterity! Tip: After I dip the sponges into the white glue and apply it to the painted Color Diffusing Paper, I set the sponges glue-side up on a tray and let them dry. Once dry, the glue forms a hard crust that makes it easier for children to poke their plastic lacing needles through. It also gives the kids a tactile cue for deciding the orientation of the letter. Instead of simply stringing the sponge letters to make a garland, kids can also stitch individual letters. Sewing is the perfect activity to develop hand-eye coordination. Because one side of the sponge is stiff, sewing is easier.



Once your hut is decorated, I like to use it as a classroom library. I put an R59601 Light Cube inside of the hut. It's bright enough to illuminate a book without being too bright. Bright lights can distract students. I put in a small selection of books, but I keep changing them to keep students interested. I put in children's books, blank books and reference books. Most of the students I work with won't be able to read the reference books, but I have seen them look intensely at the pictures. If they want, they can ask me to read specific passages from the book. I really like that because I think it engages the kids in the fundamentals of research. Likewise, there are some kids who are drawn to non-fiction and these reference books are perfect for them.

I love using our R5901 Highlight Strips and R5902 Finger Pointer Strips in the reading centre. Originally these were developed for children who have a hard time tracking while reading, especially while reading aloud. I've found over and over again that the strips are great for showing kids how to technically read from the top of the page to the bottom and from the left side of the line to the right. I like giving each child their own Highlight Strip when they start reading and I encourage them to use it as a bookmark so it won't get lost.



Children who have not started to read can also use the Classroom Literacy Hut. In addition to the books, add some manipulatives. I love our R49703 Light Learning Uppercase Letters. They come in a range of beautiful colours with all of the vowels in red.

We've doubled up on some of the more popular letters so kids can start to spell out their names or sight words. And speaking of sight words, our R5951 Sight Word String Ups are perfect for children who are starting to read. The kit includes letter beads, chenille stems and word cards. Kids match up the beads to the letters on the word cards and string them onto the chenille stem. It's easy and engaging for kids.



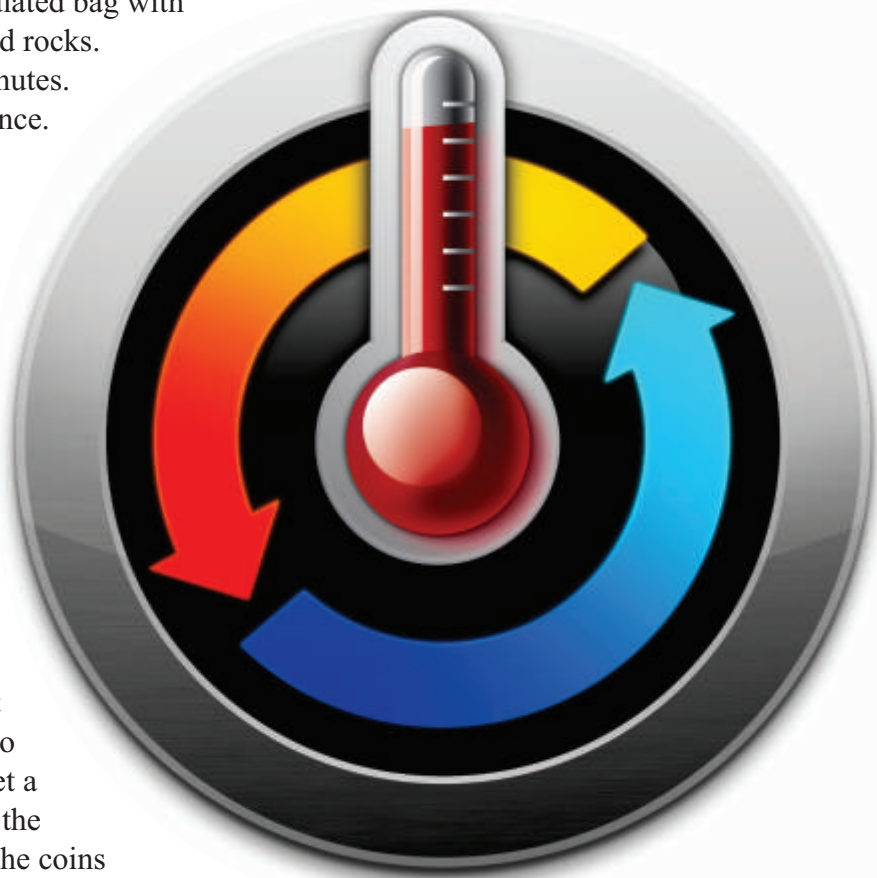
**Taking the Temperature**

Temperature is something we often avoid exposing young children to, but it is an important part of sensory explorations. The trick is to explore temperature safely. In our school the temperature of the hot water is set fairly low so even if someone ran the hot water at full blast, they are not likely to get burned. It's still hot water, but not scalding. I like working with three different temperatures, cold, room temperature and hot (but not scalding).

Here's an easy classroom exhibit. Start with a bunch of small stones or rocks. Put some in the refrigerator or freezer, some in hot water that you keep refreshing, and some at room temperature. Place each set of rocks in a bowl and ask the kids to touch them. Once they determine the temperature of the rocks, they can start experimenting. What happens when you put a hot rock in with the cold rocks or the room temperature rocks? What happens when you put a cold rock in with the hot rocks? Let children explore how heat transfers from one object to another.

Repeat the same process, but instead of rocks, use coins or metal washers. How are the rocks similar and different from the coins? Here's a tip: Metal absorbs and releases heat and cold faster than rocks. In other words, it will take less time for the coins to heat up in a bowl of hot water than the rocks. They will also cool down faster than the rocks. Try this easy experiment: cool coins and rocks for the same length of time.

Simply fill up a small, insulated bag with some ice. Add the coins and rocks. Pull them out after five minutes. Ask kids to feel the difference. Normally, they should be able to feel that the coins are cold while the rocks are still close to room temperature. If you wait longer than 5 minutes you'll end up with the rocks and coins at almost the same temperature. It will be hard to tell the difference by just feeling them; however, you can use the coins and rocks to do another experiment. Set them out and ask the kids to feel the coins and rocks. Set a timer for 5 minutes. When the timer goes off, try feeling the coins and rocks again. Are they still the same temperature? Probably not. The coins release the cold faster than the rocks.



Try the same thing with wooden building blocks. Wood is non-conductive, so it does not hold heat or cold very well. Talk to kids about that. Why is it important for trees outside to resist temperature changes? The answer is simple. Trees are living things. It is important that they don't freeze because the water inside of trees will expand and crack the wood that makes up the trunk and branches of the tree, which is harmful. On the other hand, it is great that the rocks outside absorb and release heat slowly. I live in Canada where we get bright, sunny winter days. It can be very cold outside, but the pavement still absorbs heat from the sun. On normal winter days, the sun heats the pavement and the heat is absorbed and stored. At night, the sun goes down and the wind starts to get very cold, but the absorbed heat is released by the rocks and pavement and helps to moderate the temperature. Natural and man-made rocks helps to regulate the temperature during the day and night, almost like a giant battery getting charged up during the day and releasing its energy at night.

Once you've studied temperature with solids, try a different experiment using liquid and gas. Add some dish soap or our F66525 Demonstration Bubble Concentrate solution to three bowls. In one bowl, mix the dish soap or bubble concentrate with room temperature water. In another bowl, mix ice water with the dish soap or bubble concentrate and in a third bowl, mix hot water with the concentrate or dish soap. Encourage kids to touch the bubble solution and describe it. Certainly you want them to feel the difference in temperature, but ask them to really examine each of the mixtures. What do they look like? How do they feel? How are the different solutions similar and different?

The kids should notice that the bubble concentrate mixes very easily and quickly with the hot water and resists mixing with the cold water. Can anyone suggest a reason for the difference? The answer may be obvious to an adult, but to a child, this is all new. The hot water "melts" the glycerine in the soap so it mixes easily. The cold water reinforces the structure of the glycerine so it's much harder to mix.



Next, blow some bubbles! You would expect the hot soapy water mixture to result in hot bubbles. The ice water should produce cold bubbles, but is that the case? Probably not. The water quickly releases its heat or its cold and accepts the temperature of the air being blown into the bubble. You end up feeling the temperature of the air rather than the soap film.

You may notice something else that's baffling. When you blow bubbles using the hot water mixture, they pop very quickly. The cold water bubbles last longer. It's important to make these observations and question them. Why do hot water bubbles pop faster? It's a simple matter of chemistry. Bubbles pop when the water molecules evaporate off of the surface of the bubble causing the film to get thinner and thinner until it pops. Hot water evaporates faster than cold water.

You can measure the difference in evaporation rates. Start with two plastic glasses of water. Fill one cup with hot water and one cup with cold water. Mark the top level of both glasses of water with a piece of tape or a permanent marker. Place the cold water glass in another container filled with ice. Continue to replenish the ice as it melts. Place both the hot water glass and the cold water glass, complete with its ice bath, outside on a bright, sunny day. You will find over a few hours that the hot water evaporates quickly while the cold water evaporates more slowly. It's a great experiment to explore the difference temperature makes.

For the last temperature experiment, I want to do something completely unexpected. I love doing this because children get to predict what will happen based on their understanding. Some will get it right and some will need further explorations, but everyone will enjoy the process.

Add some liquid water colour paint or food colouring to the bowls of hot, cold and room temperature bubble solution. Dip an F66531 Super Bubble Pump into the cold water bubble solution and pump out a stream of foam. Alternatively, you can use our R54465 Foam Paint Bottles. Let the kids see the coloured foam and feel it's temperature. What do they notice about the temperature? Let them stick their fingers in the bubble solution and then feel the foam. Is it the same or different? You can even generate bubbles on top of the dish of solution by pumping the Super Bubble Pump up and down without removing it from the bowl. It will quickly produce foam bubbles on top of the solution.

Repeat the experiment with the other two bowls. Chances are there will be just a slight difference in the temperature of the foam while the temperature of the water is very different. This is a great opportunity to reinforce the idea that the bubbles hold the temperature of the air used, not the water.

To finish off this experiment, dip one of the Super Bubble Pumps into one colour of bubble solution and then into another. Ask the kids what will happen when you pump the bubbles? Instead of getting a steady stream of one of the colours used, you will get a stream of a new colour of foam! The colours mix while the foam is being produced. It's really cool. Use the foam for finger painting!





**The Nose Knows!**

Scent is a tricky area. Some children are extremely sensitive to scent. Now more than ever there are allergy considerations. If, however, you have a class full of curious kids who don't display any scent sensitivities, exploring our sense of smell can be truly wonderful.

Of all of our senses, smell is the least cultivated and least appreciated in my view. Even though perfume, body sprays, scented deodorants, candles, bubble bath bombs and room fresheners are hugely popular, we tend not to express any real awareness of smell. It feels almost rude to comment on smell in polite company.

I was at a teacher conference fifteen years ago and I went to a really popular session. The room was jam-packed with teachers sitting on the floor and standing against the wall. I'm a veteran of these conferences and so I get to the room of the popular sessions early to grab a seat. As the room filled up and more and more teachers crammed in, I tried to make myself as small as possible. In the row in front of me and two seats over, a nun sat down. She was tiny and very severe looking. She was a "hit-you-with-a-ruler" type of teacher. As she walked by, this tiny, severe-looking nun left a trail in the air behind her. And then she started farting, the poor soul. At first it was a little awkward. What do you do in this kind of situation? There was nowhere to go. I couldn't change seats. After a while the situation became more and more toxic. I swear that the hairs on the inside of my nostrils were burning. And yet no one said anything, no one reacted, no one got up and walked out. We kept taking notes and asking questions as if we were in a spring-fresh daisy field. We don't value our sense of smell.

But smell is an amazing sense. Smell is the only sense that goes directly to our brains. Experts still don't really know how our sense of smell works, but they do know that the air you breathe through your nose hits an area of exposed brain cells directly at the back of the nasal cavity. Perhaps that is why smell can evoke such strong memories. As an example, think about Thanksgiving dinner. Can you imagine how it smells? I have a better sense of how a perfectly roasted turkey smells than how it tastes.



Smell is important so let's explore it with young children. Years ago I developed our R62301 Scent Sort Match-Up Kit. I love this kit because it gives kids a chance to experience different objects based on how they smell. You can make your own version of this kit. With our kit, there are cards that relate to each of the 30 scents. Each card is double sided. One side shows a small picture of an object that relates to a smell along with a number that relates to a matching cup of solid scent. The flip side of the card just shows a picture of an object without the matching number. You can start with the cards number-side up. I only give kids 5 cards at a time because after a while, the nose starts to get confused. I'm sure you've seen coffee beans at the perfume counter of your local department store. The theory is that you smell a perfume, and then take a big whiff of the coffee beans which is suppose to "cleanse your palette." I've never found that to be effective. Instead, I work with just five scent cups. I ask the students to identify the scents using the cards. It's a fun and challenging activity. After a while, kids start to get really good at it. That's when I flip the cards over and ask them to identify the scents based only on the pictures and not by matching the card number to the cup number.

In the 13 years I've been working with this product, only one child has been able to identify all 30 scents the first time out. It was really exciting to see him explore his sense of smell. It was something that he was really, really good at. Not only did this activity build his self-esteem, but it also enlightened his parents about his talented nose. He was able to do something that practically no one else could do. His parents valued his talent and have since developed it even further by exploring his sense of taste.

To make your own scent sort cups you'll need small plastic containers, jumbo pompoms and liquid scent. Certainly you can buy liquid extracts at grocery stores and baking supply stores, but that can get really expensive. I've seen smaller amounts sold at places where you buy soap making supplies. They will sometimes sell sets of scent. This is useful, but sometimes the scents aren't really recognizable to young children. I still don't know what Ylang Ylang is. When given the option, I like using clear extracts.



Start by poking some holes into the lid of the plastic container. Insert a pompom and sprinkle it with the liquid scent. Screw on the cap and set out. It's a good idea to number the scents on the top or bottom of the container. It's important that you know which container holds what scent. You'll need to recharge these containers often because the extract will start to evaporate and fade away as soon as it is exposed to air. When we smell, we are smelling the molecules of the extract as they travel through the air during evaporation. The bigger the molecule, the longer the scent will last. That's why perfumes smell differently throughout a day. The smaller molecules, like flowery scents, evaporate quickly. Medium sized molecules take longer to evaporate and really big molecules like musk don't start evaporating right away. They tend to be the base notes in perfumes and only start to emit their scent much later.

The trick to creating smell cups for children is to give them scents that are familiar. Instead of liquid extracts, you can use baby oil, orange peel, cinnamon sticks, powdered chocolate, different Jello flavour powders, etc. Make sure you disguise these so they are not easy for the kids to identify by sight alone.

To disguise scents, try these two easy solutions. First, pour the scent onto a different coloured pompom. For instance, if you are using orange extract or orange jelly crystals, apply them to a purple pompom. Children often identify colour with specific smells so mix it up. One other technique that I've found very effective is to change the weight of the containers. I put several large washers inside the containers to make them heavier. It's interesting to watch children judge a smell by how heavy the container is. The two factors are not related in the least, but because kids relate smell to other senses, like sight and touch, it becomes important to mix things up so that children focus more on their nose than on other cues.



## FUNnel Blocks

There are several variations you can try to create blocks that work with water. My favourite version uses our R60310 Crystal Color Stacking Blocks and flexible drinking straws. Crystal Color Stacking Blocks are transparent, square-ish blocks in beautiful colours with a grid pattern on top that helps guide children in stacking the blocks in interesting configurations.

I start by drilling a hole the size of a straw into one side of the blocks. Drill the hole approximately 1 cm (3/8") below the opening of the block. Alternatively, you can use a soldering iron to melt a perfectly round hole in the side of the block.

Thread the straw through the hole and then use a glue gun to add a bead of glue around the entire opening to fix the straw in place and prevent leaks when the cup is filled with water.

Make between 10 and 20 of these cups. Give the blocks to your students and ask them to make a pyramid with the straw blocks at the top and cascading down. The kids need to stack the blocks so the top block empties into another block which in turn empties into another block, etc. After all of the blocks are arranged, pour water into the top block. When the water fills the block higher than the top of the straw-hole, the siphoning action will cause the water to cascade through the straw and into the cup below.

Alternatively, you can accomplish the same thing with regular plastic cups. Use a hole punch to cut holes into the side of the cup. Thread the straw through and use regular white glue to hold the straw in place and seal up the hole. Note: A glue gun will melt the thin plastic of the cup, so you can't use it. White glue is water soluble so it will eventually leak. Use these cups in conjunction with regular wooden blocks to create a flowing water route. Tip: Add a drop of food colouring to the cups.

Start with pure water and when it hits the second cup, it will be tinted the colour of the food colouring. After the water reaches the height of the straw and starts siphoning into the next cup, it will turn colour again. Start with yellow food colouring, followed by red food colouring, followed by blue, etc. Kids will want to play with these blocks often so make them as sturdy as possible.



**Earthquake Architecture**

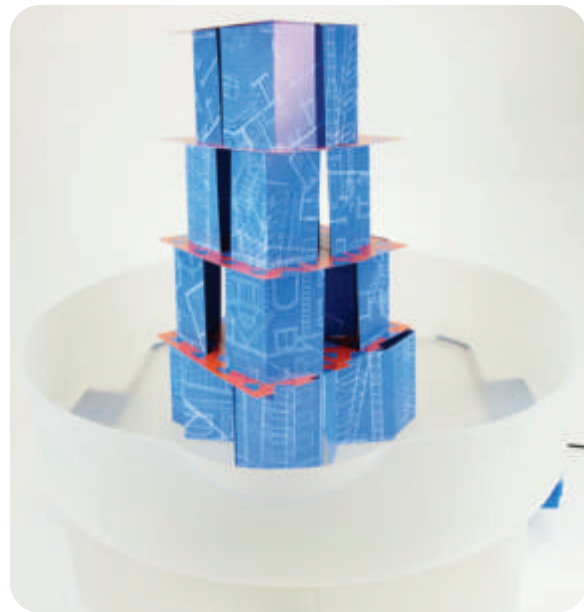
Children love the tension of building a tall tower that could come crashing down to the ground at any moment. Feed into this natural enthusiasm by challenging the students to create a building that won't come down during an earthquake!

Start with an earthquake table that you can make from plans available on the web. Check out YouTube for video instructions or go to the Network for Earthquake Engineering Simulations website for an easy plan: <https://nees.org/resources/2938>

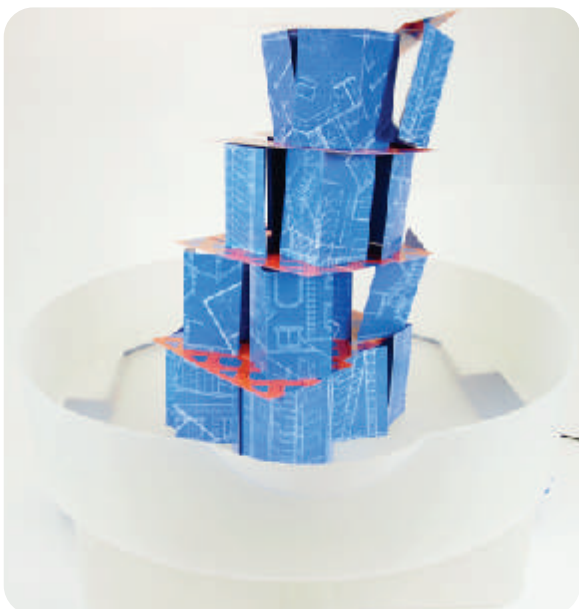
Alternatively, use Roylco's R59630 Sensory Tray. It works perfectly and features two different vibration settings. It fits snugly on R59601 Educational Light Cube and holds water, sand and a range of other materials.

Partially fill the tray with sand and ask kids to use building blocks or Roylco's R60450 Skyscraper Building Cards to make a tower. Turn the vibration unit on and time how long it takes for the tower to come crashing down.

Encourage kids to rebuild their tower and experiment with different configurations to make it stronger so it will last longer once the vibrations have been activated. Students can keep building their towers and making them stronger and stronger until they will last for minutes before falling down. It's a great way to use trial and error to learn about engineering principles.



*Build a tower*



*Activate the vibration*



*Time how long it takes to fall*

## Building with Light

One of my absolute favourite classroom activities is building with light. More precisely, I work with the kids to build with shadows. All you need are recycled plastic containers from laundry detergent, yogurt, beverages, etc., and a light source such as an overhead projector or slide projector.

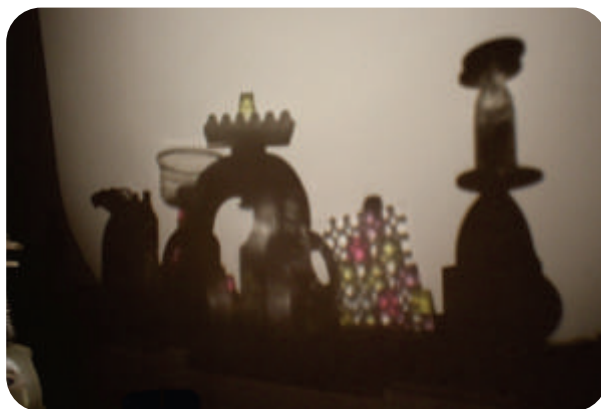
Set up the light source so it projects a square against a wall. You can set up the light source directly on the floor or on a table. Project the light against the wall and mark an area on the floor that relates to the width of the light. Turn off the projector.

Start with two objects that are the same size. Put them side by side and turn on the projector. Ask the kids to describe the shadows. Once the students have finished describing the shadow, turn off the projector.

Next, move one of the objects towards the projector and move the other object away from the projector and closer to the wall you are projecting on. Ask the students to predict what will happen to the shadow. My experience is that children will predict that the object closest to the wall will cast the largest shadow and the object furthest from the wall, but closest to the projector will cast the smallest shadow. When we turn the projector on to test our predictions, the kids are amazed to find that the opposite happens. The closer the object is to the light source, the larger the shadow and vice versa.

Depending on the ages/developmental levels of the children we can do more experiments to determine why the shadows act the way they do, or we can explore optics in a scientific way. If the kids are too young for such technical talk, we can simply move on to the activity.

Ask children to build a city scene using the recycled materials. Give them a set amount of time to complete the task. I used to ask the kids if they wanted the light on while they are building or if they wanted me to turn the light off while they are building. Experience has taught me that they almost always want the light off while building. It is more exciting to experience the shadow periodically rather than all the time. The light source can be pretty bright, so I prefer to have it off while they are building and then moving them behind the light source so they can see the shadow they created.



We normally have three 5 minute building segments before completing the project. This is a popular activity and you need to work in smaller groups of 2-4 students, so you'll need to manage the time you give them for this project so that all of your students can have a chance to participate.

Building with shadows is a lot of fun and it teaches the students to experience light both visually and physically while they are building. It helps them learn to manage time themselves by having short periods of time to build and they practice self-regulation and both fine and gross motor skills to balance the containers on each other in order to build higher.

Building with light and shadow is one of the most popular activities I do with students. I find that we can pull this out up to three times a year before it becomes a little passé. Encourage kids to find and recycle materials from home that they think would cast interesting shadows. One time a child used the organza material from the Straws and Connectors literacy hut to cover her building. It turned out beautifully. Another child brought in a beautiful antique stained glass panel from home. I was shocked when I saw it. I couldn't believe that a parent would give such a beautiful piece to a four year old to carry into school and I worried a bit that the parents didn't know. But after a quick phone call, I found out the parent was a stained glass artist and the piece was one of her "rejects." I still wasn't comfortable with the kids holding it so I held it up to the projector. The kids were thrilled with the shadows it cast. I spent an hour listening to the children tell me how to move the stained glass window to cast the most interesting images onto the wall. It was a wonderful experience.

You can turn this into an art project by taping a large sheet of paper onto the wall and asking the children to trace the shadows. This is a wonderful vestibular system activity because the children need to position themselves in such a way as to be able to trace the image without blocking the light source. They need to contort their bodies while using the muscles in their fingers to work the marker. It's more complicated and fun than you might think.

Once the tracing is complete, take the sheet off of the wall and encourage the kids to paint inside the lines to create the cityscape. I've seen really wonderful artwork created this way. The students take great liberty with the colours they choose and they add all kinds of details.



**Wiggle Races**

I find that as more and more children are exposed to more and more screens, their fine motor skills are suffering. I attended a large conference on the future of education and was part of a debate about students, keyboards and printing. It was very interesting to hear the opinions of senior administrators, principals and professors. About half of the experts said that it is important that children set aside the screens until they can develop the muscles in their hands and arms to print and write properly. The other half maintained that in the future we wouldn't have to print or write as long as we could type with our fingers or thumbs. We even had a contest to see who could copy out a technical passage faster—someone using freehand writing or someone using a keyboard. The person typing was able to copy out the passage faster because he could look at the text and not at the keyboard while the person writing out the passage needed to focus on the text and then back at the paper where she was writing out the passage.

When I left the session I didn't really have an opinion one way or another. I definitely type more than I write and my handwriting has suffered as a result. What's more important?

When I got back home I was invited to a dinner party. At the party I started to ask people what they thought of the debate. Who needs to write any more? One of the guests was a new mother who happened to be a plastic surgeon. She said definitively that her child was going to learn to write properly. When I asked why it was so important, she simply stated that maybe we don't need to write to communicate any more, but there are some jobs where fine motor skills are important. “After all,” she said, “do you want a plastic surgeon with horrible fine motor skills?” The answer to that important question is, No! I want a plastic surgeon with awesome fine motor skills!

So let's help kids develop their fine motor skills in a fun way. All you need is a plastic colander, some wooden skewers, beads such as our R2183 Fancy Stringing Rings, tongs and for a very special activity, our R59630 Sensory Tray.

Place the plastic colander on a table or in our Sensory Tray and tape it down in one place. We want it to be able to move around a little bit. Next, stick in five to fifteen of the skewers. Start by asking the children to place the Stringing Rings or other beads onto the skewers with their fingers and hands. If you are using the Sensory Tray, turn on the lowest vibration setting to gently jiggle the colander while the kids are trying to thread the beads onto the skewers. When they get good at it, challenge them to add the beads by using tongs. When they get good at that, replace the wooden skewers with dry strands of spaghetti. It becomes a fun and exciting challenge to thread the beads onto the spaghetti strands while the colander shakes.





## Wiggle Worms

In my school district, children can start public school when they are three years old. I'm not going to say whether that's right or wrong. When children are five years old, they are given iPads to use in school. Again, I'm not going to judge that policy. The world will be a different place when these children graduate from high school than when I graduated. All of this being said, more and more teachers are asking me to develop activities to strengthen little fingers and little hands. I always circle back to finger painting, but teachers, especially the younger generation of teachers tell me that they hate finger painting because of the mess it can cause. They rationalize this by adding that parents are pressuring them to only do “clean” activities in class. Personally, when I'm working with a teacher on art projects I ask the teacher to send home a note to parents telling them to send their kids to school in clothes that are easy to clean and that they don't mind staining. I like messy activities and I figure if I give parents fair warning, then there's nothing stopping us.

But let's face it: if we can develop clean activities that have real play and sensory value, then we have something very special. I've been working on developing a gel formula for a long time and I've finally got all of the technical considerations worked out.

Our F66560 Solid Water Sensory Gel is a vegetable based formula that's easy to mix, forms quickly and is safe for kids. Because it's vegetable based, it doesn't get sticky and it can be reused. All you need to do is melt it in a microwave and use it again up to three times.

I've developed lots of activities around this material, but one of my favourites is “wiggle worms.” These are very easy to make. You can replace our Solid Water with Jello for edible worms, but using Solid Water has some additional advantages. First, because it isn't sticky, the kids can really get their hands into the worms. Second, because our material is easier to use than Jello you can be somewhat flexible on the proportions of water to powder to make more or less dense worms. Third, you can scoop out the worms after the activity and melt them and use the gel for other activities. Finally, our worms are made mostly from water so they have the same “optical density” as water. As a result, if you put the worms in water, they disappear. It is amazing to watch kids react to these invisible worms when

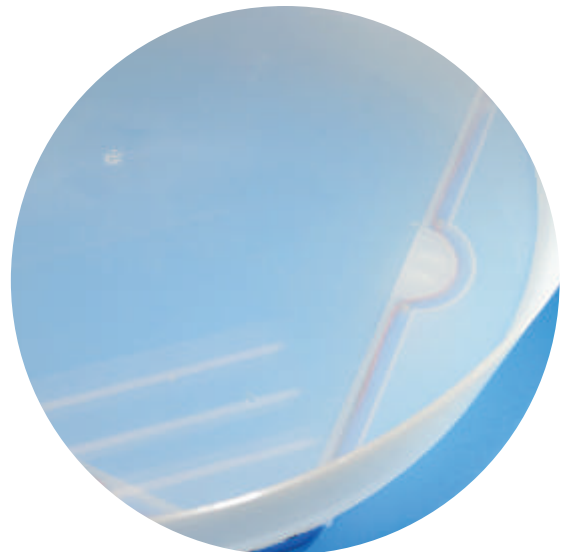
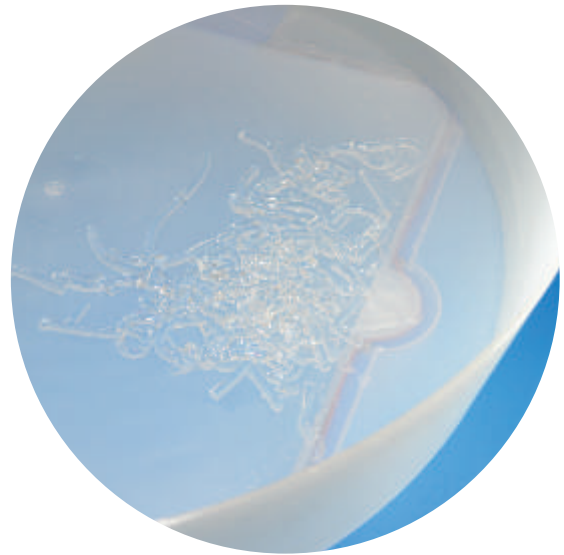


The worms are easy to make. Start with a container. I like using an empty water bottle. Cut off the top of the water bottle and fill it with either the Solid Water mixture or Jello mixed according to package directions. Take some flexible drinking straws and stretch out the flexible neck. Insert the straws into the Solid Water or Jello mixture, flexible-neck-side down. Keep inserting the straws into the water bottle until it is completely full. Let the mixture set. Tip: Solid Water will set at room temperature—there is no need to refrigerate the mixture, however, refrigerating it will speed up the setting process.

Pull the straws out of the bottle. There will be some of the Solid Water or Jello mixture left over in the bottle. Melt the Solid Water and use it for other activities or throw away the extra Jello. Pinch the top end of the straw and run your fingers down to pop out the worm out of the straw, complete with the ribs from the flexible neck.

Place the “worms” into water. For an extra special sensory treat, put the worms into our R59630 Sensory Tray and turn on the vibrating feature. The worms will still be invisible in the water, but the sound and vibration from the tray will make them seem alive when the kids discover them. It's a wonderful moment when they realize that there is more in the tray than just water!

To help develop children's “pinch grip” ask the students to extract the worms from the straws. It's a remarkably satisfying experience.



## Wiggle Worms Fishing Game

I love wiggle worms. They add an unexpected and fun element to the water table. Because the main ingredient of Solid Water Wiggle Worms is simply water, when they are submerged into water, they have almost the same optical density as the water around them so they appear to be invisible.

I love to extend the activity by creating a fishing game. There are a lot of different things you can do with the fishing game, but here are the basic elements.

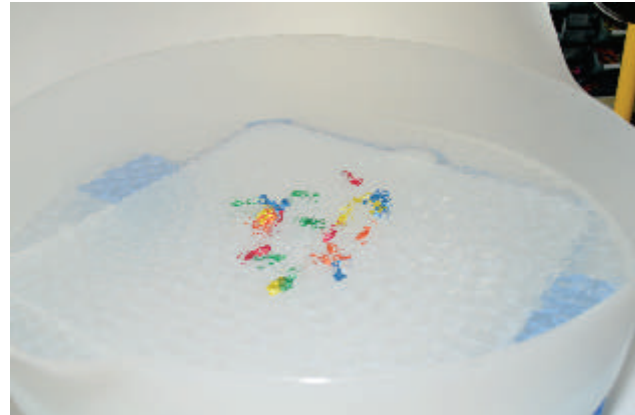
You need some type of toy fishing pole or a wooden stick, string, a fridge magnet, some paper clips and cut pieces of straw or Roylco's R2152 Straws to String.

Take a small handful of Straw Beads and insert a paper clip into half of them. Tip: You can make a range of games by using a permanent marker and writing letters, numbers or words directly onto the straw beads. If you choose a mathematics theme, ask students to "fish" for numbers from 1-9 in the correct order or encourage them to fish for colour patterns.

Glue or tie the magnet onto the end of the fishing line. Encourage kids to fish for the straw beads. The ones with the paper clips will be attracted to the magnet. The beads without the paper clip will not be "caught" but will float on the top of the water.

For a more dramatic effect, tint the water with a small amount of blue liquid water colour paint or food colouring. Place your fish in one of Roylco's R59630 Sensory Trays and activate the vibration mode to make the fish jump and swim!

I enjoy placing the Solid Water wiggle worms into the fish pond but I don't tell the kids. Instead, I let them discover the worms on their own. It's always an exciting time when a child dips their hand into the water and recovers a worm. They are hard to catch because they are very slippery, but that make the process even more fun!



**Wobble Blocks**

I love challenging children to build using unique materials. Whether they are working with Straws and Connectors, recycled containers and shadows, water with our FUNnel blocks or Skyscraper Building Cards and an earthquake table, children love building. I've found that even reluctant builders will participate in smaller group activities if the materials are engaging enough. Experienced and rowdy builders will take more time and be more conscientious when given special blocks. Building is such an important developmental skill that we need to find ways to engage all children in the process.

For a long time I've been looking for a unique block that will challenge students when building. I wanted something that was both wobbly and structurally sound. I couldn't find anything that met my needs so I created one.

I started with a mould to make beautiful blocks. It had to be perfectly square and even. I tried regular ice cube trays, but they didn't work well. Instead, I mixed up two packets of Jello with half the recommended amount of hot water. I poured this into a brownie pan and refrigerated it until it was solid. Then I removed the dense gelatine from the pan and used a sharp knife to cut cubes out of the sheet of gelatine. I gave the blocks to children and asked them to build a tower.

This method worked, but it was very important to accurately cut the cubes from the gelatine. That was harder than I expected. The kids loved the activity even when the blocks started to get sticky.

I wanted to make this process much simpler so I developed a silicone mould for forming the blocks. It works beautifully. Check out all of our F66570 Educational Molds. Our Solid Water makes the entire process much easier because it is more forgiving. For younger children you can make the blocks more dense by mixing in more powder with the hot water. For older children who are ready for a challenge, you can mix the powder with the recommended amount of water to get a less dense block that's a little harder to stack. Add a drop of food colouring to each of the cavities on the mould to make multicoloured blocks.

I like to work with six blocks at a time so kids can master building a pyramid. It's a fun activity that really helps develop fine motor skills while giving kids an achievable challenge. When the fun is over, melt the blocks in a microwave for a few seconds and pour the liquid into another mould for another activity.



## Gel Injections

I mentioned Bev Bos earlier. I want to pay tribute to her by describing an activity she did with her students and give you a unique variation.

Start with unflavoured, clear gelatine (available in grocery stores—use the powder form, not the sheet form). Use half of the recommended amount of water to make a denser gelatine.

Alternatively, use our F66560 Solid Water and mix according to package directions.

Pour the gelatine mixture into a mould and let set. Solid Water is ready to use after about 30 minutes in a refrigerator or an hour at room temperature. Leave regular gelatine overnight in the refrigerator to set it completely.

Unmold the gelatine and set it out in a paint tray (our R7512 Fingerpaint “No Mess” Tray works perfectly or put it into our R59630 Sensory Tray for a special experience). Set out a few cups of water that have been tinted with food colouring or Liquid Water Color Paint and some paint pipettes like our R5449 Paint Pipettes, R54460 Squiggle Pipettes or our R54470 Junior Heart Pipettes. Using pipettes in this activity or as part of a paint activity will help develop children's pinch grip.

Encourage the kids to squeeze the bulb of the pipette, insert the tip into the tinted water, release the bulb without letting go of the pipette and then inserting the tip of the pipette into the gelatine and squirting out the water. It is a wonderful activity.

You can make this activity easier or harder depending on the density of the gelatine. The harder the gelatine, the harder it is to insert the tip of the pipette and to release the liquid without squirting it back out. Kids learn very quickly to regulate their control of the pipette. It is wonderful to see them master the technique.

As the kids squirt more paint into the gelatine, it will start to lose its integrity. Don't worry about it. If you are using regular gelatine, throw out the mess at the end of the day (it will attract bugs so wrap it up carefully before throwing it into the garbage). If you are using Solid Water, simply use a paper towel to absorb as much of the paint as possible before melting the gelatine and using it again in another activity.

Tip: If you are doing this in our Sensory Tray, the vibrations won't really affect the gelatine, however, it will make the liquid the kids squirt into the gelatine dance and gyrate in beautiful ways!



## Gelatine Excavations

I wanted to expand on gelatine activity centres. I love gelatine, but the store bought material can be expensive, time consuming and messy. When I created our Solid Water, I wanted to make something that could be reused several times. I'm proud of this material and I'm constantly looking for ways to use it.

I love pouring the gelatine into a mould and then inserting different object inside. It is perfect when some of the items float and some sink so they end up at different levels in the gel. When I pop the gelatine out of the mould, the finished product looks great!

I like doing colour themes, letters and numbers, and shapes. We have a full range of products you can add to the liquid gelatine, but my favourites are R2184 Manuscript Letter Beads, R2185 Math Beads and R2131 Bright Buttons (perfect for shapes and colours).

Insert beads or buttons into the gelatine and let it set. Hand out some of our R5725 Goo Spreaders to a small group of students and ask them to carefully dig out the objects. If you are using buttons, challenge students by asking them to excavate only red buttons or round buttons. Alternatively, if you are using letter beads, ask them to excavate letters that spell a word in the correct order. Try burying 9 letters in the gel and ask them to sequentially excavate words that can be spelled out with those letters. For instance, insert the letter beads AGGTIOPCD into the gel. Once it is set, pop the gelatine out of the mould and write three words (CAT, DOG, PIG) on three cards. Give each child one of the cards and instruct them to excavate their words. This is a great activity for children who are just starting to read. Once they have removed the letter beads from the gel, students can string them onto pipe cleaners or you can ask them to practice writing out the word on the card.



## Take a Look, Inside and Out

Children are fascinated by the functions of their bodies. It is my experience that they are extremely curious about how and why their bodies work the way they do. They are open to exploration and they are too young to get “grossed out.”

In order to emphasize the sensory nature of this activity, I encourage kids to put on x-ray vision glasses so they can see inside the human body! Additionally, I want kids to relate what they see in x-rays to what they feel in their own bodies. Understanding the relationship between what they see on a diagram and the real thing in their bodies helps develop their understanding of what they see and what they feel.

The very first museum exhibit I created focused on x-rays. I wasn't really pleased to be working on this exhibit, because I felt there were more important things to work on, but I am a good sport, so if that's what the museum wanted, that's what I was going to produce.

There were a number of challenges surrounding this exhibit. Developing a large light table was easy because we were only using one type of material on it, plastic x-rays. Later on we would develop a more versatile Light Cube, but at the time, all we needed to do was put a Plexiglas sheet over a hollow table filled with fluorescent light bulbs. We created a very curvy table that looked great and because it didn't have any sharp corners, it was very safe when kids played on it.

Our big challenge was to produce the x-rays. Remember, this was in 2002 and we needed to develop a way to produce the x-rays that were both high quality and realistic. That meant printing on clear plastic which has a number of challenges. After we developed a technique for printing on clear plastic, we then had the problem of the ink scratching off the plastic. Once we solved that issue, we needed to work on the designs.

I live in Canada where we have all kinds of restrictions against using medical images. We simply could not get images of a human skeleton. As a result, we shifted our focus and created a set of animal x-rays. These were ideal because children are intrigued by animals, the images of the animals were beautiful and available through zoos and veterinary clinics. We could look at a range of animals including mammals, amphibians, birds, fish and reptiles. Finally, in addition to finding the kind of images you would expect, we were able to get unique images of alligator eggs, a baby kangaroo, a bird in flight and a snake that had eaten another snake.

Next I wanted to work on developing a set of human x-rays. When I first went on line to find resources, I was shocked to see how many pornographic x-rays are on the web. Those images, although interesting, would not work for our exhibit.

We started working with an American orthopaedist who specialized in children's broken bones. He saw the value in our project and contributed adult skeletal x-rays. We pieced them together to make a full human skeleton of a young woman, around 22 years of age. The doctor who helped us wanted to use these x-rays to work with children and parents to understand the process of taking x-rays. The doctor had found that children were afraid to have their x-rays taken. It is completely understandable that kids are afraid. They are usually hurt and in pain when they have to have x-rays taken, they have to remove some or all of their clothes in front of strangers. They need to stand perfectly still in a cool, dark room. And finally, they are left all alone in front of the x-ray machine which can make a pretty loud noise. What's not to be afraid of?

A few months later I met a very interesting couple. The husband had been the head of emergency paediatric care for a major hospital in Canada. The wife had the same job at a big American hospital. I talked to them about our product and how it was intended to ease children's fear of having their x-rays taken. The husband pooh-pooed the idea. Children, in his experience, weren't afraid to have their x-rays taken. The wife, on the other hand, said that in her experience, all young children were afraid of the process. That started a longer discussion about dismissing fear without regards to the patient's feelings and coddling them. It was interesting to be a part of a debate between two competent professionals who took opposite points of view about something so basic.

So we created our x-rays and started selling them to school suppliers as a way to learn about the human body and to reduce the fear associated with having x-rays taken. The most interesting thing about this process was determining the age grading for the product before we started selling it. This type of x-ray pack was completely new to the educational market and it wasn't easy to determine the age we wanted to recommend for it.

For me age grading has three important elements. First, what age is the product intended for? Are the graphics, resource guide and materials appropriate for that age? In other words, if you use cutesy graphics and bright colours, but you intend to sell it to middle or high school, there is a conflict between the graphics and the target age. Second, does the educational value fit with the age recommended? This is the hard one. Students need to learn things when they are developmentally ready. The challenge of working with younger children is that there is often a wide range of developmental levels in one class. When I first started working with teachers I went into a kindergarten class and found that some children were having a hard time scribbling with a crayon, others were crudely writing their names and a few were able to write short sentences. It was a challenge for that teacher to respond to the different needs of her students. Third and lastly, the product needs to be safe for the age you recommend. That's relatively easy to determine. It's often easy to grade a product simply based on the safety, but I think it's important to look at all three considerations.

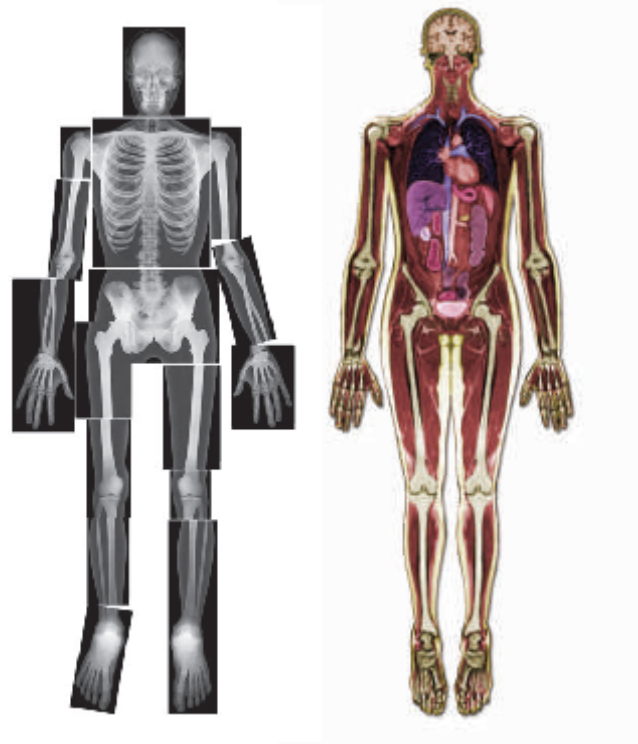
When we tested the x-rays in classrooms to find the appropriate developmental level, I was surprised to find that children 4 years and older were really intrigued by the designs. They were eager to know more about the human body and relate this to their own bodies. They were the perfect age for a set of human x-rays, so we worked a little more on the design. Instead of simply having an assortment of bones, we wanted to create an x-ray puzzle where the kids could place the x-rays in the right order to reveal an entire body. Because the human body is symmetrical, there were a lot of duplicate images. For instance, we had two hands, two arms, two feet and two legs which all took up a lot of space. We decided to cut the x-rays so kids could compare a foot to a hand and a knee to an elbow. I really wanted the design of the product to help kids use it to further explore the body.





While I think our x-rays are wonderful, you can make your own. Ask a veterinarian if you can get old animal x-rays. Download images off the internet (but not the pornographic ones) and print them on overhead projector film and then laminate them. The quality isn't as good as ours, but they will provide an introduction to x-rays.

When you have your x-rays, encourage your students to relate the bones they see to the bones in their bodies. One fun activity is to lay the x-rays out as a full human body and ask a child to lie down beside them. It becomes very clear how the images we see in the x-rays relate to our body.



**What's Inside Me?**

After studying the x-rays, kids will develop an appreciation for the architecture of their bodies. The bones hold everything up and in place. But, students may wonder about all of the things that are being held in place.

Learning about the placement and purpose of organs is the next step in understanding the human body. My hope is that by understanding how our bodies work, we will respect them more and resist doing things that put us in danger of damaging our delicate systems.

There are many resources you can buy or find on-line to help identify the organs in the human body. We make three products that I am especially proud of. The first is our R59254 Look Inside Me MRI Scans. These scans match our R5911 True To Life Human X-Rays, so they can be layered directly over top of the skeleton to see all of the organs in the body. One of the tricky aspects of organs is how they are arranged in our body. If we take a cross section of the body and start at the middle of the head and slice all the way down, we will miss some of the organs that are either close to the front of our chest or close to the spine in our back. To help with this, we created two sets of chest organs, one shows the organs at the front of our body and the other shows the organs near the back of our bodies. Using these two sheets, you can see all of the organs in their rightful place and teach students that the organs are specifically arranged in our bodies and are not linear as they sometimes appear in drawings and diagrams.



The second product is our R59257 What's Inside Me Doll. I love this fun little guy. He's 19" (48 cm) tall and when you open his shirt, you expose his chest cavity complete with a rib cage, heart, lungs, stomach, liver, bladder, kidneys and intestines. You can squeeze the heart to hear it beat and the lungs to hear them breathe and the stomach to hear it growl. When all of the organs are removed, you can see the spine in the back of the cavity along with outlines indicating where all of the organs go inside the body. Finally, when you open the flap on the back of the head, you get to pull out a big, pillowy brain. It's really fun.

To go along with our What's Inside Me Doll, we created a set of matching Doll x-rays and MRI scans. Check out our R59258 First Look: Inside Me Scans. The artwork on both the x-rays and organ scans is adorable. I never realized x-rays could be so cute! The purpose of the x-rays and MRI scans is to make learning about the human body more relatable to young children. They can use the doll to learn about the organs and then relate that information to their own bodies when they are ready.

The last product I am proud of is our R59270 My Body In Action cards. I wanted to give kids a way to "see" how the systems in the human body work. We worked with an artist to create almost holographic images of chewing, breathing, swallowing, digesting, hearing, smelling and even thinking with little twinkle lights representing neurons firing. You can use these with children, but they are sturdy enough for children to use them on their own. Our goal with these cards is to take away the mystery around the systems of the body. If we can help children understand how their bodies work, they are more likely to make choices that are in their best interest.



## Weaving World

Once children have learned about their own bodies, it's time to learn about the entire planet. I look at learning about our planet in almost the same way as learning about the human body. The more we understand the delicate nature and interconnectedness of our world, the better we will treat it. When it comes to issues of respecting our bodies and respecting our world, I think of young students as ambassadors to the adults in their lives. They will bring home the message that we need to treat both our bodies and our planet with respect.

We developed F66547 Wire Weaving World as a way for younger children to learn about the planet while developing their fine motor skills and vestibular sense. The idea is that children can weave different objects through the continents and longitudinal and latitudinal lines on the wire globe. I like using a range of different materials to weave through the wires to give children different tactile sensations. Some materials work better than others because they are more subtle and wrap around the forms better. Personally, I don't mind some challenge when it comes to weaving because it helps children develop their finger muscles while learning the properties of different materials with hands-on experience.

One trick I found that works really well is to hot glue ribbon onto fridge magnets. That way children can position the ribbons anywhere they want. This little trick really makes weaving easier and more fun.

To extend this even more and to incorporate more senses into the fun, I like to create a telephone system. It's easy to do and doesn't require any special tools. You need some plastic hose, around 1 cm (1/2") in diameter, some connector pieces and some funnels. All of this can be purchased at hardware stores such as Home Depot. I buy funnels from the Dollar Store.

Cut the hose into manageable lengths between 1 m (3') and 3 m (10'). Buy connector pieces that fit into the hose and stay in place through friction. I encourage the kids to assemble their own phones and weave them through the Wire World. Once inside, they can speak to their friends from different parts of the planet. We talk to parents and caregivers to learn how to say greetings in other languages and then answer the phone using those greetings. It's a fun way to integrate multicultural awareness into sensory exploration.



## Bug's Eye View

I'm colour blind and I remember a few times when I was in school and the other kids would find out that I was colour blind. They would always be curious and ask, "So, what's that like?" How can you describe what you experience as normal? I've heard people describe what being blind is like, but only people who have gone blind and have something to compare it to. If you're born blind, it is really hard to describe. As a mental exercise, try to describe what hearing normally sounds like.

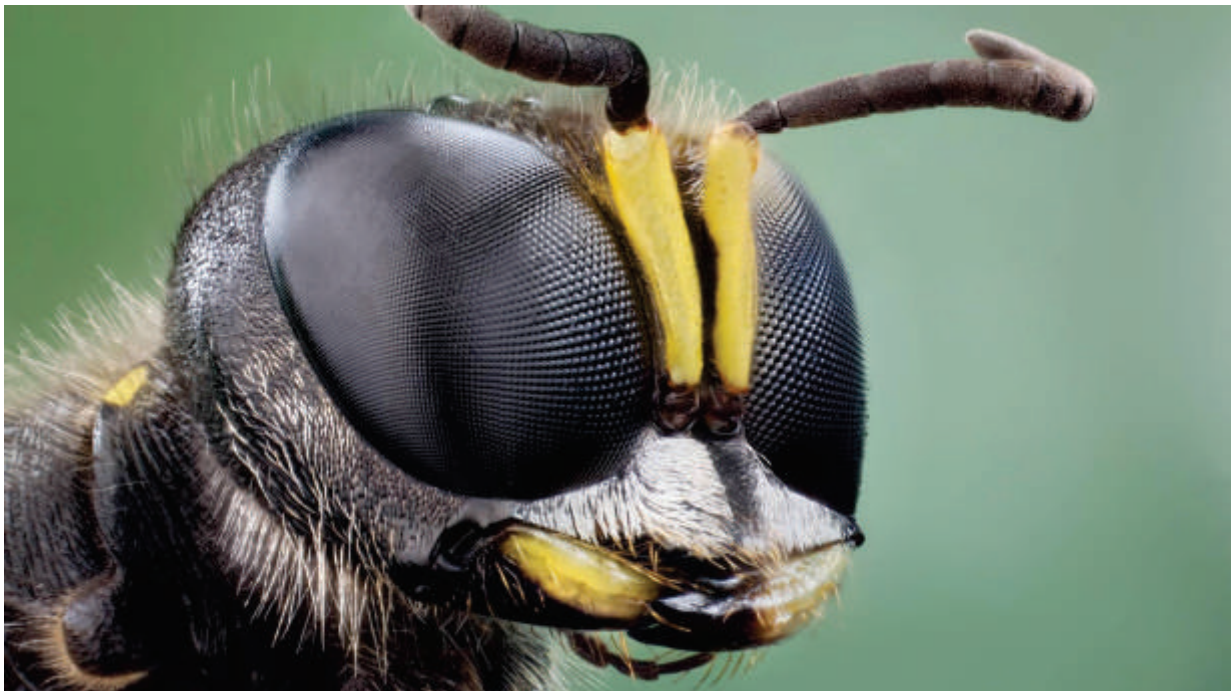
I developed our R59421 Color Vision Perception Kit as a way for normally sighted students to experience what it's like to be colour blind. In addition to the technical aspects of colour blindness, students still need to "put themselves into someone else's shoes" to get the full pictures. I want to further develop this, but let's start by experiencing what it's like to see like a fly!

Flies have compound eyes. That means that they can't see sharp detail, but they are very good at seeing movement. I wanted to create a way for children to experience seeing like a fly.

I knew this wasn't going to hold the kids' attention for long, so I needed to design an exhibit that was easy to make and relatively inexpensive. I tried making different types of glasses the kids could wear, but the lenses required were just too expensive and it required fine precision work that I didn't think a lot of teachers had the proper tools to perform.

Instead, I started with reflective surfaces. I was inspired by a disco ball with tiny mirrors pasted to the surface. Instead of reflecting light into tiny pin points that circled around the room, I wanted the kids to look into the ball and see all the reflections on the convex surface. While this was a good start, it didn't really work. We needed the reflections to be bigger.

Christmas was just around the corner and one day while shopping I noticed some shiny silver balls. I wondered if they could be used to make a reflective surface that caught movement without really catching details.



I worried a bit about how fragile the ornaments were. I bought a pack and when I got them home I realized two things. First, today's Christmas decorations are made from plastic and not glass so they are almost impossible to break. Second, they aren't nearly as reflective as the ones I remember from my childhood.

I bought a whole bunch of silver balls tried to figure out a way to adhere them together. I didn't think a hot glue gun would work to stick them down because the surface is so smooth. I tried a couple of other ideas, but again, they were just too complicated for such a simple exhibit.

I returned to the glue gun, but I first rubbed the back side with sand paper to rough it up so the glue would stick more aggressively. I was really happy with the results. I looked carefully at each ornament and picked a good side which was shiny and smooth and a bad side which may have been slightly marred. Almost all of the ornaments I bought at the Dollar Store had bad sides.

I then found a box that could hold the ornaments without a lot of room left over. I sanded the ornaments and glued them in place.

When the kids looked inside the box they saw a couple dozen ornaments. It took a little while to notice that the ornaments were reflecting the students' faces. Once the kids identified the reflection, we started talking about flies and the way they see. I opened up a book and held it above the reflective box and asked the kids to read any words they could.

They couldn't make out a single word. Even the pictures were hard to identify! However, when we moved the book, all the kids could instantly tell. I did a simple experiment. I held up the book in front of six kids. I asked three of them to look directly at the book and three of them to look at the reflection of the book in the box of ornaments. I then asked the students to raise their hand when they saw the book move. I started reading the book out loud to distract the kids. When I went to turn the page, all of the kids looking at the reflection immediately put up their hands. I know that the kids looking at the book saw me turn the page, but they didn't really focus on it as movement. They were too busy focusing on the pictures, words and story. Because the kids looking at the distorted reflection of the book weren't distracted by the pages of the book, the movement was extremely noticeable. It was a fun exercise.



**Throw and Miss**

I still wanted to experiment with distorting children's vision in other ways. When experimenting with the “Bug's Eye View” I had bought several sets of goggles. I wanted to find a use for these glasses and remembered a product I had seen intended for high school students. The product was called Drunk Glasses and when you wore them, you were supposed to feel like being drunk. I tried on the glasses and they presented the world in a distorted way. It is almost impossible to walk a straight line while wearing the glasses. They are designed to warn kids of the danger of driving under the influence of drinking.

I wanted to do something that was more fun for the kids, but when I developed my own drunken glasses I discovered something very interesting that I want to share with you.

I started with a pair of underwater goggles and used duct tape to block out all of the light except for two rectangles in the centre. I then taped two prisms onto those rectangles. You need to experiment a bit with the orientation of the prisms to get them just right, but when you position them properly, the world takes on a completely different perspective. When you look straight ahead, you “see” something off to the side that looks like it is straight ahead.

My plan was to have one child wear the glasses and throw a ball to another child. When I experimented with these goggles with some of my adult colleagues, I realized the ball was not the way to go. Too often the ball was thrown wildly. That's okay if you're outside, but inside, a wild ball toss can be a problem. Of course you could do this outside, but then you're spending a lot of time chasing wild balls.



I replaced the ball with a squeaky dog toy in the shape of a rooster. It was fun and it squeaked whenever someone caught it. Suddenly, the game became very fun and challenging rather than just frustrating.

But I discovered something really, really interesting. When I was working with adults, they almost always missed on their first two or three attempts. One of my colleagues was never able to compensate for the distortion. She simply could not “disbelieve” her eyes. She threw the rooster where she expected it to go rather than where it needed to go. Later on she told me that she knew she was “doing it wrong” but she could not help herself.

When I did the same activity with the kids it was amazing how quickly they understood how to throw the rooster so their friend would catch it. Some kids did it on the first try. At first I thought the goggles were somehow faulty like they had “fixed” themselves overnight. I checked the goggles and sure enough, they were exactly the same as the day before. I repeated the activity with some more adults and had pretty much the same result as I had with the first set of adults. I tried it again with some more kids and found yet again that they were able to compensate for the distortion. I didn't know what to make of it.

One of my colleagues who wasn't aware of my discovery, but who had tried out the glasses, asked if she could borrow them for an activity with her grade six students. She reported that the older kids had the same trouble as the adults had. They weren't able to throw the rooster to their partner.

I've repeated this experiment over and over and I've found the same thing. Young children are able to throw the rooster so it's caught after just a few attempts. Older kids and adults can't do it as easily. My unscientific conclusion is that the plasticity of our brains start to solidify at around age ten. Before that, we don't throw the rooster where we see that we want it to go, we throw the rooster where we know that we want it to go. Our senses aren't developed so we don't really trust them. When we are young, our world perception is made up not from what our sense tell us, but what we know from experience is true.



Versions of goggles and glass with distorted lenses are available through large school supply companies.

## Blind Art

I want to finish off the exploration of empathy through vision by describing an experience I had at a blind school a decade ago. I was asked to work with teachers to develop art projects for blind students. At first I was a little taken aback. Why do blind children need to create visual art? But the principle of the school patiently explained to me that blind children need to develop their sense of touch so they can develop their ability to read Braille. That made sense to me. Then the principle went on to describe a conversation she had with one of her student's parents. The parent casually mentioned how he had gone to a friend's home and saw all of their children's artwork plastered on the refrigerator. The parent then went home and noticed how empty his refrigerator was and made a simple statement: "I wish I had art to put up on our fridge." The principle made it her goal to do art with blind students.

We created a range of additives that you can add to paint to give them distinct textures. Our R75415 Finger Paint Sensations Kit offers 10 different additives and instructions on how to use them. By explaining colours and giving the blind kids the textures, teachers could help the kids finger paint a scene. For instance, the teacher might say, "The sky is blue and blue paint feels like this...." and then gives the child the blue finger paint to feel. She might follow up with, "The sun is yellow and yellow feels like this...." Next, the teacher might say, "Grass is green and green feels like this...." Finally, the teacher might finish up with, "Bricks come in different colours, but I have red bricks on my house. This is what red feels like...." The teacher then gives the child a big sheet of paper or thin card stock and ask them to paint a blue sky, yellow sun, green grass and a red brick house.

The experience is wonderful for blind students, but normally sighted students benefit from it as well. I love giving this to kids so they get a completely new feel when finger painting. I think finger painting is one of the most important things you can do with younger children and I love putting a twist on it. Normally sighted students can feel the paint exactly as it is or they can wear blind fold while painting to help give them an opportunity to feel what it's like to be blind.

Over and over again I've done this activity with normally sighted students and the results are wonderful. Sometimes the kids do a terrible job. That's okay because they learn to appreciate the challenges associated with being blind. Sometimes the kids do a good job and impress themselves. That, too, sends out a very positive message that blind people are capable of doing more than we often give them credit for.





**Amazing Art with a Tactile Appeal**

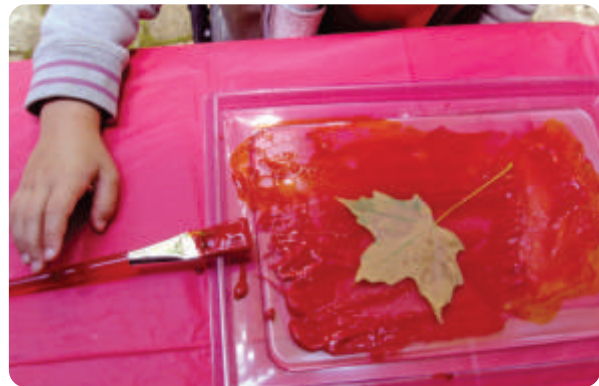
Let's explore Monoprinting! Divert attention from making "colorful" artwork to applying the process of monoprinting to develop your students' technical skills while giving them a tactile experience! Monoprinting is the technique of transferring an image from a plate to a sheet of paper or fabric. Instead of focusing on colour, however, we want to encourage students to focus on creating patterns and thinking about the placement of graphic elements such as lines and textures. Explore and develop techniques to create impressive artwork without focusing on color.

Before I begin, I like to start with a specific color palette of paint. You can stick to primary colors or you can mix two to four colours that work well together. Depending on the age of your students, you can work with them to create the palette. For younger students, you can provide the color scheme. Using an interesting color palette results in beautiful artwork even as we focus on technique.

There are a lot of different ways to create monoprints. You can use a clean meat tray and a ball point pen, scratch a pattern onto PlayDoh® or carve a design into a lino-block. My favorite method is to use one of our R54480 Paint Pads and Tray. Let me explain how it works.

We've create a jelly-like pad that you can paint on top of. When you press a sheet of paper over the wet paint, it transfers the design beautifully onto the paper. I love these Paint Pads because they are so versatile and easy to use and clean. You can use a good quality children's paint with the pads or a cheap acrylic paint. Personally, I won't use block printing inks because they're harder to clean up and I want this to be easy. In terms of clean up, I like using baby wipes. I'm amazed at what baby wipes clean. I've used them to get ink off a rug. When you think about it, it seems wrong that they are so effective. What's a baby's bum made out of anyway?

Traditional monoprinting uses a hard base, such as a wooden block or metal plate that has been carved into a permanent image. The base is then painted and pressed onto a sheet of paper.

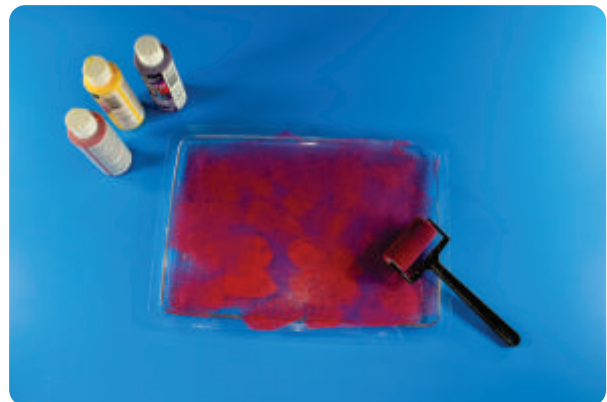




Add only a small amount of tempera or acrylic paint and cover the whole surface. You can use just one colour (which is my preference) or cover the surface with several colours. For instance, you can achieve some very pleasing effects by mixing red, yellow and purple together! Use a brayer to roll and spread the paint evenly across the Paint Pad or cover the surface by finger painting on it or carefully brushing the paint.

Next, create the design. You can use different tools to “etch” a pattern into the wet paint. Try our R58624 Gear Stencils, R5841 Optical Illusion Rubbing Plates, R55004 Super Value Leaf Sponges, R5320 Floppy Foam Brushes, R5451 Paint Scrapers and R57015 Junior Goo Spreaders to create beautiful designs. Once the design is in place, cover with a sheet of paper and press lightly. Lift the paper to see the print. I like to make two or even three prints of the same artwork for three reasons: First, the first print may be too wet if the student has used an excess amount of paint. The second print will be better. Second, by making two or even three prints off the same design it makes cleaning up the gel pad much easier. Third, you can use the other prints to make more artwork so nothing needs to be thrown away.

Historically, artists would add individual details to the prints to make them more “customized” and less mass-produced. With our activity, we will be using the R54480 Paint Pad from Roylco. The Paint Pad is a pad that is made of a wonderful gel-like substance. It feels great against developing fingers and doesn't absorb paint, so it's great for making monoprints. It even feels good when you are using it and pressing paper onto it!



Here is an example of the process that I like using:

First, I'm going to start by cutting a shape out of one of the sheets from our R22054 Lace Design Paper. After covering the gel pad with a thin layer of paint, I lay the cut-out shape on top of the paint and then cover with a sheet of paper and remove to see the monoprint which is dominated by the negative space that resulted from the Lace Design Paper. I then carefully lift off the Lace Design Paper and then make a second print. The details of the Lace Design Paper come out almost photographically. This technique works with paper doilies and fabric lace.



Second, I clean off the gel pad and re-paint it with another colour. This time I'm going to use the same technique, but I'm going to do it with leaf shapes from our R15333 Botanical Cuts paper. Once again, I'm going to make a print with the leaves on the gel pad and then again after I've removed the leaves, but this time, instead of using blank paper, I'm going to use one of the sheets of paper I originally printed with the Lace Design Paper.



Third, after I clean off the pad again, I'm going to apply a small amount of a new paint colour. This time, I'm going to draw an image on the pad using our R57015 Junior Goo Spreader. Once I'm happy with the design (remember that it will print “backwards”) I'm going to use some sheets of paper from the first two rounds to make interesting designs.

After going through this process, every student will have unique, creative and “fridge-worthy” art!

At this point I want to talk about why this type of art experience is good for colour blind students. Here are some of the reasons:

First, it allows students to develop a technique for making prints. The “art” is in producing the design.

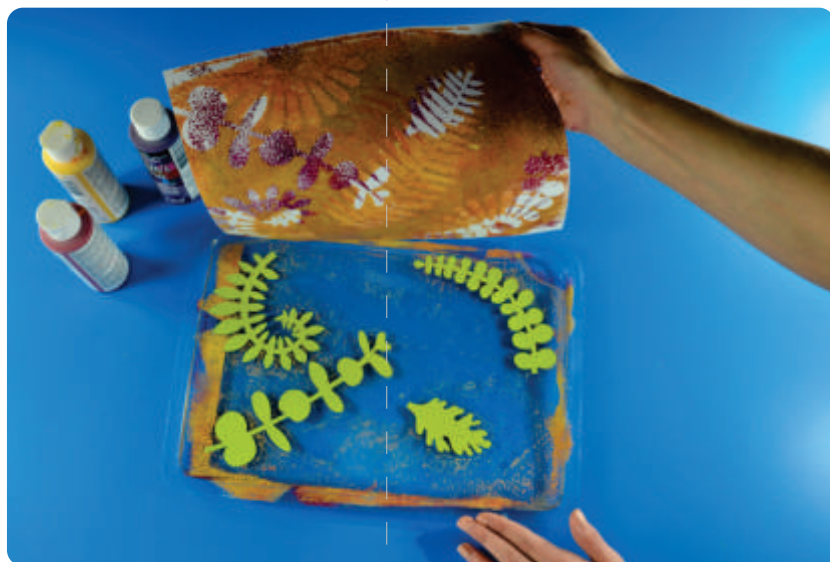
Second, I want to give the teacher an opportunity to talk about colours. I've worked with a lot of art teachers who never talk about colours unless there is a problem. I strongly suggest that when you develop a palette that you talk about why the colours work together. You can do this technically by talking about the colour wheel and colour theory or you can talk about



why you think colours go together on a more emotional level. All of your students, not just the colour blind ones, will appreciate an insight into your colour world so this gives you an opportunity to talk about it.

Third, students can produce beautiful, colourful artwork without the stress and pressure of choosing colours. I like to compare this to cooking. You can be given specific ingredients and a specific technique can be described, but the variation in terms of how the ingredients are used and the way the technique is employed can result in very creative interpretations of the recipe. That's what we're doing here. We're giving kids the colours of paint and we're providing the tools, but after that, the students can develop their own designs. I think this is a wonderful way to develop creativity.

Fourth, when you are developing the colour palette for the activity, I would suggest doing it in front of the kids. You can mix the colours and you can describe the resulting colours. I've seen this done with students, although I've never done it myself, and it's almost poetic. The words art teachers use to describe mixing paint and the resulting colour is really wonderful. Don't deprive your students of a great opportunity to get inside the head of an artist. The process of mixing colours is just as important for your normally sighted students as your colour blind students. It really brings colours to life and it reveals so much meaning behind colours. It's an important thing to do for all of your students.



## Sense of Empathy

I'm not sure that a sense of empathy is really one of the senses I should be focusing on, but I think it is an extremely important sense. Developing empathy is probably the most important thing you can do to help create a society centred on addressing social justice issues. Having empathy for our fellow citizens of the planet is probably the most important thing we can teach our students.

Probably the easiest way to develop a sense of empathy in younger children is to read stories to them. By developing their imaginations through story time, students develop their empathy. Once students have enough experience with their senses and can imagine themselves in other people's shoes they can start to "feel" what it's like to experience pleasure and pain, joy and sorrow. By developing students' empathy, we can greatly increase their ability to imagine the sensory input that other people, animals and literary characters experience.

There are a lot of ways you can help your students develop their sense of empathy. Reading stories where characters experience hardship and triumph is a great place to start. If you are working with autistic students, developing empathy is particularly challenging and because of that, it is even more important. Over the years I've tried many different techniques for talking about moods and emotions. The most effective way I've found is to show children pictures of other children in a range of different situations. I have a shoe box of photos that I've clipped from magazines and newspapers. These are great, but they are never exactly what I want.

This year we developed our own set of photographs. Each one tells a mini-story. You can show the photo cards to your students and ask them to describe the situation and then ask them to describe how the child featured in the photograph feels. There are no right and wrong emotions or good and bad emotions. Instead, try talking to your students about how the kids feel and what is going to happen next. Our R49592 Explore Emotion Photo Cards feature 24 photographs of children from a range of ethnicities experiencing different situations. When you ask kids about the photographs, work in smaller groups. Remember, they will respond to the photographs from a personal perspective. In other words, they will describe how the pictures make them feel based on their experiences. You will be able to tell a lot about your students by listening to how they describe the scenes.



**Making Faces**

One of our favourite activities for developing a sense of empathy has to do with giving children an emotion and asking them to draw a face that relates to it. I love this activity, but there are problems with it. Not all the children will represent an emotion in the same way. Likewise, if you are doing it with a larger group of kids, you may end up with one or two children getting the “wrong” answer based on personal experience rather than what we expect to see.

I wanted to create something that kids can use to represent emotions without risking getting it wrong. We developed our R49591 Explore Emotions Super Doll to make exploring emotions fun. You can make your own version of this doll with an old fashion felt board along with some cut-out felt pieces you decorate with a marker. Our doll has two buttons to press to hear sounds. The first button plays one of sixteen random sounds that correspond to emotions. The second button repeats the first sound as often as you want so the students can recheck their sound and then play it again after they have composed their facial features. We added a superhero cape to the doll that acts as a storage device for the Velcro pieces.

The best part of this activity is talking to the student about the emotions and how the child has represented the emotion on the doll's face or the felt board. It is through these discussions that children begin to understand the nature of the emotions they feel.

Understanding emotions in ourselves is very important. When we understand our emotions, we learn to deal with them constructively. It is a vital step towards self-regulating our behaviour.

This is especially true for autistic children. They have an especially hard time regulating their reaction to stimuli. Likewise, they often don't appreciate how their actions affect other people. By learning about emotions, they have more opportunities to understand themselves and how they interact with others.



The challenge in talking about emotions is to do it without prejudicing the children into believing some emotions are positive and others are negative. In other words, we need to remove the value we may consciously or subconsciously place on individual emotions. That is a hard thing to do.

I was working with a teacher years ago who used to act out emotions for the kids and ask them how they would deal with a person expressing those emotions. She was a wonderful actor, but sometimes her performance struck a little too close to home. She would mimic her students. One little boy who was experiencing extreme separation anxiety which seemed to get worse throughout the year rather than better, was often the subject of her emotion performances. I understood that she was trying to “help” the student by portraying him so that he could get a sense of the impact he made on his fellow students, but it really was the wrong way to go. By singling him out, even though it was not explicit, she stigmatized that child and the emotion he was feeling.

When we created our Explore Emotions Super Doll, I wanted it to be a fun and positive experience for children. I wanted them to learn to identify emotions and at the same time experience their reaction to emotions. We chose to use a doll because it has inherently human-like characteristics, but children understand that it doesn't really feel anything. It's a safe way to explore how we feel.

Learning about emotions helps children to master them. After they explore emotions in a comfortable, fun and safe way, they can appreciate what it's like to feel these emotions. This exploratory work will help children as they grow and experience the joys and sorrows of life. One of our goals as educators is to give children the power to master their emotions rather than to be the slave of their emotions.



## Conclusion

We perceive our world through our senses. We develop all of our understanding of our place in the world through our senses. When we are young, our senses tell us everything we need to know. Through our senses we develop our ability to learn, to read and write, to walk and dance, to imagine life in someone else's shoes.

Our goal as educators must be to provide opportunities for children, especially young children, to understand the world through their senses. Children need to exercise our senses just like we need to exercise the muscles in our bodies. Through this approach, we will give children the opportunity to learn about their world and their place within it. Equally important, we will give children the opportunity to find hidden talents and explore aspects of themselves that they just starting to discover.

By exploring our senses we are exploring both our world and ourselves.

When you create activity centres in your classroom that explore the senses, you need to give kids the time they need to master a task. Design your centres that pose achievable challenges that boost confidence and encourage students to take academic risks. Please remember my motto: When a child succeeds at anything, they learn to succeed at everything.

Enjoy working with young children and developing their senses. Provide a safe, challenging environment where children will succeed. Give them a foundation for developing their senses and open up a world of possibility to each of your students.



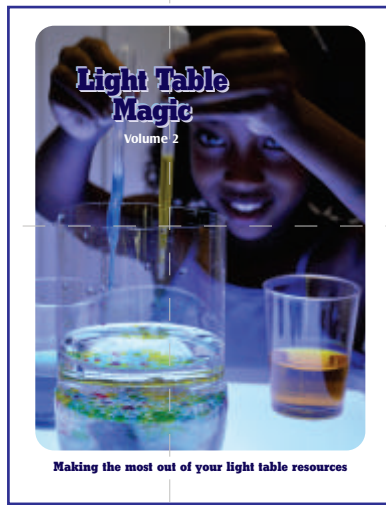
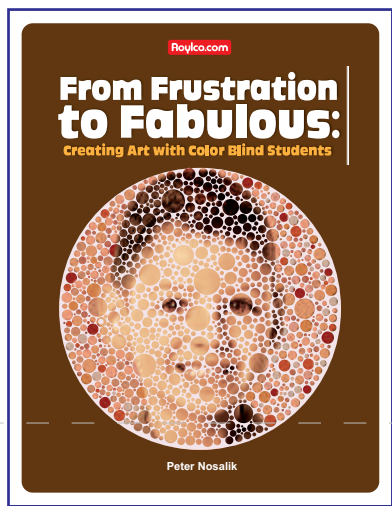
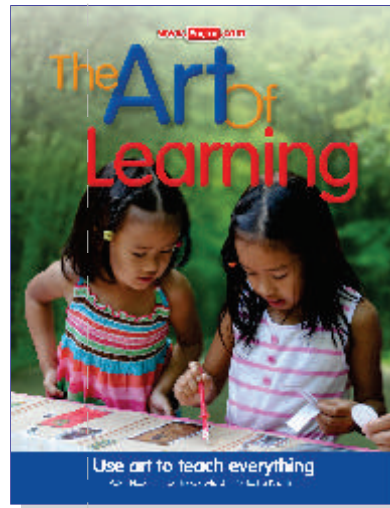


## Appendix: Product Information

We've listed items as they appear in the book. Some items are used throughout the book, but are only listed once. For more information about our products and to watch useful videos, please visit our website: [www.roylco.com](http://www.roylco.com)

Page#	Item No.	Description
12	F66529	Geometric Bubble Forms
14	R59421	Color Vision Perception Kit
15	F66525	Demonstration Bubbles Concentrate
17	R6085	Straws & Connectors™
19	R62301	Scents Sort Match-Up Kit©
21	R62010	Body Poetry: Animal Action Cards
22	R62011	Body Poetry: Yoga Cards
23	R62013	Stepping Stones Exercise Balance Kit
25	R15212	Color Diffusing Paper™
25	R5601	Plastic Lacing Needles™
25	R55006	Super Value Capital and Lower Case Letter Sponges
25	R59040	Wipe Clean Worksheet Cover
26	R59601	Educational Light Cube
26	R5901	Highlight Strips
26	R5902	Finger Pointer Reading Strips
26	R49703	Light Learning: Uppercase Letters
26	R5951	Sight Word String Ups
29	F66531	Super Bubble Pump
29	R54465	Foam Paint Bottles
33	R60310	Crystal Color Stacking Blocks
34	R59630	Sensory Tray
34	R60450	Skyscraper Building Cards
37	R2183	Fancy Stringing Rings
38	F66560	Solid Water Sensory Gel
40	R2152	Straws to String
41	F66570	Educational Molds
42	R7512	Fingerpaint "No Mess" Tray™
42	R5449	Paint Pipettes
42	R54460	Squiggle Pipettes
42	R54470	Junior Heart Paint Pipettes
43	R2185	Math Beads
43	R2131	Bright Buttons™
43	R2184	Manuscript Letter Beads
43	R5725	Goo Spreaders
46	R59254	Look Inside Me MRI Scan
46	R5911	True To Life Human X-Rays®
47	R59257	What's Inside Me Doll
47	R59258	First Look: Inside Me
47	R59270	My Body In Action
48	F66547	Wire Weaving World
53	R75415	Finger Paint Sensations Kit,
54	R54480	Paint Pad and Tray
55	R58624	Gear Stencils
55	R5841	Optical Illusion Rubbing Plates
55	R55004	Super Value Leaves Sponges
55	R5320	Floppy Foam Brushes™
55	R5451	Paint Scrapers™
55	R57015	Junior Goo Spreaders
56	R22054	Lace Design Paper
56	R15333	Botanical Cuts
58	R49592	Explore Emotions Photo Cards
59	R49591	Explore Emotions Super Doll





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