**Log Book**

**I Spy with My Little Eyes: Preventing and Managing Myopia in Kids**

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**Wednesday September 25, 2024**

I began my planning today. I decided on a project on myopia and began to plan how I would format it. I hypothesized that reading and screen time are the main causes of myopia.

**Thursday September 26, 2024**

I began my official research today, on myopia, looking at some background information.

I found out that myopia typically develops in childhood as a result of the eye growing too long from front to back. Light is then focused at the front of the retina rather than on it as it should be. Myopia is nearsightedness, which prevents us from seeing far distances properly.

I figured out that near work plays a factor in myopia. People who spend more time reading and on screens are more likely to develop myopia.

**Friday, September 27, 2024**

I began to research some charts and more information about myopia. I looked up some factors of myopia, such as outdoor activity and near work (reading, screen time).

**Monday September 30, 2024**

I found out that the largest factor in managing myopia is outdoor activity. People who spend more time outdoors can manage the progression of myopia, as well as prevent getting it. People who spend more time near work should also spend more time outdoors to prevent and manage myopia.

Going outside more at an early age can help prevent myopia. If there is a history in your family, there is a higher chance of you getting myopia yourself because part of it is genetic.

**Monday November 11, 2024**

I began my official presentation today. I began taking all of my research and putting it together into a write-up and presentation.

**Tuesday November 12, 2024**

I continued my work from yesterday.

**Thursday November 14, 2024**

I continued putting together my presentation.

**Sunday November 24, 2024**

Myopia is a common eye focus disorder. More than 40% of the U.S. population has it. It presents difficulty seeing things that are farther away. This is because the light entering the eye is focused in front of the retina instead of on the retina. Children may be seen squinting and complaining of headaches and blurred vision.

Common causes of myopia include genetics, ethnicity, near work (reading and screen time), and not spending enough time outdoors.

**Thursday January 9, 2025**

Today, I learned about what the eye is. The eye is a sensory organ that light enters through. The eye sends a signal to the brain from the optic nerve. The brain decodes the message and builds a picture of what is happening around you.

I also learned about the anatomy of the eye, which is very complicated.

**Cornea:** Protects the inside. It does the work of bending light when it enters the eye.

**Iris:** What your eye colour comes from. It controls the size of your pupil.

**Pupil:** The small circle inside of your iris, and the pupil is black.

**Retina:** A thin layer of cells that are light sensitive. It converts light into electric signals. It contains rods and cones, rods helping you see low light and cones helping you see colours.

Also, sight and vision aren’t the same thing, even though they are often used interchangeably. Sight is what your eyes alone do. Vision is the entire process starting with sight and ending with the picture your brain has created through the signals.

**Friday January 10, 2025**

Did you know that there was a major increase in myopia during COVID? This is what I researched about today. In the United States, 40% of the population has myopia. The commonness of myopia is rising rapidly, from 30% globally now to 50% globally in 2050 in kids and teenagers. COVID had an impact on this because kids spent more time doing near work, including doing school online and doing near work for entertainment. They were also outdoors much less, if any at all.

**Saturday January 11, 2025**

I found out about newspaper articles with headlines relating to my project to look at. I also sent an interview to Dr. Bunny Virk, an optometrist at FYidoctors in Calgary. The questions are below.

1. What age do you suggest starting eye exams?

2. At what age does myopia usually start and when do you introduce glasses?

3. Is there a usual age at which myopia stops progressing?

4. How do you decide who may benefit from myopia lenses or atropine drops?

5. What is the difference between myopia and astigmatism? Do they usually occur together? Do the prevention and treatment strategies work for both?

**Sunday January 12, 2025**

I learned about Ortho-K, vision correction overnight contact lenses. I also learned a bit more about the causes of myopia. If both parents have nearsightedness, the child is 6 times more likely to develop it. Prolonged near work and shorter outdoor time significantly increase your risk of getting myopia.

I also found out a bit more about recommendations. It is recommended to spend at least 2 hours a day outside. It is also recommended to use the 20-20-20 rule when doing near work, which means that every 20 minutes of doing near work, we should look at something 20 feet away for 20 seconds.

**Sunday January 19, 2025**

I got a reply from Dr. Bunny Virk, lead optometrist at FYidoctors, Calgary, McKenzie Towne, which I incorporated into my presentation. The answers are below.

1. Optometrists recommend babies have their first eye exam between six and nine months

2&3. Myopia generally starts in school-age children and progresses until about 20 yrs old. Glasses are introduced when the patient requires them and vision is affected.

4. The best option for myopia control treatment would depend on a few factors, specifically the patient’s age, hobbies/activities, prescription, and ocular health. For example, a teenager may not tolerate the side effects of atropine, therefore would be better suited for myopia control lenses.

5. Myopia is simply ‘near-sightedness’, which means images far away appear blurry and light focuses in front of the retina. Astigmatism is due to improper curvature of the eye, which causes blur at all distances (both far and near) and light focuses on multiple points of the retina. They can occur together or separately. Astigmatism can also occur with farsightedness.

Treatment for astigmatism, similar to myopia, would include glasses, contact lenses, or refractive surgery (like LASIK/PRK), lens exchange depending on the severity. Prevention has been shown to work more effectively for myopia vs astigmatism. Techniques include giving your eye breaks from screens, playing outside and using myopic control devices.

Now that this was incorporated into my presentation, it was ready to print and put onto my trifold. Today, I set up my trifold with all of my slides.

**Monday January 20, 2025**

I created a handout for judges at the Louis Riel Science Fair. This handout summarized my project. This is what the handout said:

**What is myopia?**

Myopia, the medical term for nearsightedness, is when you can see things up close clearly, but things far away look blurry. Research suggests that myopia currently impacts one in three children and is rising rapidly. It is expected to affect 50% of all children and teenagers by 2050.

**Why is myopia important to prevent?**

* Myopia is associated with blurred vision and frequent headaches making it difficult to do schoolwork and other activities.
* Early treatment and prevention is important or it can lead to more serious eye problems later in life such as glaucoma, cataracts and even blindness.

**Prevention tips for kids**

1. Spend time outdoors

* Sunlight and looking farther helps keep your eyes healthy and reduces the risk of myopia.
* Try to spend at least 2 hours a day outside playing sports, walking, or just having fun!

2. Take breaks from screens and reading

* Staring at screens or books for too long can make your eyes tired and worsen myopia.
* Rule of 20-20-20: Every 20 minutes, look at something 20 feet away for 20 seconds.

3. Regular eye check-ups at least once a year, starting at ages 6-9 months.

**Management tips for kids and adolescents with myopia**

1. Wear Your glasses or contact lenses and continue regular eye check-ups.

2. Practice healthy habits like spending time outdoors and avoiding doing near work for long stretches.

3. Talk to your doctor or optometrist about Ortho-K, special lenses like MiYOSMART and Essilor Stellest, myopia control soft contact lenses, and drops like atropine to prevent the progression of myopia.

**Monday March 3, 2025**

I have gotten into the CYSF. Today I edited my presentation, adding future considerations.

My future considerations now are:

It is important to consider how to encourage more outdoor time in a climate like that in Calgary.

Myopia treatments are new. More research is needed on the long term use and effects, and on combining strategies versus using one.

It is also important to study prevention strategies for other eye conditions like astigmatism.

Global collaborative approach to myopia prevention and treatment is necessary to reduce the global burden of myopia.

Artificial intelligence may have a role in early diagnosis, personalized treatment and monitoring progression of myopia.

There are emerging treatments such as red-light therapy which are being studied. The studies are in early stages and safety standards are being determined.

I started putting some of my research onto the CYSF platform. Ethics and Due Care has already been approved.

**Saturday March 15, 2025**

Today, I uploaded my research and data onto the CYSF platform and made a video recording to put on. I completed the platform today.

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