No genius left behind – learn to code with Hopscotch

Remix : Komplettverrucktjunge

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1. Introduction

At the time of this writing , we find ourselves in Canada in an election campaign. One of the crucial points of the campaign is the economy. Canada finds itself in recession because of falling oil prices. However, 80% of the rest of the economy is going well. There are huge economic and social inequalities in the world. We are entitled to ask ourselves as teachers, do we give our students everything they need to succeed in a global world? Is something missing? Can I make a more profound difference in my class?

Organizations like Code.org inform us of the lack of professionals in the field of computing. There are many jobs available now ; however, companies cannot find employees to hire . The computer science programs in college and the university does not meet the demand. In addition, this area is reserved mostly for white men, seen as geeks. One can make a long list of well-known men in the field of computing. Can we make a similar list for women or people of colour? Jane Margolis reminds us in an article in Educational Leadership that computer science cannot be reserved only for elite students who have parents with the knowledge to help them. Each student should have the chance to join the world's most coveted jobs. It is a question of equity.

Our schools are filled with computers and tablets available to do what we want with technology. There are two main barriers preventing more students to engage in the field of information technology and all related areas. First, young people do not know what it is. When they know, they think it is for geeks. The second barrier, teachers do not have the knowledge to guide their students in this direction.

What image do we have of people who can manipulate computers? There is, of course, Steve Jobs, Bill Gates and Mark Zuckerberg. We also have the image of Chloe O'Brian on 24, Lizbeth Salander in the Millennium series, or the famous Mr. Spock. Are they realistic models or models that attract our students? Margolis' research indicates that the lack of models is a significant factor in students' decisions to pursue the field of technology. I think that by starting to code at a young age, each of our students will have the opportunity to see themselves as an engineer, software developer, website designer or technician before the negative images of the geek culture are present. Finally, it is the mission of Hopscotch, a free application found on the iPad, to give

students from 8 years old the opportunity to learn how to code. Hopscotch was developed by two young American teachers, Samantha John and Jocelyn Leavitt, in order to facilitate learning of programming at an early age.
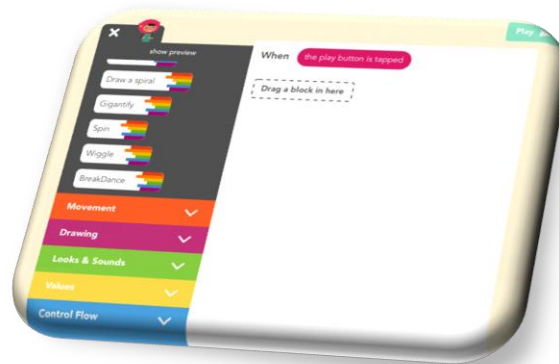
The price of the app and its quality makes Hopscotch an app of choice for learning to code and make a difference in the world. Yes, Hopscotch is completely free and works with the iPad. Hopscotch won the "Best App Lifelong Learning " at the NYC BigApps awards ceremony, the Kapi award for the best app in teaching technology and the Parent's Choice Gold Award .

Changing my mindset and realizing that I can help my students in this area is what has been most decisive in my development as a teacher. It was a difficult decision at first because, as a French immersion teacher, I was supposed to teach French! When I realized that there were many class projects that students could create by coding while integrating the whole curriculum, my class changed completely. While following the curriculum, students' interest and my passion, it is possible to give a positive attitude towards technology to all our students, away from negative stereotypes and to give everyone the tools to work in the current global economy.

Since a large majority of students do not know why they should use technology, my mission is to give an understanding of what coding can offer, and how it can be used to solve problems and become innovative.

Canada has no specific curriculum for technology at the primary level. The use of technology is sought and encouraged, but the choice of tools and how to use them is left to the teachers. Teachers and students are free to follow their passion and creatively use technology, which leaves no room for boredom. However, if we look at the international level, the International Society for Technology in Education ISTE, provides standards for the application of technology in the classroom. The standards indicate what students should know and be able to do in order to learn effectively and live productively in a world of increasingly digital. The 6 ISTE Standards for students are: creativity and innovation, communication and collaboration, research and information literacy, critical thinking, problem solving and decision making, digital citizenship, and technology operations concepts.

This book shows the learning scenarios where each of these standards can be followed using the Hopscotch app on the iPad.

With creativity and innovation, the student must reflect, build new products, identify and predict trends. Hopscotch is an ideal tool for creativity. For example, with Hopscotch we can write and create new interactive stories. It is more than a story on paper, it is a new interactive product that simulates some apps that you can buy on the iPad. With Hopscotch, we can make models and simulations of all kinds. Combining simulations with a search of the latest trends of scientific research, we can build games and simulations with the most promising ideas for the future. Maybe the student who now starts searching and code an idea, will be the one who will make the implementation of the idea in his adult life.

With the communication and collaboration standard, students should use digital media to communicate and work with a diverse audience, to support their own learning and contribute to the learning of others. Hopscotch is built with this standard in mind. Hopscotch offers several learning tools that students can use to learn by themselves. They can learn to code by problem solving in a game. They can learn by watching videos created by professional coders at Hopscotch. They can learn by watching the programs written by the Hopscotch community consisting of professionals and other students. They may also discuss their learning with the Hopscotch discussion network. Hopscotch allows students to express themselves with mathematical expressions that the computer understands. Each student can share their creation and innovation with the entire

Hopscotch community on social networks too, if they have permission from their parents. Hopscotch is a communication and collaboration application. Nothing prevents teamwork in the classroom or at home, to develop the programs.

Research and information literacy is the standard that encourages students to seek, evaluate and organize information during an investigation. With the iPad, students can go to nature and take pictures, he may search the Internet or use other applications to do his research. Once completed their research, their findings becomes the basis of their new program which they share with the Hopscotch community.

The fourth standard is critical thinking, problem solving and decision making. The research that students conduct have the goal of solving a concrete problem that we currently face, such as global warming, for example. There are several directions that scientists are using to solve the climate problem. After a search, you can write a simulation with Hopscotch to show best practices in this area. Coding with Hopscotch is in itself a problem-solving exercise. It is just impossible to code if we cannot solve a problem. The ordering of the rules to create a program that works require thinking and problem solving. When the program you created does not give the desired result, you must debug it, find out why it is not working. There is a lot of critical thinking, decision making in the program design, in order to decide what to code, how to code it, debug it, satisfactorily complete the program, and then share their efforts with a diverse community.

In the sharing of ideas and programs, students learn the fifth standard, digital citizenship. With each program the student shares, he develops his digital footprint. He learns to share programs he wrote himself, and is developing a digital portfolio that shows what he is capable of. The student can keep the images or links to the programs he wrote in a different place in addition to the Hospcotch community, in a blog, for example. Programs that have been partly inspired by other programs, with Remix, are shared with the mention of the original author. Hopscotch mentions the original author automatically. We can learn from someone else, but we also mention our source. When the class is working on a common project for an assembly, you can also use Hopscotch images and incorporate them into another application to create videos to be shared on

YouTube. We must discuss originality, protection of their privacy by not sharing personal information. What we share is positive and helps our society.

The last standard is the operations and technology concepts. Students must demonstrate their understanding of concepts, systems and technology operations. They must demonstrate that they can code by themselves, they are able to find errors in the code and fix them. They are able to produce a Hopscotch code reflecting their grade level. If used properly, the Hopscotch app of choice that meets the international standards of the use of technology in schools.

2. Why learn to code?

Have you ever wondered what our lives would be like without the use of technology? The objects of every day are made from code, but we do not teach our students how to code. Cars, planes, phones, apps on your phones, computers, medical equipment, books, media, security, communication, energy, and video games are all made with code. Everyday objects are made with the code, yet, we do not teach our students how to code. Would you like to give all your students: boys, girls, the poor, people of colour, disadvantaged people, to the gifted, the ability to find a job or to be the next Steve Jobs or the next Julie Payette ?

In addition to facilitating language learning in my class, I also believe that my students need to have all the necessary skills to build our future. They must be able to express themselves using technology and develop the skills required by future employers. People who know how to code and understand the basis of technology will have more employment opportunities, now and in the future. Jobs in the technology sector are in great demand. Being able to code is a new way to read and write and also a tool for future economic success.

Learning to code at a young age is not a new idea. Seymour Papert of MIT developed LOGO in the 1960s to teach math, while having fun. He wanted to invent mathematics that students would like. LOGO is still available today. Mitch Resnick also of MIT, developed Scratch with the same idea in mind. More recently, Samantha John and Jocelyn Leavitt developed Hopscotch for the iPad.

Work opportunities for students who know how to code are enormous. Here are the statistics from CODE.org. In the field of mathematics, science and technology, 60 % of available jobs are jobs for people who know how to code. And if we look at the number of graduates in mathematics, science and technology, only 2% have the necessary training to be able to work in this field. And among those qualified, only 27 % are women. Why is this so ? It is not in the curriculum ?

Learning to code in order to build the technology to solve the most imminent problems that our society faces at the moment is probably the most relevant reason to learn how

to code. Do you know how to deal with climate change? Do you know how to solve our food problems or economy? Our students will have to face those problems and they need the tools and knowledge to do so. The Canadian government invested more than $ 1 billion each year to support and fund the technological transformations and to find solutions to energy problems. We need a lot of talent in this area. By learning to code at a young age, our students can develop interest, passion and the know-how to use essential tools for achieving these goals. Dintersmith and Wagner (2005) also noted the disconnect between schools and the world of work that is becoming more innovative. Companies want to hire staff capable of solving problems creatively, staff who invents new ways to add value to their organization.
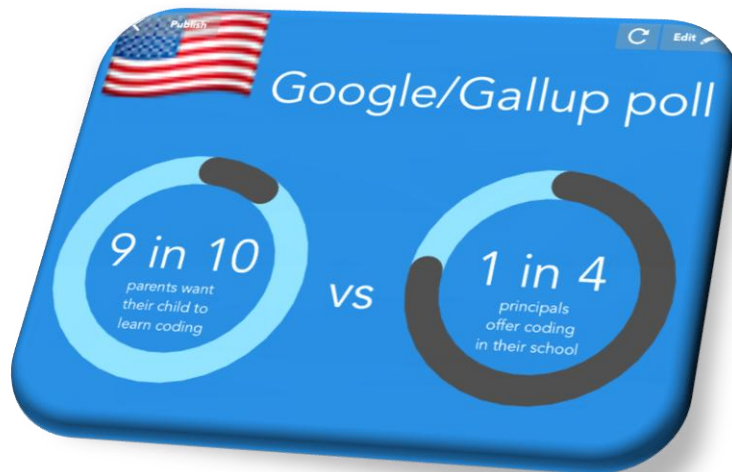
There is the example of the Google firm that has great difficulty in finding qualified people to hire. They have sponsored a Gallup survey to understand the situation in schools to solve their problem of staffing (Miller, 2015).   In this Google / Gallup poll, students, parents, teachers, principals and superintendents responded to questions in order to know what is the state of computer science courses in schools, which is a step to solve the problem lack of personnel in this field of work. They found that 9 out of 10 parents would like their child to learn to code. Parents find that computer science is an area of knowledge that would be useful for their child. However, it was found that only one in four schools offer computer classes. We see a large gap between what parents want, the skills that the industry needs of their employees and what is taught in school. The survey also notes the most important reasons why computer science is not taught

more often. Principals and superintendents indicate that the majority of class time should be spent teaching the skills needed to pass the tests and that coding is not part of these skills. Although the curriculum calls for "Explain and report results using different tools," or that use learning strategies like "problem solving", the use of the programming tool Hopscotch responds well to these curriculum expectations, but it is not much used since it is not included in the tests of the Ministry or the testing tools used by teachers. The superintendents have additional reasons for the lack of computer courses in schools. They also indicate a lack of money and a lack of qualified teachers. It is true that it is unusual to find teachers who have already programmed, whether at the university or in high school. I want to show that it really is very easy to learn to code. Any teacher can code with Hopscotch.

The students, from grade 3, are able to code easily with Hopscotch. There are also teachers who code to make their teaching more interesting and accessible for students who have learning difficulties. Gifted or highly motivated students who started coding at a young age with Hopscotch can start from middle school to create their own company while coding using the industry's programming tools since they would have the knowledge of the Computational thinking in primary school. It's so easy, fun, interesting and useful that we are entitled to ask why we did not do it sooner? Finally, do not necessarily take my advice, take advice from a grade 3 French immersion class that coded for some lessons. We have written in class the words of a French song that reflects their thinking and sang to the tune of YMCA song. Here is the result.

Technology Standards (1, 2, 3, 4, 5, 6)

We can use students' products to do podcasting .

What drives you to code ?

What is the reason that drives you to learn how to code ? Each one of us must find his own reason and his own motivation. We will learn to use the French keyboard and the emoji keyboard with Hopscotch to express our own motivation. You will see two sample programs. I invite you to get your hands dirty and create your own program Hopscotch expressing your motivation to learn to code. Before using the Hopscotch app on the iPad, you must ensure that you have access to the French keyboard (if writing in French) and the emoji keyboard by checking your settings. You must go to Settings, then General, and Keyboards. Add the French keyboard and the emoji keyboard. Once done, you are ready to create your first Hopscotch program.

By learning a single command, you can already create programs with powerful ideas. Under the tab " Looks and Sound " we can find the rule " Set Size Percent " . This command allows you to change the size of the selected objects. We can enlarge the text, an emoji character, or make it smaller by adjusting the percentage.
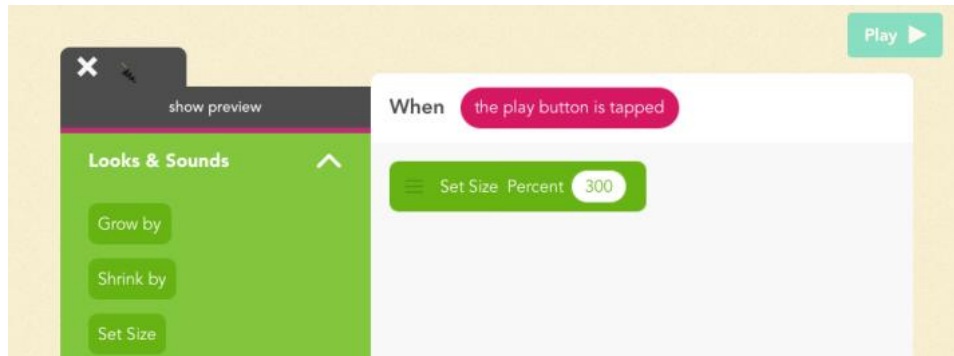
The first program consists of searching on the emoji keyboard objects that are made from code to include them in the program, to adjust their position on the screen with our finger, to adjust their size with the command 'set size percent ", and to write a title. In minutes, you get a result like this one. All programs in this manual can be found on the Hopscotch app under the pen name **SlickJudge**.
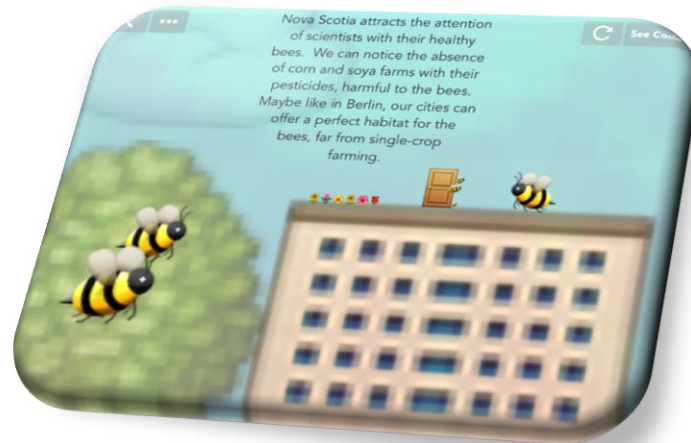

Technology Standards (1, 2, 3, 4, 5, 6)

Students can also use videos, teachers or other students created to learn how to code.

Hopscotch can communicate and share ideas that can help solve impending problems. For example, it is well documented that the bees that pollinate our cultures are dying. Without bees, it will be difficult to have crops to feed our growing population. Scientists are beginning to find the cause of the disappearance of bees and also to find solutions that we can begin to implement. To learn the best ideas to use with our students, we can always see the Hopscotch application itself, radio, television, colleagues, Twitter, the

entire Internet, and all the books. Hopscotch offers many programs that can be consulted and remixed to learn to code. Many programs that are in this book were written entirely by the author and others have been remixed from other programs. In case the program is a Remix, it will be shown next to the image.

(Remix -Madi-)   Technology Standards (1, 2, 3, 4, 5, 6)

The Hopscotch app has several videos that show detailed explanation of how to code. You can also create your own sample programs to be shared on your own YouTube channel that students can follow. The videos are very useful in the classroom because each student works at a different level. When a student has a programming question, you can always refer to the video to find an answer.

3. Why innovation?

On the same day, the teacher is facing many difficult situations. Sometimes, more than 50% of our students live in poverty. Teachers lose their French vocabulary by living in an English-speaking environment. A student from a war-torn environment is transferred into our class. A child dies in our class. There are budget deficits and cuts across all levels of government and the public sector. Companies want carry petroleum by rail from Alberta to New Brunswick while passing in our most populated cities forgetting the tragedy of the Lake Mégantic train accident. We live with prolonged strikes and teachers are still without contracts. Learning with technology is replacing learning with books, and we do not feel prepared. We must develop new lessons using technology when our students are often more skilled than the teachers. In addition to working in these most difficult situations, the teacher is told that his practice is insufficient.

On the same day, we hear from many encouraging situations. French is in great demand. There are parents who give their time every week to deliver pizza to students to raise funds in order to fund students swimming. Teachers share their expertise with other colleagues. Various foundations offer time and money to help our students. A scientist finds a solution to the disappearance of the bees by increasing genetic diversity. A pilot of a plane with solar cells, the Solar Impulse 2, crosses the Pacific, without using a single drop of gasoline to raise awareness and motivate the world to find solutions to the problem of global warming. The CBC broadcasts weekly the most innovative ideas in the world of science and technology in French and English. Earthrise from Al Jazeera disseminates innovative ideas in the environmental area on their website. There are companies like Hopscotch or Code.org that provides free resources to help teachers and students to learn software development which is at the base of any technological development. There are regional and international conferences publishing videos worldwide to prepare tomorrow's education. There are many ideas available that can be implemented to prepare our students for the reality of tomorrow.

We do not know the world of tomorrow, but we must prepare our students for this reality. Being bilingual is a good start, but is it enough to prepare our students to the increasingly demanding global trade, with job situations for a world that we do not know yet?

Tony Wagner from MIT offers a realistic vision of what we can do in our class to prepare our students for the world of tomorrow. You can see an overview of all the books and reported on his website.

Tony Wagner has done interviews with a large number of leaders in the areas of for-profit and non-profit organizations, in several different fields to find out what are the skills required in their field. After several interviews and research on the skills required for success in their field of work, he documented seven skills that one must have in order to survive in the workplace. Note the word survives. They are the following. 1. Critical thinking and problem solving. 2. Collaboration across networks and leading by influence. 3. Agility and adaptability 4. Initiative and entrepreneurship. 5. Accessing and analyzing information. 6. Effective oral and written communication. 7. Curiosity and imagination (Wagner, 2012, Kindle Empl. 530). These skills are absolutely essential, but they are no longer sufficient. The challenges that our students will have to solve are very difficult. In the world of technology and science, Canada and the United States is losing their dominance in favour of the Asian countries. Innovation is the skill that is and will be the most in demand and most necessary.

Innovation is looking for ideas that will work in the future (TEDed, Bashir). For example, one can think of two organizations who have done an excellent job in this area. The Peel Board of Education with its BYOD and Google company that gave inspiration to #geniushour.

For several years, the Peel District School Board encourages employees and students to be innovative, creative and leaders in the use of technology. One approach is Bring Your Own Device (BYOD) that allows students to bring their own electronic device. The approach was meant to solve some existing problems. Many students were bringing their own device in the classroom and were distracted by technology. There were also budgetary problems of buying computers and tablets. Allowing students to use their own device according to the teacher's instructions can start solving problems of distraction and funding problems. By suggesting creativity tools, students can be creative in the classroom and can pursue their projects at home with their device. The motivation and commitment of students increased. This innovative approach has been studied and analyzed by researchers at the CRIFPE who found the idea very positive.

Google has developed a practice to increase the creativity and productivity of their employees in the field of development. Google employees can spend 20% of their time working on a project of interest to them at the condition that the project can benefit the company. Since employees choose the projects that fascinate them, productivity is increased. The movement " Genius Hour " for students is based on the same principle.

In all areas, it is important to find unconventional solutions to the problems we are facing. Students will learn from a passionate teacher who works following the innovative models and ideas around us. With a passionate teacher, you can learn what you like, although sometimes it is difficult and we can make mistakes .

During Genius Hour students can work for one hour on a self-selected technology project, provided that it is related to their program of study. During Genius Hour, some students began to write books for publication, using Wattpad. Some have created and published videos on YouTube using ExplainEverything. For daily assessment, using NearPod, students can creatively show their understanding of their learning. And finally, to learn the basics of programming, my students created new programs on the iPad, using Hopscotch. Students can learn to code while expressing innovative ideas .

It is possible to integrate the ideas of Tony Wagner in an innovative French or French immersion class. You will see several examples of the use of Hopscotch to learn to code while exploring innovative ideas in the science, social studies, art, mathematics and French program.
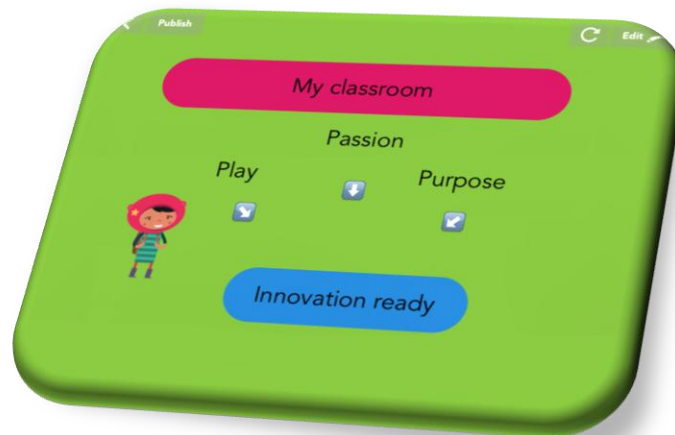
The language class becomes a place where students learn through play. Programming with Hopscotch is quite interesting . Not only students can create video games linked to the curriculum, they play their own games when they finish with their iPad or even their phone. Students become enthusiastic about their learning. The questions are open. Students have a choice of activities and choose their level of involvement. With this choice, students become very invested and passionate, because their learning becomes personal. Students know that we learn with the best resources, they create a very important job that can be shared with the online community. Learning becomes relevant and students become very creative. This model is a dramatic change from complete worksheets to learn grammar .

Learning to Innovate

There are several ways to innovate and several ideas that we can follow to make a difference. In your opinion, which area needs more development? Is it in science , social studies or the arts? I invite you to choose an idea that interests you.

We will learn to draw a line to express our innovative ideas. With Hopscotch, we can draw lines with 24 different colours or more, with a length and variable width. The line can be drawn horizontally, vertically or in any angle, after knowing where the line starts.
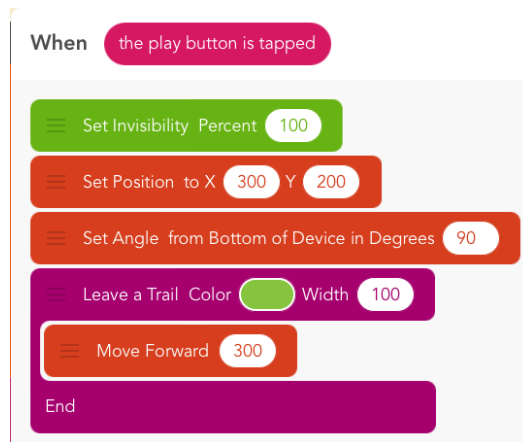
The character in the above code, draws a vertical green line, when you press the Play button. The "Set invisibility Percent" command makes the character transparent or make it invisible while keeping its presence and function. At 100%, the character is completely invisible. The "Set to Position X Y" command places the character at a specific location on the iPad screen. Values of X can vary between approximately 0 and 1020 and the Y values may vary from 0 to 800. We have subsequently indicated the angle at which the invisible frog will move. With an angle of 0, the character will move horizontally, from left to right. With an angle of 90 degrees, the character will move to the vertical, Finally, the "Leave a Trail Color Width" command allows you to draw the line. Here, the line is coloured green, and has a width of 100 units. We use the "Move Forward" command within the "Leave a Trail" command to indicate the length of the line that we want to draw.

The energy-related innovations related to address climate change are in most demand, in order to develop our resources sustainably. A network of petroleum companies launched a competition to stimulate innovation in research. The competition will reward a person or a group with $20 million for an idea for removing CO2 from the atmosphere and convert it into a useful product. Maybe this next Hopscotch project idea could qualify. Oil is a nonrenewable fossil fuel; however, it is possible to create renewable oil using micro algae. Several companies are currently testing the idea. Much of the research is to identify the algae in nature that contains more fatty acid is most efficient. My students were able to see that algae were very present when our class aquarium was near the window where the sun was in abundance. Innovative companies build photo

bioreactors to grow algae (EarthRise Al Jazeera). The models are very diverse. The algae are fed carbon dioxide from industrial waste such as cement. With plenty of sunshine, they develop, make photosynthesis and produce oxygen, which returns to the atmosphere, with a net effect of cleaning the atmosphere. From algae biomass, we can be extracted a fatty acid that is used to make a biofuel almost identical to oil that we use today. This biofuel is produced by removing two tons of carbon dioxide from the atmosphere for each barrel of oil renewable produced.
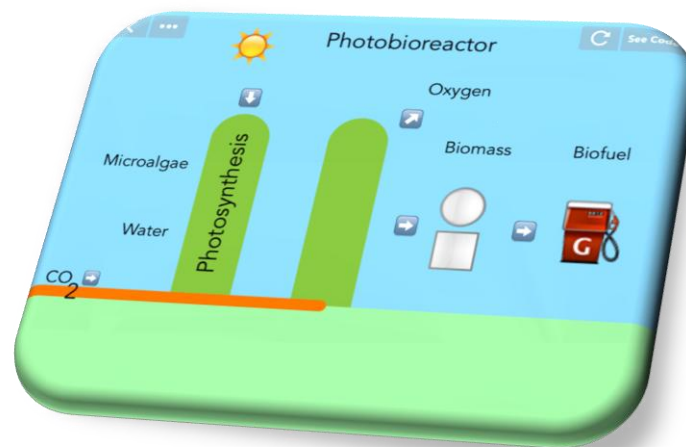
Technology Standards (1, 2, 3, 4, 5, 6)

The simplest programs involve only drawing lines. From 8 years old, all students, even the most disadvantaged, are able to code a line in minutes to express a great idea. This really is a good start.

4. SAMR Model – Substitution

The SAMR model is very useful to gradually introduce technology in our classrooms (Wart, 2013). SAMR is an acronym for **S**ubstitution, **A**ugmentation, **M**odification, **R**edefinition. We use it in our school board. Here is an analogy of the process. First, at the substitution level, we replace a good coffee brand with a similar brand of coffee. At the augmentation level, our coffee is getting better by adding milk to make a café latte. At the modification level, you add the chocolate and milk to make a café mocha. At the redefinition level, coffee is something you could not imagine, something you have never tasted before, like frappucino pumpkin spice. So in terms at the substitution level, if we sometimes replace paper, crayons and paint with Hopscotch, we begin to climb the ladder of technology and start teaching 21st century skills that our students so need learn.

French teachers also use the ASPID model (Karsenti, Fievez 1994). ASPID is an acronym for **A**doption, **S**ubstitution, **P**rogress, **I**nnovation and **D**eterioration. At the adoption level, it is difficult to use technology since we must spend a lot of time learning to use it. There is no match in the SAMR model. At the substitution level, as in the SAMR model, there is no advantage or disadvantage to using technology. At the Progress level, technologies have a positive impact, they are used to teach, learn or perform traditional tasks with greater efficiency. This level corresponds to two SAMR levels: Augmentation and Modification. At the innovation level, technology permits the construction of school tasks as it was not possible before. There is an evolution in how to teach and how to learn. This level corresponds to the Redefinition level of the SAMR model. At the Deterioration level, which is not in the SAMR model, technology increases the shortcomings of teachers, often at the expense of students.

At the substitution level, one wonders whether this new Hopscotch technology will bring something. Using Hopscotch, our final product will seem more professional. For the student who is struggling, his work will look really nice. The pupil can write and feel very proud of his work, which in my experience is far superior to the technology with only a pencil. I have seen in my class a student move from a level 2 to level 3 only because Hopscotch interested him. It was more motivating and he spent more time doing his

word because he was satisfied with the results. The gifted student can feel very inspired because he has the chance to work at his own pace in a project that excites him. If he has his own device, he will certainly work in class and at home to finish his work. I saw passionate students working at home complete social studies project and present a truly innovative work to achieve a level 4.

Tell Me About Your Vacation

We can plan and write a text based on the text forms we are currently studying. For example, the student returning from holidays can talk about his summer experience. With Hopscotch, to create more variety, you can change the text that appears on the screen and change the colour of the letters with the command " Set Text to Color ". Letters can be one of the 24 colours in the palette or you can code the text so that the colour of the letters is different, every time you use this command. In the example here, the text part of the bubble will be a different colour , each time the program starts. The colour is chosen randomly. The range of colours gives more opportunities to express creativity with text.
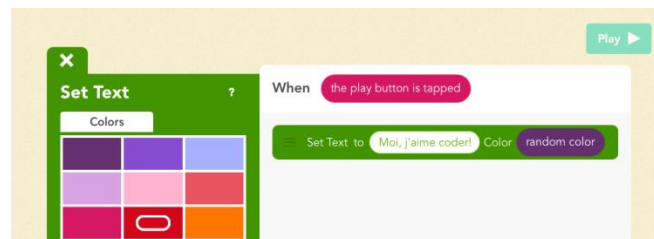
The first example refers to the weather in Iran. Iran had extreme temperatures that we never meet here. How to live with these temperatures of 74 degrees Celsius ?

Technology Standards (1, 2, 3, 4, 5, 6)   Source : Radio-Canada   Technology Standards (1, 2, 3, 4, 5, 6)

In the second example, the program is not difficult to write, it's just more detailed. The gifted student love this kind of challenge. With the participation of the Prime Minister of Ontario, Penetanguishene citizens and all visitors, the province recently celebrated 400 years of French presence in Ontario in the summer of 2015. In addition to speaking French and learning to code, the student learns some history and geography .

After preparing programs like these, we can make a connection with an application like Google Earth on the iPad that allows students to begin to understand how programmers at Google are doing their job. We are also giving our students an idea of how they could use the code in the working world.

5. SAMR Model – Augmentation

At the augmentation level, technology provides new features that were not possible only with paper and pencil. Students are more engaged in their work. We try to answer the question. Does technology bring new features that improve the work?

Hopscotch offers many characters and emoji characters that can be easily programmed to move to give us a professional-looking product. For example , we can write interactive stories, or make a movie in no time. The shy student, one who does not talk much to the whole class, will feel very comfortable using his story and transforming it into an audio book or film. He recorded his text with his voice , filming the progress of the interactive book, or a simulation while reading the text with a dramatic voice.

Can we distinguish truth from fiction?

We can initially plan and write a story or simulation using the text forms that are currently studying .
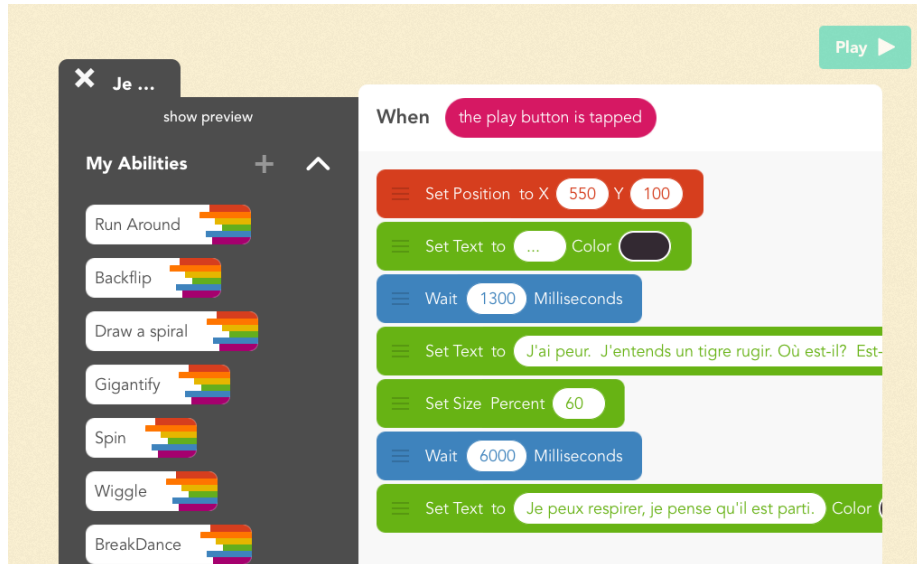
To write an interactive story, we need two more commands: "Wait" and "My Abilities ". The " Milliseconds Wait " command allows the program to stop for the number of milliseconds indicated in the bubble. Wait 6000 ms makes the program wait six

seconds, allowing the reader to read the text that was written. Finally, Hopscotch provides abilities already programmed like " Run Around " or " Backflip " that moves the characters without having to code them yourself. With the help of these abilities, a character can move on the screen while the text is displayed. Combining these commands, we can very easily write an interactive story . This story can then be filmed with the iPad and commented with ExplainEverything, for example. The first example is a small story that unfolds on two pages with the character moving on the screen.

(Remix Tiger2718) Technology Standards (1, 2, 3, 4, 5, 6)   Technology Standards (1, 2, 3, 4, 5, 6)

The second example from science class shows a satellite that moves from left to right in front of the earth and the moon. Once at the right place, the satellite takes a picture that is subsequently transmitted to Earth.

Left to their imagination and with a little support from the teacher, can you imagine the kinds of stories and texts that students could write? At the level of modification, the student becomes more creative. He needs to develop his ability to solve problems by coding with Hopscotch. The work no longer consists of filling worksheets, the students thought process is much more rigorous.   Already at this level, we changed the student's mindset. It is able to code, he is able to write creatively and can already begin to see where programming can be applied in the real world.   For example, with fiction, we can make the connection with the applications of the Chocolapps company that offers excellent stories in French with additional features for students. For scientific simulations, students can begin to see how people in eduMedia are doing their job.

With a few sessions with Hopscotch, we made a very important link to the work place and the knowledge necessary to succeed in the technology world.

6. SAMR Model – Modification

At the modification level, the classroom works very differently. Each student has a personal interest in the quality of their work. The technology is necessary for the proper functioning of the class and lessons. Students ask questions in order to learn and they are more responsible to find resources to answer their own questions.

The teacher does not need to create all model programs necessary for each student in the class. Models of all levels are already created by Hopscotch and all the other teachers and students using Hopscotch. Students can use a sample program from Hopscotch , remix it and create a new program. They can see how the original program was written and learning from the model, on their own initiative. This can be done in class, at home, or as I've seen, in a music concert . The student can learn during the school year or during the summer as well.
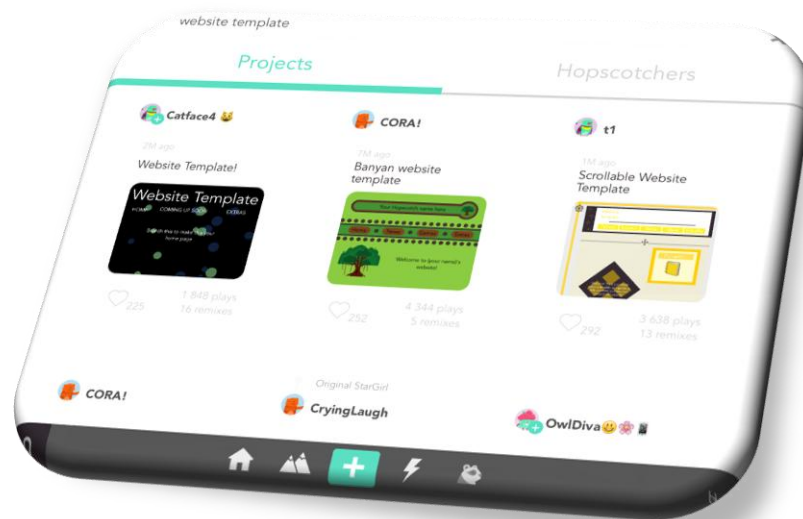
Technology Standards (2, 5, 6)

The Hopscotch app provides an environment for working at the modification level with a network for sharing programs with other Hopscotchers. Programs can be shared on the Hopscotch app network, Instagram, Facebook or Twitter, if they have the required

age of 13. Hopscotch offers protections. The Hopscotch network is regularly checked for inappropriate content. If you notice something that should be removed, there is a function on the app to draw attention to the problem.


Publish a Website

Every year, junior students from my school are preparing a musical to be presented before the whole school, parents and a few other schools in the vicinity. Aspiring Celine Dion may well be motivated to learn how to make Websites advertise their musical using one of the models on Hopscotch. Those who love sports , restaurants or who like to travel can also think about creating a website, necessary for any business.
To create a website as you see here, one must understand another command.

Technology Standards (1, 2, 3, 4, 5, 6)

It is the "When text is Tapped " command. When we pressing on the iPad, by touching the text, we can change the text or add another command. We can also attach more than one command to a text. For example, if I touch on "Home" on the website we created , we change the text that is written on the page. The text must also change when you press the other News or Music or Extras button. We attach each command to the initial text.
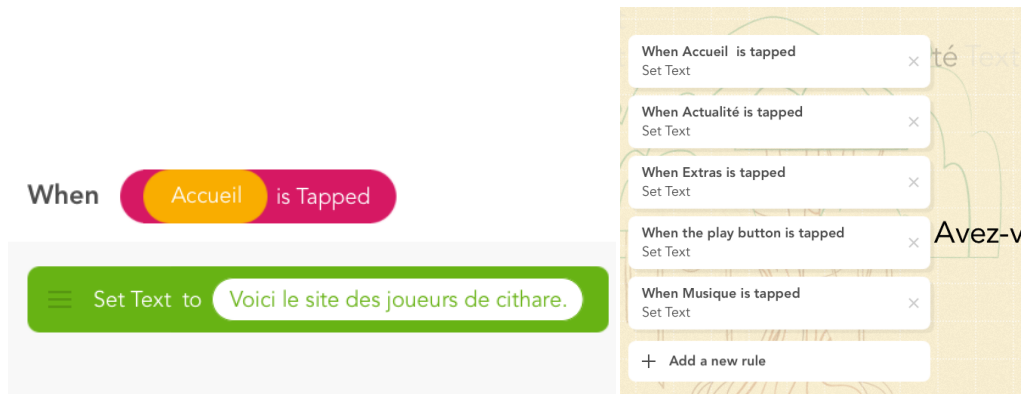
With each button on the website, we attach a command to the text to be displayed on the screen. In this case, we have 5 different texts that will be displayed when you press the corresponding button. In this program, by working at the modification level, the student can see how websites work, and provide a brief introduction to marketing.

What is your opinion?

The news on the radio, on television or on the Internet is a constant source of ideas for writing Hopscotch programs to discuss and form an opinion. During election time, there are polls throughout the campaign to see the voting intention before election day. You can do the same with Hopscotch. We write the program and then we can ask people around about us their intention to vote by pressing the iPad. We can make all kinds of polls, on all kinds of subjects, and display the results.

Technology Standards (1, 2, 3, 4, 5, 6)

One can guess that it is possible to count and display numbers with Hopscotch. A variable is used. A variable is only a place where you can keep the value of a number. The value of this number may change during the course of the program. For example, you can create a variable called GREEN with the value of 0. If you touch the frog, add a point to the number of people who vote for the GREEN party. The value of the GREEN variable changes from 0 to 1. If you touch the frog again, the value of the variable increases by 1 again and we know that 2 people have voted for the GREEN party. Each command using the variable will be done with the current value of the variable. It can display the contents of the variable with the same "Set Text To" command. Instead of a text in the bubble, we put the variable that contains a number. Also, to display the permanent vote on the screen, use the "Repeat Forever" command.
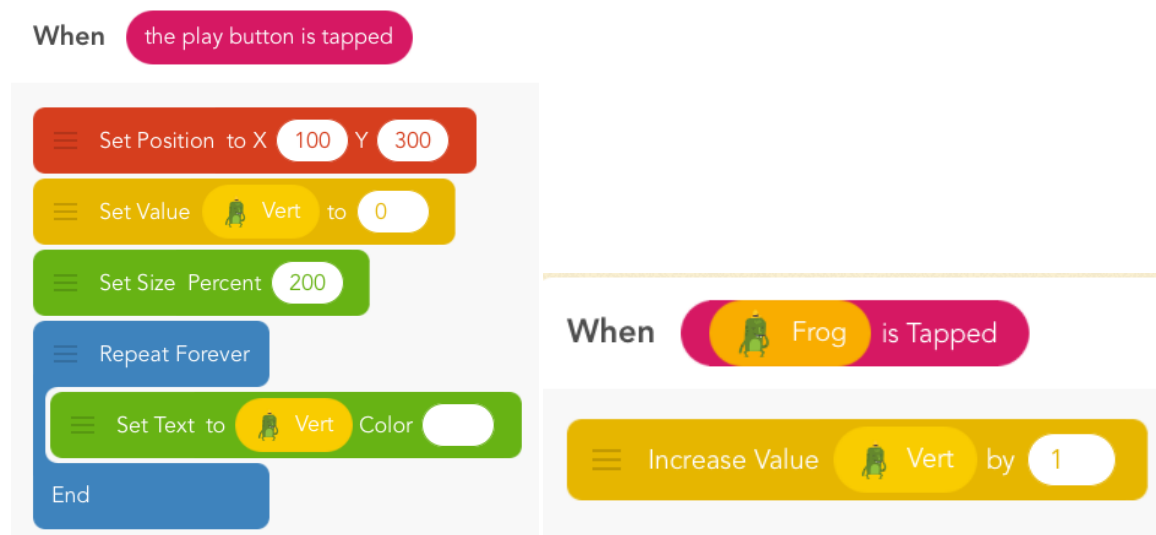
After working some time with Hopscotch and an online professional learning network, we realize education changes. The teacher is no longer the wise person in front of the students who listen. There are several teachers at the same time. Students learn from each other, from the whole Hopscotch community, from his entourage and also the teacher who became a guide and a coach who motivates students. Learning can be 24/7, 365 days a year. What do you think?

7. SAMR Model – Redefinition

At the redefinition level, one wonders if the technology allows us to work in ways that were impossible before. At this level, technology is not the end but a medium, a tool that supports students learning in the same way as a pencil supports learning. The student is very comfortable with technology and is required to communicate his knowledge. It allows answering the student's personal questions and to jointly on projects of the whole class or group. If we use the Bloom's taxonomy, the student works at the highest level of his cognitive faculties at the synthesis and evaluation. He can communicate with people around the world, evaluate ideas and produce his own comments about or related to the product. The product is again communicated to the world with technology.

By following the links below, you can see here an example of two classes of French immersion, a 3rd and 4th grade, working together to find an idea to protect the environment. Students knew that their work would be presented in a school assembly, and an iPad conference in Montreal. Each student's idea is communicated with Hopscotch (beta). A song accompanies the work of the students. Everything is assembled by the teacher and presented to the world through YouTube and the Internet.

Assembly : https://www.youtube.com/watch?v=UOrw4NH4PpM

Technology Standards (1, 2, 3, 4, 5, 6)

Steps to protect the earth

At first, to find the best ideas to protect our planet, we can consult people and scientists worldwide. With the help of the media and the content of today and the last few years, available on the Internet, it becomes very easy to consult with scientists around the world with the most promising ideas. Students are inspired to create their own version. In addition to consulting the media for ideas, the student can see all the videos prepared by Hopscotch explaining the basis of programming with Hopscotch. The student and teacher can look at many examples provided to help write their program. In this example, I used the video "Secret Colors" available from the Hopscotch app to create this lesson. By scrolling the text up, we can see all the videos created by Hopscotch.
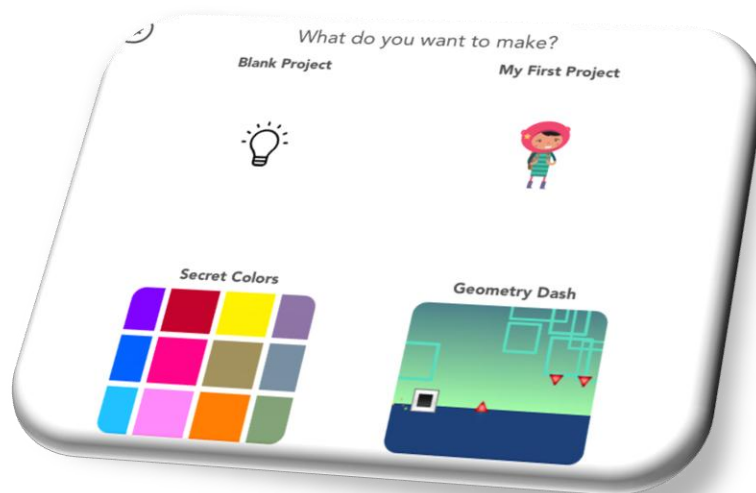
Technology Standards (2,5)

In this example, the student will feel as if it had superpowers compared to other students because, like magic, he will create new objects with hidden characters and use all the colours and not only the 24 colours available Hopscotch, while using the now familiar command, "Set Text to." First, being inspired by Rover exploring Mars and recycling, one can create his own Rover using recycled objects.
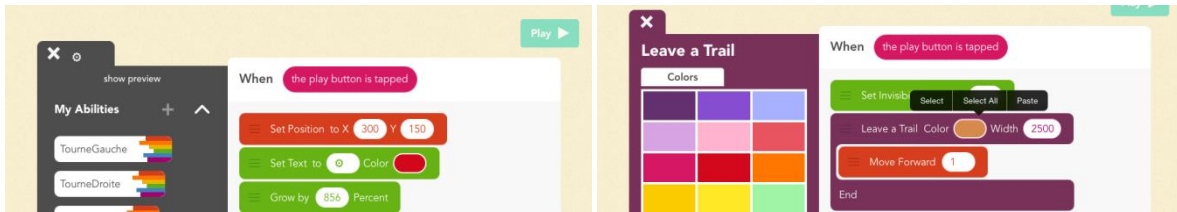
We can develop really different texts using the full range of characters available on the Internet. It is very easy to copy a character from the Unicode character table (http://unicode-table.com/fr/), and paste this text into the bubble of the command, "Set Text to." With this large number of different characters, we can create all kinds of designs. Here you can see the gears in three different colours that part of the Rover. On the right, you can see a replica of the Solar Impulse 2, this completely solar airplane that went around the entire world without fuel. For all colours, a colour table is used (http://www.colorizer.org/) to insert the chosen colour code in the colour of the bubble. The video "secret colour" shows you in detail how to do it.
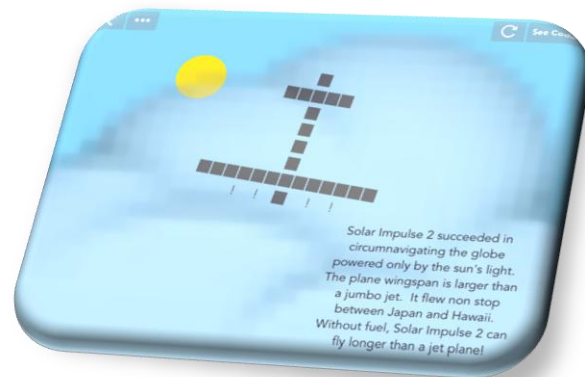
Remix: HeavenlyTrapPrince Rover : Technology Standards (1, 2, 3, 4, 5, 6)   Solar Impulse : Technology Standards (1, 2, 3, 4, 5, 6)

By working collaboratively, it is possible to work at the redefinition level to innovate towards a common goal, a common vision.

8. Genius Hour

The concept of Genius Hour motivates students to be creative, and inspired by the model of the company Google. Students work with relative freedom for a little over an hour to complete their project. In the Google company, employees work 80% of time on projects assigned by their company and 20% of the time on projects they have selected themselves. Google employees are more creative and work best during 20% of the time they are allowed to be creative on a project they have chosen. Because of the personal involvement of the employee, the company Google is more productive that way. This works in the same way with the students. Often, students do their best work during this time. In a way, trusting our students by guiding and encouraging them, they produce a great work. Sometimes, the student shows teachers new ways of doing things. When students arrive at school already knowing the content of the curriculum, how do we teach them? Giving time to students to be creative could be a solution. With the availability of iPad in our school, students can be creative with Genius Hour once a week for two periods. Each student can work at their own level with simple or complex code, depending on his skill, on topics or angles of his choice.

Drawing a line is very simple; but gradually as students progress in their journey, they learn computational thinking. They learn how to solve problems, rather like writing procedural texts, one must know how to communicate with the computer through Hopscotch and put the events in the correct order, otherwise, the meaning will be different. In the kitchen, for example, to cook a meat dish, one must: 1. Light the fire, 2. Add oil, 3. Add meat and onions, 4. Browning the meat and onions a few minutes, 5. Add water, 6. Wait a little to boil water, 7. Add vegetables and chicken bacon, 8. Boil gently for two hours. 9. Turn off heat. If something is missing or if the steps are not in the right order, we will not have the desired effect. In this example, it lacks something important. It lacks the frying pan! What a disaster! I imagined a good dish, but I missed an instruction.

Tell Me About Your Country

For students from around the world, drawing the flag of the country of origin was natural. One can also discover another country according to the interest of the students. News sites like the CBC are filled with images and graphics generated by

graphics software. We also see a box with a search engine to search within the website. All this must be coded. We must learn to understand abstractions and rehearsals.
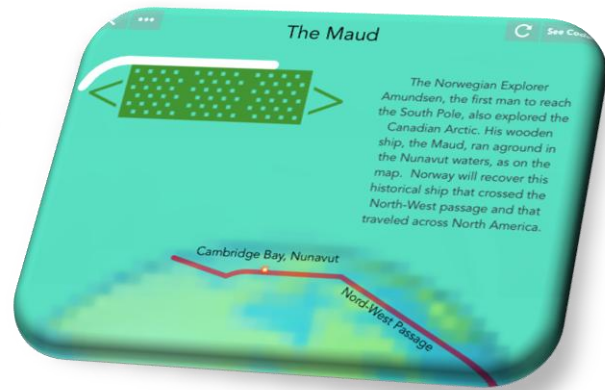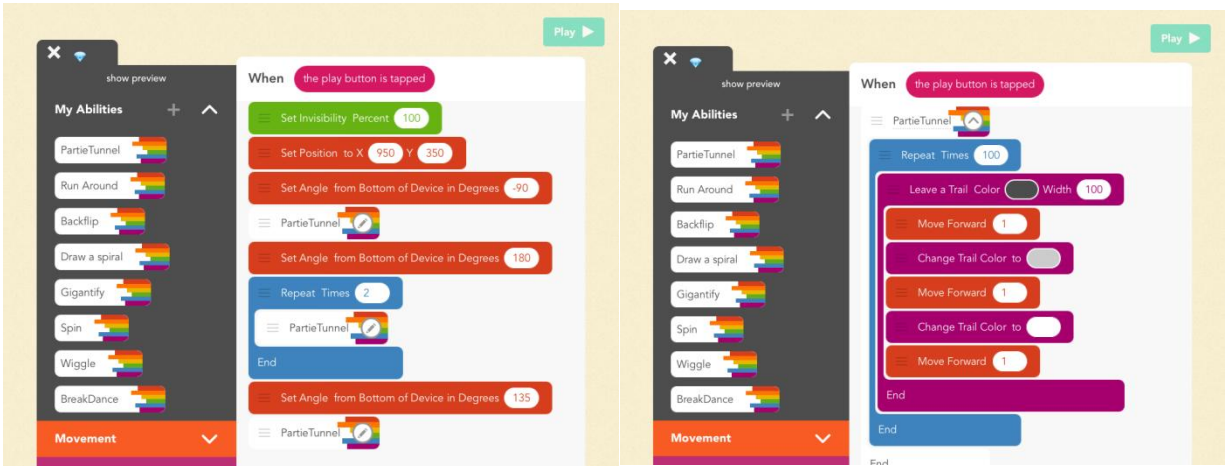
Tunnel : Technology Standards (1, 2, 3, 4, 5, 6);   Maud : Technology Standards (1, 2, 3, 4, 5, 6)

The two pictures of Hopscotch commands show how to write code that draws the new pedestrian tunnel travelling to Toronto Islands. 1- I use the "Set Invisibility Percent" command to make the emoji character of the invisible diamond. The diamond will draw the tunnel. 2- It shows where we will start drawing the tunnel with the "Set to Position X Y" command. 3- It is indicated in which direction we will draw with "Set Angle" command. To go down, we have to adjust the angle to -90 degrees. 4. We draw part of the tunnel. We will see these details later in the second page. 5. We change direction to start drawing to the left. 6. We draw part of the tunnel twice. It will be twice as long. 7. We change direction once more to rise to the surface. 8. We draw a part of the tunnel. We have now completed drawing of the tunnel.

There was a level of abstraction that is coded in the ability. We used this portion of code 3 times. Put this code in an ability makes the final code shorter, easier to read and much less complex. If we give each ability a descriptive name, it also helps to document what the code does.

Regarding the second page, PartieTunnel draws the tunnel. It includes drawing a small black line repeatedly, followed by a small gray line, followed by a small white line. And we designed our tunnel.
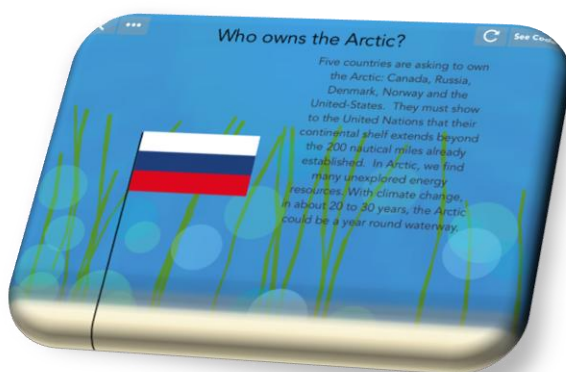
If the order changes, if the angles change, we will have something different.

Drapeau : Technology Standards (1, 2, 3, 4, 5, 6)

Graph : Technology Standards (1, 2, 3, 4, 5, 6)

Remix : MagmaPOP
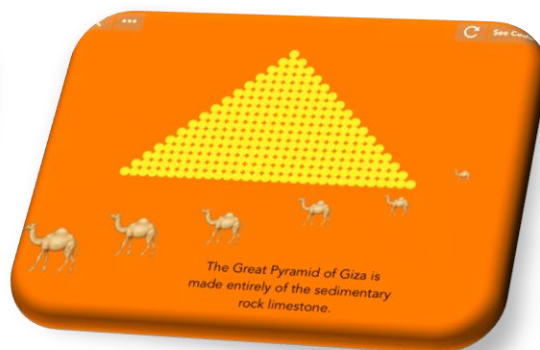
Arctique : Technology Standards (1, 2, 3, 4, 5, 6) Pyramide : Technology Standards (1, 2, 3, 4, 5, 6)

We saw a tunnel. We can try graphs of the economy of our country, old or future explorations of each country. By leaving students the choice, you trust them, giving them time so they can work at what interests them, you will truly get unexpected results.

To which genius do you look like?

Every creative person or who contributes something positive does not have the same way of thinking or working. The French book "Génie toi-même", shows the character of several known creative people and their way of working. We see these qualities under the heading curious, imaginative and determined. For example, Albert Einstein in physics who worked with very advanced mathematical concepts said: "It is sometimes believed that the great scientists are locked in words and figures. Nothing more wrong! Thought is also (and especially) in pictures." This is an excellent model for users of Hopscotch. The thought is reflected in many images. Since Einstein wrote the theory of relativity, we will see here a picture of the Big Bang model. We see the big bang in numbers. This image could also represent the Star Trek spaceship travelling at a terrific speed.
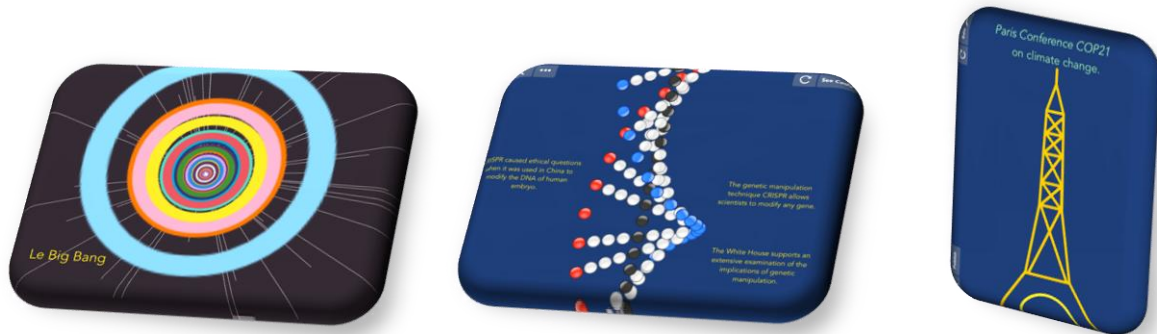
Remix : Axolotl
Technology Standards (1, 2, 3, 4, 5, 6)

Remix : A fun nickname
Technology Standards (1, 2, 3, 4, 5, 6)

Remix : TheWeirdFreewPop
Technology Standards (1, 2, 3, 4, 5, 6)

A genius like Charles Darwin, who discovered the theory of evolution, asked himself many questions. "The mark of a genius is to ask questions that nobody else asks … and investigate until he finds a satisfactory answer. " Because today we know that DNA has a big role to play in heredity and changes from one generation to the next, I will represent the DNA as one of the results of research started by Charles Darwin. The children already have many questions. They must be encouraged to keep their creative spirit. Like Martin Luther King, the geniuses have a vision and key projects. The world will be

different they express them. Paris, represented by the Eiffel Tower, also has a vision of inspiring the world with its conference to make decisions to address climate change. Each child can develop his own vision.

9. Computational Participation

Technology changes constantly. Applications and the operation of applications are constantly changing. What you learn when you learn to code? We always work alone in this culture geek? Do I express myself creatively?

Students who learn to code will certainly learn to solve problems. It is a basic element of the use of IT. The word used is computational thinking. Students learn to make real applications such as video games, or interactive stories. Computational thinking is part of the writing of computer programs and systems, but is not limited to computers. When cooking, we are using computational thinking. When playing chess, computer thinking is used. When writing a procedure, a procedural text, computer thinking is used. Finally, when children put their LEGO in order to create a new play, computational thinking is used. It is not necessary to have a computer. One must be able to know what we should include and exclude from the project. We must organize the steps and sub-steps, if any. We must perform the movements in a particular order, without forgetting anything. We think systematically about the problem to solve. There is an organization, Computer Science Unplugged, which offers a wide range of activities that can be done to understand the computational thinking, playing without a computer. It is also possible use art for this purpose. For example, you can ask students to make a mosaic. One can add constraints. We can only stick our little pieces of paper from left to right or from bottom to top. We can also use only one colour at a time. This way, students developed computational thinking and can see the progress of their algorithm before touching the iPad. Students learn to think better.

Research shows that, in general, girls are less interested in programming than boys. We wondered if class's layout could have an effect on the interests of girls and boys towards computers. They compared the stereotyped classes with computer components and posters with posters like those of Star Trek and other classes decorated with art and nature. They noticed that the girls preferred the non-stereotyped classes and the boys loved both. In the non-stereotyped class, the proportion of girls interested in computer science was 3 times higher. Ornaments such as plants, animals, art, away from geek culture of computing, was more inviting for girls.

Technology Standards (1, 2, 3, 4, 5, 6)

The term computational thinking defined by Jeanette Wing in 2006 is amended by Kafai and Burke (2014) to go beyond the resolution of individual problems and is called "computational participation". Computational participation, also includes personal expression, creative design, and social participation.

> Computational participation, as we see it, is the ability to solve problems with others, design systems for and with others, and draw on computer science concepts practices, and perspectives to understand the cultural and social nature of human behaviour. (Kafai, Burke, 2015)

In computer science, writing a program must have a purpose, a motivation, a sense of purpose or objective. It must make a definite service. To better reflect the reality of learning and the reality of the industry, we must also include the community element. There's quite a process to write a program. We must meet a client, talk to him to find out his needs. We must design the program, debug it , test, document, sell, modify, and do maintenance. For large systems, this is never made by a single individual. The work is done in a community. You learn from others and working as a team. You are never alone.

The Hopscotch app reflects well and encourages this reality. One can look at and consult programs from the whole community in order to learn coding. You can use them, change them, remix them. We can follow a specific programmer. In our programs , if we remix from another program, modify or use part of another program, it's normal. That's how we learn. Students can work in teams in the classroom and discuss their design and help solve problems .

Technology Standards (2, 5)

With the pen name **SlickJudge**, we can see, in the left image, two programs shared with the Hopscotch community, written entirely by the author and two programs remixed from two different coders. You can see the names of the coder of the initial program. Hopscotch solves the problem of copyrights by automatically indicating the reference. Ideas from the Hopscotch community can be viewed, and you can "like" a project. The projects from the community are also shown as interesting examples. The right image shows one of my programs about the oil sands, whose idea comes from the website Inside Education. It was highlighted by Hopscotch community. Teachers also can share their lesson plans, reflecting what they should teach and learn from each other. With the ability to highlight programs loved by the community, the dimension of creativity is also present. We can create all kinds of programs using the best ideas and the best techniques. From programs highlighted, we can build even more creative programs, on the shoulders of the entire community. This concept joins what Tony Wagner spoke with the need to develop innovation skills in our students.

11.   Introducing Coding in Science Classes

It is possible to learn and express our understanding of science in several ways. For example, the science curriculum of the Ontario Ministry gives some clues about it. It strongly favours a varied and active learning of science, drawn from real life situations :

> When planning science and technology programs, teachers will provide activities and challenges that actively engage students in inquiries that honour the ideas and skills students bring to them, while further deepening their conceptual understanding and essential skills.
>
> Moreover, using a variety of equipment, tools, and materials help deepen and extend students' understanding of scientific and technological concepts and further extends the development of scientific inquiry and technological problem-solving skills. p. 30

Students can do experiments, make observations, do a search on the Internet, in the classroom, outside, in museums or with scientists who visit schools. The curriculum states that one must also learn to manipulate tools. We can use magnifying glasses, microscopes, specimens, computers, for example. Hopscotch with the iPad is one of those tools.

For the evaluation of a project done with Hopscotch, we can use the same headings as found on the Ontario government website. The heading does not change, only the tool changes. We are assessing the curriculum expectations and Hopscotch is used as a tool. The program written with Hopscotch can be very dynamic and show movement as in simulations that scientists must sometimes carry on with computers. Once the program is written, the teacher discusses with students in a mini-conference in order to express his understanding.

Where can you find the best ideas to learn science? One can find many innovative scientific ideas using the Internet or in nature by going outside. Will Richardson stress the importance of using the Internet which offers a huge choice of ideas for students. Armed with effective skills to research and evaluate information, students have more freedom to learn. The Internet gives students the freedom to seek answers to their own questions.

Personally, I use several sources of knowledge to code creative ideas. I use books, talk to people in person or on social networks, nature, my own intuition and also the Internet. All these sources of knowledge are important. You will see in this section, sample Hospcotch program for grades 3 and 4.

Describe the Basic Needs of Plants

The Hopscotch program shows a plant, soil, water, sun, oxygen and CO_2 from the atmosphere. When you touch the sun rays, we see a yellow line representing the rays moving from the plant to the plant, showing that the plant needs the sun. When the water is pressed, the drop of water rises in the stem of the plant, showing that the plant needs water. When CO_2 is touched, it drops on the leaves of the plant, showing CO_2 needs of the plant for photosynthesis. And finally, when you press on the oxygen, we may realize that the plant produces oxygen that is released into the atmosphere. The program is very dynamic, interactive and really fun once completed .

Technology Standards (1, 2, 3, 4, 5, 6)

Each emoji character must be placed on the screen with our finger. If we want to ensure it stays in one place, you can use the command " Set Position " to place it in the right place on the screen. There is a little trick to colour the entire screen blue. With the "Leave a Trail" command, we indicate a wide line of 999999 units, wider than the dimension of the iPad, and advance by 1 to draw a large dot covering the entire iPad.
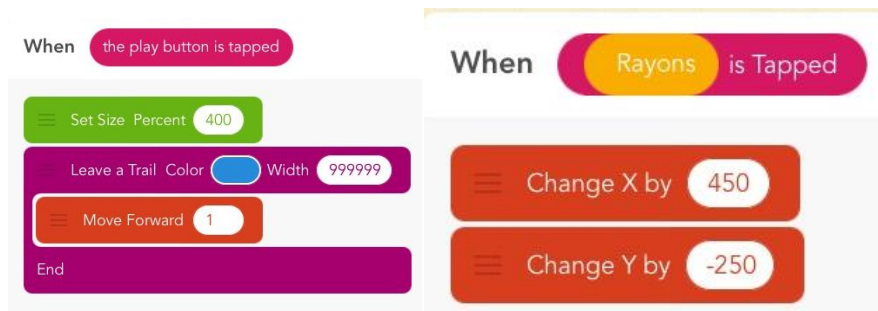
To code the movement when pressing on the text, we must write the rule, " When text is Tapped ". There are several Hopscotch commands to change the text's location on the screen. We saw "Move Forward" that allows movement in the direction that faces our text. The "Change X by 250 " command allows moving the text to the right by 250 units . To move left , -250 is used. The command "Change Y by 250 " will allow the text to go up by 250 units, a little above the point where the text is currently located. To go down, the negative -250 is used.

This is a dynamic program that grade 3 students are able to do. It can be done in minutes. This program can also be integrated with the mathematics expectations since we learn about number sense , measurement, and translations .

Where do we observe the forces at work?

Project Wet offers many resources in print and online in order to discover the role of water in our lives. The Expectations are connected to the American curriculum. You can always find the related activities related to our own curriculum. They also connect the news with expectations through social networks. In news broadcast by the network ABC, we learn that California found an innovative way to prevent water from evaporating in this sunny environment and keep the water in the pool. They placed plastic balls floating on the water surface. The plastic balls provide shade to the water that evaporates less quickly. Is this a good environmental strategy, or is it rather an advertisement to sell ping pong balls? Is this a strategy to pay attention to the plastic continent located in the Pacific Ocean? This experience, in addition to learning about forces, allows learning critical thinking. Students do the experiment in an aquarium and draw their conclusions.
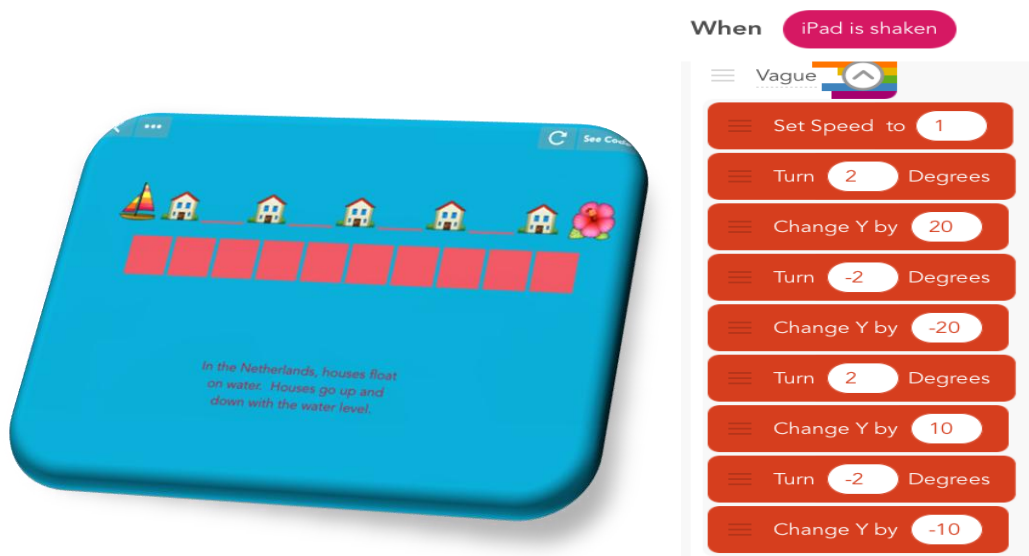
Technology Standards (1, 2, 3, 4, 5, 6)

To code this program, we need to clone the emoji character of the black ball. To do this, we need the two "When" commands shown in the images. At first, when you press the "Play" button and the program starts, you must specify the number of clones that we want to see. We repeat 10 000 times the command, "Create a clone of This Character"; this will get 10,000 black balls. Second, we must state what each of the clones will do. When the character is cloned, each clone will perform the commands in the second "When". For variety, use the command "random" which allows for a choice of random numbers. The first command chooses an angle at random for each ball to move from the truck to the pond. Then, each ball advances at random from 100 to 200 units. Balls can now be found around the pond. We want to spread the balls uniformly throughout the pond. To do this, we will place each ball in the middle of the pond by using the command "Set to Position X Y" and the Cartesian position of the middle of the pond. It is also possible to ignore the first 3 and instructions to place the ball in the middle of the pond by using our fingers. In order to distribute the clones evenly in the pond, we will adjust the movement angle at random between 1 and 360 degrees and then each ball will move between 20 and 250 units randomly. We can see that the balls were sent with strength from the truck to the pond. Once in the water, the balls are distributed evenly over the entire surface of the pond.

When the play button is tapped

    Repeat Times 10000

        Create a Clone of This Character

    End

When character is cloned, make the clone

    Turn random -30 to 30 Degrees

    Move Forward random 100 to 200

    Set Position to X 700 Y 200

    Turn random 1 to 360 Degrees

    Move Forward random 20 to 250
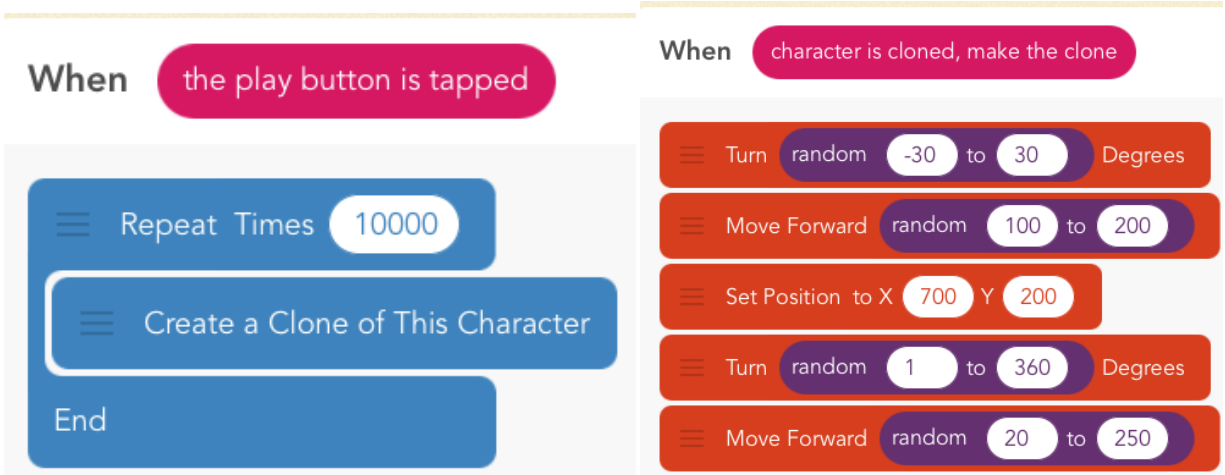
To see these forces at work , we can use a toy truck, black plastic balls and an aquarium to experiment. After the experiment, we can write our code which shows the results .

Invent a New house

In one of Al Jazeera's EarthRise broadcasts, it discusses how engineers develop aquatecture to build homes that can float on water to cope with rising sea levels caused by global warming. They combine their knowledge of the ships manufacture industry with knowledge of construction. With an aquarium, you can experiment to build a structure that can float on water. It can be seen in a demonstration how a pipette with a long stem can float to the surface before writing the code.

In the Netherlands, houses float on water. Houses go up and down with the water level.

When iPad is shaken

    Vague

    Set Speed to 1

    Turn 2 Degrees

    Change Y by 20

    Turn -2 Degrees

    Change Y by -20

    Turn 2 Degrees

    Change Y by 10

    Turn -2 Degrees

    Change Y by -10

Technology Standards (1, 2, 3, 4, 5, 6)

A different structure may be constructed using emojis characters and also indicate our understanding with the text. To simulate a wave, you can shake the iPad and see how the structure responds. With "When iPad is shaken " command attached to our structure, we can move the house when we shake the iPad. The house changes a few degrees , up and down with the wave. As an architect, we can show the stability of the structure with the plans that have been made with Hopscotch .

What we find in the ground?

The Book "Place-based science teaching and learning " is a great resource of scientific activities enabling the student to make a link between school science and the real world of work and other contexts. The activities and experiences are practical and offer related hints to the social world, and mathematics. The activities can be adapted to different levels. It includes an activity entitled " One Square Metre of Ground Survey". We go out, and examines a metre of soil in the surrounding nature and we take note of what is found there. One can find living and non-living objects, different rocks, soils of different colour and texture. Once the exploration is complete, we indicate our findings with Hopscotch. To make the program more dynamic and make it a game, you can insert a worm that moves with the movement of the iPad.
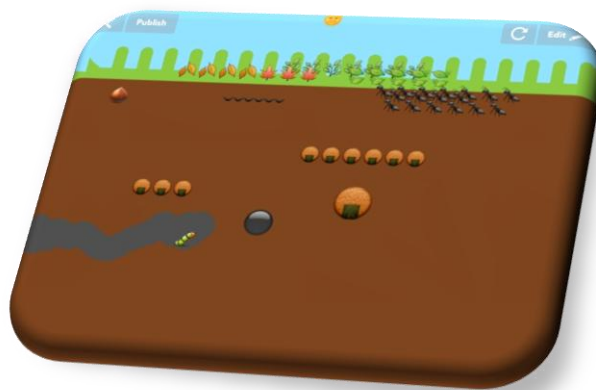
Technology Standards (1, 2, 3, 4, 5, 6)

The next two images show the code necessary to move the worm with the movement of iPad.
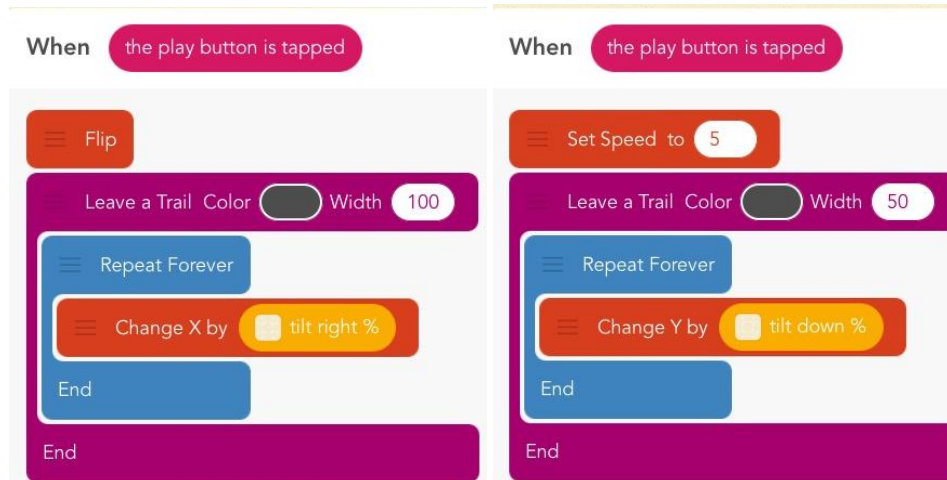
We must attach two rules to the worm when you press the Play button. The first rule controls the horizontal movement and the second rule to control the vertical movement of the earthworm. The command "Flip" changes the orientation of the worm so that the head is in the same direction as the motion. With the movement of the earthworm, a gray line will be drawn with the "Leave a Trail" command. "iPad tilt% right" and "iPad tilt down%" Hopscotch variables are designed to obtain the orientation of the iPad. Used with commands "Change by X" and "Change Y by", the worm will move in all directions, according to the movement of the iPad.

While following the curriculum for science and including grade 3 mathematical concepts, with a few commands the teacher can give the student, we learn curriculum content while having fun, using a tool that will allow the student to make a link with the world of work currently in demand and work with innovative ideas.

Draw me a habitat.

It is easy to spot cobwebs in the garden or even in the house. We can observe the habitat, how the spider captures its prey and how scientists use this knowledge in their research. When looking at a spider web with a microscope that uses the iPad screen, it is very interesting to see protein fibres that are found inside. The thread of the spider is stronger than steel wire of the same size.

Technology Standards (4, 6)

In this program, we draw the spider web we saw under the microscope. In order to draw the web, we add emoji characters, representing the proteins. To draw the web, we will draw increasingly longer lines, alternating white and gray colour, while turning.

We work here the logic of the web. We must first create a variable called length which will contain the changing value of the length of the line. Initially, there will be a line with a length of 5 units. A white line is drawn with its variable length and is rotated 45 degrees. We then draw a gray line of the same length as the white line without turning. For the next line, we increase the length of the line by 1 and it is done 100 times. We can see in the image, blocks corresponding to the description, to draw the web.
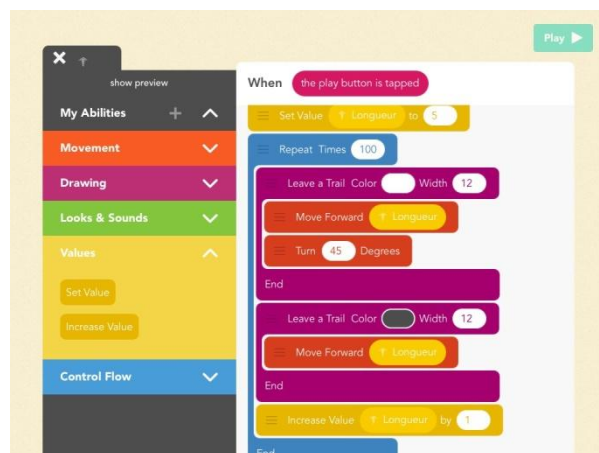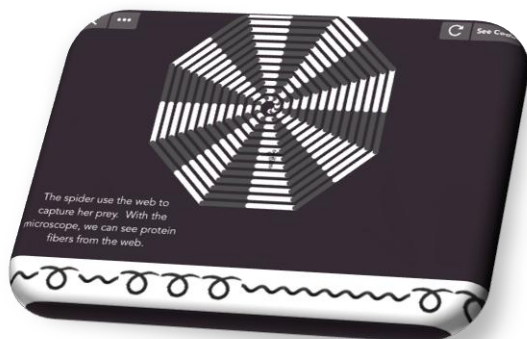
Technology Standards (1, 2, 3, 4, 5, 6)

Students also write their findings in this project with the text. When finished, the teacher can use a rubric on habitats and have a mini-conference to assess the knowledge of students about habitats.

Show me a bright invention.

Did you know that the understanding of the movement of light inside the camera goes back more than 1000 years with Ibn al-Haytham who made the first experiments with the camera obscura? His findings were used centuries later by European scientists when Middle Eastern knowledge was integrated with Europe knowledge during the Middle Ages.
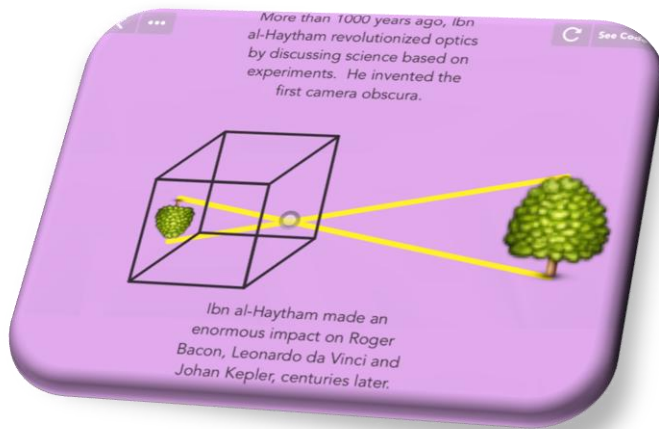
Technology Standards (1, 2, 3, 4, 5, 6)

To write the program, we need the command " Set Position " that allows you to draw a line from a specific starting point on the screen to another specific point on the screen. The command " Leave a Trail " draws a line from the place where our point is, here (900 , 440) to the new point specified in the command (250 , 280). It's easy to find the Cartesian position on the screen. When you move the characters on the screen on the desk, Hopscotch displays the position so that we can see it.

Show Me an Innovation Connected to Sound

The sound propagates in the air, solid and in liquids. With sonar, boats and submarines can move and know their surroundings using sound. It can detect fish, other marine

vehicles, rocks, the seabed, or ice. NASA also use radars to map changes in the layer of the Arctic ice. With global warming, knowing how the ice melts and at what pace, becomes an important factor in understanding climate change. In this example, we can see the screen of a radar with objects found in the water and the cursor which moves with a circular rotation. The text is on a white board that can be moved to the left in order to read it. We move it to the right for storage.

Technology Standards (1, 2, 3, 4, 5, 6)

We already know how to draw vertical and horizontal lines. There are several possible algorithms: either have several characters that draw a line each, having a character who draws all the lines, one at a time, or have clones drawing the lines. The white line around the black spot is made by drawing a large white dot followed by a black dot a little smaller, in the same place .
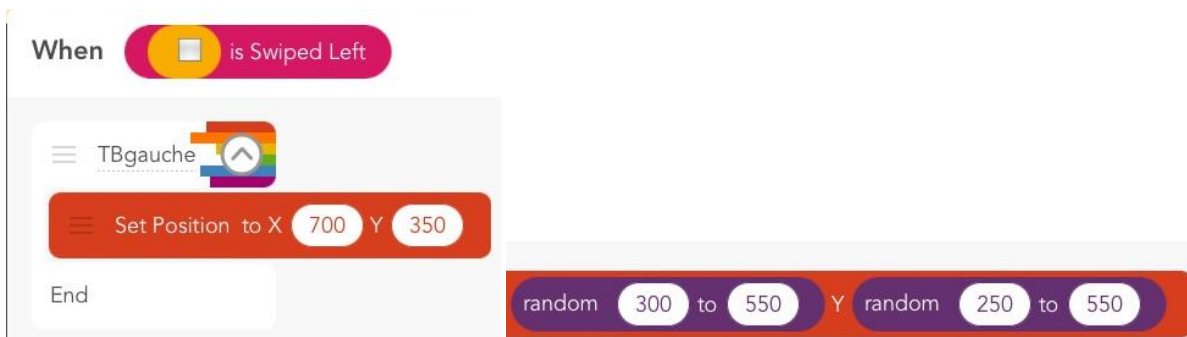
The whiteboard is the emoji character of the white square. We place the text over it. The whiteboard and text that is above should move at the same time. To make it easier, you can create an ability that is used both by the text and the white square. In order to read the text, we must drag the whiteboard and text that is above to the left. We use the "When - is Swiped Left " command allowing the text and the white square to physically, with a finger, drag the white board on the iPad screen. You can put the new position in the ability which has been called TBgauche to remember that the whiteboard is to slide to the left. We also create a TBdroite ability store the white board to the right.

In our radar, the blue dot moves at random on the screen. It uses the "Set Position " command with a value of X and Y randomly selected with the command "Random" indicating the smallest value and the largest value that can be selected. Inserted in "Repeat Forever " command and adjusting the speed, we will have a cursor that moves continuously on the iPad screen.

How do pulleys and gears?

The pulleys are used on construction sites, in ports to transport the goods, in factories, in several machines such as elevators, for example. In the following example, we see a pulley used to build a fleet of solar panels. The program requires characters for the pulley and the solar panels that you can copy and paste from the Unicode character table on the Internet or from other Hopscotch program. To operate the pulley, it is possible to add two buttons to move up and down the rope and the solar panel using the pulley. The most motivated students can arrange more pulleys to obtain vertical and horizontal movements and a breakpoint .

Pulleys are used on trucks to carry solar panels in construction
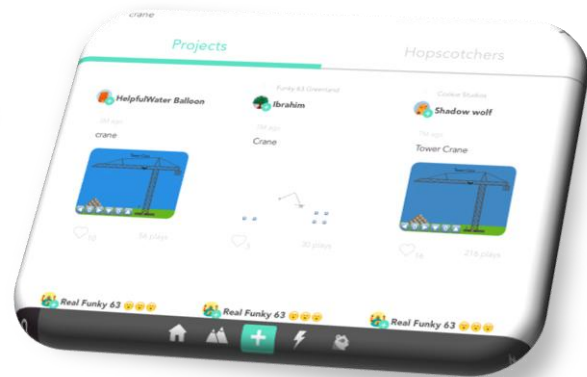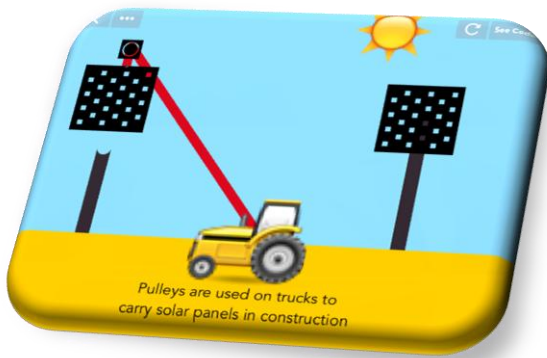
Technology Standards (1, 2, 3, 4, 5, 6)

Since the majority of students play video games, much talk will follow the creation of this program that uses the buttons. Students can communicate with each other by sharing their projects with the Hopscotch community. It is possible to search, using the project name, the name of the Programmer's avatar or by searching the most recent programs. You can create a program from the start or by remixing programs that already exist. If another person uses a project that you have created, it is possible to notice its use. In the example from this section, I used the project name " crane " to find other similar projects among the Hopscotch community.
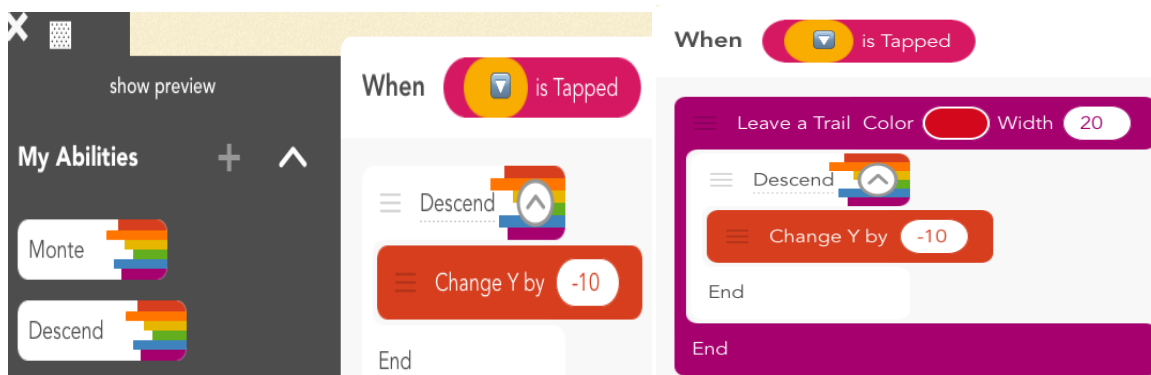
To lower the solar panel with the button, you can create an ability called "Descend" which changes the value of Y by -10 each time you press the button. When the solar panel goes down, the red rope must become longer at the same time; so we draw a red line with the small point which is at the end of the rope. To go up, we must use a positive value of Y and draw a blue line where there is no more red rope.

The simplicity of programming buttons will definitely delight the students who frequently play video games.

Playing with rocks

Since the vast majority of students, boys and girls, regularly play video games and that the vast majority of boys discuss their video games while playing to socialize with their friends, create a video game while learning the science is a way to make their learning very personal and relevant. Once completed coding their games, they can invite their friends to play the video game they created. You can play a video game created with Hopscotch on the Hopscotch app on the iPhone or the iPad. Imagine the pride of your students when they easily write a program that resembles their favourite video game and when their friends play the game they created. They will certainly discuss and begin to understand what is coding and where it is needed.

Of all the programs of the Hopscotch community, there are several related to the Minecraft game. We can use this game and connect it to the science curriculum. We use stones and bricks to build houses, buildings and aqueducts. If we draw medieval structures, this program can also be linked to expectations of social studies. This Hopscotch program can also be connected to the mathematical concepts of number sense since it can give visual examples of the value of a number. This program also allows to link to geometry since we must create squares and assemble them into a more complex geometrical figure. We made a connection with measurement since we must make estimates of the number of squares that can be drawn on the length and height of the iPad. By playing the game they created, we can also ensure that students understand patterns by asking them to play the game they created. They can draw ABC, ABBC patterns, and many others.
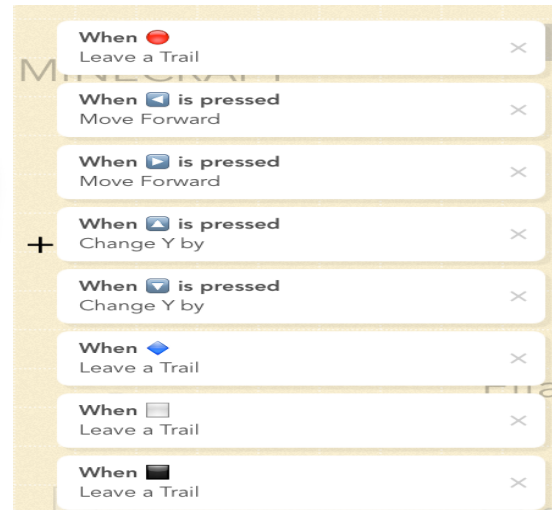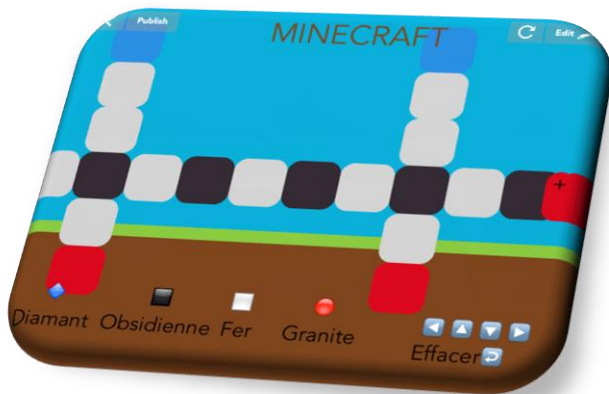
Technology Standards (1, 2, 3, 4, 5, 6)

In this Hopscotch program inspired by the video game Minecraft, we'll create a structure with several types of rock. To play this game, you must move the cursor, the "+", in the right place on the screen with the arrows keys. When pressing one of the buttons corresponding to the rocks, you can draw the rock of the same colour on the screen. To change the position of the cursor, use the 4 arrow keys. To move right, use the "Change by 100 X" command when pressing the right arrow key. To the left, use the left arrow and the value -100. To move down, use the "Change Y by -100" command when pressing the down arrow key. To move up, the right arrow key is used with the value 100. The value 100 takes into account the length of the lines that are drawn and the width of the lines you draw with Hopscotch. To draw a square, you can see the algorithm in the image, draw a line 50 units long, one after the other in the four directions of the square: a line from left to right, followed by a line from bottom to top, followed by a line from right to left, followed by a downward line. Each line has a length of 50 units and a width of 50 units. You can see the red stone with its red colour. Each stone of a different colour will be coded in the same manner with its corresponding colour. Each of the rules that you create for every rock and every movement of the arrow keys must be attached to the cursor as shown in the picture a little higher.

When (🔴) is Pressed

Leave a Trail Color (⬤) Width (50)

☰ Carré50 ⌃

☰ Move Forward (50)

☰ Change Y by (-50)

☰ Change X by (-50)

☰ Change Y by (50)

End

End

When (▶) is Pressed

☰ Change X by (100)

When (🔽) is Pressed

☰ Change Y by (-100)
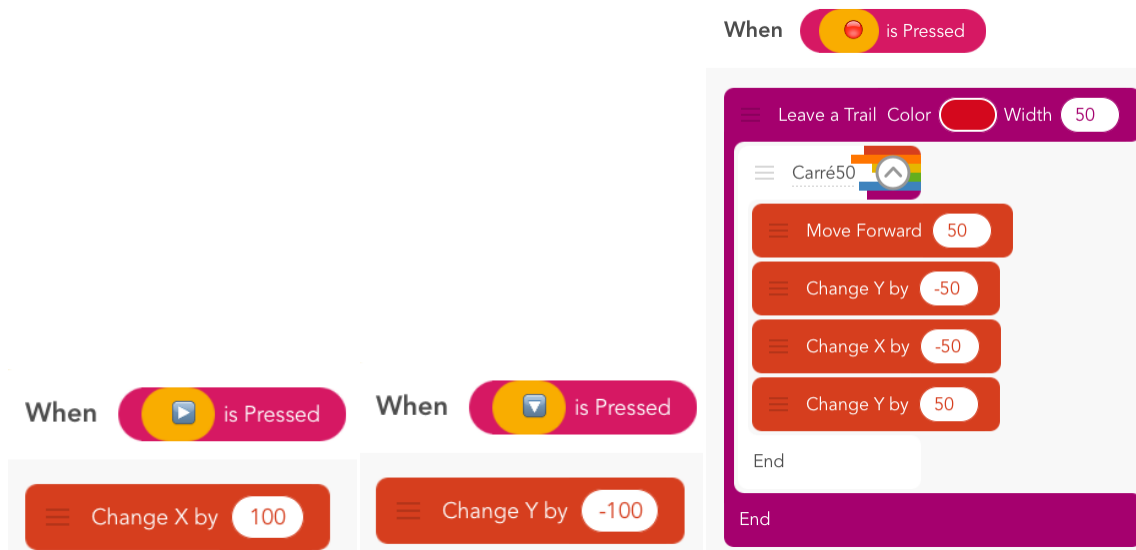
This program makes it possible to connect many expectations from the curriculum and at the same time, students will be proud of their work for a long time. Professional engineers that I know tell me about the first game they created when they were little. They remember it like it was yesterday. This is one of the moments that have marked them the most when they were younger.

12. The language class

Students are invited to speak, read , write and share their experience at the academic level but also at a personal level every day. The book "L'enseignement efficade d'une langue seconde' offers several strategies and activities for students 5-16 years, based on research, to teach a second language. For each strategy, there are also ideas that can be used to continue the activity with technology.

Write Texts With the Computer (25)

This second language learning strategy allows a collaborative and interactive environment and allows to write various texts. Hopscotch is not a word processor but it is possible to write texts attached to images. There is even a small word correction function for the texts that are written using Hopscotch.

The topic of the next program could be drawn from a restorative circle that solves behaviour problems before they become more serious. They help find the cause of the problems and allow students to find a way to solve the problem if the situation comes again. For more information you can always visit the "International Institute for Restorative Practices" website. Students face many difficult situations and by talking or writing in their journals, they can learn to behave better. There are situations like the death of a seriously ill student or gunfire in the community who may need to be discussed in class. For example, at the Peel Board of Education, a death made headlines. A boy was shot and died. The school community was shaken. This kind of discussion can surface in restorative circles. The foundation Shania Kids Can Clubhouse of the singer Shania Twain gave much money to the affected schools to improve students' environment. Writing a thank you letter is entirely appropriate. It can be written and decorated with Hopscotch.

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The commands necessary to write this type of program are simple: draw a very large dot for the background with the command "Leave a trail" and write the text of a different colour with the "Set Text to" command and different size letters with the "Set Size Percent" command.

The computer text may take the form of a story or a poem. For many people and children, writing is not an easy task. Technology can help many people who have difficulty speaking or writing. Those who were previously silent, become more productive and innovative. For those who like to code, or for those who have a rather mathematical intelligence, writing a story by coding becomes much more interesting and challenging. Moreover, those who frequently play video games can immediately see how stories are an integral part of technology.

We always start with a model of a text. For example, the book "The Dot" is a story of a young girl who shows perseverance in art. Vashti cannot draw. Her teacher encouraged her and start drawing points of all colours, and sizes. At the end of the story, Vashti develops an artistic style all its own. We note the courage and perseverance of Vashti. The Hopscotch program here is an interactive program based on this idea. On the first page, the student said he did not know how to code. The teacher encourages him and asks him to draw a dot. We see the dot on the second page is framed.
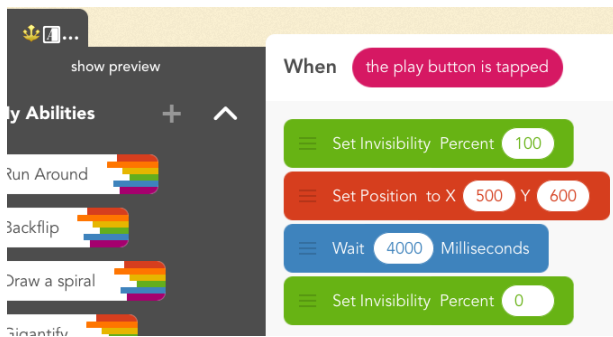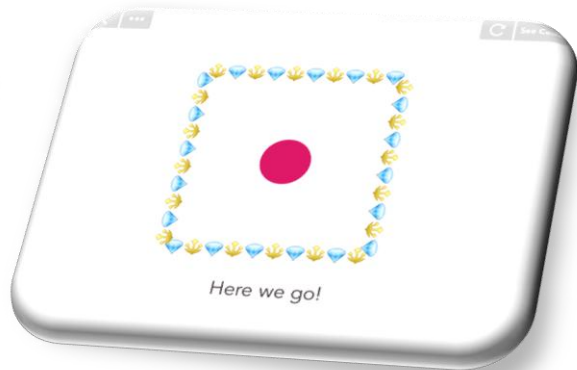
Technology Standards (1, 2, 3, 4, 5, 6)

The trick to see the next two pages is to play with the commands "Set Invisibility Percent" and "Wait". The girl on the iPad screen stays there for 4 seconds or 4000 milliseconds. After waiting, it becomes invisible and draw a point with "Set Text To" command. The code for the frame is shown in the image. The emoji characters are used to draw the line of the frame. It makes it invisible first. It is positioned in the desired place. The vertical line can be made with the "Turn 90" command. After waiting 4 seconds, it makes all lines visible using the command, "Set Invisibility 0%". We can add other pages by setting the time for each page. The third page may appear after 8 seconds and for each additional page we add 4 seconds. There are other ways to do it, like turning the pages with the command "When text is swiped left", but this is the easiest way. We can move the characters, which can make the story very interesting and fun at the same time. If you prefer poems, one can write poems too.

My students loved to code so much, they made it the subject of their speeches for the annual French speech competition of our school board. Here you see a young grade 4 girls who won the competition at the school level and represented our school at the school board with her speech about the importance of learning to code at primary level.

Technology Standards (5, 6)

Keeping a newspaper reading and discussion (7)

It is possible to keep a reading and discussion log directly related to programming with Hopscotch, talking about problems encountered and solutions found. If the student can read and understand the text, summarize its problems, and responding to texts of others, we can promote communication. The journal is at the following address.

http://forum.gethopscotch.com/
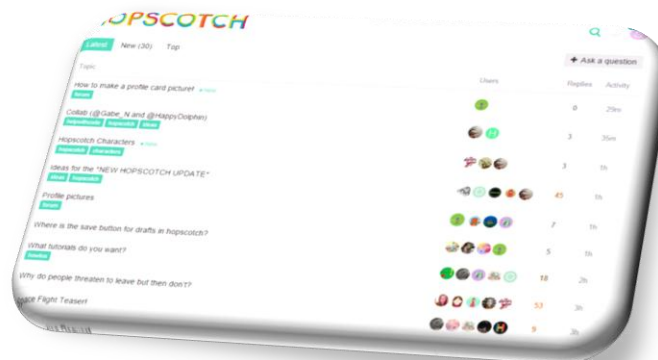
Technology Standards (2)

Since many people love the cinema, we could discuss how to create special effects in movies.
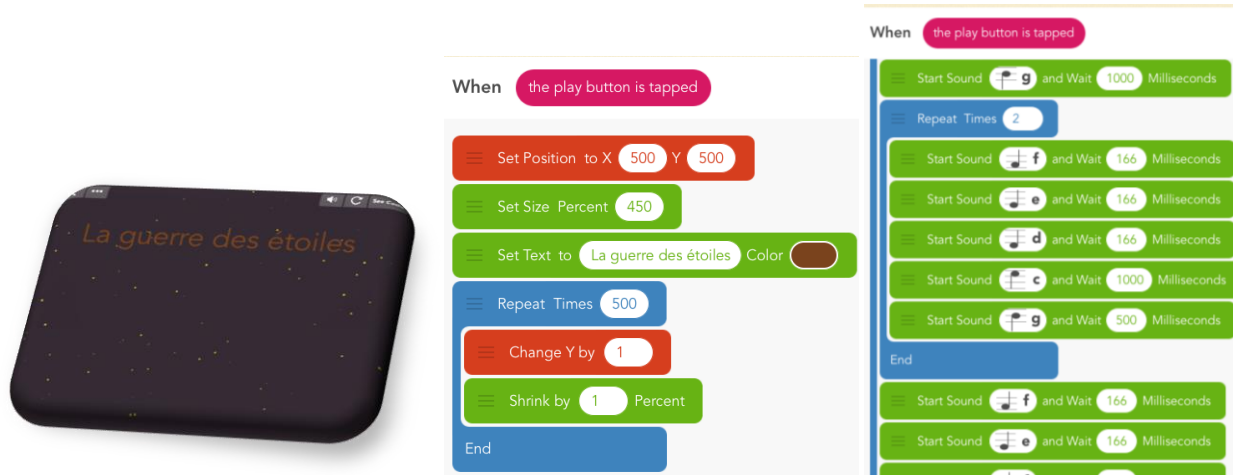
Technology Standards (1, 2, 3, 4, 5, 6)

J.J. Abrams directed the movie Star Wars, and is the author of the upcoming Star Trek movie. How do they do to drag the title on the screen to make the story more appealing? Two rules are used for the title to slide on the screen. We change only the Y position by 1 and the letters are shrinking at the same time in a loop. If you want, you can also add sound effects using the rule Start Sound. You see here an example of the musical notes of the theme song of the film.

Read in Unison (4)

The reading aloud helps to improve pronunciation and oral communication. With a more experienced model, we can better identify all the sounds of a word. If you like the song, you can also write and code words of a song of a popular music and then sing it. One can see how the karaoke functions. In this example, during the singing of the song, we can also move the astronaut by tilting the iPad in multiple directions.

Technology Standards (1, 2, 3, 4, 5, 6)

Talking about pictures (5)

The images help the understanding of texts. We can take pictures of ourselves or consult books or the Internet.

If we know how to express ourselves in a few words, we can create content for Websites, using a model already coded. We only have to add the text to the website. In the language class, we can choose a template from a website available from all Hopscotch models and ask students to create a website to support the organization they like most. All my students love nature. We go to the forest on the school grounds almost every time allocated to daily fitness (DPA). They are attached to nature and love to run in this very unique environment. The environment is a constant source of inspiration and benefit to the child development. The state of students with attention deficit disorders becomes better with a little contact with nature. Students who play in nature play more creatively than those that play on flat ground (Louv, 2008). So, they could create a website with ideas related to multiple images of nature. In the following program, we have the home page. Each button pressed gives the possibility to write a different text with a different Hopscotch image.
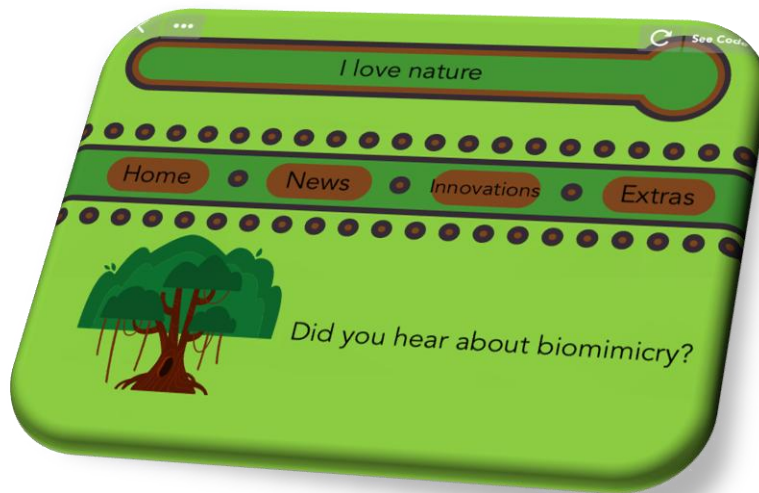
Technology Standards (1, 2, 3, 4, 5, 6)   (Remix CORA!)

Represent steps in a process (15)

This strategy allows writing a report of a subject, a text, experience in an organized format. Keywords are used like first, fourth, then, after, at the end, or finally.
We can write a text explaining the steps of programming a Hopscotch program. Using another app like ExplainEverything, we can record our voice and also publish the text on the Internet.

Technology Standards (1, 2, 3, 4, 5, 6)

https://www.youtube.com/watch?v=_hXjl51XD_o

Students can take the Hopscotch program he wrote and explain the steps of his writing. One can take a picture of all the important elements of the program and explain while using the key words we learned. You can see a French example by following the link above.

12. Social Studies Class

The Historical Thinking Project, was created to change the way teachers teach history and how to communicate the historical ideas in the 21st century. They offer several resources, including posters, showing the six historical thinking concepts for working with our curriculum. They are: establish historical significance, use primary source evidence, identify continuity and change, analyze cause and consequence, take historical perspectives, and understand the ethical dimension of historical interpretations. In grades 3 and 4, the concept easier to understand is to use facts derived from primary sources. It is possible to do field trips and visit historical sites or to visit the museum to see artifacts we can study to understand history. If this is not possible, we can always do virtual tours to historical sites, use historical images, or newspapers that can be analyzed.

Show Me an Artifact

During a field trip to a school of the 1800s , students can have an excellent idea of the lives of children of that era. In the school " Brittania Old School House " students take the role of a child of the times and can see the running of the school with the teacher using the tools, books and toys of the time. Also shown is the pedagogy of yesteryear and the discipline methods of yesteryear that students find amusing. To write, students mainly use the slate and also the ink and pen. To compare the old tools with those of today, we will code a slate using Hopscotch. With the slate, students can do the same work they did at the historical school. Hopscotch offers a video in the app that shows how to code this slate. You can see the code in the following pictures.
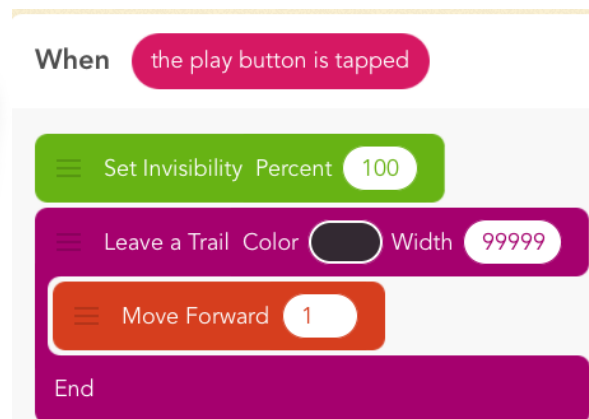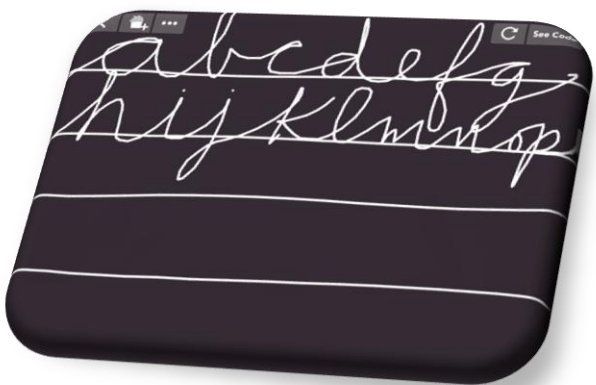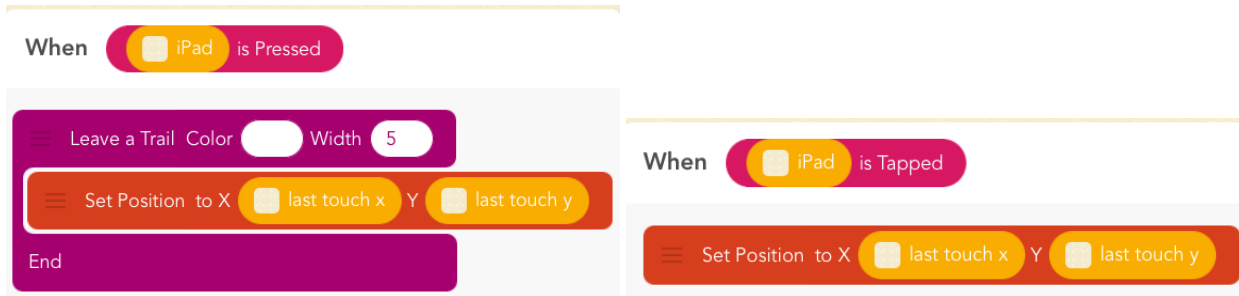
Technology Standards (1, 2, 3, 4, 5, 6)

First , we have a character who draws the black background. It makes it invisible and draws a very big dot that covers the entire surface of the iPad. Subsequently, we have a second character, once made invisible, allows you to write or draw on the iPad where the finger touches the iPad. The variables " iPad last touch X" and "iPad last touch Y" indicate the position where our finger touched the iPad. White is written where the finger has touched the iPad. After the program completed, we created a modern version of the slate. One can also make a link to the app " Back in Time " that shows artifacts from the beginning of the universe to understand the utility to recreate artifacts in order to understand the story.

Show Me a Job According to the Territory

Near Kingston, Ontario, where Lake Ontario flows into the St. Lawrence River, lies the Thousand Islands region. The size of the islands will surprise you. To be considered an island and not a rock, the surface of the island must be above the water level throughout the year and be conducive to human habitation or economic development. We can see islands with a single tree and a few animals or an island with a small cottage covering the entire area of the island that you can rent for holidays. Half of the islands are in Ontario and the other half are beyond the border with the United States. This area is now part of the UNESCO World Heritage Centre. A virtual tour can be done there. (https://www.youtube.com/watch?v=EXN-wXAednQ) The beauty of the place with the lake, the numerous islands and historical sites makes it the ideal place for the tourist industry, with its restaurants, hotels and cruises. In this program, we will draw islands and code the path of a cruise ship to be followed by the captain of the ship and its junior officers.

Technology Standards (1, 2, 3, 4, 5, 6)

In the Hopscotch program, we include a character that draws the background and a character that draws each of the islands. For islands, each character uses the same code. When instructions are placed in an ability, it becomes very easy to reuse the code. The ability is a new block that has been created, and that can be reused throughout the program like any other block. We will create a Ile ability that draws a single island. In order to do this, we include the ability in order to make the character invisible and a command to draw a green line representing the island. The angle with which the island drawn can modified with the command "Turn" that turns the character from the horizontal position to the left, in counterclockwise. You can also change the size of the island by using "random" to obtain a width and a length between the two random numbers shown. In this example, the island will have a random width between 100 and 150 units.
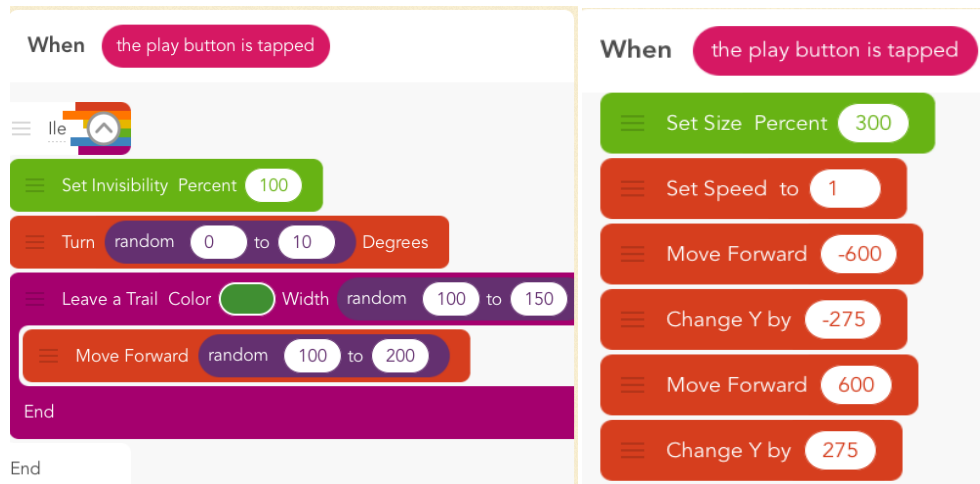
In the right image, you code the path of the cruise ship. First, we make the emoji character a little bigger and adjust the speed of the boat to 1. It uses the " Move Forward " command to move the boat to the left and then to the right. The "Change Y by " command is used to move the boat down and then up. In addition to creating an interactive program, students may share the work with his teacher, the class and also the Hopscotch community.

Show Me a Historical Museum

In our study of heritage and identities: ancient societies, we can highlight one aspect of a society such as an aspect of innovation of the Muslim society of the Middle Ages. The contribution of Muslim societies to the renewal of science and innovation in the Middle Ages is very little known. There are some books for adults and children on the subject. Robots are from really far away they are from the Muslim society of the Middle Ages. In the book " Les génies et leurs grandes inventions avec des reproductions de plans originaux ", we can see originals and reproductions of Al- Jazari plans, for example, the clock of the elephant installed at Ibn Battuta Mall. The first robots come from Al- Jazari , more than 800 years ago. Automata are the equivalent of our current robots.

In the following program, the innovative aspect is emphasized in the ancient Muslim society by showing its contribution in several areas. We do the same thing here. When we press each emoji character, it triggers the appearance of text at the bottom of the screen that explains one of the inventions of the Muslim world. Pressing the clock,, we

read about Al- Jazari. We must wait two seconds before pressing the next picture and read about the next invention.
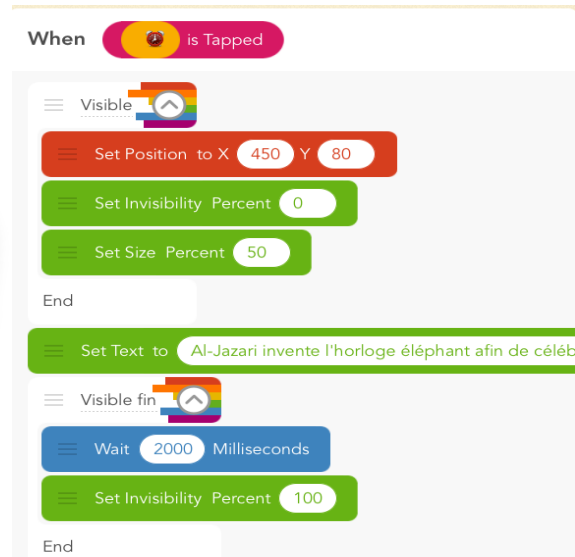

Technology Standards (1, 2, 3, 4, 5, 6)

The title and each emoji character is selected and placed on the screen using the "Set Position" command. The appearance of the board game's surface is entirely optional to the proper functioning of this program. Each emoji character representing an invention, is assigned to a letter made invisible. The code for this letter is only activated when you press the emoji character of his invention. At this point, the text becomes visible. You can create the ability to make the text visible, place it in the bottom of the screen and adjust the size of the letters. Subsequently, the text of our research is shown. We wait two seconds before making the text disappear in order to start over with another invention. The program also contains music that can be added. In the end, we have an application like those seen in museums, where children can press buttons to find answers to questions.

What are the important issues in Canada?

This program explores the causes and consequences of economic development in a region of Canada, particularly in Quebec where religion is hardly practised. Churches such as the Basilica Notre-Dame of Montreal where Céline Dion and René Angélil were married is still busy with its tourist location in Old Montreal. It is the same with the St. Joseph Oratory atop Mount Royal. During the canonization of its founder, Frère André

by the Pope, pilgrims felt as if they had won the Stanley Cup of religion and filled the chapel for the occasion. Even with these great events, religious tourism is not much developed in Quebec. Quebec's religious heritage disappears because there are not many people to finance repair of churches increasingly abandoned. The following program discusses this issue in Quebec. It is easy to do by drawing the church with black lines of different lengths, size, and different angles.

Technology Standards (1, 2, 3, 4, 5, 6)

It is also possible to code music to accompany each program. Here, when you press the music notes, the melody means starts. With the " Start Sound " command, you can select sounds and notes on two different scales. The duration of the note is indicated by indicating the time in milliseconds. In the current economic reality of financial austerity, is the religious heritage will be lost or someone will find a creative way to boost religious tourism in Quebec to keep this heritage?

14 - Emotional intelligence

Daniel Goleman popularized the model of emotional intelligence. He asserts that emotional intelligence is more important than IQ or the education of parents in school success. We can think of the test of marshmallows. Four years old received a marshmallow. They had the option of eating or wait a few minutes without eating the marshmallow, and receive two. The children were followed for several years to see their development. Those who waited were able to focus on their goal, eliminate distractions and control their behaviour. Even for students from prestigious universities, emotional intelligence proved more important than IQ or parental education in predicting the success of their Scholastic Aptitude Test (SAT) to enter the University and also in their personal success.

In his TED conference, Daniel Goleman mentions a very interesting discussion with a murderer who had an IQ of 160. He was a certified genius. With all his intelligence, he ended up in prison for life. What for? How could he get here? He had committed the crime being very close to his victim. He confessed that if he had felt a little distress for his victim, he would not have been able to commit the murder. He had to cut that part of himself, otherwise he would not have done it. We see that there is no correlation between intellectual intelligence and emotional intelligence.

Several models and techniques are available to help children with emotional intelligence. Danie Beaulieu has developed classroom impact techniques to develop emotional intelligence in schools. These techniques can be used for classroom management, to develop self-control, empathy, develop the ability to motivate yourself and educate intellectual and emotional planes. She suggests using the inventiveness in the application of techniques from her book. By following this model, these techniques can be used in the classroom and can also be coded.

Emotion

In this program, we'll just identify the emotions that one feels in many situations. After a discussion of emotions of real or fictitious situations and constructive ways of avoiding or controlling negative emotions or situations that make children happy, we can

associate the expressions of emoji characters with the name of the emotions of their choice or that was discussed.

Technology Standards (1, 2, 3, 4, 5, 6)

This Hopscotch program is simple, with a line to draw the background, emoji characters and yellow letters that have been enlarged and positioned on the iPad screen.

Assertiveness

The next program illustrates the concept of assertiveness. As a withdrawn person, or shy, the bear is almost invisible. But as he begins to interact with others, to work and to distinguish himself, the bear becomes increasingly colourful and very visible. It even has the arms and hands in the air, like athletes who come to win an Olympic race. At the end of the program, the bear is fully visible and asserts itself.

Technology Standards (1, 2, 3, 4, 5, 6)

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The code for this program is shown in the right image. The bear and the text are initially 100% invisible. By using a variable and the repeat command "Repeat Times", we change gradually by -1 , the value of invisibility to make the bear and the text more visible. After 100 repetitions of the command "Repeat Times", the bear is completely visible , with invisibility 0%. With perseverance, you can learn to be more assertive.

Attention (27)

The technique 27, the curtain, allows to reactivate the students' attention and encourages their participation. With the curtains closed, you cannot see outside and those outside cannot see inside. How can we open our curtains to better participate?


Remix : Tappy mlp

Technology Standards (1, 2, 3, 4, 5, 6)

This program uses two concepts. First, let's have white letters with a message that can be seen only when drawing the background of a different colour with our finger. The code allows you to draw 1000 pink and red consecutive lines to find the message. In the curtain algorithm, we draw a pink line from the position where the finger touches the screen till the top of the iPad, followed by a red line from the top of the iPad right to

the initial position. By touching with our finger across the iPad, we can draw our curtain consisting of two colours.

Qualities (33)

In the technique 33, sticky notes, we choose a quality that the student possesses or that needs to be developed. After a discussion of the quality, the student wears the sticker sheet on him all day. In this case, we can write the Hopscotch program and then print the picture created so that the student can carry his message all day.

Remix : PrettyDiamond
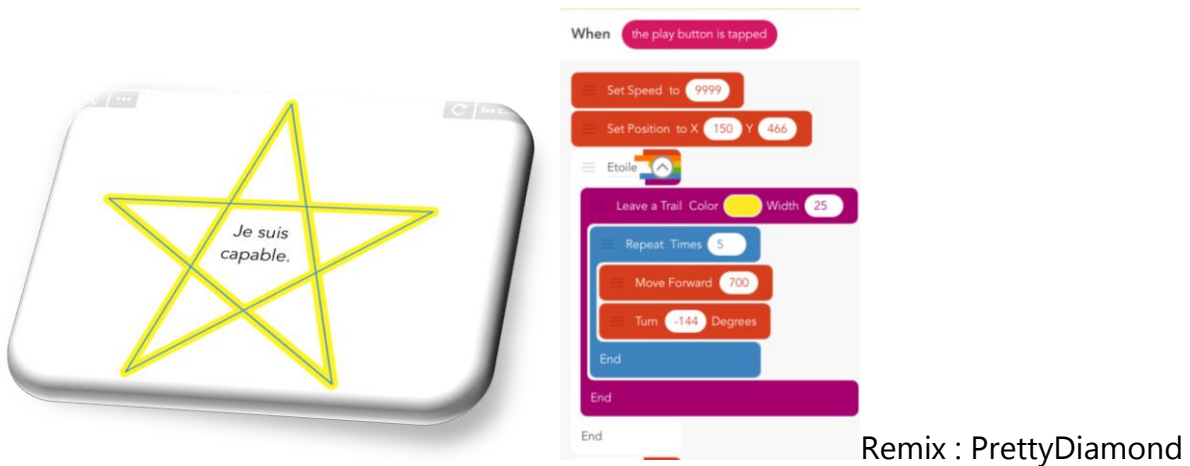
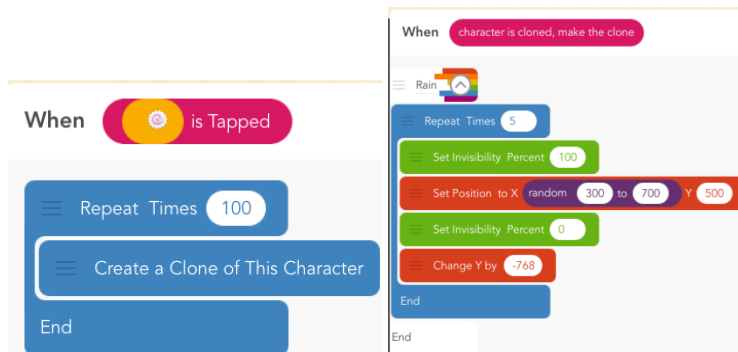Technology Standards (1, 2, 3, 4, 5, 6)

To draw the star, draw 5 yellow lines of 700 units long, while rotating 144 degrees between each line. It is possible to draw a line less wide of a different colour to add variety to the star. In the centre of the star is written a the message or a quality.

Harmful Influences (19)

The technique of the sponge 19, illustrates the adverse influences. If the sponge is filled with water, the absorption capacity of the sponge is greatly diminished. Similarly, if too much concerns us, it is not possible to learn well. Is it possible to break free of its concerns in order to be more attentive? This may also explain the failure during a test. In the following example, the student argued with a friend. To solve the problem, he will ask him why he acted this way to initiate a discussion.

Remix : Valgo

Technology Standards (1, 2, 3, 4, 5, 6)

Large text and the emoji character are easy to make. The code you see is to wring the sponge. We will have 100 clones of a drop of water. Every drop of water will do the same code.   The drop goes five times to a random position in the sponge, and goes to the bottom of the screen. It becomes invisible and visible again when the drop returns from the bottom of the screen to the sponge. After 5 times, all the drops are at the bottom of the iPad and the sponge is squeezed.

Tolerance (13)

In the technique of the mirror 13, we can show tolerance. Students who tend to criticize others may realize, with this program, that others do the same as us, but in a different context. The monkeys occupy the same positions as the birds, each moving with its own innate characteristics.

Technology Standards (1, 2, 3, 4, 5, 6)

Restorative behaviour

Technical adhesive tape, 32, can promote restorative behaviour. After a discussion of the consequences of behaviour, we must repair what has been broken. It may be perhaps only to apologize for hurtful words towards a friend.
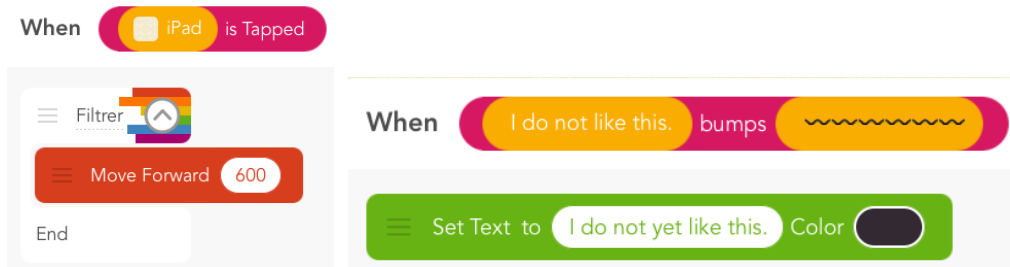

Technology Standards (1, 2, 3, 4, 5, 6)

In this program, we begin with the emoji character of the broken heart and we must slide our finger on the iPad, as if we were putting adhesive tape on the heart in order to repair the emoji character, and replace the broken heart with the healthy heart.

In the technique of the filter, we pay attention to hurtful things that we can say and find a better way to express themselves. We pass the words in the filter and we get something better on the other side. Similarly, the discouraging words can be directed

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to oneself. For example, instead of saying "I am not able," we can say, "I am not yet able." The correction is much more positive and encouraging.
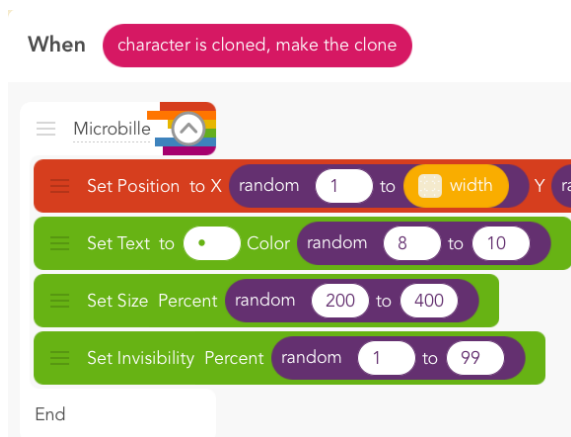

Technology Standards (1, 2, 3, 4, 5, 6)

In this program, the text goes towards the filter when touching the iPad. Each sentence is changed when the text touches the filter and continues its way through the filter. It can show how to use the 'I' messages instead of using accusations. Relations between the children will be much improved with better communication.

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15.   Character Traits

School boards discuss with parents the most important character traits that their children should learn. In Peel, following the consultations, six traits were selected to be taught in the classroom and in the assemblies. Every month, a different character trait is highlighted.

Kindness

With kindness, we show compassion towards others. We can be kind to other people or other living things. We listen to others, we help those in need, and protect and respect the environment. In this environmental example, it was noted with the Canadian "Plan for the management of chemicals", the microbeads present in cosmetics and toothpastes are not dissolved in water and cause pollution in water. They enter our food chain through fish that eat plastic microbeads. With the help of the Canadian government, we begin to collect data in order to regulate its use. In this example, we show kindness by finding ways to understand the environmental effects and to respect the environment.

Technology Standards (1, 2, 3, 4, 5, 6)

The background of the image is the character emoji of the orange with size 5000, which allows a background of a plurality of colour tones. In this program, we see how to display the water microbeads. We must create clones. Each clone of a microbead will do the same code. At random, the microbeads are positioned on the entire surface of the iPad. We use the values 1 to "iPad width"for X and 1' to " iPad height" for Y. The ball is a dot that we can copy and paste, from the Internet, in the rule "Set Text". This is the Unicode character of the bullet. The colour of the balls will be selected randomly using

the Hopscotch colour code. The colour 8 corresponds to orange, 9 corresponds to dark yellow and 10 to pale yellow that you see on the Hopscotch colour palette. The size of the bead will be randomly chosen between 200 and 400. In addition, the ball will be darker or lighter according to transparency variable. We choose from 1% invisible to 99% invisible. Invisibility gives the impression that the fish is in 3D polluted water.

By advertising to raise awareness of this danger, the child shows his kindness. You've probably seen the 30 acts of kindness that you can do in a school. It is also possible to write an interactive story with Hopscotch showing one of these gestures.

Co-operation

We define co-operation by working together to achieve a common goal. The United Nations conference in Paris in 2015 shows how adults and nations are working together to solve environmental problems that faces our entire planet. Each of us can contribute and work together to find solutions to climate change. We learn to reduce our consumption, to recycle, to use natural light in the classroom, walking or taking public transit instead of the car. Everyone has ideas to cooperate towards this end.

Remix : RussetFox –off
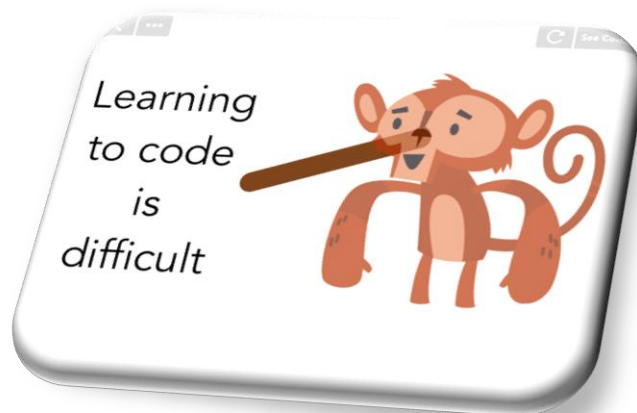
Technology Standards (1, 2, 3, 4, 5, 6)

This program shows one of the problems that we face due to climate change, temperatures and extreme environmental conditions. The polar bear is another symbol of climate change with melting ice in the Arctic. The right image shows how to draw the

spiral. The dot is cloned and each dot is made 60% invisible. It gradually becomes a little bigger as it grows by 10% each time it moves on the screen. We turn each dot by -51 degrees. The first dot is small and becomes larger while turning. It moves from the start of the spiral to the end. This is the set of all clones moving spirally which forms the spiral on the screen.

We work together towards a common goal.

Honesty

With honesty, we tell the truth, we demonstrate sincerity and are trustworthy. Like Pinocchio, this monkey is not telling the truth. Learning to code is really easy. Why deprive yourself of knowledge that can make a big difference in the lives of our students?
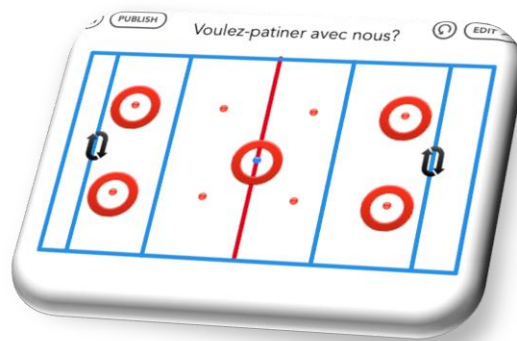

Technology Standards (1, 2, 3, 4, 5, 6)

This program only involves placing the text, enlarge the monkey and draw Pinocchio's nose with a line.

Inclusion

With inclusion, we treat each person fairly. Everyone is treated without prejudice, with respect, while respecting differences. We welcome every person in our class and our school and invite them to play with us. Although the community of our school is very

international, every year, the whole school is invited to skate and participate in our national sport, hockey. Everyone is welcome and had the opportunity to learn a popular winter sport. Those who do not know how to skate are helped by their new friends. The program represents an aspect of social life in a school where we welcome and includes others.

Technology Standards (1, 2, 3, 4, 5, 6)

Respect

We treat others, ourselves, and our environment with great esteem and value. We learn to be polite, to follow the school rules, to care for others and their property. We can perhaps remember the Pakistani Malala who won the Nobel Peace Prize. Malala has shown exceptional courage and determination in the pursuit of the rights of girls to have an education. Under the tutelage of her father, she had an open education and developed a critical approach to society where she lived. The Taliban attacked her with a rifle shot to the head. The attack was condemned by the entire world. In her speech at the UN, she said, "The extremists are afraid of books and pens. The power of education frightens them. " She continues today to campaign for women's rights. If you show your students how to code, it may be that the designer of the next Google search engine is in your class! You see, one of the designer Respect

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says "The extremists are afraid of books and pens. The power of education frightens. "She continues today to campaign for women's rights. If you show your students how to code, it may be that the designer of the next Google search engine is in your class! You see, one of the Hopscotchers will be the next designer of the next Google. Every day could Malala day where each child is given the chance to reach their potential.

Technology Standards (1, 2, 3, 4, 5, 6)

Responsibility

We are reliable in our actions, our promises and commitments. It is therefore a goal and we continue until it is achieved. We show initiative and we persevere even if there are difficulties. For example, we can show we responsibility towards the environment by taking the subway or the bus and planting trees. By changing our habits, we can consistently demonstrate our responsibility towards our common goal.

Technology Standards (1, 2, 3, 4, 5, 6)

16 - The mathematics class

The Ontario mathematics curriculum discusses the mathematical processes that students use to understand mathematics effectively. Hopscotch allows the use of all these processes in order to have a good mathematical education. Problem solving allows making connections between the world around him and mathematics. The student can understand how mathematics is used to develop the technology and get a job in the future. The student solves problems in all spheres of life.

With communication, the student studies, explores and illustrate ideas in a mathematical language. Hopscotch helps develop the mathematical language used every day by engineers and programmers. Mathematical concepts are used in the context of the technology. Hopscotch can also be used with another app, like ExplainEverything to explain when speaking, the mathematical concept and reasoning. The student shows his reflection by sharing experiences and strategies. Hopscotch allows sharing all programs with the Hopscotch community or social network, according to the parents' decision. Students can share their analysis with other students in the language class, and also publishing their explanations with ExplainEverything on the Internet for the whole world, if allowed by the parents. By adjusting the Internet publication to private, you can limit access to only those who have the specific address. The reasoning gives meaning to mathematics.

It is impossible to write an algorithm that works with Hopscotch, without making visible its reasoning. Hopscotch adds the element of fun to the reasoning. When developing a program using our reasoning, we see moving objects, drawings that appear, games that are developed. The result is very motivating for the students. With the establishment of links, we see the usefulness of mathematics in the study of other subjects. It is possible to write programs and make connections with all areas of the curriculum and life of the child. Hopscotch is a technological tool to illustrate math concepts students need.

Hopscotch also allows modelling, the students' understanding visually. Hopscotch illustrates its mathematical understanding in each of the five areas of mathematics.

Number Sense and Operations

In the book Good Questions: The differentiated teaching of mathematics, Marian Small uses open questions to teach the big ideas to students in different stages of development. The questions are aligned to the Canadian and US curriculum, from preschool to grade 8.

The following program can answer the question: What are the similarities and differences between the 6,001 and 1,006 numbers (Small, 2014, p. 34). The program shows these numbers in the context of the number of Syrian refugees who arrive in our country. Using the rule of clones, the difference visually between 6001 and 1006 refugees crossing the border is shown. The two numbers using the same digits, but one is much larger than the other. You can see the difference by seeing the number of young girls across the border. The media or the presence of Syrian refugees in our own class allows us to make a connection between numbers and the real world.
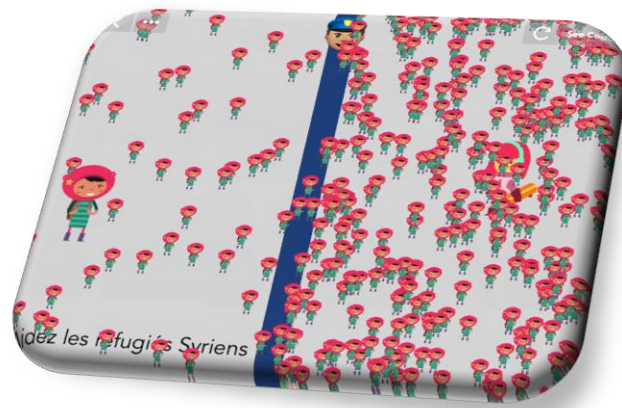
Technology Standards (1, 2, 3, 4, 5, 6)

Kathy Marks Krpan (2013) explains in her book that the mathematics reading demands different skills than reading other subjects. You need prior knowledge to understand the text. It is important to help our students to read mathematics effectively. Mathematics texts include graphs, photographs, maps, picture books, novels, newspaper articles and also advertising. In addition, for writing, students are often limited to numbers and mathematical procedures. The mathematical writing should be encouraged to be able to write with several perspectives. We can use the text, images and numbers to explain our mathematical thinking.

The book "If Earth were a village," offers a mathematical look at the Earth and its inhabitants. If the entire population was only 100 inhabitants, relatively speaking, what might we notice about its inhabitants? The book speaks of religions, languages, education, money and many other subjects. With regard to the availability of food, 60 people are always hungry, 16 are sometimes hungry, people and only 24 people eat well. To represent numbers, we only need to draw a line of the corresponding length, using the program already written CryingLaugh grid, available on the Hopscotch app. The student has to draw a line to represent numbers. They are drawn in blocks of 10 as with math manipulatives.
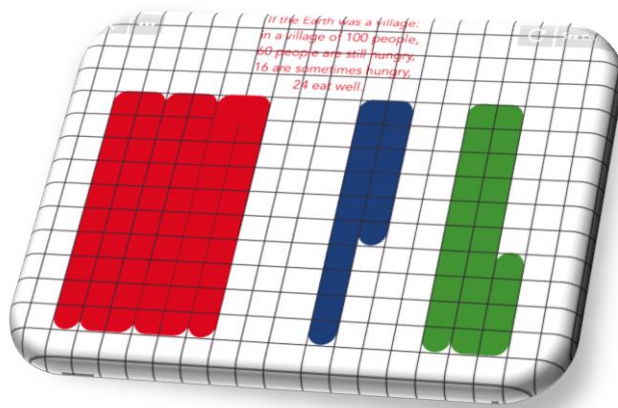

Remix : CryingLaugh

Technology Standards (1, 2, 3, 4, 5, 6)

Kathy Marks Krpan (2013) offers 6 strategies based on research in order to become effective readers of mathematics. Using the book "The magic bus this Earth", we will look at some Hopscotch programs showing our understanding of the reading.

First, with the **deduction and prediction**, readers can forge a link between their own knowledge and the text and make a conclusion about an idea of the text.
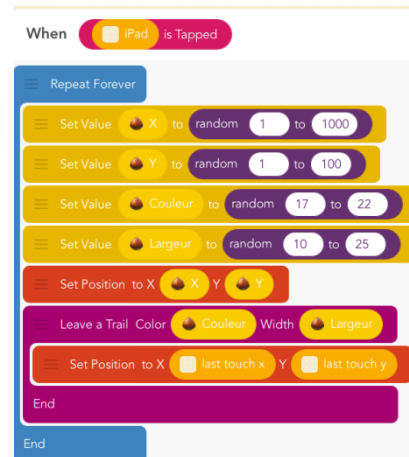
Remix Wilson Farrell Technology Standards (1, 2, 3, 4, 5, 6)

The image gives an idea of the height of the highest mountain in the world. We can give an idea of the height of Everest and also make a connection with the text. Everest is the highest peak. Since it does not show exactly 8848 metres, we proportionally show the height of the mountain. You can add more text explaining our understanding. We know that a person is too small to appear on the image. We also know it takes 4 rounds of school property during the marathon to run 1000 metres or 1 km, so over 34 laps of the schoolyard is the height of Everest. A well trained adult male need several hours to walk up to the summit. The record was 8 hours 10 minutes, when using supplemental oxygen. It can be reached in 9 minutes 26 seconds by helicopter. In this Hopscotch program, we must draw the mountain with several lines, from top to bottom of the mountain. The top is where the iPad is touched with a finger. We draw several lines from the top "last touch X and Y" to several random positions at the bottom of the screen where X may vary between 1 and 1000, the width of iPad, and Y can vary between 1 and 100 at the bottom of the screen. The variables here only allow a better view of the program. A sentence of the text of the book requires a great job of thinking to understand the meaning.

The second strategy is to **make connections**. Readers use their prior knowledge and can build meaningful connections with the text. The book Magic School bus presents the Earth also speaks of the types of rocks found on Earth, like basalt. Although the text talks about the rocks in a scientific way, we can draw basalt with Hopscotch using fractions, ¼ and 1/8 here. We use the emojis characters of black-and-white colour to show an image with both fractions. Clones are used to fill the screen with rocks, drawn

with fractions. They were placed randomly on the screen. With the "Set Size Percent" command, we can have rocks of several dimensions. We see small rocks and larger rocks, but each keeps the proportion of the fraction. The fraction does not change with the size of the rock.
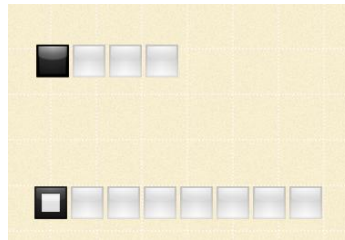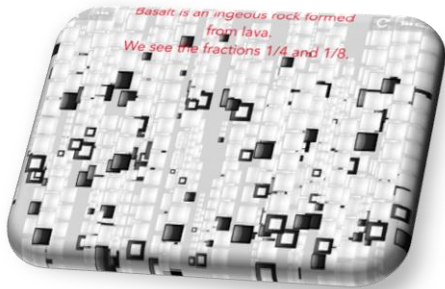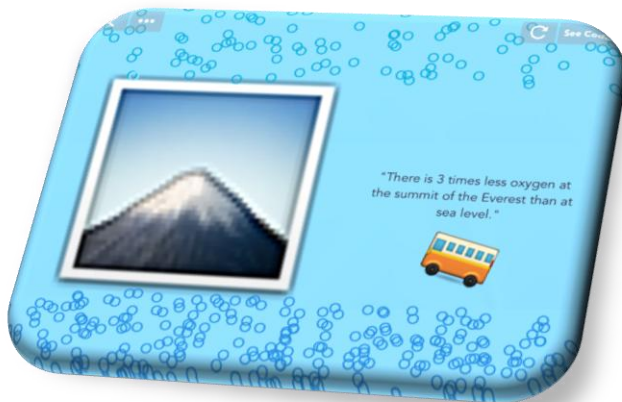

Technology Standards (1, 2, 3, 4, 5, 6)

Third, with **visualization**, students can create mental images of the text. It indicates that there are three times less oxygen to the summit of Everest than at the level of the sea. The Hopscotch program comparatively shows 500 oxygen molecules at the bottom of the screen and three times less top of the screen. The exact number is not calculated but only shown visually. The size of each molecule is, of course, not at all proportional to the image of the mountain.
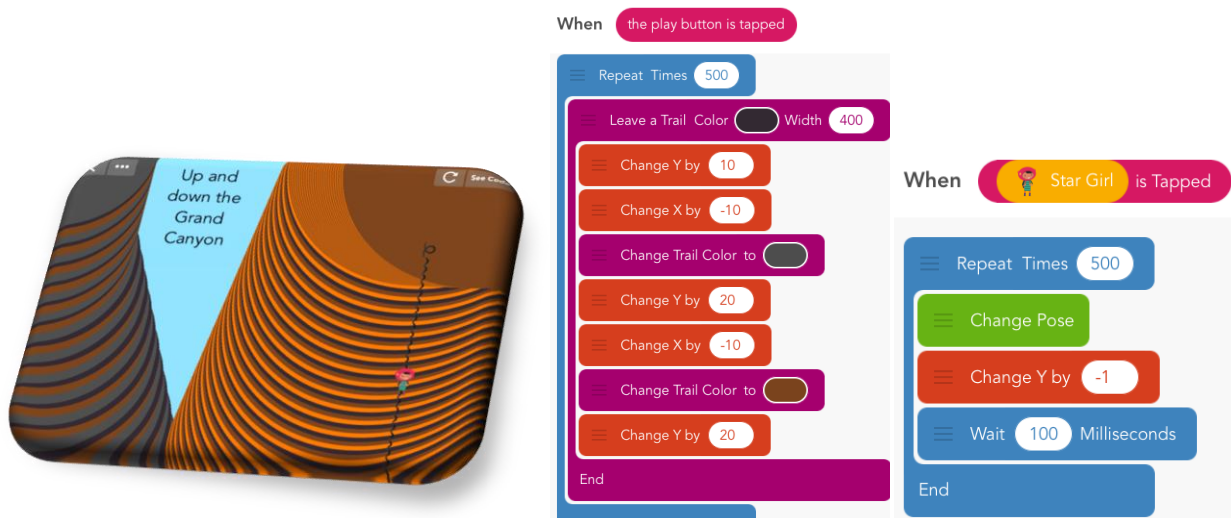

Technology Standards (1, 2, 3, 4, 5, 6)

To display oxygen, we use the rule "If Check Once" with a random choice of 1 to 3. With random choice, we will get equally the numbers 1, 2, or 3. The algorithm will allow draw a molecule of oxygen, dark blue, only if the resulting value is 1. Otherwise, when obtaining the values 2 or 3, we will draw a molecule of oxygen pale blue, which does not appear since its colour is the same as the colour of the background. So you can see three times less oxygen above than below the screen.

Fourth, **self-monitoring** allows the use of metacognitive strategies to see when the text makes sense. Communication helps to develop this strategy and also to solve problems and create algorithms. In the book, we also visit the Grand Canyon. It shows two students who are climbing the Grand Canyon. We can show the big idea that we know when to use addition and subtraction to write this Hopscotch program. To draw each colour of the sedimentary layers of the Grand Canyon, one must use the addition with Y to go to the top of the screen. Subtraction should be used with X to draw each layer going towards the left. To code the climbing of the girl, we should use addition with the rule "Change Y" for going up and subtraction to move down the Grand Canyon.

Technology Standards (1, 2, 3, 4, 5, 6)

Fifth, the strategy **asking question** helps clarify details before, during and after the reading. We question the content of the text. With the magic bus, we can find fossils at the top of Everest, indicating that there was water above the surface, there are 450 million years. One can ask several questions and do a search to understand these numbers or the concept of the evolution of the Earth during all these years. With the timeline, you can see the Big Bang, the birth of the sun, the appearance of life in water.

The magnifying glass represents the moment when the fossil is formed. There are animals, dinosaurs, ice age, the birth of civilization, industrial civilization and the future with the spaceship that will travel to Mars where we just announced the discovery of the presence of water on Mars.
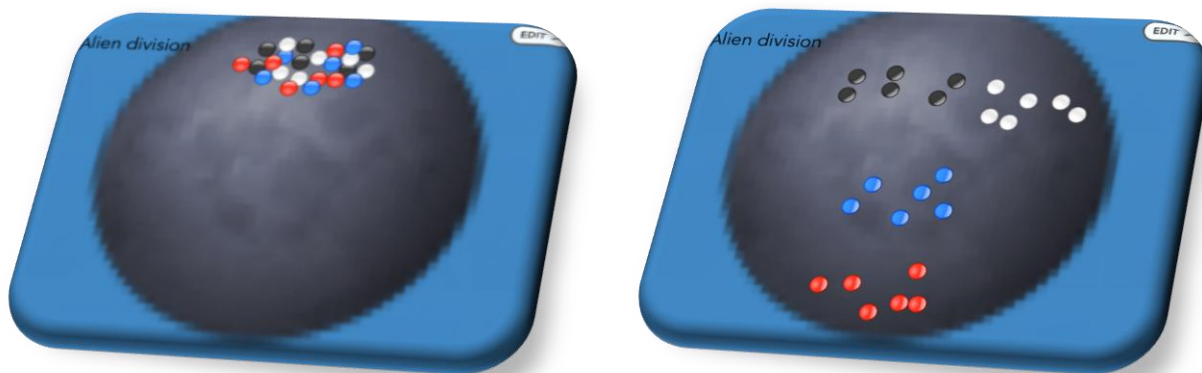

Technology Standards (1, 2, 3, 4, 5, 6)

The sixth strategy, **identify what is important**, let us focus on the important ideas of the text and to make connections with what we already know. With this book, we can make connections with important ideas of science and technology, government and the economy. Coal mines are responsible for the greenhouse gas that warms our planet. As does Ontario and Canada, one reduce the consumption of coal to produce electricity. Also, mines are important to our economy, as they provide the raw materials we need to manufacture products that are used every day like our bicycle, car, train, telephones, and spaceships.

In the book "Eyes on Math" Marian Small shows how we can understand mathematics visually. Visual images are an important way of understanding the world. Hopscotch allows us to do visual images of mathematics. The following example is taken from the question: What story of division can you show? (Small, 2013, Kindle Empl. 1469) We find ourselves on a planet with an alien population. When our spaceship arrives, the aliens move and divide the planet into four equal groups. In the beginning of the Hopscotch program, all aliens are in the same place. When you shake the iPad, the aliens, represented by dots of 4 different colours, divide themselves and move on the planet. We see visually with this story, the concept of division.

Technology Standards (1, 2, 3, 4, 5, 6)

Hopscotch allows us to create video games to practise our mental arithmetic or to learn our multiplication table, for example. In this program we generated random questions with three answer choices. Only one of these answers is correct. With the arrow keys, you must move the beluga to reach the correct answer. If you touch the wrong answer, you can try another choice. If you touch the correct answer, you get a new problem and we move to the next level. We have already seen the code to make the arrow keys, to display text, and to get random numbers using a range. We see in the picture, the logic to determine if it was the right answer. We will have to create variables to store our numbers. A is the first number of the problems, randomly selected between 2 and 100. B is the second number of the problems, randomly selected between 2 and 100. C1, C2 and C3 are the three possible answers. Only one of the answers will be the correct

answer C. The other answers C is random numbers between 2 and 10,000. The variable Niveau indicates the number of problems that the player has solved.
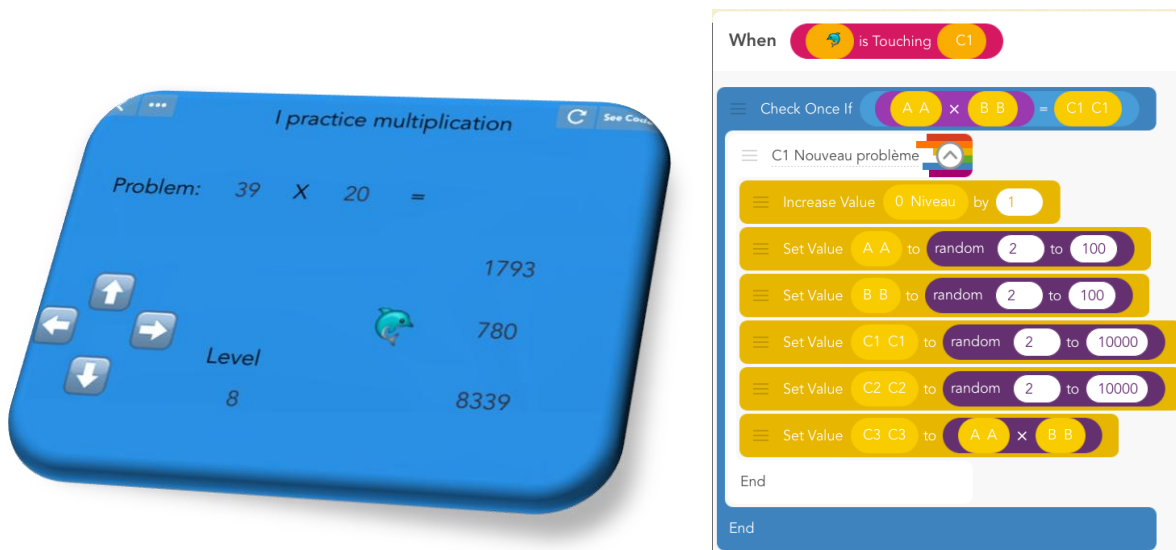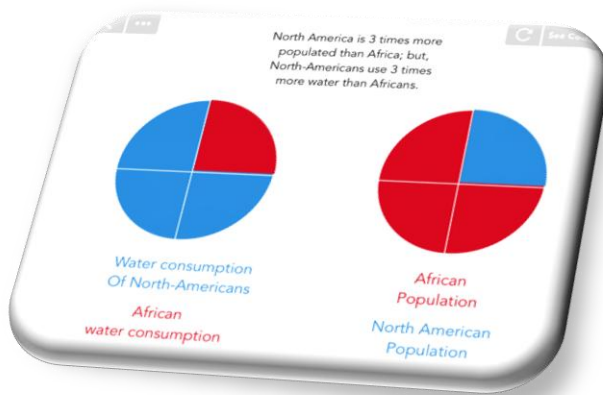

Technology Standards (1, 2, 3, 4, 5, 6)

Each response should be coded according to an algorithm similar to the one shown in this example of the first response. When beluga touches the first answer on the screen, if checks once if the answer is correct. If it is incorrect, it does not matter, but if that's the right answer, add 1 to the level and generate a new problem. A and B will have a new value. C1 and C2 become wrong answers and the answer will be placed in the variable C3 which is the 3rd number down in the selection of answers. You can create a video game to practise mental math. The range of numbers can be adjusted to the level of each student.

The book "Rethinking Mathematics - Teaching Social Justice by the Numbers" is about how many children would rather go to the dentist than learn math while others love numbers. Mathematics is often separated from their life and their surroundings. They offer ways to see how mathematics can be used as a tool to make it more a more equitable and just world. We can familiarize ourselves with what is important to our students and the mathematics behind what concerns them the most.

The book History of water on Earth, covers topics such as the distribution of drinking water on earth, the cycle of water, how water is used in our life, access to water and pollution of water. Reading the book, we can realize the lack of equity in access to safe drinking water. It states that North America is three times less populated than Africa,

but it uses three times more water than the Africans. What does this mean mathematically? While Africa uses a bucket of water, America uses three buckets of water.   If using a fraction to represent the proportion of water between Africa and America, we will have ¼. Since a circle is 360 degrees, ¼ of a circle is 2 times 90 degrees or 45 degrees. In the code, in order to draw ¼ red, we draw the circle line by line, by turning 45 times by 2 degrees each time. A discussion of equity may follow the reading.

Technology Standards (1, 2, 3, 4, 5, 6)

Do children come from poor backgrounds? Do they take their breakfast with a cockroach every day? The newspaper Le Devoir reported on 14 September 2015 that 38% of households in the city are threatened by poor sanitation. How to represent this percentage or that fraction: 38/100?

The right image shows the code that draws the percentage of the chart. One must know that the circle has 360 degrees. Half will be 180 degrees. The quarter will be 90 degrees. 38% will be 136 degrees. 136 lines can be drawn by turning 1 degree or to make the program faster, you can draw 68 lines by turning 2 degrees. First, draw the purple point with a width of 300 units. Thereafter, the fraction can be drawn over, by drawing a line 10 units wide and 150 units long. We can see the proportion of people whose health is affected by an unhealthy household.

Geometry

In the book "Kick the habit fuel," Tom Rand says that when the global banking system failed in 2008, governments around the world amassed almost a trillion dollars overnight to avoid the crisis. The question here is, what would you do with $ 1 trillion? The book offers ways to invest in green technologies. As with WordPack app, which allows you to draw the shapes with pretty words, this program draws a nice shape with the words encountered when it comes to green technology. Here you learn the coordinates and angles to make a drawing.

Technology Standards (1, 2, 3, 4, 5, 6)

We can use our knowledge of coordinates, angles and line drawing to learn the geometry of triangles and rectangles. We can always draw a spiral whose position changes while learning movements. Mathematics is more motivating with a great idea that students are passionate about. The University Institute of Mental Health of Montreal provides interesting statistics on mental health: one in five people will suffer from mental health in his life. Two thirds of people do not seek the help they need. In addition, 50% of workplace absences are related to mental health. In a TED conference, a policeman, Kevin Briggs, spoke of his experience with people who are close to suicide.

In his experience, it is not the fact of speaking that help troubled people, but being there and just listen. For a future police officer, or to be a friend, learning to listen become an excellent quality to intervene in situations of mental health. To draw the bridge, we use straight lines and angles in order to draw the triangles.

Technology Standards (1, 2, 3, 4, 5, 6)

In another TED conference, it was indicated that there were more black men in prison today than there were slaves in 1850. Can we do something to help? With the lines and angles, one can draw the rectangle. You can see 6 spirals drawn 300 units apart.
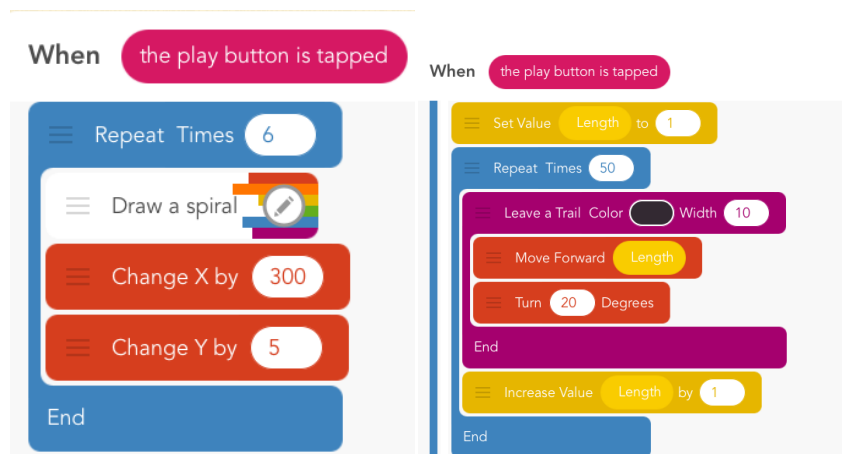
To draw the spiral, we must draw one line increasingly longer while rotating 20 degrees. Here we have an example of computational thinking. The spiral is already coded in a Hopscotch ability. Students can watch in detail to understand and use computational thinking. We have a variable Length containing the length of the line. We start with a line of 1 unit along the Length variable, the length of the line, any change in the program. The length of the line becomes longer, its size is increased by 1 unit each time

it passes through the loop to draw the line. It is always possible to see a preview of what happens in the program, rule by rule, with the "preview" button.

Here we see the highlighted rule, " Move Forward " while running. This button is also used to help locate programming errors.

Technology Standards (1, 2, 3, 4, 5, 6) Technology Standards (1, 2, 3, 4, 5, 6) Technology Standards (1, 2, 3, 4, 5, 6)

We see above, three other examples of programs using geometry. The ecolo house is a house with a roof covered with solar panels to generate electricity sustainably. The aquaponics system can grow food in urban areas. Plants feed on fish waste without the use of pesticides that pollute the environment. The final example shows a polar bear swimming between the ice that melt because of climate change. The shape of the ice is from a problem of the book Right questions. "A figure has six sides and two angles measure 90 degrees. What could it look like? " Seeing a rich example of the application of mathematics, students will have interest in a better and better understanding.

Measurement

The program Découverte on Radio-Canada, hosted by Charles Tisseyre discusses the contribution of Sarah Parkak in the discovery of treasures still buried in Egypt. With the help of infrared technology placed on a satellite, she discovers unknown archaeological sites in Egypt. We saw the pyramids, mummies, gold sarcophagus. It considers that even 90% of Egyptians are still buried treasures. When they dig into the Egyptian ground, one metre of soil corresponds to 1,000 years in the past. The treasures were buried 6 metres deep. One can measure the size of carrots that archaeologists have to dig to find artifacts of ancient Egypt .
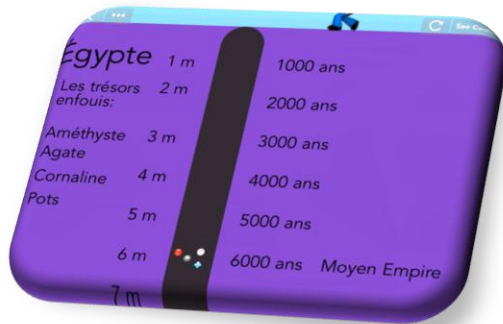
Technology Standards (1, 2, 3, 4, 5, 6)   Technology Standards (1, 2, 3, 4, 5, 6)

Most recently, Bob McDonald from the show Quirks and Quarks was discussing a new species of ancestors or cousins of humans that had been discovered in South Africa. They are Homo Naledi. His brain is the size of a large orange. By providing an orange, one can measure the approximate dimensions of the orange, make an estimate of the size of the skull of Homo Naledi and compare with the size of our own skull. In these two examples, we can see that math is used in archaeology and science.
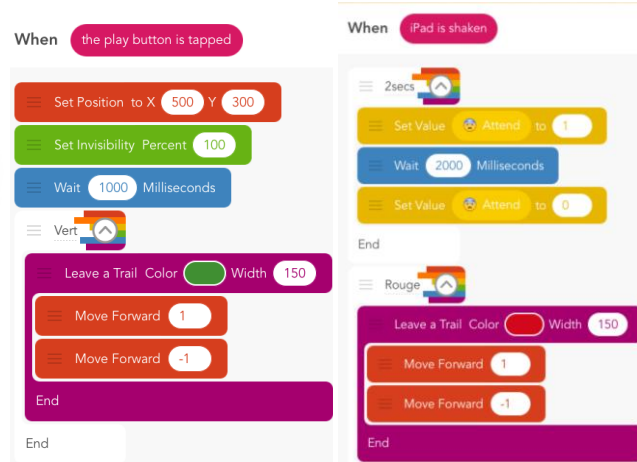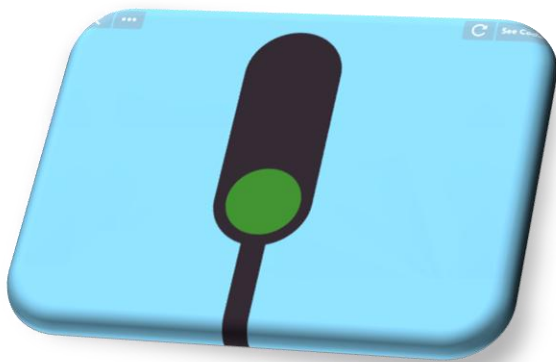
Technology Standards (1, 2, 3, 4, 5, 6)

Traffic lights must be programmed to work well. You can always make an experiment to measure the duration of green lights, yellow and red at an intersection or a virtual tour of a traffic light. How long each light last? In what order they are shown? What does each colour mean? There is a hidden code in there. With the rule " Wait Milliseconds " can be coded the expected time for each of the signal lights.

The Regularity and Algebra

Can you see regularity in schools of fish? Nature provides many examples where one can observe regularity. One can think of flowers, the spider, snake's skin, zebras or butterflies with their colourful patterns and regular shapes. Some scientists observe regularity in nature to invent new products or improve the performance of existing products. The thesis Benyus who wrote the book Biomimicry, is that in a world where we try to improve nature, we can learn and innovate from nature. Many inventions have been inspired by nature. We can think of the duck where one can learn balance in flight, the dolphin that teaches us about the underwater communication, or sea cucumbers that teaches us the medicine of tomorrow. Her book tells how animals and plants inspired inventions in the field of food, energy, medicine, engineering, and many others. In this example below, scientists from the California Institute of Technology observe schools of fish to improve the performance of wind turbines. The regularity of fish is the mathematical concept we study in the context of innovation.
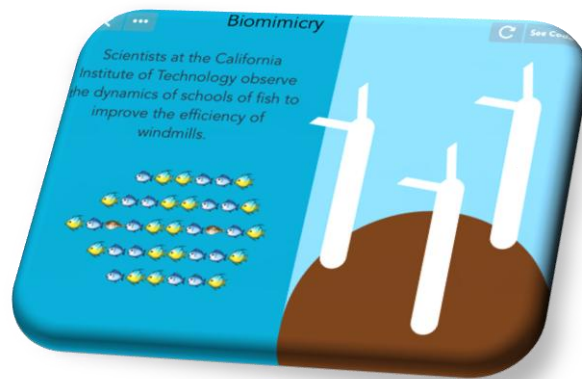
Technology Standards (1, 2, 3, 4, 5, 6)

We can see here with the repeated octagons, another example of regularity. To draw it, one need only code an octagon, turn 10 degrees and draw another octagon. The code is placed in an ability since the octagon is repeated. The code becomes simpler and easier to understand .
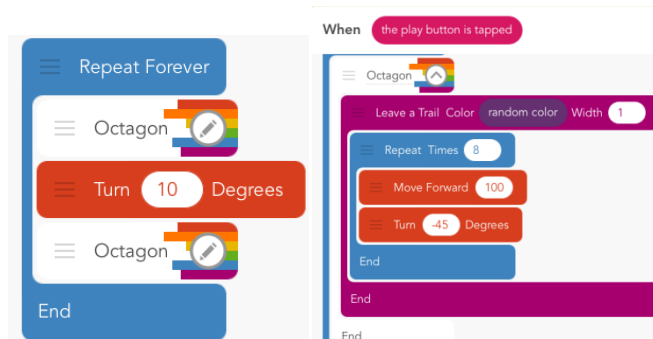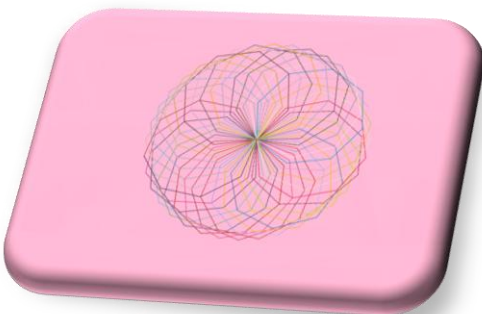
Remix : Andrew   Technology Standards (1, 2, 3, 4, 5, 6)

In a class of Kathy Marks Krpan, she gave a lesson idea to measure the distance. She had organized a spitting competition of watermelon seeds. Whoever was able to spit the furthest seed wins. The force with which we launched the seeds had an effect on the distance travelled by the seeds. Her students loved the experience. This is an innovative way to plant a garden while learning to measure distances.
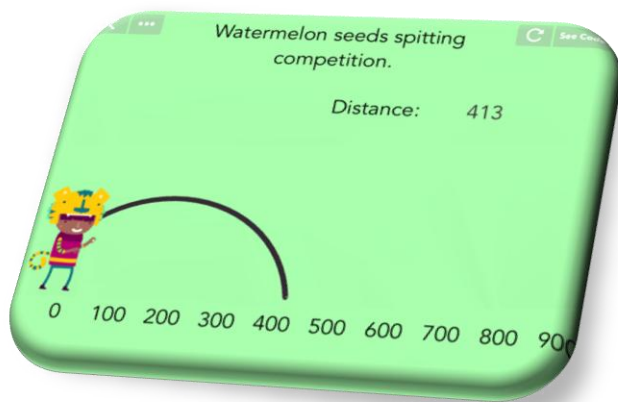
After doing the experiment outside, we can code it to learn algebra in the coding context. We have a variable, Distance, which values we randomly select between the values 10 and 50. When pressing on the character Miss Chief, we see the path that takes the watermelon seed. Each time we press on this character, the value Distance will be different and the distance from the seed will be different. This illustrates the big idea of algebra by Marian Small: any regularity, algebraic expression, relationship or equation can be represented in a variety of ways.

The next program shows another example of algebra. We see a futuristic image of an astronaut on Mars going to pick tomatoes in the greenhouse. In this program, we draw a very nice background using two colours. It draws an orange line, moving from bottom to top (iPad Height) followed by a yellow line moving from top to bottom Y = 200 . To move to the right, we use the variable of the current position of the character, X position, and we advance by 1, after drawing the line. We see how algebra can be used to draw a nice futuristic image.
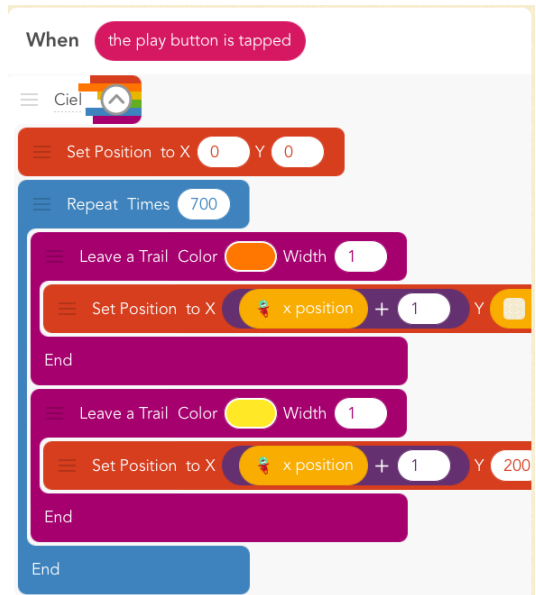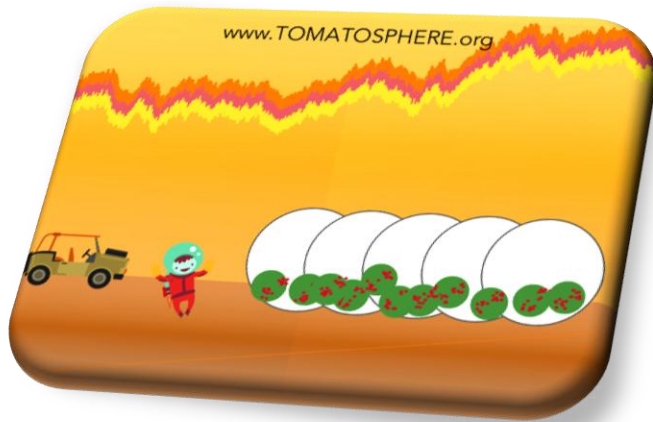
Technology Standards (1, 2, 3, 4, 5, 6)

Data management and probability

In the book Good Questions, Marian Small gives the big idea that diagrams can effectively represent data because they reveal a glance a large amount of information. We see two examples. Many people have health problems due to malnutrition. These problems are more dominant in the countries of Central Africa.
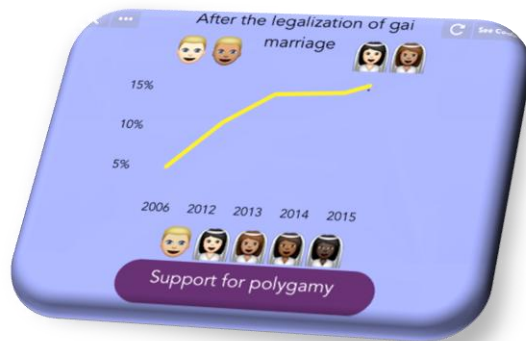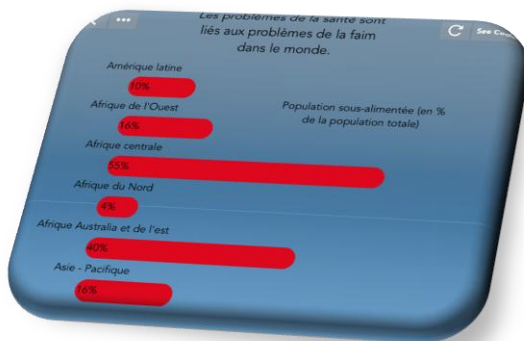
Technology Standards (1, 2, 3, 4, 5, 6)

In the second example, it is not a question here of the controversial health curriculum, but marriage statistics, what people think about polygamy. We know that the number of marriages in Quebec was less. What this chart shows is that after the legalization of gay

marriage, the population feels more favourable to polygamy. We see in these examples two different ways to represent data. In choosing your topics, it is important to choose what interests your students.

For probability, students can use the game already available in the Hopscotch community and learn probability by playing the game. The idea is from Nelson's book Mathematics 4. The circles show a third way to represent Data. The image gives the algorithm for drawing the blue and red circle. The guitar is rotated at random between 370 and 720. The guitar comes full circle and moves to a new location at random when you press on it. The goal is to move along the squares of the game according to the colours chosen by the guitar. You can choose one of three spinners to play and we have only the right to move if the colour of the next square was chosen by the spinner. By playing this game, we learn probability since one must choose the spinner that offers the best chance of winning each time.

The book " Well Played " offers many math games that we can use to help our students understand and practise math. Besides being fun, games remove the fear that we may have of mathematics. They allow to have a positive image and a sense of mathematics. The authors show how to integrate games in a mathematics program. In the Bingo example, a number line can be used numbers with the spinner to learn how to add decimals. The effect of chance, coded with Hopscotch, makes learning fun.

If students are able to code these games, they have learned how to write a video game. Otherwise, they can play the mathematical video game created with Hopscotch instead of playing a violent video game.

Proportional Reasoning

But you will say , the program does all student's calculations. They learn nothing! You can see in the next example that we wait 2 times the specified time in the variable and the angle is: 2 X 360 / 16. While it is true that the computer can calculate all additions and multiplications, students must understand proportional reasoning to write many programs. We use proportional reasoning when one recognizes and forms multiplicative comparisons between each quantity (Small , 2015, Kindle Empl . 175). This is the logic behind fractions. How do we know that ½ is the same as 25/50? If you look at the link under the program, you will see that the dots move on the screen as if a circle of dots were turning.

Technology Standards (1, 2, 3, 4, 5, 6)
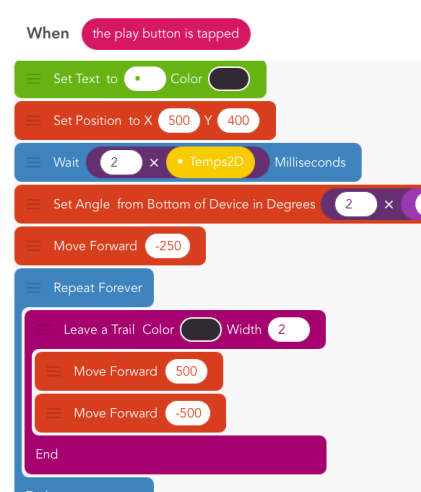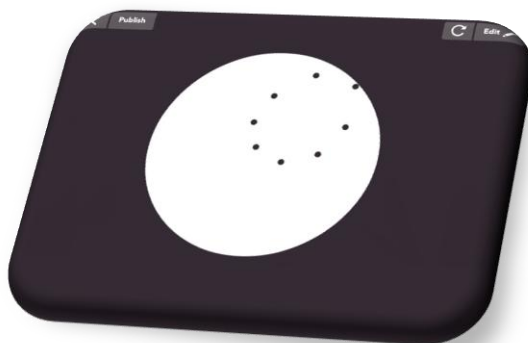
It was an optical illusion. In fact, the dots are continuously coming and going on the screen at a specific time and angle. Each dot has a starting point, a time and a different angle. We practise proportional reasoning to write this program.

The Mathematician in Me

Children spend a lot of time watching television or playing video games. Many Hollywood films portray people who hate math. You will laugh at the video "Hollywood Hates Math" where famous actors show how they hate math. There are not many people who project a good image of mathematics. Is it possible, with a vision or a different method of teaching, to change the perception that students have of mathematics? Is it possible to make mathematics fun, useful and even necessary to make a difference in the world? I think so. Where did you meet math?
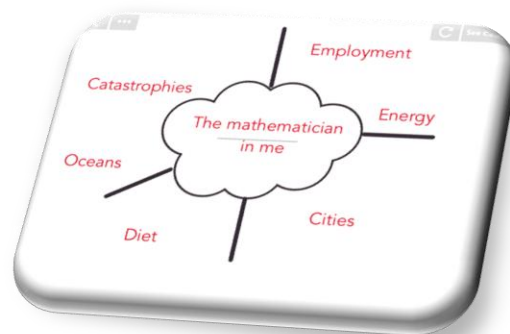
Remix : GlitteringGenius   Technology Standards (1, 2, 3, 4, 5, 6)

Each of these areas are major United Nations issues.

17. The art class

Art lovers will be delighted. It is really easy to code while drawing. Simply draw a line. It can include all elements of art in our designs. We are a few examples. One can use several drawing techniques. The Hopscotch network also offers several art examples. In addition to the 24 colours available, there are the invisible colours that can be used and all characters of the Internet, as we have seen earlier, in the SAMR model section .
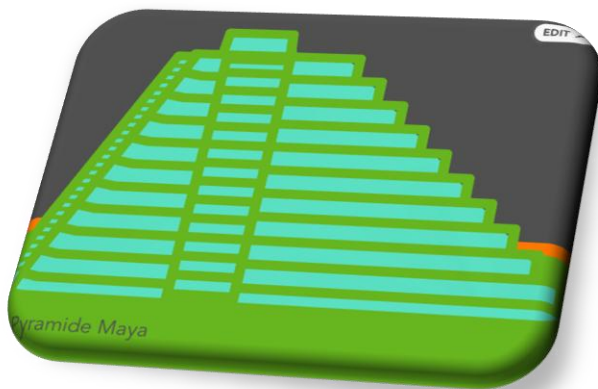
Technology Standards (1, 2, 3, 4, 5, 6)

Technology Standards (1, 2, 3, 4, 5, 6)

Technology Standards (1, 2, 3, 4, 5, 6)
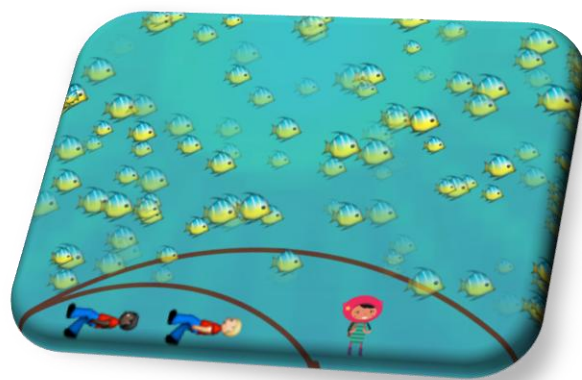
Technology Standards (1, 2, 3, 4, 5, 6)

We can see here, a Mayan pyramid in South America, a butterfly, the eye of Horus which is a protective symbol of ancient Egypt. The parts of the eye are used to write fractions. Finally , one can see a luxury hotel with the surrounding fish. It can be a Maldives hotel which is located under the sea. To attract customers, the hotel's architects must find

ways to make their environment very pleasant for their customers. The image can also represent Ripley's Aquarium of Toronto where one can spend the day and even the night observing the fish in a giant aquarium. Under the blue water, we have the emoji character of the sun magnified more than 1,000 times and made almost invisible. The tiger, which can be seen on the Hopscotch network, is made up of several small points programmed with the colours brown , black and white .

Remix : The Virtualworld

Technology Standards (1, 2, 3, 4, 5, 6)　　　　Technology Standards (2,5)

Al Jazeera America recently published a technological documentary about a wind-water simulator that simulates storms and turbulent waters. The scientist in Miami is studying the interaction of wind and water in order to understand the dynamics of hurricanes that would help them save lives. In the program, we are simulating waves in the ocean in the storm. We draw the waves with a finger to the simulation.

Hopscotch allows you to save programs in app. If students start a program on the class's iPad, they can still publish their draft and continue at home using their own iPad, Unpublish it to remove the program from the community and continue working. The completed programs can be left on Hopscotch without being published. They can also be shared with the Hopscotch community, on Instagram, Facebook, Twitter, email or even just with the link we can copy and paste. Enthusiastic budding artists will be creative for several hours.

18.   Science class, grades 5 and 6

Knowing the facts underlying science and technology, based on scientific experiments is essential, but the curriculum requires us to go further. The Ontario program for science education has four aims. Each of our students must acquire the scientific and technological culture, must be sensitive to environmental issues, have an understanding of the nature of science and technology, and develop their attitudes to science and technology. In a multicultural classroom with children from around the world, this is not an easy task. Some students, due to their experience in their country of origin, come to the classroom with several contradictory and negative attitudes towards science. They hear ideas from television, the culture of their parents, their friends' ideas. It becomes important to develop their own opinion, independent of other people, which allows the student to act according to his beliefs.

Derek Hodson (1998) recommends an issues-based curriculum to give students the ability to make decisions or act responsibly about social, economic, environmental or ethical, related to science. We must be able to show how science impacts the lives of all students, their families, their local and global environment. His model has 4 levels. At the first level, we assess of the impact of science in society and how science is determined culturally. At the second level, one must recognize that science and technology decisions pursue a goal or interest. At the third level, students should develop their own opinions and positions regarding the problems. At the fourth level, it is preparing to act in the face of the issues. The choice of issues to consider is crucial so that students will develop critical thinking and the ability to make decisions, and possibly engaging with their interests to pursue their idea with the personal ability of the student. This does not mean that everyone will become a scientist, but the student is going to use its capabilities to develop this scientific idea. In his adult life, the student can become a technician, a scientist, a science reporter, a writer, a science teacher, an activist for science, a monetary benefactor of science, a psychologist, a protester, or even a Minister of Health or the Environment.   Each role is important to contribute to the big science project. At the base is the understanding of science for all and a political movement.

Draw Me a Scientist

The activity "draw me a scientist" allows to have an idea of the attitude of students towards science and share those ideas with the entire class. With a visual demonstration of their attitude and feeling, we more apt to understand the student, their interests and to correct, if necessary, the scientific misconceptions they could have on science or add other conceptions of what is a scientist. Sharing and discussing help improve students' designs. Can a scientist be a man, a woman, a person of colour, an emigrant? Do they all look like Einstein or are they people like us, that includes every student? One could, for example, design a scientist as someone who conducts research using a microscope. The Découverte program of 11 October 2015 about the research required to go to Mars, mentioned, that if we want to do research and important technological developments to go to Mars, for example, what will be the most important is a positive attitude and a great emotional behaviour. Without these qualities, great achievements will be impossible, since they are impossible without working together to make a large team project and we must all work together to succeed.

Technology Standards (1, 2, 3, 4, 5, 6)   Remix : Immenseevergreen t Technology Standards (1, 2, 3, 4, 5, 6)

To draw the image of the microscope, we only use the emoji characters, enlarge them and draw yellow lines and a large pink dot for the background. The second program with the flashlight shows traits a scientist should have. The text is displayed in black, on a black background. You can see the text only when the yellow light is moved on the iPad, using the flashlight. The flashlight is moved along the location where the finger touches our iPad with the command " Set Position" and variable " Last Touch X" and

"Last Touch Y". The yellow dot position values will be slightly different in "Last Touch –X 100 " and " Last Touch Y -160".

The empathetic drone

For many people, technology has a very negative image. One can think of the image of a drone when powerful governments go in developing countries because of some individuals charged with terrorism and launch a bomb to destroy the buildings and infrastructure in the region. Local people need to recover from their injuries and collateral damage. This image of science which some of our immigrants have experience satisfy the needs and interests of particular powerful groups. This vision does not favour disadvantaged people or minority cultures. While it was necessary for the defence, is this the best approach? Are there other uses for drones? Drones can be used to send packages, such as drugs, in remote areas where it is difficult or dangerous to visit. A drone can be used to film or take pictures from different angles, than of the surface of the Earth. With an infrared camera, the drone can be used to locate and catch poachers of rare species such as the rhinoceros. For our grade 5 example, a drone can be used to guide blind people so they can work out and run on a training track. In this example, we see a friendly and empathetic drone that helps a disabled person to function more normally.

Remix : TheWeirdFreewPop Technology Standards (1, 2, 3, 4, 5, 6)

In this example, you see a drone, in black, flying over the blind runner. The drone flies over the track, guiding the blind runner with its sound. The track is drawn in perspective with a track width which increases by 1 every time through the loop of the drawing. The runner travels along the track too. It is smaller to the left and bigger to the right. To code the runner, we place the same emoji character several times along the track. Each runner will become visible and invisible alternatively, giving the impression that it moves from left to right. Each waits his turn with the "Wait" command, becomes visible for 100 ms, and becomes invisible. Since the runner moves quickly, we have the illusion of one single runner. The use of this particular drone can give more freedom and a better quality of life for blind people, a good prescription for health.

Nobel Prize in Medicine

Some students have extensive ideas from a very young age, thanks to their personal ability and the care of their parents. One can think of a known personality, Chelsea Clinton for example, who began to read the newspapers at the age of 5 and even wrote a letter to President of the United States at age 5, because she did not agree with his policies. She had to form an independent opinion about what she read. Can we inspire our students to what is possible?

We can show with the Nobel what is possible to accomplish. The Nobel Prize for Medicine honours personalities of the medical world who gave great service to humanity. For example, many adults and children worldwide are affected by AIDS. We begin to find solutions to this disease through research. We can beat this disease and Luc Montagnier made a big step with the discovery of the virus that causes the disease. The research does not stop with him , but they still continue. Finding the cure for a disease can be time consuming, but with hard work, we can overcome any disease.

Biomimicry

Here is another example of biomimicry. Using observations of nature in order to make innovations, sometimes in another area. We can see in this example, a section of the bone of the spine. We notice the outside of a bone, the structure is very stiff and strong, but the interior of the bone is instead hollow .
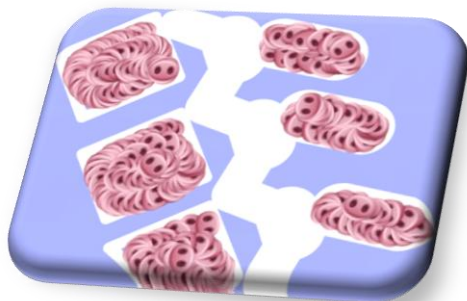
Remix : ghost   Technology Standards (1, 2, 3, 4, 5, 6)

To code the structure of the bone, we only draw white lines for the spine. Since we draw many lines, we can divide the work in stages. An ability is made to draw a rectangle, another to draw the spine and another for the oval portions of the spine. Our character is positioned at the right place and the ability is used to draw each part. To show the hollow portion of the bone, we draw inside the bone with a emoji character that rotates to the position where the finger touches the iPad.

To test structures, we can do the falling egg competition where we are to drop an egg without breaking it. What can we do to protect it? We wrap the egg with of a large amount of bubble wrap to protect it from its fall. We can also use microstructures developed by Boeing. Inspired by the way the solid but hollow bone, Boeing has invented a light metal structure, consisting of 99.9 % air. This structure is lighter than Styrofoam. If we wrap the egg with this microstructure, the egg can fall from a high building without breaking. This is a good material to use to build an airplane. This material is so light that it can be placed on a dandelion flower without it moving.

Remix : Andrew Technology Standards (1, 2, 3, 4, 5, 6)

To draw the flower, we draw an octagon, turn 5 degrees and draw another octagon. The microstructure consists of clones with a special character of octagonal shape, which moves along the rectangle. We see its algorithm: it moves by 25 units to the right, 15 times, to draw the first line. Then the clone comes back to the left to draw the second line a little higher. We repeat 5 times to obtain 5 lines.

We can observe the geckos that hang from the ceiling with their feet covered with nanoscale hairs. With biomimicry, we can learn from this observation and build the surgical tape that could replace sutures and staples in hospital. We see an example here .
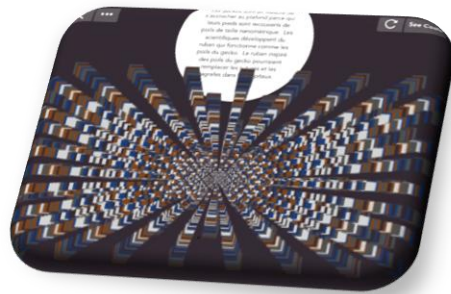
To show this, we use a special character that looks like a rectangle made of dots. Each clone of the character takes a different colour at random. We use the colour code between 18 and 22. On the colour palette, 18 is dark blue, 19 dark gray , 20 black, 21 brown and 22 pale gray. Thereafter, each of the clones grows a little more than the last, by 20 units.

Biomimicry also allows us to observe the skin of sharks to inspire us to reduce drag and save energy. With this design, windmills and airplanes can reduce air drag. This design also repels bacteria. This is an interesting asset for hospitals, kitchens and bathrooms. Let's see this shark skin .

We see the pattern: 1, 2 , 3, 4 , 3, 2 repeated. Each digit corresponds to a vertical line of a different length. In this algorithm, we draw each line from left to right, from the middle. Each line is drawn in the same way, with a different length. We therefore draw

the top half, then turns around to draw the line from top to bottom, and we go back to the middle of the line, in order to draw the next line .

Pharmacy 3.0

Quebec is facing a shortage of doctors. Many families do not have family physicians and one must often wait several months to see a doctor, even in situations where the health of patients is very precarious. The show Découverte of October 18, 2015, discusses an idea of Roger Simard, a pharmacist in the Montreal region that tracks the health status of their patients remotely. There are many technological tools that allow obtaining data such as the patients' blood pressure. Instead of going to the doctor, a machine takes the blood pressure and the information is entered into the program. The pharmacist keeps track of all his patients, every day, and can detect anomalies and problems remotely. The patient does not need to visit the pharmacy or the doctor and the doctor may be concerned with the most urgent cases. Hopscotch does not yet offer a way of communicating with external tools, but nothing prevents us from doing an experiment by taking his blood pressure, by going regularly at the pharmacy, or to measure the speed of a heartbeat to draw a diagram of the results.   We draw lines of the graph according to the observed data.
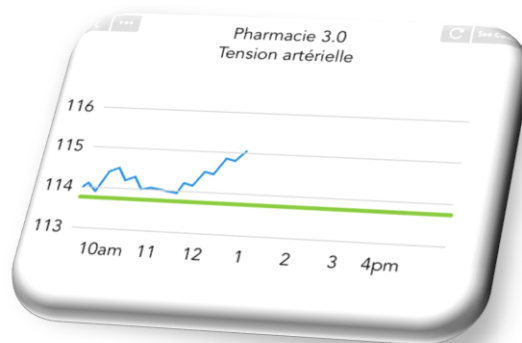
Draw me a safe structure

Far from the idea of the suspension bridge of Tacoma where physics has taken 50 years to understand why it oscillated and collapsed, imagine the excitement when walking on a glass bridge at 183 metres high, between the mountains in the Hunan province, in

China. It is like walking, suspended in the air, in a vacuum.   Imagine the extra fright when a tourist drops a bottle of water on the deck and cracked the glass. In order to make the bridge structure stronger, engineers built three layers of glass. Although one of the layers of glass was cracked, tourists were never in danger, because the other two layers were not affected. The Hopscotch program is to draw lines and dots.

Remix : mystic-coder Technology Standards (1, 2, 3, 4, 5, 6)

Draw me the energy of the future

On its website, Inside Education offers several resources for students from grade 4 to grade 12, to learn about a significant energy resource of Canada. They offer several perspectives that must be considered with the oil sands: the economic, technological, environmental, social, the future. They offer tours for classes of Alberta, but also for teachers across Canada. Selected teachers can go to Alberta, all expenses paid, on-site to learn all aspects of the petroleum industry. The journey begins in Edmonton with lectures from people leading the industry. By plane, we travel to Fort McMurray to visit the sites of several oil companies, see their facilities and talk to their scientific research to solve the problems they face, and their technologies. You can see the lives of the employees, indigenous people who live in the area, museums, challenges and successes. Teachers return with a bag full of resources for their students and a large number of articles available on social networks.
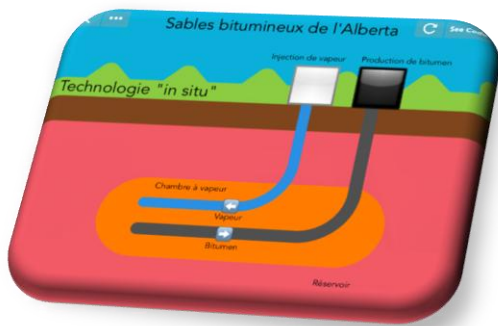
Technology Standards (1, 2, 3, 4, 5, 6)

The oldest drilling technologies have more environmental problems because of deforestation required for the construction of an oil site, tailings ponds, the water pollution and the loss of irreplaceable wetlands. We also see their environmental restoration efforts once the petroleum mining is complete. The latest technologies, such "in situ" , eliminate large areas of deforestation and tailings ponds. Two horizontal wells are dug in the ground to reach the oil. The first well injects steam to heat the bitumen and allows it to flow down and to be raised to the surface in the second well. The bitumen is then collected in pipelines and sent to refineries.
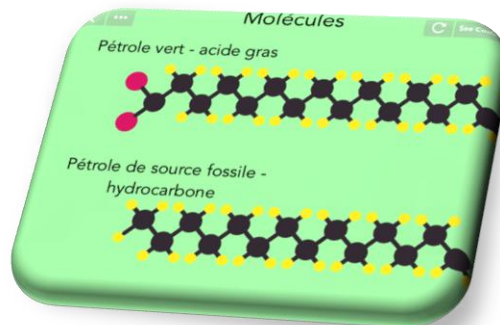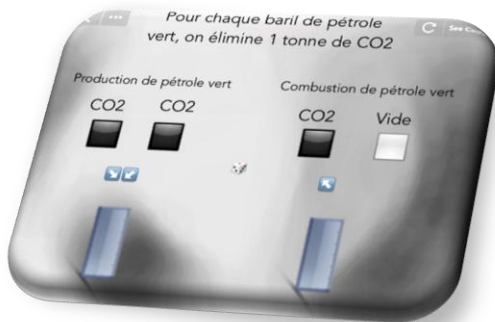
Technology Standards (1, 2, 3, 4, 5, 6)   Technology Standards (1, 2, 3, 4, 5, 6)

One of the scientists discussed green petroleum research and online articles showed how green petroleum is produced. We have already seen, previously, green petroleum production. It is interesting to observe that the production of 1 barrel of green oil removes two tons of carbon dioxide from the atmosphere. The combustion of green

petroleum green gives a ton of carbon dioxide. It has the net effect of removing 1 ton of carbon dioxide from the atmosphere. In addition, green petroleum works like traditional petroleum. Technologies that use petroleum (cars , trucks, planes) can remain the same as the green petroleum molecules are almost the same as fossil fuel molecules.

Preserving Biodiversity

Bee colonies are disappearing all over the world. This is very worrying because they pollinate plants that feed us. Without bees, plants cannot reproduce easily. You can see in the diagram, the statistics of the Canadian Association of Beekeeping Professionals that bees' loss level is above the acceptable loss level. Bees are sick.

Technology Standards (1, 2, 3, 4, 5, 6)   Technology Standards (1, 2, 3, 4, 5, 6)

Al Jazeera America reported that US scientists are working to diversify the bee population, to genetically engineer a healthier super bee, to be able to survive the collapse of colonies. To do this, scientist select drones who survived winter and extract their sperm. The semen is used to artificially inseminate the queen to get stronger bees and more diverse genes, accelerating the work of nature to aid the survival of bees.

The polar bear population is also declining. Canadian scientists monitor the population using satellite images. The photo taken from space shows several white dots. The white dots are circled. The photo is taken of the same location two days later and scientists note the points that have moved. The white dots that moved are healthy bears. This way, we can tabulate the polar bear population. With global warming, polar bears are travelling a little further and begin to encounter brown bears. They found their own way to diversify. The mating between polar bears and brown bears produced a new species

of bear that scientists have called pizzlis. They are white bears with black fur around the eyes. We created a video game where the pizzli, which is climbed up the mountains to feed on plants, slides down the mountain while avoiding rocks that may be on its way. This program follows the same logic that the program "Snowboarder" that can be found on the Hopscotch app.

Technology Standards (1, 2, 3, 4, 5, 6)
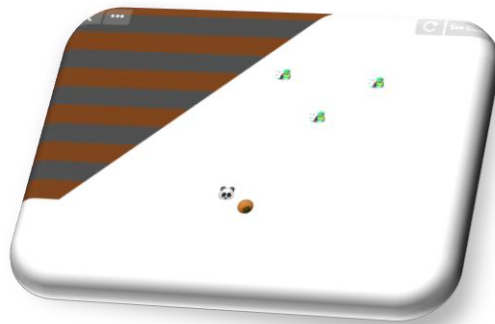
Technology Standards (1, 2, 3, 4, 5, 6)

The impacts of flying machines

Planes have several roles. They can be used for travel, for military or recreational operations like riding a parachute, to spread insecticide on crops in danger, to spread water on forest fires. The environmental impacts are different for each role.

Technology Standards (1, 2, 3, 4, 5, 6)

Remix : Kiwicute2015   Technology Standards (1, 2, 3, 4, 5, 6)

Moreover, we read about plane crashes, or even space accidents where space shuttles explode in the atmosphere in an accident during take-off.

SpaceX explodes after lift off

Technology Standards (1, 2, 3, 4, 5, 6)

Electricity

The farms in eastern Ontario invest in solar energy to produce electricity. They are found everywhere on houses and in solar power plants. This renewable energy provides electricity to many homes.

Avec du sel fondu, les panneaux solaires peuvent fournir de l'électricité pour 70,000 demeures. L'énergie est 100% renouvelable.
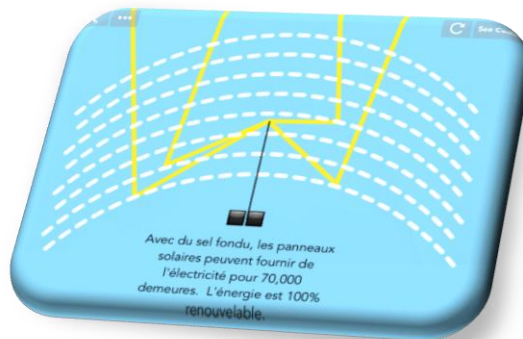
Technology Standards (1, 2, 3, 4, 5, 6)

In New Brunswick, we experiment with the production of electricity from potato residues and manure! A dairy farm produces 3,000 tons of manure per year. The waste is placed in the biodigester with bacteria that produce biogas. Biogas turns a generator to produce electricity that can be sold to citizens.
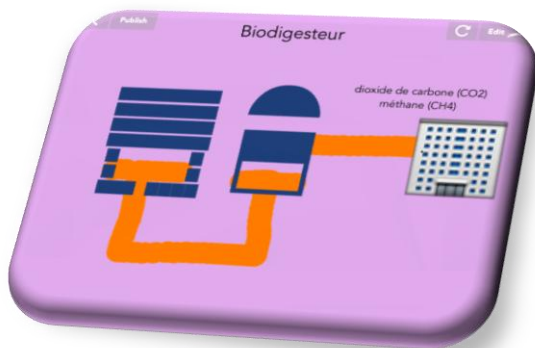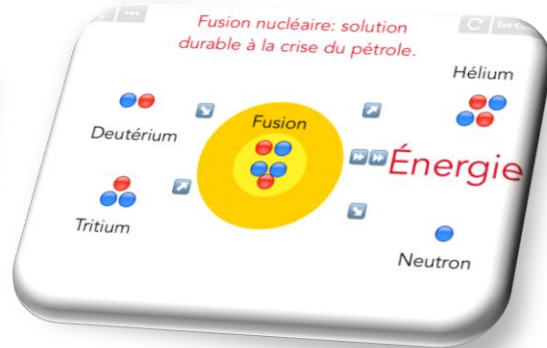
Technology Standards (1, 2, 3, 4, 5, 6)   Technology Standards (1, 2, 3, 4, 5, 6)

Far from being ready, scientists are looking for controlled nuclear fusion processes to generate electricity. A fusion reaction is when two hydrogen isotopes, deuterium and tritium, combine to form helium and a neutron and release a large amount of energy. It is the reaction that gives energy to our sun. Nuclear reactors using fusion are under construction in France and Britain. This is a very expensive project. In order for the reaction to occur, one must heat up the reactor at 1 million degrees Celsius which requires a lot of energy. If the reaction produces more energy than it consumes, it will have succeeded.

Space

Guy Laliberté, a space tourist from the Cirque du Soleil, paid $35 million to go into space aboard the International station. He took amazing pictures that were published. However, space walking is not as easy as one thinks and requires years of intensive training in an environment that simulates weightlessness on Earth, under water, wearing a space suit. Bob McDonald, in his book Canadian Spacewalkers, talks about the experience of Canadian astronauts who have walked in space, including Chris Hadfield. Historically, the first astronauts found this almost mortal experience. Chris Hadfield found the easy training. During the training, they hear a recording giving instructions for the day, but in the end, the astronauts listen to music chosen by their instructor and dance in their spacesuits. It is possible to create a game with Hopscotch doing a simulation of an astronaut in training. The astronaut walks along the iPad following the movement of the iPad, while coding the music the astronaut can listen to, while dancing in his spacesuit.

Technology Standards (1, 2, 3, 4, 5, 6)   Remix : MinecraftMonkey   Technology Standards (1, 2, 3, 4, 5, 6)

The Internet and the NASA website offers us many beautiful images and scientific information about space exploration. To see space images, we need several tools. With technology such as infrared, for example, we can detect different aspects from those seen with the naked eye, thanks to the heat. Here you can see a spiral galaxy, Messier 81, at a distance of 12 million light-years with infrared. Infrared allows us to see heated dust of young massive stars.

19. The social studies classes, grades 5 and 6

What the explorers saw?

The interaction between the explorers and the First Nations have been significant in the development of Canada. In this game, we see an explorer travelling by canoe on a river to meet with first nations people. Emoji images are placed at the top of the screen that indicate what they saw and did during their trip. When pressing on each of the images, it descends to the bottom of the screen. The boat can be moved along the screen. Explorers met people who were really friendly. They began to barter with fur. One meets ice on the river that we must avoid. There are also whales. During his trip, the explorer sees the homes in America with their tents. We add more details to the program descriptions.

Remix : MagmaPOP Technology Standards (1, 2, 3, 4, 5, 6)

Services from the Government of Canada

Governments provide a multitude of services that can be seen on their website. You can create a similar website showing several services. Hopscotch offers several website templates that can be modified to create our own, with our information. For example, the government provides job search services to all citizens of working age. This example shows a fictitious government announcement in search of programmers/analysts to develop their systems at the Ministry of the Environment.

On est à la recherche de développeurs de logiciel pour le Ministère de l'environnement. Ils doivent être capable d'utiliser un langage de programmation, tel Hopscotch, et avoir une grande connaissance des problèmes reliés à l'environnement.

Remix : The How To King old Technology Standards (1, 2, 3, 4, 5, 6)

What makes Canada unique?

There are many people who have worked together to develop the identity and heritage of Canada. The book of Macleod and Wishinsky gives us many examples of the pride and identity of Canadians. Did you know that former Prime Minister Lester B. Pearson is the only Canadian who won the Nobel Peace Prize in 1957, for his intervention in Egypt. His proposal created a cease-fire in the Suez Canal.

Remix: MagmaPOP Technology Standards (1, 2, 3, 4, 5, 6)

International co-operation

The media bring us everyday news of the effects of the co-operation or lack of co-operation in the world: wars, international aid, rallies, conventions, international trade, discussions to solve the problems of climate change. If we do not cooperate at the international level to prevent war, the population suffers, and we can lose the unique World Heritage sites. Here we see the site of Petra in Jordan that could disappear because of the war. These structures have been carved directly into the rock.

Des sites historiques du patrimoine mondial pourraient disparaitre à cause de la guerre.

Technology Standards (1, 2, 3, 4, 5, 6)

20. Outside class time

I will never forget the image of the boy with coding Hopscotch in an amphitheatre, a Saturday night, with his parents, at a concert of classical music. This game, work, or that homework was not at all like a chore, either for the child or for the parents. In his book, " Les Devoirs " Thierry Karsenti (2015) looks at what the research says about homework and student achievement. He noted a positive impact of homework on academic achievement and also offers twelve conditions for the homework to be effective. Coding with Hopscotch meets each of the winning conditions proposed by Dr. Karsenti.

Technology Standards (2, 5)   Technology Standards (4, 6)

First, the homework is "not time-consuming" In grade 3 and 4, the time to spend on homework is 5 to 15 minutes 1-4 times a week. Coding a Hopscotch program during the weekend meets these requirements in addition to supporting the cognitive engagement and development of the student. Secondly, the homework "does not unduly burden the work of teachers". For beginners, Hopscotch offers games on its app of 43 different levels. In each game, a new command is learned, and we see a different program when the command is used. The programs are engaging and fun. Third, "they are neither too easy nor too difficult". To go further, if he wishes, the student can see the code of the program and learn the code that he played. There are enough homework prepared by Hopscotch for an entire year. The concept is a bit like in video games that students are familiar with. Instead of playing video games, students write video games.

Fourth, "they involve the family". The Gallup/Google poll indicates that the majority of parents want their child to learn to code. In order to code at home, parents must provide access to the iPad to their child for a while. They must monitor the work of the child. If the child uses social networks like Instagram to share photos of their work, parents need to monitor. A recent study indicates that parental anxiety towards mathematics can be passed to children (Quirks & Quarks, 12-09-2015). When parents help their children in their many duties and show anxiety towards mathematics, children learn less mathematics and more anxiety towards mathematics. The attitude of parents towards the homework is important. Even if one uses mathematics in a Hopscotch program, what is mainly learned is problem solving. By showing homework with Hopscotch as a game and not math, children will not learn the anxious attitude of their parents. Hopscotch is a game that allows us to learn to code, that opens the doors to the labour market and knowledge necessary for success in the future.

Fifth, " they make judicious use of technology. " Learning to code will give an understanding of the basics of technology and open doors to the world of work in a field that is in demand. Sixth, " they participate in the construction of student motivation ". Do a homework that resembles a game is very motivating for the students. He did not realize he is learning. It is engaging and it's not a chore. You will see the pride in their eyes when students tell you, "Madame, I finished all the levels! " They learned to code easily while having fun .

Seventh, "they take into account social and economic inequities". By coding at a very young age, students of colour, immigrants or from a disadvantaged background have the opportunity to learn a profession in high demand and well paid. Each of your students could become the next Steve Jobs or the next Julie Payette. If the student has no iPad at home, it is always possible to make a weekly programming club where all interested students can join. Code.org recommends Hour of code, one hour of programming available to students once a year, where all participants have the opportunity to code for an hour in order to become familiar with coding and give taste of the profession to students. To remove negative stereotypes of programming, it is important to show people various role models of coders. The company Disney for example, offers the image of Frozen movie characters as examples of girls who know how to code. There is also Malala, who won the Nobel Prize, who is also associated with

programming. In the infrared image, you can see the students' enthusiasm for Hour of Code. The photo was taken with the infrared camera FlirOne that attaches to the iPhone. It shows students without revealing their identity. The image of the star shows what a black girl who could do in less than an hour, the first time she tied to code. She learned that it's something she can do, away from negative stereotypes of geek culture.

Technology Standards (5, 6)   Technology Standards (1, 2, 3, 4, 6)

Eighth, "they target particular students who experience learning difficulties". There are teachers who use the code in classes of pupils with learning difficulties, to engage them academically. If their homework time consists of time playing what looks like a video game to learn problem solving, he will be more motivated. One should not forget the talented and gifted students who come to class already knowing the entire curriculum who are bored and who do not want come to school. Learning to code can encourage them to find a passion that will serve them for a long time, in addition to encourage them to stay on the school benches. Students who need to miss school in order to travel for a whole month can use Hopscotch to write programs, either by following the

examples of the Hopscotch app or by following the YouTube channel that shows how the teacher writes the programs related to the curriculum.

Ninth, " they take into account the age of the students". For elementary students, homework reading and writing is very important. Hopscotch allows students to write long texts with a medium they love. For a student who lacks motivation for writing , the medium may be what makes the difference. Students can write letters, books, a newspaper, designing posters, developing a website, write interactive stories, give explanations illustrating the program he wrote. The program can also be a response to a fictional text or documentary he read.

Tenth, " they bring students to organize themselves and become independent". Students can follow the early levels proposed by Hopscotch. They work at these levels independently. After finishing all levels, they can look at the code produced by the Hopscotch community, and choose new challenges according to their interest. There are many programs to choose from for all tastes and all levels of difficulty. Students will have the chance to become innovators by creating their own program while pursuing their own passion.

Eleventh, " they appeal to particularly effective teaching strategies ". Hopscotch has the advantage of offering a homework that makes sense for students and gives an interesting choice. In addition to playing a video game or feel like they are developing an app like professional coders, the choice to work with Hopscotch is very interesting and very motivating. The gifted student who makes the minimum effort in the classroom can be encouraged to excel by giving captivating homework with Hopscotch. They often need their challenges since everything seems easy. They can learn perseverance. It is the same for students who have acquired a taste for programming. The strategy of the game levels enables pupils to find an environment that rewards their efforts immediately, by seeing the coolest run-out of their program when they have completed their level.

Twelfth, " they provide students with the help and resources they need ". With the support of parents, the teacher, the levels in games, videos showing how to code a

program, the programs of the Hopscotch community, discussions of the Hopscotch network, Hopscotch's blog and accounts on social networks, the Hopscotch app gives all necessary resources to the teacher and the student need to succeed.

The school club can be a place where the student surpasses himself, goes further and c learns how to build programs that use more advanced concepts. For example, one can read on the Hopscotch blog about Kedai, this young 12-year-old girl with Kiwicute2015 pen name, who wrote a program that looks like this, fish, using sine and cosine concepts. The fish move by moving our finger on the iPad without touching.
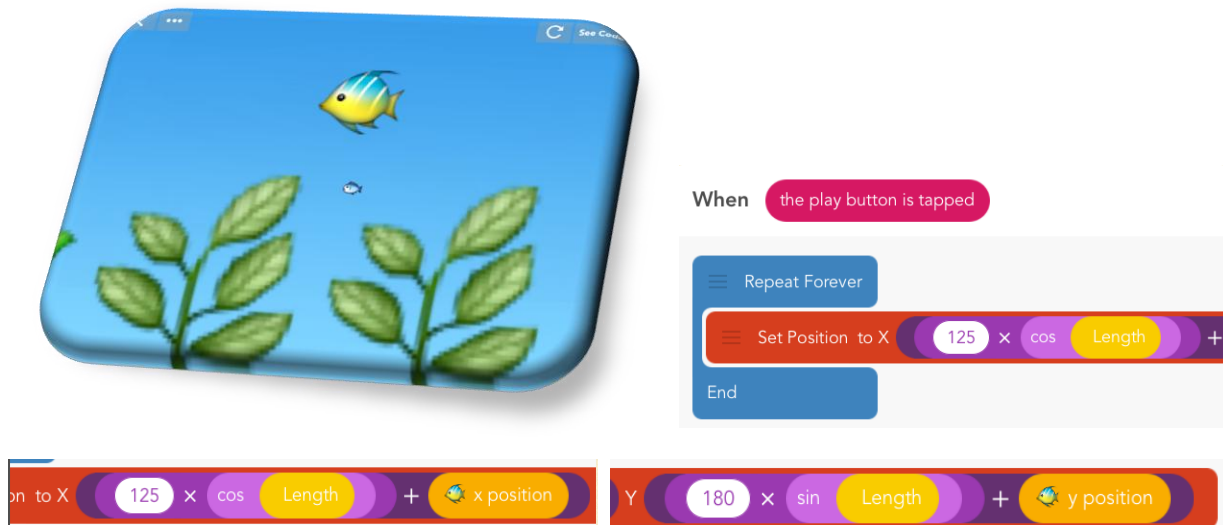
Technology Standards (1, 2, 3, 4, 5, 6)

In the following example, we use the video of the Hopscotch program Geometry Dash video to create the program using a different environment. The idea comes from an issue of Earthrise of Al-Jazeera. We see a video game with four Afghan women that have been hired to protect the environment. In the game, the vehicle is careful not to hurt the tiger by leaping over the tiger. If the jump is successful, it earns points .

Technology Standards (1, 2, 3, 4, 5, 6)

Hopscotch provides good support to students and is a superior resource for homework help.

21. Conclusion

A recent news report on CBC indicated that Canada is lagging behind in the global movement to introduce computers in the classroom. (http://www.cbc.ca/news/technology/canada-lagging-in-global-push-to-teach-kids-computer-coding-1.3185926) . In the newsletter, it was stated, one year after the adoption of the program in all schools of Great Britain, that the Canadian journalist was the first to meet the author of Computing at School to talk about the movement. While computer courses are available in many high schools, there are several reasons behind Canada's delay in the computer education for all students. There are more pressing concerns such as school funding, the number of students per class. Some believe that the technology is not in the curriculum and the teachers lack the necessary training to teach programming.

Britain adopted the program in their national curriculum, Computing at School. This movement to allow their students to achieve excellence was started and continued by concerned and passionate parents, administrators and teachers. They wondered how to help their students succeed in this field. After a few years of effort, they finally introduced the program in the curriculum. In the US, there is also programming in some of their schools, but it is far from all secondary and primary schools. Several organizations like Google and Code.org, in addition to the American president, continue to encourage its people to pursue this field. According to code.org, if a student knows how to code, he will become a super star.

Technology Standards (4, 6)

The world of education is experimenting with the best way to add technology in their schools. The model where each student learns at his school with an iPad is not viable because of the enormous costs of the acquisition of technology. A smaller model is to have a few iPad that divide the entire school. This work it was carried out with 15 iPad for the entire school and the iPad of the teacher.

What struck me most in reading the book "Most Likely to Succeed" is the mention of creativity tests that NASA uses to select their engineers and scientists. They also administered this test to children and adults. 98 % of children under 5 years are creative geniuses. There are 30 % of 10-year-olds , 12% of children 15 years and only 2 % of adults who are creative geniuses. Tony Wagner also shows that we live in an innovation economy. We must give a chance for our students to keep and develop these qualities of creative genius .

Following the model of Genius Hour, the students had the opportunity to participate in a project with technology, one hour per week and create something they care about. In my school, a class each year had the opportunity to learn programming. This manual was written to show how easy it is to code. If a student grade 3 or grade 4 is capable of coding and develop very creative programs, everyone is able to do it. In this manual, we have seen examples of the entire curriculum and all aspects of school life. All students were motivated to learn how to code and learn how to make a difference. They knew it was important and everyone brought their ideas to learn. Even the students with learning difficulties had some very creative ideas that contribute to their individual and group work. The Hopscotch app provides the necessary support for the students to learn independently and also offers the teacher a lot of ideas that we can bring into our lessons. If you have taken the time to consult this manual, I know you're the Superman or Wonderwoman well placed to help students bridge the gap of the world of innovation in education.

The Nobel Peace Prize of 2015 was awarded to the Tunisian National Dialogue, for his contribution to democratic dialogue during the troubled times of the Arab Spring . We, like them, should continue the dialogue in order to help all students succeed.

22. Glossary

Ability: Code that can be reused

Algorithm: A recipe for a program

Coding: Telling computers what to do

Concurrence: Two things happening at the same time

Conditional: Statements of the form "IF (something is true) THEN (do an action)".

Debugging: Finding mistakes in your code and fixing them

Event: When something happens

Iteration: Having ideas and making mistakes, over and over

Logic: The process of making decisions

Loop: Code that repeats

Operator: A mathematical symbol that makes an equation

Program: A set of instructions a computer can understand

Programmer: A person who writes programs

Programming Language: A set of rules or blocks that can be used to write any program

Random: When there's no pattern

Range: The highest and lowest number random can choose between

Rule: Instructions that tell your computer what to do (the command) and when to do it (the event)

Sequence: The order in which instructions are given to the computer

Object: A character or text with its own rules

Value/Variable: A holder for a number

This glossary was used with permission from the book « Hopscotch curriculum ».

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