



Fitness: using a systems thinking approach to make it more sustainable, educational and a means to reconnect with nature.

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Over the past number of decades, research has been increasingly drawn towards understanding and quantifying the benefits of exercise and the benefits of spending time outdoors. However, due to urbanization, technological advancements, and the advent of modern machinery and transportation, the connection between the two appears to be growing apart.

This project begins by analyzing the many issues with the current exercise industry/paradigm using the *Living Principles for Design Framework*. By utilizing the framework's four streams – culture, environment, people, and economy – to categorize information, it provides a holistic view that identifies leverage points and points of intervention to be considered for subsequent fitness trail designs, to strengthen the connection between the human body and nature.

Emphasizing those leverage points, a human-centric approach to design (*Design Thinking*) was then applied to further explore and develop possible solutions. To help accomplish this task, three different focus groups of varied backgrounds and ages were created. The focus groups were primarily used to gain empathy, engagement, and collaboration to develop out-of-the-box thinking and design possibilities by the user, for the user!

The resulting prototype developed for the client depicts an outdoor trail with four main spaces (each representing a 'nature-inspired' obstacle) located at consistent intervals throughout the trail. A fifth space, located inside the circumference of the trail was created for the purpose of stretching and meditation to help complete the mind-body-nature connection.

In the end, it can be argued that a human-centric design approach to create an outdoor fitness platform (one made of sustainable materials) not only provides a means to draw people outdoors, but:

- educates and brings awareness to sustainable living;
- advocates for a more sustainable means to exercise & achieve fitness; and
- strengthens an individual's connection between their body and nature.

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PROJECT INTRODUCTION

The project introduction section outlines the problem statement, sustainability challenge, strategic approach, sustainable impacts and scope of the project. The section concludes by highlighting the professional Goals intended to be taken away by the author.

Urbanization and rapid advancements in technology have not only led to a progressive disconnect between humans and nature, but have misguided modern day perceptions about exercise and overall fitness.

The planet has been witness to unprecedented population growth; global numbers reached 7.6 billion people in 2017, with 54% of individuals now living in urban centers.^{1,2}

Technological advancements have led to new discoveries, the development of new cures, the solving of problems that were once perceived as unsolvable, and to the creation of new products and materials.

This growth and advancement has many advantages, but has also led to many negative consequences that plague our planet, some of which are yet to be discovered or understood.

- Increased infrastructure has led to a decrease in natural resources and biodiversity.³
- Expanded urban (city) limits has overtaken surrounding natural landscapes.³
- The demand for food and fresh water has significantly decreased the planet's reserves.⁴
- There has been a significant increase in human created pollution and waste.²

This supply and demand challenge often leads to quick fixes that hurt the environment in the long run. In this aspect, the fitness industry is no different. Over the last number of years, the demand for bigger and better, has led to a dramatic increase in modern fitness centers.⁵

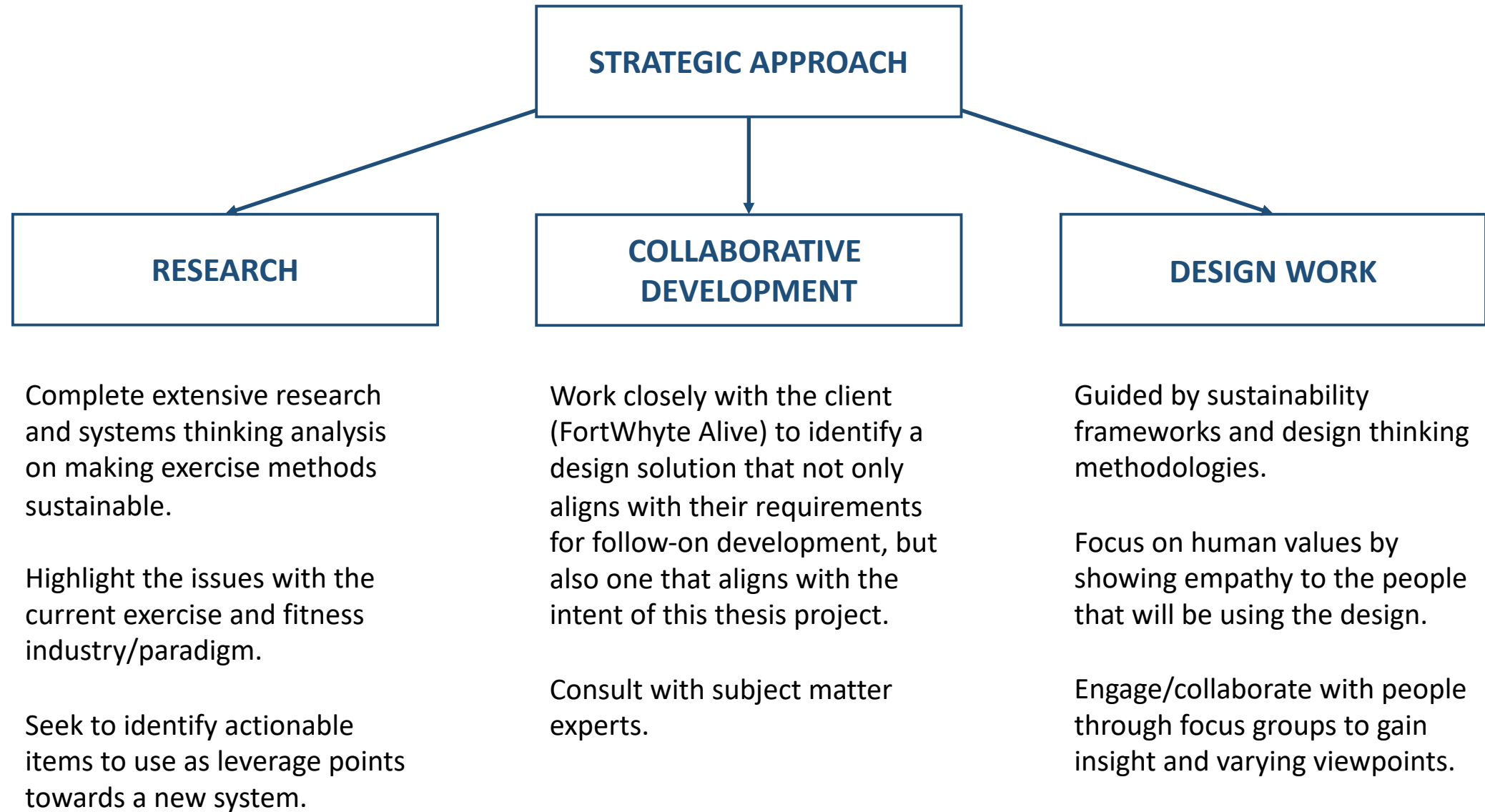
Once considered a necessity and way of life, humans depended on their fitness to perform physical actions necessary for work and survival.⁶

With the advent of modern machinery and transportation, humans for the most part have moved away from natural movement outdoors and into cars, buses and trains to move them from place to place. As time went on obesity rates started to rise and have recently reached epidemic proportions.⁷ This appears to indicate a shift in perception that humans have gone from one extreme to another.

Many people today exercise because they want to look good and feel good, however, the way they work to achieve these goals is by purchasing expensive gym memberships and running on indoor treadmills.⁸ The connection between the human body and nature is being left behind.⁹ Today, the global population seems to be in a fitness crisis. With what seems as a limitless number of fitness centers (the majority of which are located indoors), increasing number of technological fitness gadgets, and an increasing need for motivation to exercise, it is a stark contrast in what was experienced in previous years.

This increased focus on fitness is a positive trend in society. Yet it brings challenges to the environment (building increasing numbers of fitness centers and creating more technology). Research shows that some time spent in nature yields many benefits to the individual.¹⁰ Could we combine fitness and the outdoors in a way that helps to restore an individual's connection with the simplicity of being outdoors?

This thesis project aims to explore the current exercise and fitness landscape using a systems thinking approach, to identify leverage points and points of intervention, and to design a new system for exercise; one that focuses on the basics, educates, brings awareness to sustainability, and aims to strengthen one's connection with the outdoors.



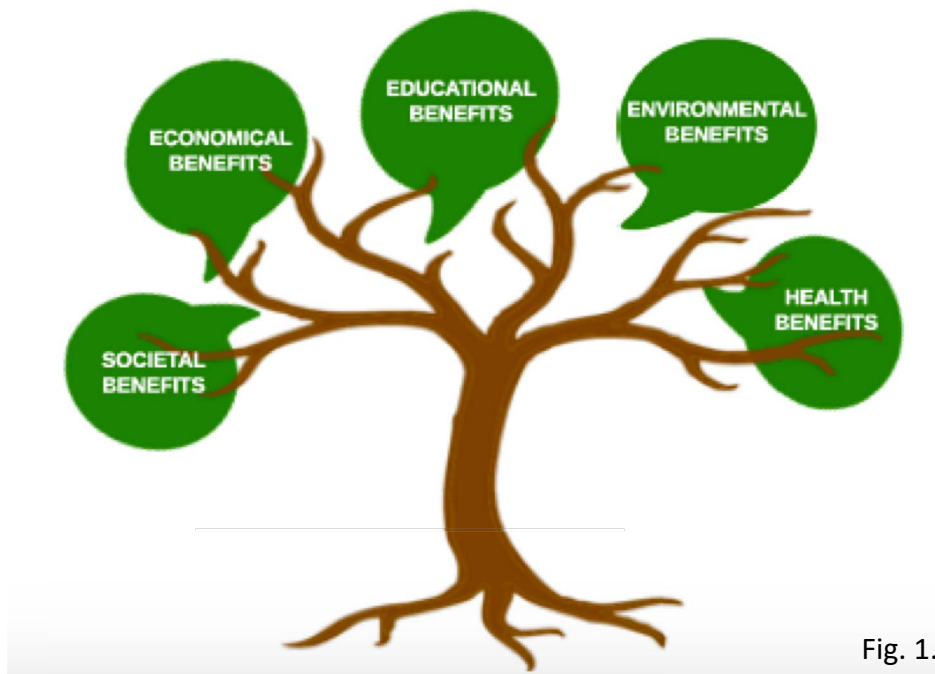


Fig. 1.

SUSTAINABILITY: *“is maintaining a delicate balance between the human need to improve lifestyles and feeling of well-being on one hand, and preserving natural resources and ecosystems, on which we and future generations depend.”¹¹*

PROJECT GOAL: to use fitness as an intervening point to:

- push sustainability awareness & education; and
- re-establish &/or strengthen the connection between humans and nature.

POTENTIAL BENEFITS:

Societal Benefits: Increased opportunity for social interaction. Increased awareness for community space and nature. Fosters sense of shared responsibilities.

Economic Benefits: Supports natural infrastructure for human enjoyment. Negates necessity for gym memberships. Attracts users/visitors to parks and green spaces. Encourages increased time spent outdoors – away from technology.

Educational Benefits: Provides platform for natural, cultural and heritage education. Opportunity for experiential education and to increase one’s respect for nature.

Environmental Benefits: Reduced need/desire/requirement for indoor fitness center infrastructure (by reducing supply & demand). Being in close proximity to parks with fitness trails, equates to reduced vehicle trips, congestion, and GHG emissions.

Health Benefits: Promotes healthier communities by supporting and improving mental and physical health. Healthier populations lead to increased productivity and more enjoyment in life.

- An in-depth systems thinking analysis of the current fitness and exercise industry/paradigm.
- Conduct research, surveys, & interviews to ensure an effective and well received product.
- Gain insight from various individuals through the application of small focus groups. Aim to have individuals of varied background and view points, as well as age.
- Design a collaborative outdoor fitness-trail prototype.

- Collaborate with outside organizations to design and develop a 'real' sustainability-geared product and/or service.
- Become more familiar with systems thinking methodologies in order to identify intervening and leverage points.
- To design (and introduce) a creative means to educate and bring awareness to sustainability.
- Expand knowledge and networking contacts of those in the outdoor industry, as well as to identify other points of intervention for future collaborations.
- Expand knowledge in trail design, and gain a better understanding of using landscape features to shape designs.
- To create products that inspire people to get outdoors and into nature. To help restore a lost connection with nature, and to identify the many benefits associated with its reconnection.
- Expand knowledge in exercise and fitness, and gain a better understanding of how to apply design around the basic fundamental human movements.

PROJECT EXECUTION

The project execution section begins by providing information about the client for whom the project designs are intended for: FortWhyte Alive. To ensure alignment with the client's desires, a list of requirements was created between the author and client at the start of project work.

The section continues by outlining project objectives, proposed frameworks, and highlighting the project's application of the *Living Principles for Design Framework*. This framework was used to highlight key aspects about the current fitness industry/paradigm and to identify points of intervention to be used in subsequent designs.

FORTWHYTE ALIVE:

- **WHO?** FortWhyte Alive is a not-for-profit organization that relies on caring staff & volunteers, grants, donations and fundraising to provide for the community.
- FortWhyte Alive is a 640-acre protected urban green-scape, consisting of prairie, lake, forest and wetland.¹²
- FortWhyte Alive is a nature center, a wildlife refuge, and a place for education.
- **WHAT?** FortWhyte Alive is,
 - *“dedicated to providing programming, natural settings, and facilities for environmental education, outdoor recreation and social enterprise. In doing so, FortWhyte promotes awareness and understanding of the natural world and actions leading to sustainable living.”¹²*
 - Their goal is to *“connect humans with nature through experiential programs and events that foster sustainability.”¹²*
- **THE CONNECTION?** FortWhyte Alive has expressed its desire to install an outdoor fitness trail. The dedicated time and effort afforded by this thesis process, provides FortWhyte Alive with an opportunity to receive an in-depth analysis, including designs to move forward with their fitness trail desire.
- A meeting was conducted with the client (FortWhyte Alive) in February, 2018 to determine a list of requirements for their outdoor fitness trail. Refer to Appendix B for further detail.



Fig. 2.

- Establish a working relationship with the client (FortWhyte Alive).
- Use a sustainability framework to identify actionable items, to help bridge the gap between current state and future needs/desires for the purpose of designing an outdoor fitness trail.
- Use *Design Thinking* as a guiding design process.
- Engage with groups of individuals who have varied viewpoints and backgrounds to produce out-of-the-box thinking and user insight.
- Design a well researched, human-centric fitness trail prototype that exceeds the client's expectations. The design will strive to highlight sustainability education and awareness.
- Outline a comprehensive list of next steps for the client to ensure a smooth transition from project results and concept drawings to design development and beyond.

→ Actual frameworks used

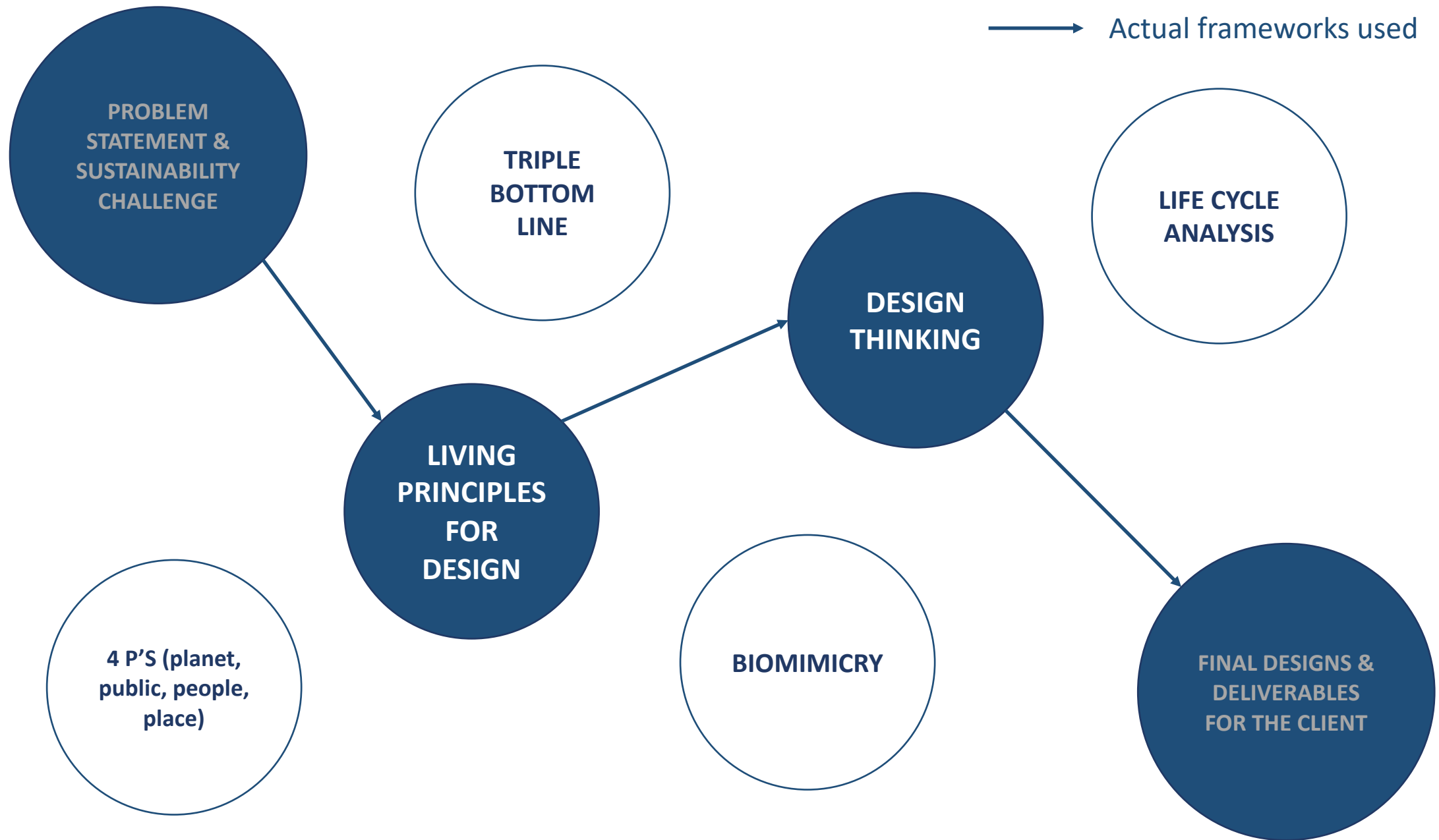




Fig. 3.



“The Living Principles for Design Framework is a catalyst for driving positive cultural change. It distills the four streams of sustainability – culture, environment, people, and economy – into a roadmap for sustainable design that is understandable, integrated, and most importantly, actionable. The Framework is meant to help designers and their clients take a holistic view and optimistic approach to sustainable solutions.”¹³

The Living Principles for Design Framework is intended to not only highlight the many issues with the current exercise industry/paradigm from the point of view of each of its four streams, but will identify leverage points and points of intervention to be considered for subsequent designs.

“If you change the way you look at things, the things you look at change.” – Wayne Dyer



Culture

“Actions and issues that affect how communities manifest identity, preserve and cultivate traditions, and develop belief systems and commonly accepted values.”¹³

JOURNEY MAP

- Primal Times (move to survive)
- Neolithic Times (fitness through agricultural actions)
- Ancient Times (fitness from war/battle preparation)
- The Dark Ages (body rejection)
- The Renaissance (fresh start – focus on body & physical education)
- Industrial Revolution (fitness for patriotic pride & civic duty)
- Rise in Modern Fitness Industry (rise in competitive sport & fitness)
- Current State = Overwhelmed (limitless fitness choice)¹⁴

‘MCDONALDIZATION’ OF FITNESS CENTERS

- Has had a huge effect on how fitness centers are created & for their rise in popularity:
- Efficient - offers an efficient method for satisfying many different needs.
 - People can calculate how much time it will take.
 - Predictable - offers no surprises. Products & services are highly predictable.
 - High Turnover - space created allows customers to carry out required tasks quickly and leave.¹⁵

“People think now, because of the health-club fitness movement, that in order to exercise you need to join a fancy club and wear fancy clothes. In fact, some of the best exercise, research is showing, doesn’t require a gym membership at all!”¹⁶

FITNESS CULTURE

- Body building & fitness are synonymous with cultural concepts of beautiful bodies.¹⁷
- Exercise brings individual happiness and promise to look & feel good.¹⁸
- Rise in US health clubs is directly related to growing urban populations of singles (emerged as social centers).¹⁹
- Exercise became preventative medicine for individuals – reduce stress, disease symptoms & to improve/extend healthy living.²⁰
- Shift in ‘less physical work’ required humans to get fit in other ways.²¹
- Corporations started to take note of exercise costs & benefits (ref. productivity).²²
- Health care costs diminished for those that took part in regular exercise.²²
- Humans are enamored with youth – being fit symbolizes strength.²¹
- Rise in fitness was a response to crises in both health and identity.²¹
- *“Having Lost faith in much of society, government, business, marriage, the church... Exercise is how we take control over our lives.”²¹*

EMPLOYEE HEALTH & WELLNESS

- Increased productivity
- Reduced absenteeism
- Enabled recruitment & retention
- Improved overall morale²¹

WHY FITNESS CENTERS?

- They enable exercise in all weather conditions.
- They provide multiple workout options.
- Joining reassures one’s commitment to exercise.
- They allow one to feel socially connected.
- They provide reinforcement to stick to exercise routine.
- Is as much psychological as physical.²¹

Key Takeaways:

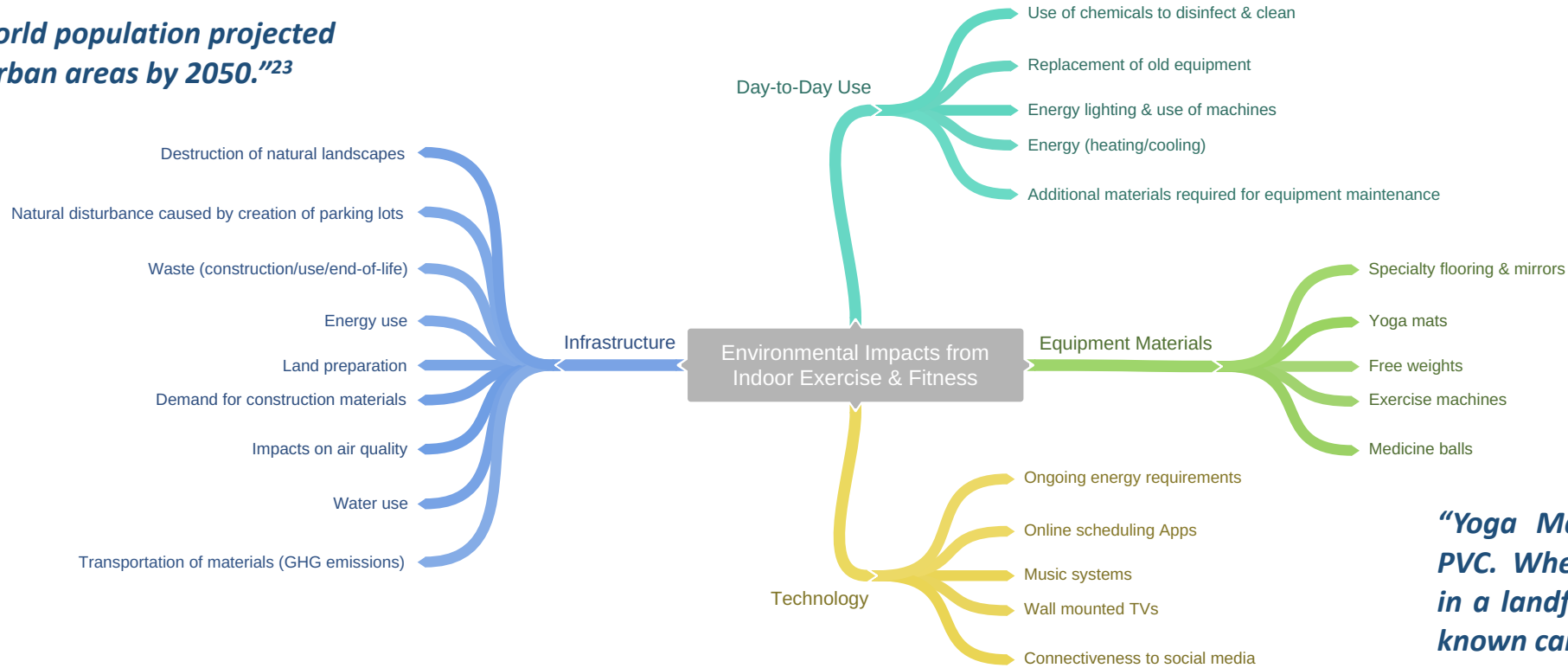
- Overwhelming choice of fitness fads & trends.
- All weather solution preferred.
- Membership costs force commitment.



Environment

“Actions and issues that affect natural systems, including climate change, preservation, carbon footprint and restoration of natural resources.”¹³

“68% of world population projected to live in urban areas by 2050.”²³



“Yoga Mats are often made of PVC. When incinerated or buried in a landfill, it releases dioxin – a known carcinogen.”²⁵

Fig. 4.

“More than half of the urban land cover on the planet by 2030 has yet to built – an expansion that will have a direct impact on biodiversity hot spots.”²⁴

Key Takeaways:

- Many negative environmental impacts associated with fitness center infrastructure.
- Hidden costs are often overshadowed by health benefits.



People

“Actions and issues that affect all aspects of society, including poverty, violence, injustice, education, healthcare, safe housing, labor and human rights.”¹³



Fig. 5.

“An Ipsos Reid Poll (as cited in Nature Conservancy of Canada, 2011) reported that 90% of respondents agreed that the more connected they felt to nature, the happier they were; yet on average, Canadians spend almost 90% of their time indoors.”²⁶

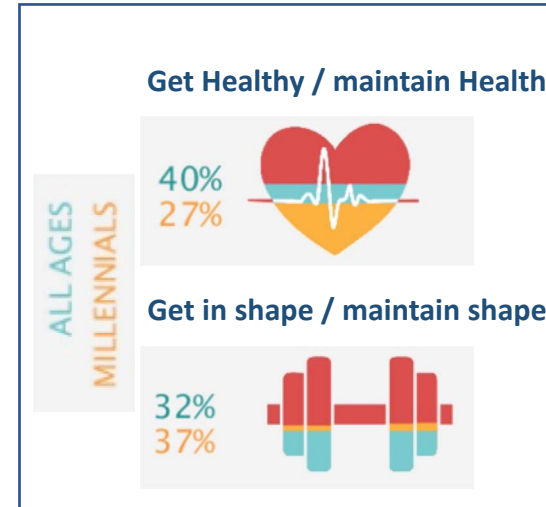


Fig. 6.

2018 FITNESS TRENDS

- High intensity interval training
- Group training (5+ participants)
- Wearable technology
- Bodyweight training
- Strength training
- Professionalism (certification)
- Yoga
- Personal training
- Programs for older adults
- Functional fitness²⁷

MILLENNIALS

- Wellness is a daily, active pursuit.
- They exercise more & eat smarter.
- Willingness to spend money for a healthier lifestyle.
- Use fitness apps, more than any other age group.^{28,29}

Key Takeaways:

- Top Drivers: location, atmosphere, equipment, entertaining, & social.
- Ideal Experience: fun, calm, convenient, & challenging.
- People are willing to spend \$ to try new fitness trends.



Economy

“Actions and issues that affect how people and organizations meet their basic needs, evolve and define economic success and growth.”¹³

GLOBAL: 2016 #'S

Market size of global health club industry	83.15 billion USD
# of health and fitness clubs worldwide	201,000
# of members of health/fitness clubs worldwide	162.1 million

USA: 2016 #'s

Health club industry revenue in the US	27.6 billion USD
# of health and fitness clubs in US	36,540
# of members at health & fitness clubs in US	57.25 million
Health & Fitness club industry employees in the US	713 thousand ³⁰

REASONS FOR JOINING A FITNESS GYM

- Stay healthy
- Weight reduction
- Optimizing strength &/or endurance
- Improve body image & overall appearance³⁰

“Almost 2/3 of people who regularly exercise are, or have at some point been a member of a health club or gym.”³⁰

PHYSICAL INACTIVITY

- Is a primary cause of most chronic diseases.
- Is detrimental to health & normal organ function capabilities.
- The body rapidly mal-adapts to insufficient physical activity.
- Sedentary employees are vulnerable to ailments.³¹

PHYSICAL ACTIVITY

- Evidence suggests that exercise therapy can be just as effective as medical treatment.
- 1-20 minutes of daily exercise can dramatically lower the risk of developing serious chronic disease.³²

“The estimated direct, indirect, and total health care costs of physical inactivity in Canada in 2009 were \$2.4 billion, \$4.3 billion, and \$6.8 billion, respectively. These values represented 3.8%, 3.6%, and 3.7% of the overall health care costs.”³³

Key Takeaways:

- Global health club industry market size = 83.15 billion USD (2016).
- Being physically fit makes economical sense.
- Being fit has many proven health benefits.

PROJECT OUTCOME

The project outcome section follows the *Design Thinking* process. Though the next slide outlines the final design package, the design process and individual design sketches are shown in greater detail in subsequent slides.

The human-centric process begins by identifying stakeholders, expert & user input, design drivers/lenses, and potential barriers. For the purpose of this project, the *ideate* phase not only highlights brainstorming thoughts, but the design approach taken; the *prototype* phase discusses final individual design sketches (obstacles); and, the *test* phase shows the complete package. In order to fully grasp the concepts behind the final designs, one must follow the story told through each consecutive phase.

The section wraps up by outlining next steps to be taken (both short and long term) and final concluding thoughts.

Using the desired site as indicated by the client, the highlighted area (to the right) depicts the proposed outdoor fitness trail. The fitness trail consists of four spaces in the form of obstacles (#'s 1-4) with a 5th space to represent a stretching and meditation area.



Fig. 7.



Fig. 8.

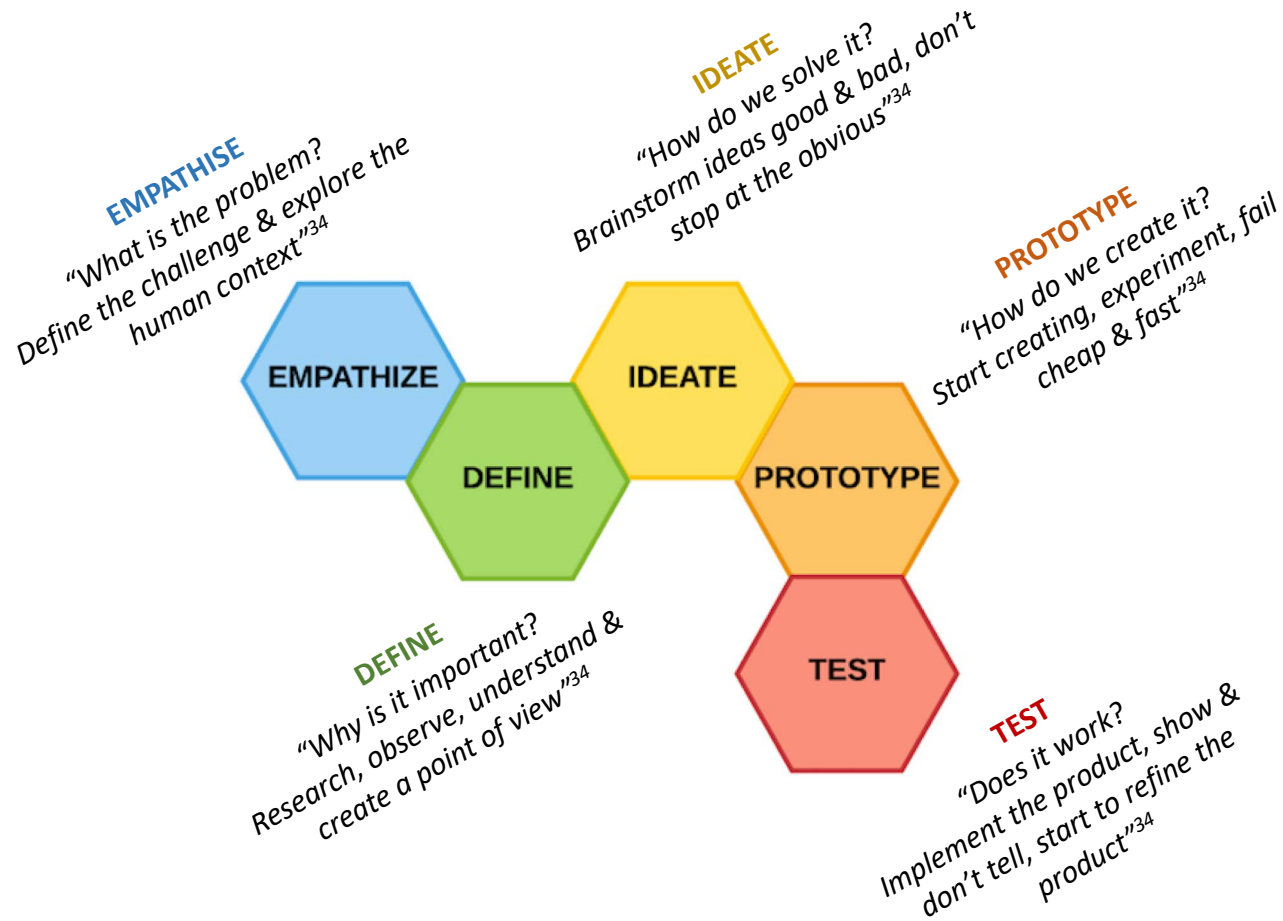


Fig. 9.

Using the leverage points and points of intervention obtained from the Living Principles Framework, the focus now turns to creative problem solving. To achieve this, the Design Thinking Framework will guide these actions.

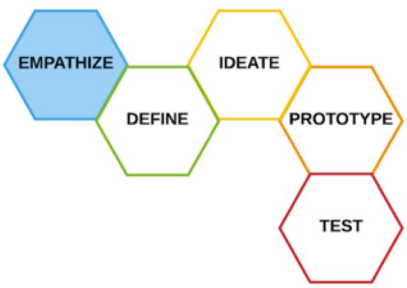
"Design Thinking is a process for creative problem solving. It encourages organizations to focus on the people they're creating for and leads to human-centered products, services, and internal processes. The core of design thinking is getting actionable and knowing your questions. It's about simple mindset shifts or ways of asking questions differently – a new way to look at problems."³⁵

"3 Important Aspects of Design Thinking:

1. Empathy (human-centered)
2. Ideation (generating lots of ideas)
3. Experimentation"³⁵

"When done right, Design Thinking:

- captures the mindsets and needs of the people you're creating for;
- paints a picture of the opportunities based on the needs of these people; and
- can start to anchor on your designs and offers."³⁵



STAKE HOLDERS

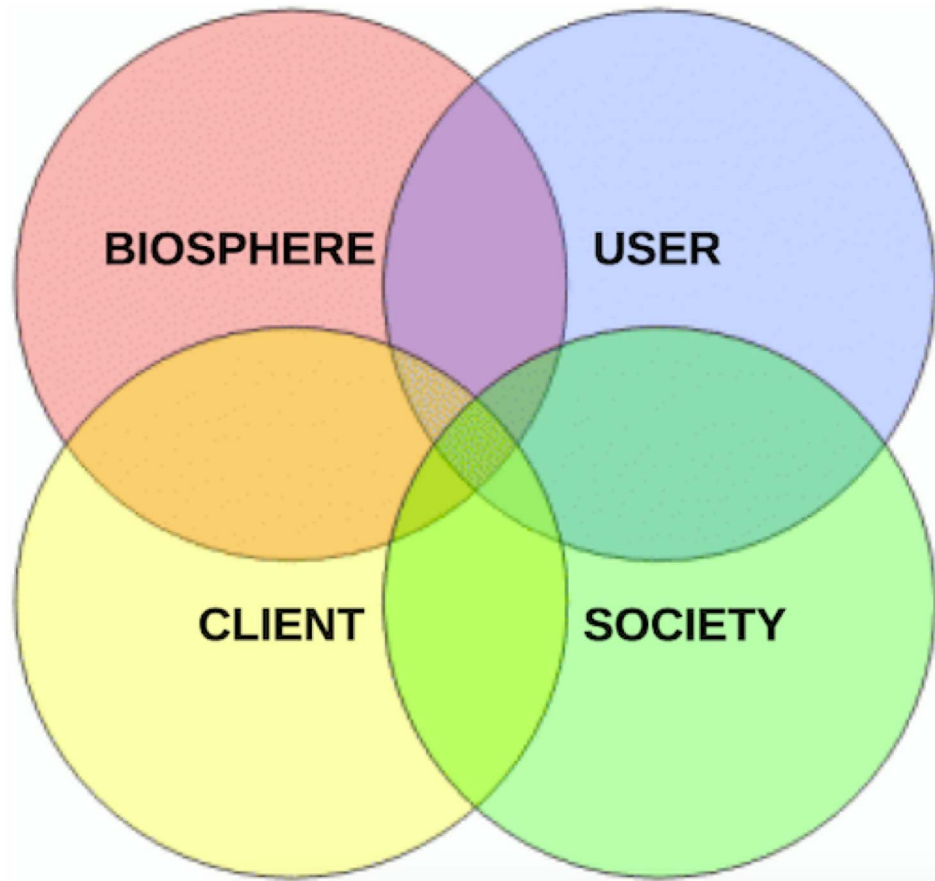


Fig. 10.

BIOSPHERE – includes the air, soil, water, and all living organisms within the environment. Greater significance is given to the living organisms in or around the location where the design will be implemented.

Habitats: Prairie Grasslands, Aspen Parkland Forest, Wetlands (cattail marshes), Lakes & Riparian Zones.

Local animal residents: bison, black-tailed prairie dog, red-tailed hawk, white-tailed deer, eastern cottontail rabbit, red-sided garter snake, Canadian geese, bald eagle, northern pike, walleye, perch, variety of duck, western painted turtle, among many others. (Information provided during a verbal conversation with Renee Olafson-Dyck, Interim Director of Education at FortWhyte Alive, October 10, 2018.)

USER – all those who interact and/or will use the outdoor fitness trail.

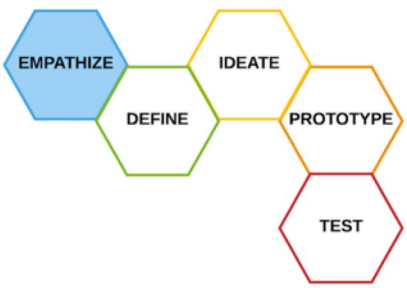
Families, nature enthusiasts, athletes, summer camp participants, schools, etc.

SOCIETY– all those who are affected by the fitness trail – both directly and indirectly.

Surrounding communities, businesses.

CLIENT – the organization that has requested the design.

FortWhyte Alive.



CONSULTING WITH EXPERTS

The following information is a compilation of interviews, document review, and materials produced by subject matter experts in the design, building of, and educating people about fitness and being outdoors.

IMPORTANCE OF PLAY AND BEING OUTDOORS:

Include Loose Parts

- Play is meant to be unstructured and self-directed.
- Play is built on being real, raw, and natural.
- Loose parts forces creativity.

Four Seasons

- Build spaces to allow for year-round access.
- Plant herbs & vegetation for all seasons.

Human-Centric Design

- Involve children in the dreaming (design) process.
- Design in such a way that users are compelled to move.
- Size matters.
- *“We all deserve to feel small next to an ancient tree, or huge next to a challenge.” - Bienenstock*
- Create obstacles that balances RISK and REWARD.

Engage Senses

- Vary texture and material.
- Create soundscapes.
- Plant herbs to ignite different sensory moods.

**See reference 36*

EDUCATION:

Philosophies

- Allow for imaginative, open-ended play as well as spaces for creativity; and, ensure clear division between the two (safety measure).
- Create each space to be engaged with and interpreted differently from user to user. Allow for hands on experiences.
- *“Play to learn – learn to play.” - Mathis*
- Physical activity must embody a holistic approach – mind & body!
- *“Learning to move is as important as reading and writing skills, and the ability to work with numbers.” - Kriellaars*

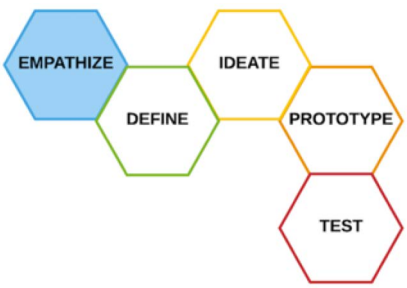
Time in Nature - Individually

- Helps to reduce stress.
- Increases feelings of empathy for other users and for nature.
- Leads to a deeper sense of spirit.
- Allows one to become more creative and playful.
- Increases one’s overall physical and mental health.
- Better sleep and mood.

Time in Nature - as a Society

- Increases tendency to protect park land and natural spaces.
- Reduces overall high inactivity levels.

**See reference 37*



USER INPUT

Three focus groups were used to gain a more in-depth understanding of the user. Two parallel focus groups were created that were composed of adults, using Facebook as the means to communicate. A third focus group was a one-week *Outdoor Fitness-Trail Building Challenge* given to a group of 24 kids (ages 11-13) who were taking part in a summer camp. Group demographics and additional information can be seen in Appendices C, D, and E. Some of the information derived from these focus groups has been summarized below.

Fig. 11.

5 Adults:
Varying ages & occupations



June 11
Why do I play outdoors? I don't want to say train because I really don't like to "exercise". I like to be active - and the more that resembles play or activity that makes me simply enjoy being in the moment because of the company or surroundings, the better. I am a person that chased numbers and goals all my life and spent hours in hot, loud gyms with artificial lights, running on machines that took me nowhere and lifting things only to put them back down in the same spot. I now choose activities that get me outside, allow me to breathe fresh air, appreciate the beauty that is naturally present and to connect with my kids without electronics, TVs or watching other people do more or better things - we get enough of that through our daily life or organized sports (which we also love!)

June 10
These are the reasons why I train outdoors:
1) Easily accessible: It's much more easier to step out of the house and start a workout in a park nearby or in the forest in my backyard, then get in the car and drive to the gym. It's easy for me to do a high intensity workout in my backyard while the kids are home
2) Love of the outdoors: there is nothing like breathing fresh air while exercising. I can't stand the smell of sweat in a gym.
3) Diversity of workouts (depending on the type of terrain I can vary my workouts (trail running in the woods, sprints in the sand, hill workout) as well the weather will influence my workout. If it's raining hard I will do a slow run in the woods in a sheltered area. If it's a beautiful day, I might go for a run/workout/bike ride along the river.
4) Its low cost! Membership in a gym can be very expensive!

Fig. 12.

5 Adults:
Varying ages & occupations



The fresh air and the natural beauty draws people outside. Partaking in outdoor fitness results in increased stamina and overall sense of well-being.

Using natural elements (boulders, logs, trees) in creative ways for outdoor areas encourages users to engage their imagination and their bodies- to think outside the box. This encourages exercise of the brain and other muscles at the same time.

I think what makes outdoor fitness the most fun is engaging in fitness with others.

7w Like Reply

24 Kids (Ages 11-13):
4 Groups of 6



Fig. 13.

How do we make outdoor fitness fun?

- Build obstacles to entice a team concept as well as individual.
- Build obstacles to have varying levels of difficulty.
- Include 'hidden treasures' to heighten senses.
- Allow users to help create obstacles.

How might we draw people outdoors for exercise?

- Use natural elements in creative ways.
- Encourage users to engage their imagination and bodies.
- Instill a sense of 'play.'
- Engage an individual's sense of curiosity.

What draws people outdoors?

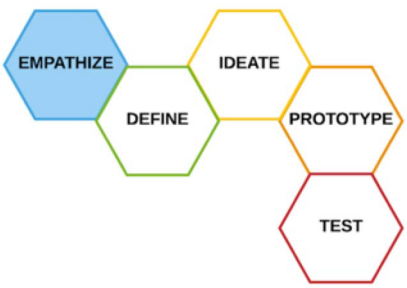
- Fresh air.
- Accessibility.
- Changing scenery.
- Natural organic beauty.

Positive feedback gained:

- Exercise is 'fun' when completed on obstacles and/or structures.
- Exercise is preferred to be done in teams or groups.
- Participants all had a general understanding of basic fundamental human movements.

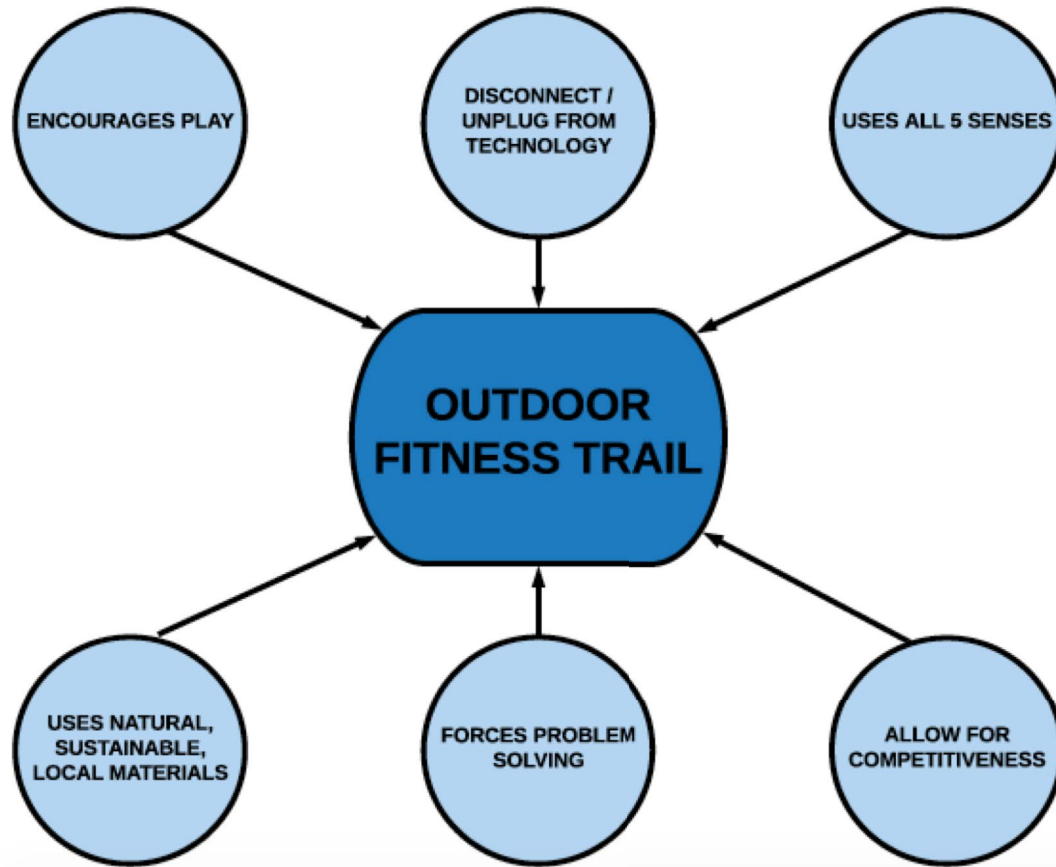
Negative feedback gained:

- Large association with technology and its inclusion in exercise.



KEY DESIGN DRIVERS (LENSES)

The below *Design Drivers* derived from discussions with the client, as well as the participants in the two online focus groups. Once the list was finalized, participants in the two online focus groups were asked to rank them in order of importance. The diagram below outlines the 6 Design Drivers, and highlights the top 3 and bottom 3 as indicated by the two focus groups.



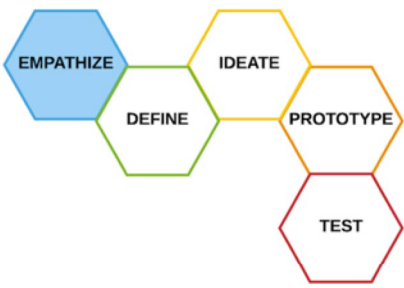
Participants were asked to provide comments to support their rankings. Below are some of those comments that were received:

"The lack of 'play' and reliance on technology are the two reasons why we're seeing a decline in human health and happiness." – C.C.

"Modern living has made us rely more and more on technology and part of it has taken away the appreciation for our natural surroundings for many people. Lots of kids these days rely heavily on video/computer games and now iPads. As adults, we behave the same way; we tend to get too busy in work/personal life and sometimes forget to take care of ourselves and our bodies." – J.F.

"In our busy world, taking a little time to simply play, smile, and decompress without expectations or standards is so very important." – S.G.

"We're so busy and distracted that we've lost touch with our sense of play, which has always been woven into the fabric of everyday life until only very recently in human history." – C.C.

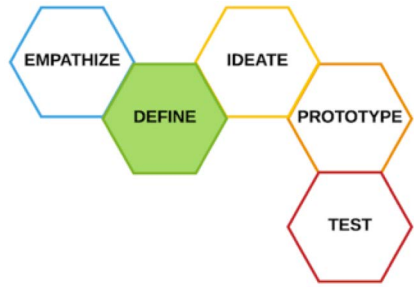


POTENTIAL BARRIERS

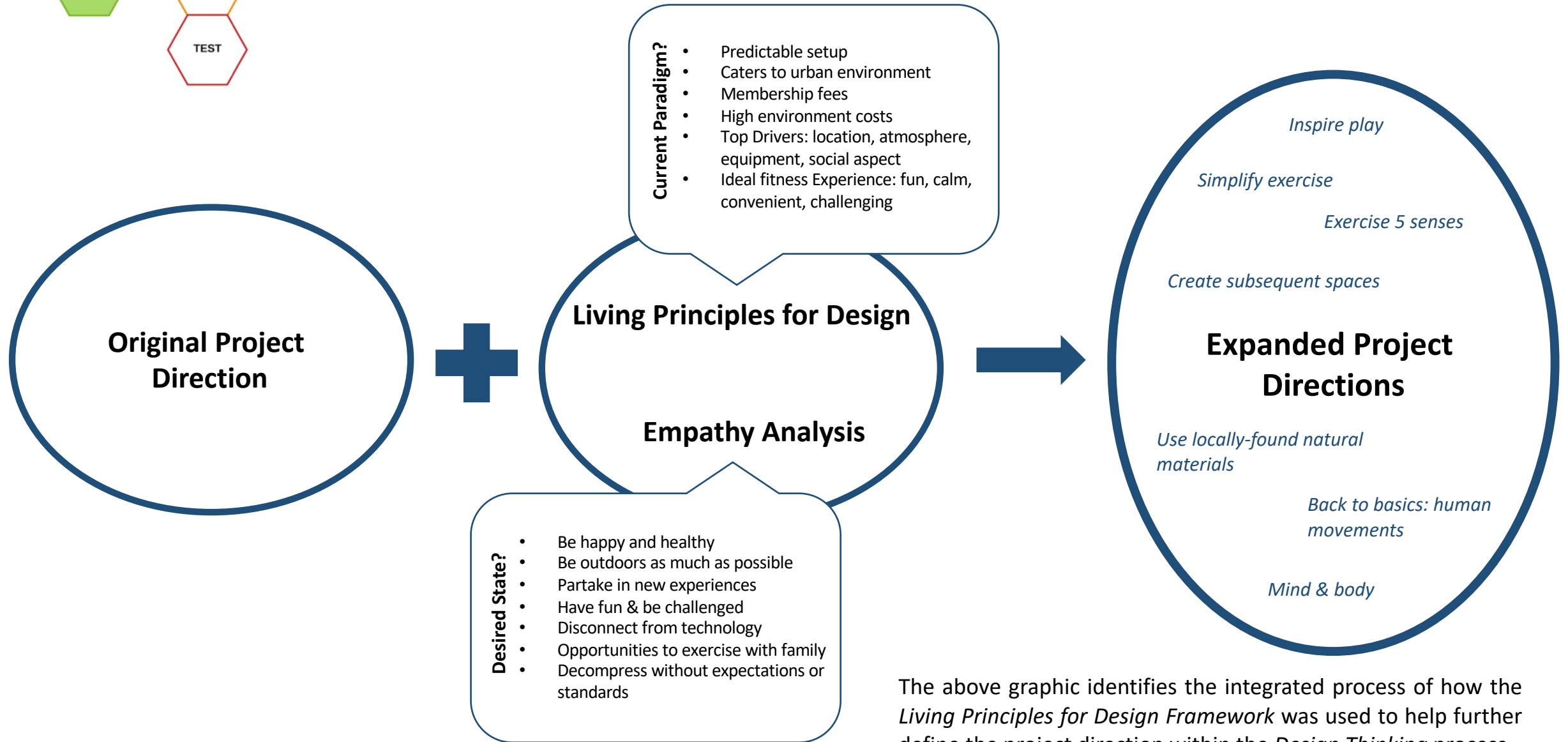
The following word picture depicts the many problems, concerns, and/or perceptions that people associate with exercising outdoors. The below barriers were identified during focus group discussions as well as through additional research.



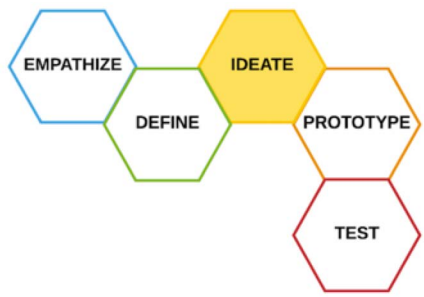
Fig. 14.



RE-DEFINING THE PROBLEM



The above graphic identifies the integrated process of how the *Living Principles for Design Framework* was used to help further define the project direction within the *Design Thinking* process.



BRAINSTORMING

PROJECT INSPIRATION



SIMILAR TYPES OF FITNESS/EXERCISE TRENDS

Creating an 'enjoyable' yet challenging platform for exercise and fitness

- Annual Royal Military College (RMC) Obstacle Course
- Obstacle Course Races

Using nature as a source of learning & reconnecting

- Learning Landscapes
- Natural Play grounds
- West Coast Trail System

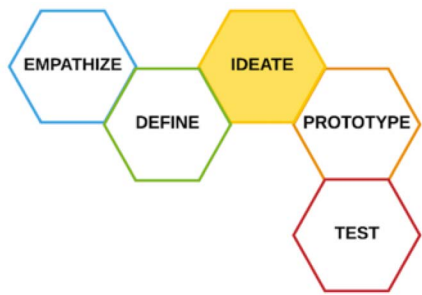
Focus on body movement & flow

- *Natural Movement Fitness (MOVNAT)
- *Primal Play
- *Somatic Learning
- Parkour – Free Running

Outdoor fitness trails and stations that mimic indoor setups!

- *Par course
- Outdoor human kinetic machines

*Additional information on the above terms can be seen in Appendix A (Glossary of Terms).



DESIGN APPROACH

The following design approach outlines the process that will be used to complete the designs/deliverables for the client.

*The 6 Lens Analysis is a question/answer process that was used to stimulate brainstorming and out-of-the box thinking. Questions used can be further examined in Appendix G.

Identify Natural Objects / Obstacles



Cross-reference with Basic Fundamental Human Movements

***process used to identify top 4 natural objects that have the greatest exercise platform potential*

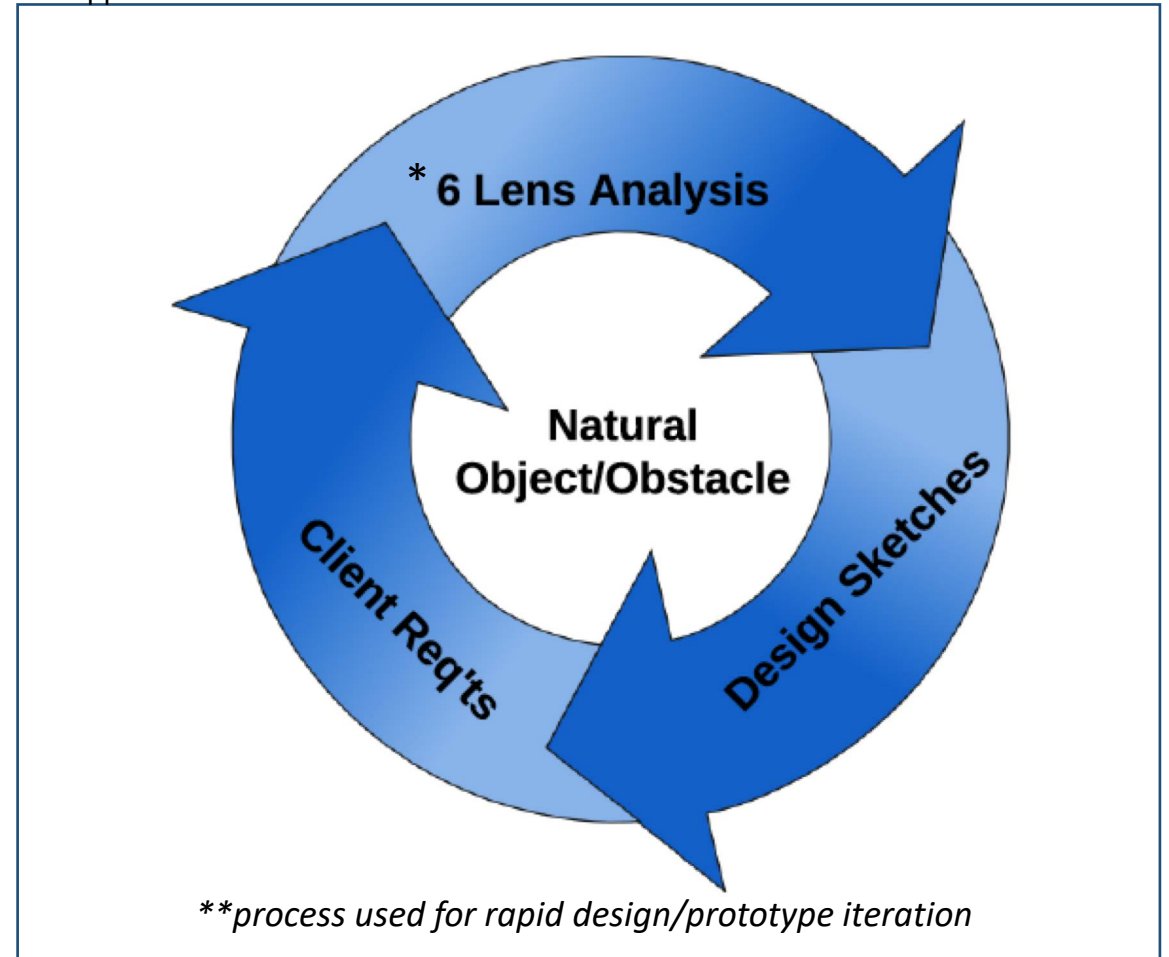
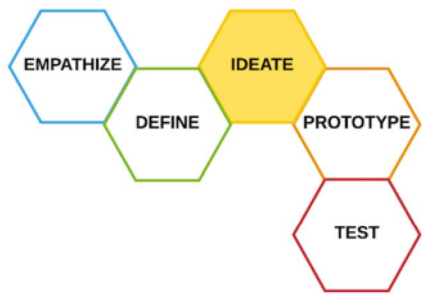


Fig. 15.



IDENTIFY NATURAL OBJECTS/OBSTACLES

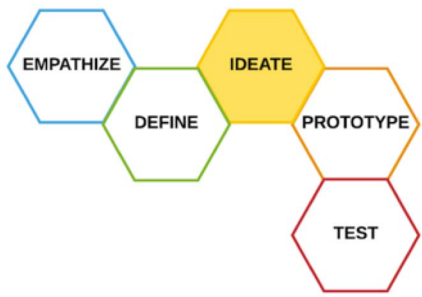
The following word picture depicts natural objects/obstacles in the client’s local region. A site assessment was completed to ensure accuracy.



- Natural materials provide & inspire:
- Natural flow and rhythm
 - Natural Feel
 - Strengthen one’s connection to his/her natural surroundings

Fig. 16.

‘How do you bring nature to life? You use the simplest of materials.’ – Andy Goldsworthy



CROSS-REFERENCING HUMAN MOVEMENTS

The below table identifies the top 4 natural objects that have the greatest potential to maximize fitness opportunity when used in the form of an obstacle. A comprehensive matrix including notes and reasoning as to why these four were chosen can be further analyzed in Appendix F.

Natural Obstacle	Pull	Push	Squat	Lunge	Hinge	Rotation	Gait
Felled Trees (log pile)	X	X	X	X	X	X	X
Willow Bushes (thick vegetation)			X	X	X	X	X
Boulders	X	X	X	X		X	X
Drift wood			X	X	X	X	X

Pull – “pulling a weight towards one’s body, or one’s body towards an object.”³⁸

Squat – “lowering one’s body in place with feet firmly planted.”³⁸

Hinge – “the act of bending at the waist with a neutral spine.”³⁸

Gait – “the technique of walking (includes jogging, jumping, etc.).”³⁸

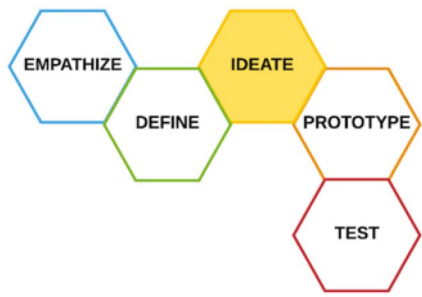
Push – “pushing a weight away from one’s body, or one’s body away from an object.”³⁸

Lunge – “lower body movement that involves stretching one foot out in front of the other.”³⁸

Rotation – “a motion that involves twisting at the core.”³⁸

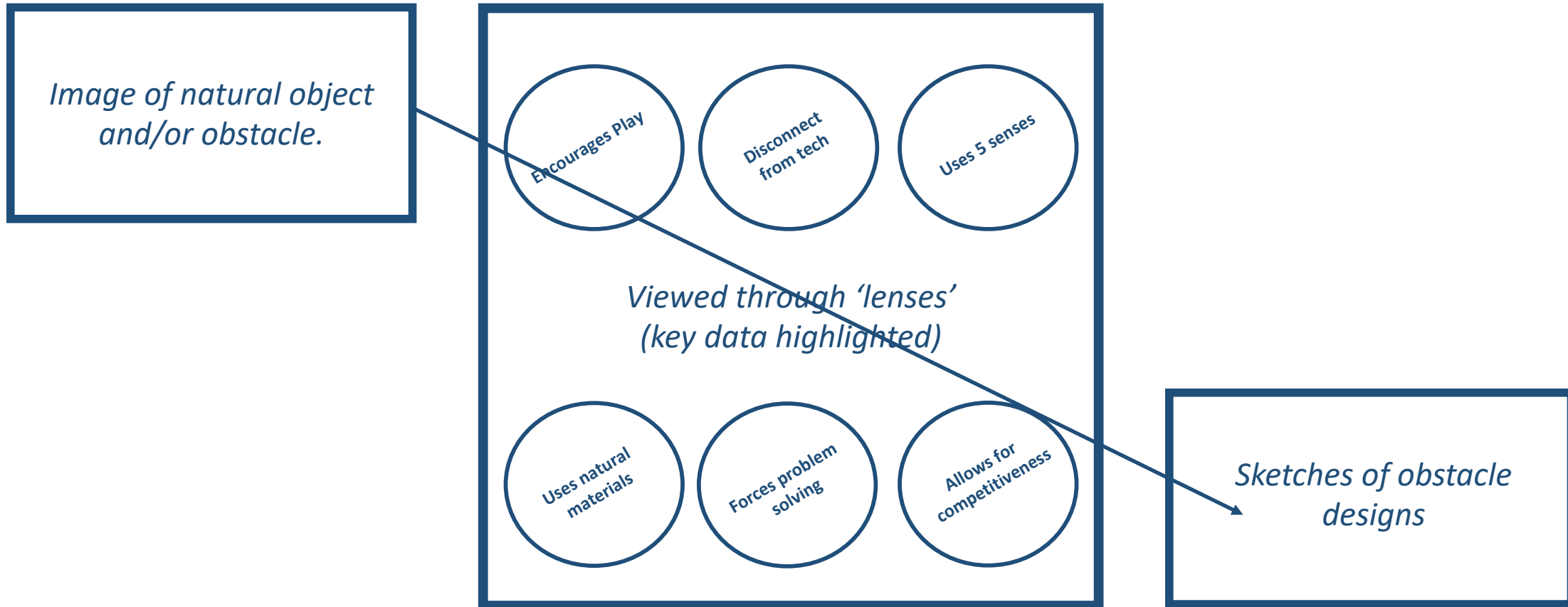
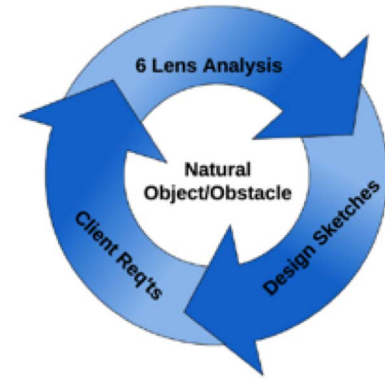


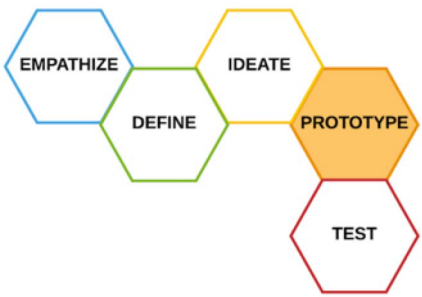
Fig. 17.



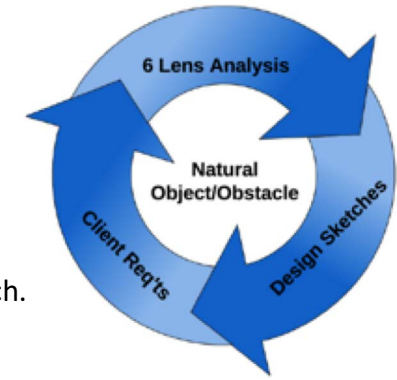
DESIGN SKETCHES

Subsequent obstacle designs are based on the expanded process highlighted by the circular diagram in the upper right-hand corner. The analysis of each lens follows specific criteria/guidelines as outlined in Appendix G. Resulting data produced by the analysis can be further analyzed in Appendix H. Although not depicted in the below diagram, client requirements were referenced through each design/prototype iteration



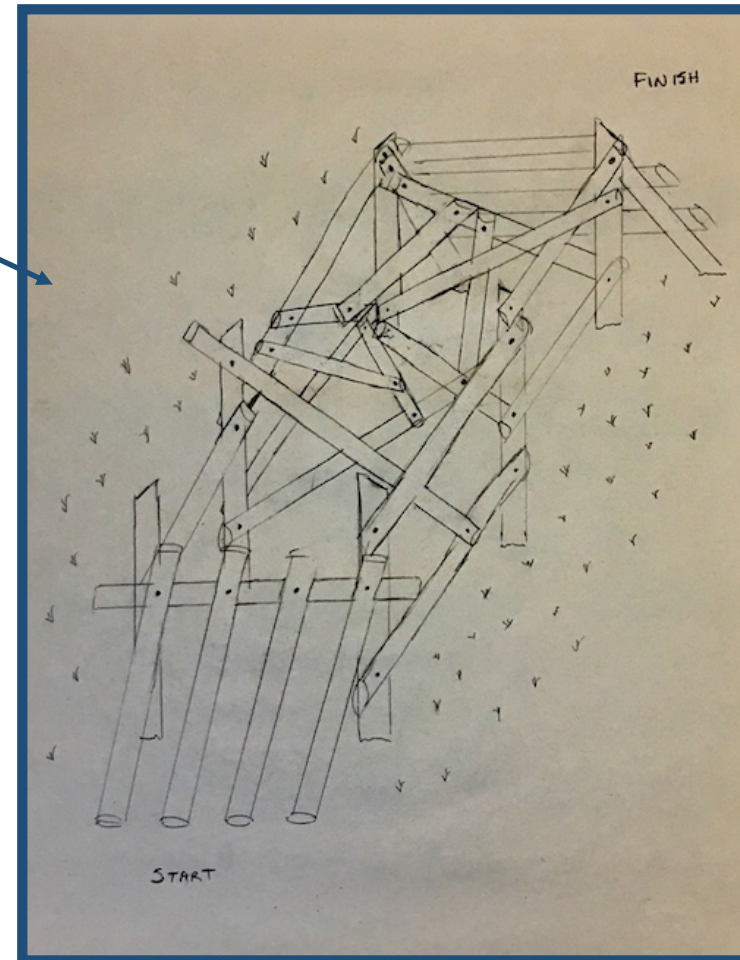
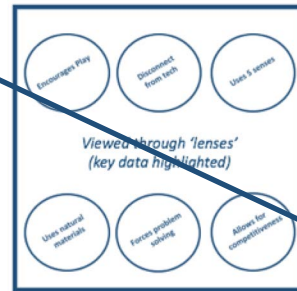


OBSTACLE #1: LOG PILE – ‘KURPLUNK’



Suggested Materials:

- Locally sourced logs.
- Anchored with recycled rebar and/or large bolts.
- Ground covering underneath obstacle to be locally sourced wood chips/mulch.

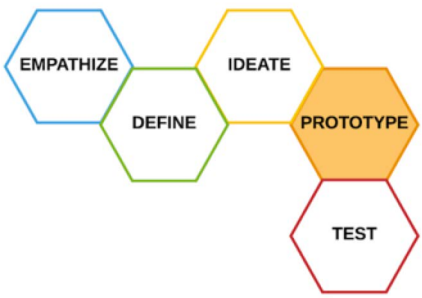


Design Features:

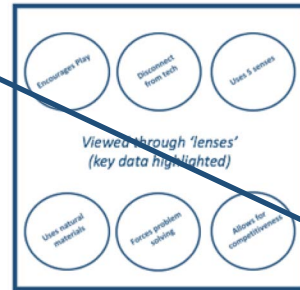
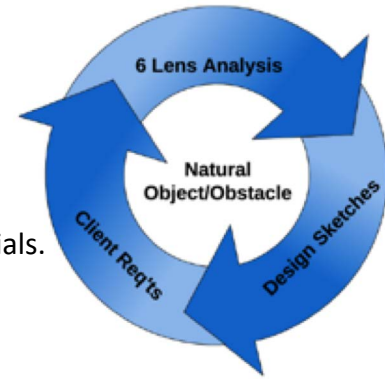
- Designed to be a ‘controlled chaos.’
- Obstacle to be both wide and long to allow for multiple users & passage points.
- Design will have some aspects hidden from the start (progressive disclosure), promoting decision making on the fly!
- Design will allow for passage of one’s body over, under, across and around.
- The name ‘Kurplunk’ is used to trigger a sense of excitement of random log placement, similar to the placement of random sticks seen in the board game that shares the same name.

Human Movements Exercised:

- Pull
- Push
- Squat
- Lunge
- Hinge
- Rotation
- Gait

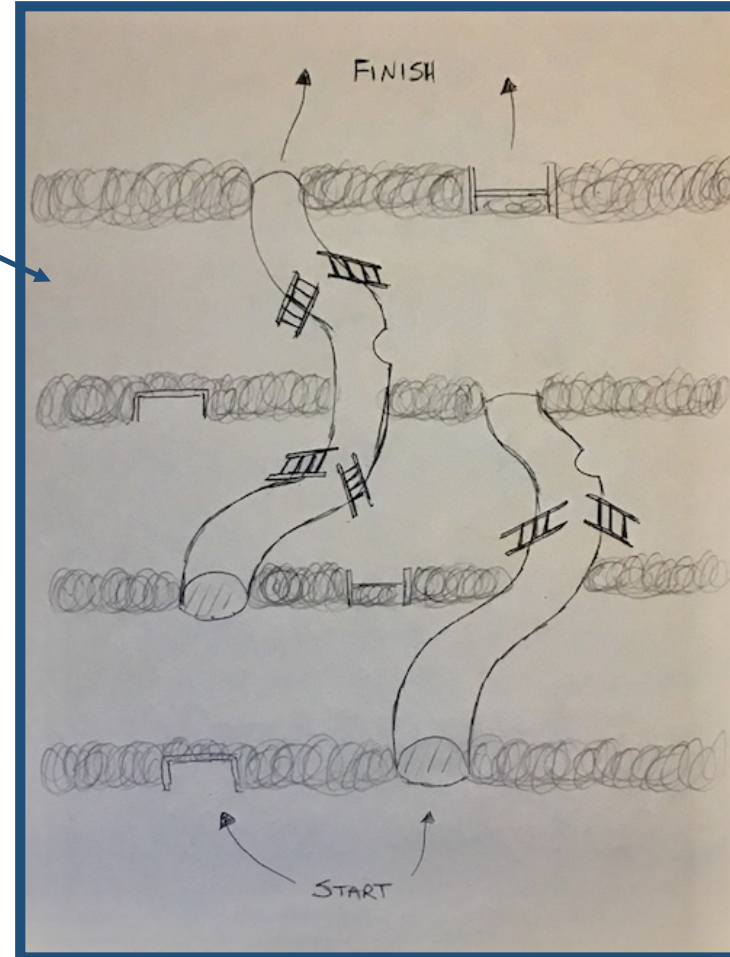


OBSTACLE #2: WILLOW MAZE – ‘SNAKES & LADDERS’



Suggested Materials:

- Locally grown willow bushes, or similar type of hedging native plant.
- Structure to be made of interconnecting bamboo and/or other natural materials.
- Ladders/bridges to be made from locally sourced wood.
- Ground covering to be locally sourced wood chips/mulch.

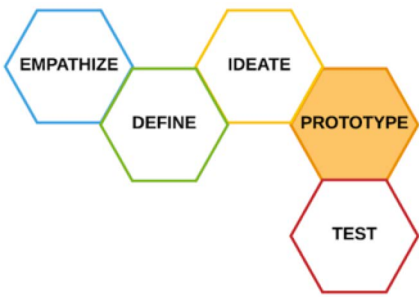


Design Features:

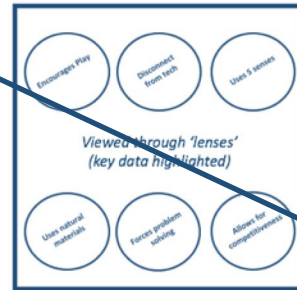
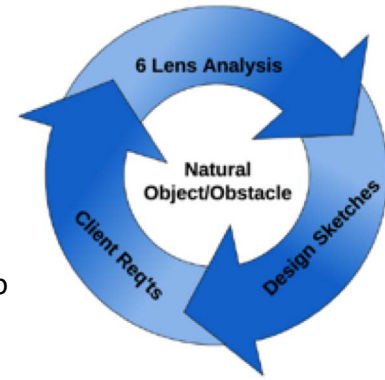
- Willow maze will consist of long winding tunnels and multiple walls to resemble an agility course.
- Tunnels will resemble the shape of a snake – giving homage to local breeding grounds for the red-sided garter snake.
- Multiple entry and exit points will allow for multiple passage possibilities.
- Changing seasons and continued growth of willows will allow for constant change to this obstacle.
- Design will have some aspects hidden from the start (progressive disclosure), promoting decision making on the fly!
- The name ‘Snakes & Ladders’ is used to give homage to the red-sided garter snake breeding grounds as well as to the popular childhood board game.

Human Movements Exercised:

- Squat
- Lunge
- Hinge
- Rotation
- Gait

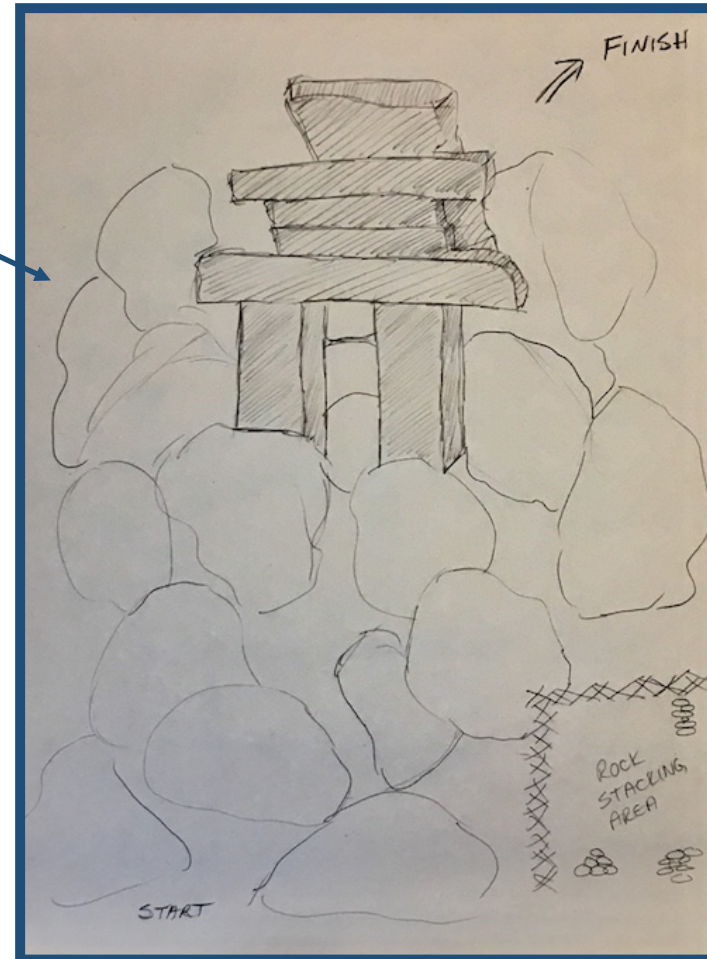


OBSTACLE #3: BOULDERS – ‘INUKSHUK’



Suggested Materials:

- Locally sourced boulders of various types and sizes.
- Additional anchoring (bolts) may be required for safety.
- Surface material (between boulders) to consist of various rock/pebble sizes to provide variations in touch and feel.

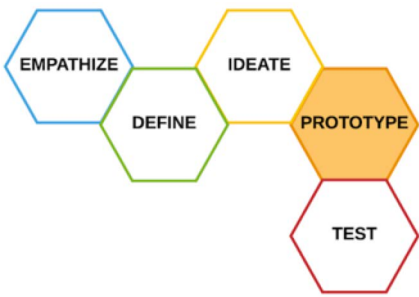


Design Features:

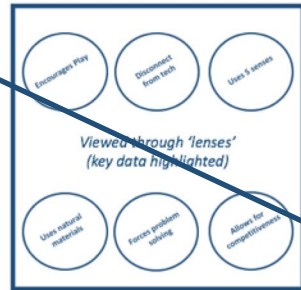
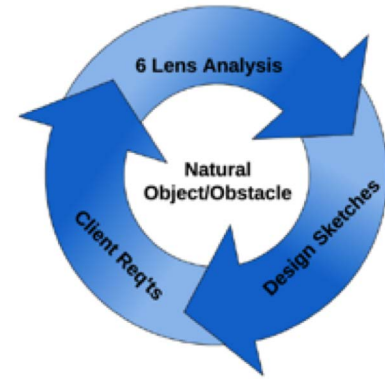
- Designed to be a ‘controlled chaos.’
- Obstacle to have multiple towering spires to inspire ‘child-like’ play to climb, boulder and shimmy around.
- Obstacle to be both wide and long to allow for multiple passage points.
- Spaces between boulders will contain varying pebble/rock of different sizes to play on one’s sense of touch.
- Obstacle to contain trenches, caves, and walls to force different body movements.
- Design will have some aspects hidden from the start (progressive disclosure), promoting decision making on the fly!
- An adjacent area will be set up for rock stacking. This space is intended to exercise the mind as well as the body.
- The name ‘Inukshuk’ is used to give homage to ancestors that used the technique of rock stacking as a form of wayfinding.

Human Movements Exercised:

- Pull
- Push
- Squat
- Lunge
- Rotation
- Gait

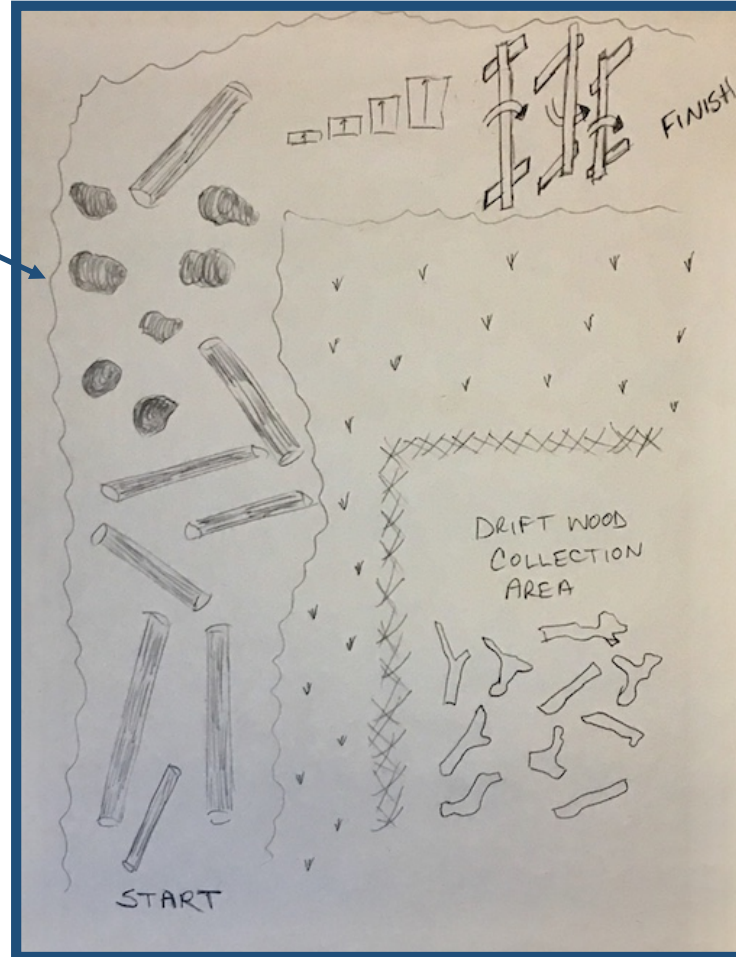


OBSTACLE #4: DRIFTWOOD – ‘LAVA’



Suggested Materials:

- Locally sourced logs, stumps, and rocks for traversing.
- Anchoring system (recycled rebar and/or bolts) will be required for safety.
- Driftwood to be obtained from local river systems.
- Ground covering for the ‘mini’ obstacle course to be locally sourced wood chips/mulch. Smaller pebbles to be used for the driftwood collection area.

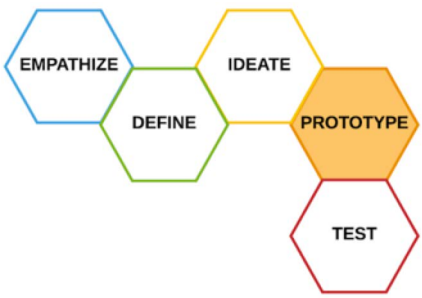


Design Features:

- This ‘mini’ obstacle course is to contain a variety of materials to traverse.
- Course to be wide enough to allow for at least two users simultaneously.
- A Driftwood collection area is to be created and will mimic clutter and disorganization. This area will contain various pieces of wood that differ in shape, size, and weight.
- The driftwood collection area will be large enough for people to build and to play with the various pieces (the different sizes & weights is intended to provide an additional unique workout).
- Driftwood pieces can also be carried when traversing the course as individuals or as partners - adding extra layers of difficulty.
- The name ‘Lava’ is used to trigger a sense of playfulness from the popular childhood game, where participants are not to touch the ground.

Human Movements Exercised:

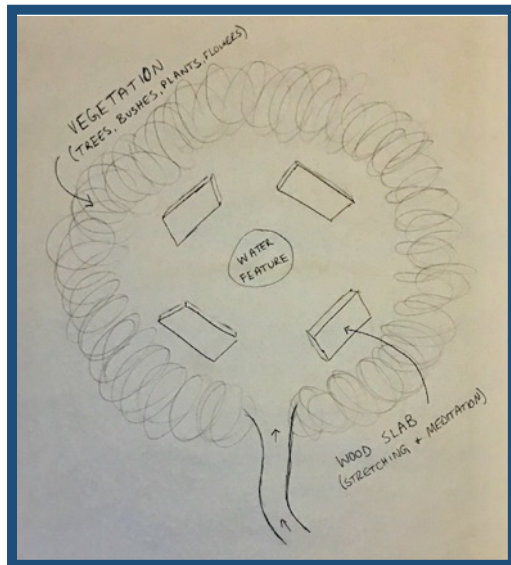
- Squat
- Lunge
- Hinge
- Rotation
- Gait



ADDITIONAL FITNESS TRAIL FEATURES

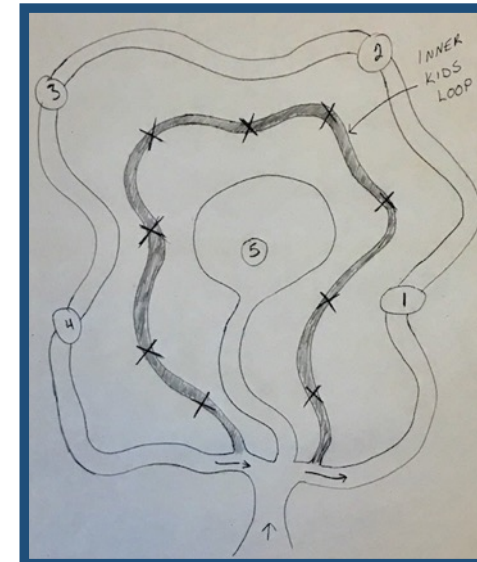
#5 Stretching & Meditation Area:

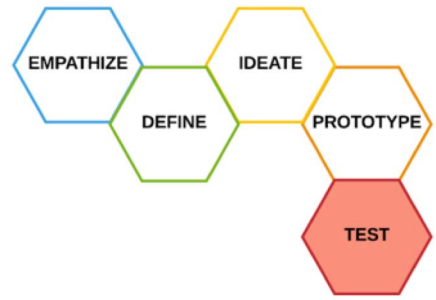
- Area to be hidden/secluded from the rest of the fitness trail.
- Area to be surrounded in natural beauty – plants, flowers, trees, etc.
- Installation of various raised wooden slabs to be used for stretching and meditation.
- Area to include central water feature if able.



Optional Stack Loop Design – Inner loop for smaller kids:

- Shorter distance to cover for smaller children.
- Obstacles to be scaled down and spaced to be more frequent. (X's on the below map to indicate frequency of obstacles in relation to the numbers located on the outer loop.)



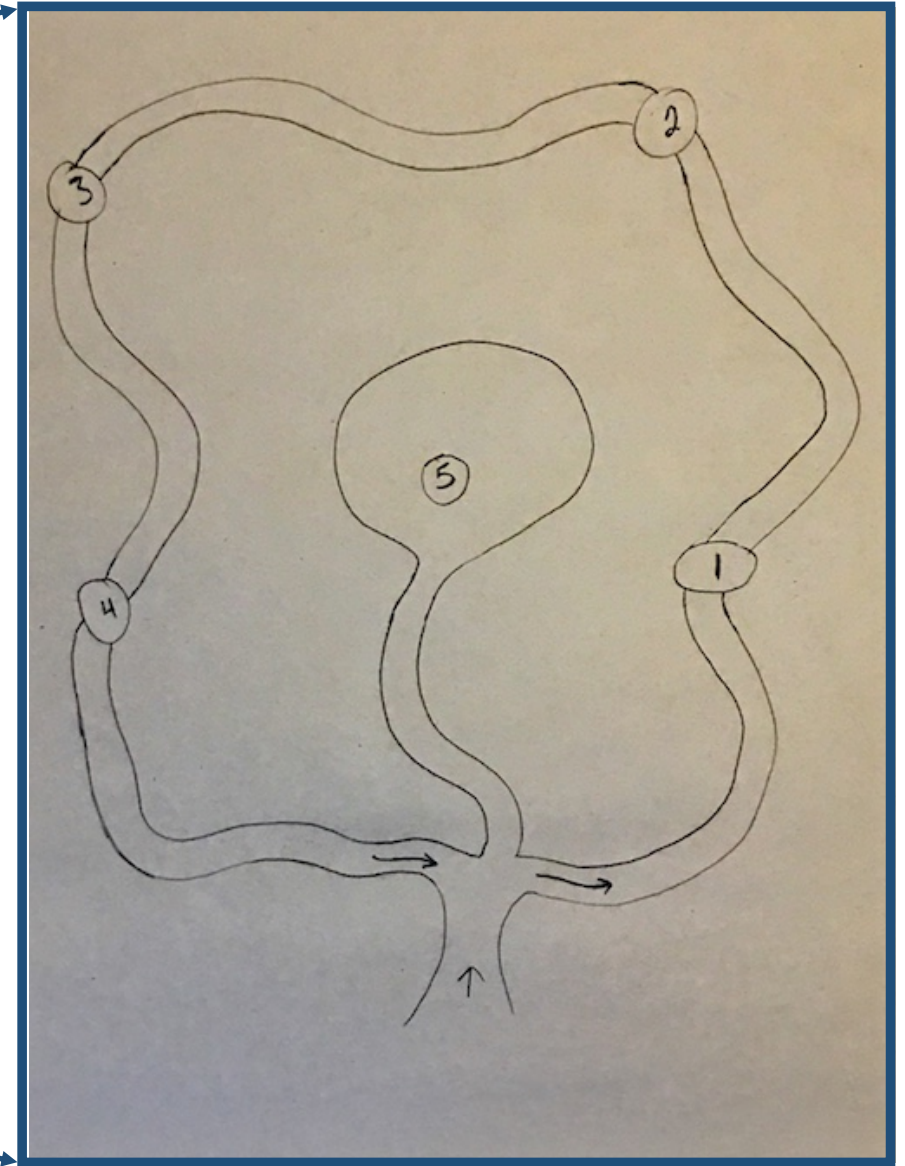


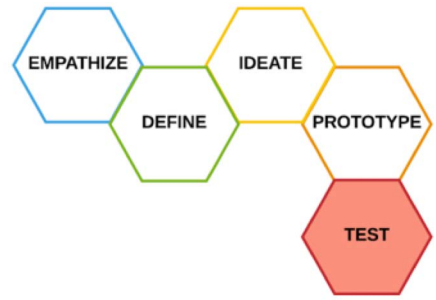
PROPOSED FORTWHYTE ALIVE FITNESS TRAIL

Fig. 18.



- Fitness trail path to have a natural meandering flow.
- Surface material between obstacles to be crushed local rock.
- **See P.20 for full mock-up of proposed outdoor fitness trail.**





PROPOSED FORTWHYTE ALIVE FITNESS TRAIL - SIGNAGE

To ensure that the proposed outdoor fitness trail remains true to its 6 design drivers, appropriate signage will be required to both prompt one's sense of wonder & awe, and to educate and bring awareness to the user. The signage is intended to highlight important benefits of being outdoors and the many benefits of being active through exercise and fitness.

The following signage is recommended:

- **A Trailhead Sign.** This sign would invite users to strengthen their bodies and minds by being present (in the moment) and to immerse oneself in the surrounding natural beauty (with a focus on the 5 senses).
- **Obstacle sign.** This sign would cover the following topics and would be located at the start of each obstacle:
 - Highlight key aspects of the primary natural object used;
 - Identify various ways to complete the obstacle (providing examples for different movements); and
 - Identify key takeaways (benefits) for exercising and being outdoors.

'I took a walk in the woods and came out taller than the trees.' – Henry David Thoreau

SHORT-TERM

- Consult with subject matter experts that were unable to be reached, or required for further discussion.
- Work closely with the client to make any further/additional design changes.
- Consult with landscape/graphic designers to tweak concept drawings and design development to ensure that all design, construction, and installation specifications as well as all necessary safety measures will be met.
- Develop a cost estimate for the construction and installation of the outdoor fitness trail.
- Help the client to secure project funding and to assist with the fitness trail development.
- Work with the client to establish an action plan (phased approach) for the construction of the fitness trail.
- Suggest alternative locations for the fitness trail – one that is closer to the parking lot and more accessible!

LONG-TERM

- Expand the network of ‘sustainable-driven’ outdoor fitness-trails throughout the city, similar to the design proposed in this thesis project. This will help to further increase sustainability awareness and to get more people exercising outdoors.
- Create an online platform (i.e. smart phone application) that would identify the outdoor fitness-trail network, and pinpointing additional outdoor fitness options in the selected area. The online platform would be used to identify location only.
- Propose the design/construction of a suspension bridge to access the fitness trail from the south! This action would help to promote the fitness trail and to provide better access to its intended location.

One of the goals for this thesis project is to review existing research that quantifies the current approaches to exercise and fitness. By addressing the supportive research outlined and categorized within the *Living Principles for Design Framework*, it became clear that there is an increasing divide between the human body and nature connection. This project therefore attempts to use this research and systems thinking methodologies to find leverage points in our current system to bring not only further understanding to it and the relationship between the human body and nature, but to suggest another approach to help synergize the two.

Using *Design Thinking*, it brought a human-centric approach to the design process, ensuring empathy, engagement and collaboration at all levels. Input was achieved by consulting with subject matter experts, brainstorming with three different focus groups (all varying in background and age), which included a *Fitness Trail Building Challenge* with 24 participants (ages 11-13). The information obtained led to a deeper understanding, and a more universal approach to designing an outdoor fitness trail.

The design process focused on six different design drivers (lenses), and focused on prominent natural objects at its intended location; a process that can be customized and adapted to any location. The enclosed fitness trail proposal is but just one example of this approach, making it both universal and scalable.

In a time where the connection between the human body and nature has been perhaps divided due to urbanization and rapid technological advancements, this new fitness system adapted process and way of thinking could help to re-cage what is perceived as being lost. A love of self combined with a love of nature is a more unified approach in building a sustainable future.

REFERENCES / WORKS CITED

References / Works Cited
P.43-45

Image Credits
P.46

- (1) "World Population 2017." United Nations, Department of Economic and Social Affairs, Population Division (2017). (ST/ESA/SER.A/378). https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_Wallchart.pdf
- (2) "World Urbanization Prospects: The 2014 Revision." United Nations, Department of Economic and Social Affairs, Population Division (2015). (ST/ESA/SER.A/366). <https://esa.un.org/unpd/wup/Publications/Files/WUP2014-Report.pdf>
- (3) Karen C, Seto, Michail Fragkias, Burak Guneralp & Michael K. Reilly, "A Meta-Analysis of Global Urban Land Expansion." Journals PLOS One. August 18,2011. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0023777>
- (4) "Increased demand and climate change threaten global water supplies – UN Report." United Nations News. March 12, 2012. <https://news.un.org/en/story/2012/03/406062-increasing-demand-and-climate-change-threaten-global-water-supplies-un-report>
- (5) "Gym, Health & Fitness Clubs Industry in the US." IBIS World - Industry Market Research Report. Accessed November 4, 2018. <https://www.ibisworld.com/industry-trends/market-research-reports/arts-entertainment-recreation/gym-health-fitness-clubs.html>
- (6) Ralph S. Paffenbarger Jr., Steven N. Blair, & I-Min Lee. "A history of physical activity, cardiovascular health and longevity: the scientific contributions of Jeremy N Morris." Oxford Academic – International Journal of Epidemiology. October 01, 2001. <https://academic.oup.com/ije/article/30/5/1184/724212>
- (7) "Obesity and Overweight – Fact Sheet." World Health Organization. February 16, 2018. <http://www.who.int/mediacentre/factsheets/fs311/en/>
- (8) "Total number of memberships at fitness centers/health clubs in the U.S. from 2000 to 2017." The Statistics Portal. Accessed March 21, 2018. <https://www.statista.com/statistics/236123/us-fitness-center--health-club-memberships/>
- (9) Kevin Loria. "Being outside can improve memory, fight depression, and lower blood pressure – here are 12 science-backed reasons to spend more time outdoors." Business Insider. April 22, 2018. <https://www.businessinsider.com/why-spending-more-time-outside-is-healthy-2017-7>
- (10) Valentine Seymour. "The Human-Nature Relationship and Its Impact on Health: a Critical Review." Frontiers in Public Health. November 18, 2016. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5114301/>
- (11) Sustainability Definition. Global Development Research Center. Accessed April 01, 2018. <http://www.gdrc.org/sustdev/definitions.html>
- (12) "Connecting Humans with Nature." FortWhyte Alive. Accessed March 13, 2018. <https://www.fortwhyte.org/about/>
- (13) "Your Roadmap for Sustainable Design: The Living Principles for Design." AIGA. Accessed March 13, 2018. <https://www.aiga.org/aiga/content/why-design/living-principles/your-roadmap-for-sustainable-design/>
- (14) Erwan Le Corre. "The History of Physical Fitness." The Art of Manliness. October 23, 2018. <https://www.artofmanliness.com/2014/09/24/the-history-of-physical-fitness/>
- (15) George Ritzer. (2011). *The McDonaldization of Society 6*. London: SAGE Publications.
- (16) Mandy Oaklander. "The New Science of Exercise." TIME Health. September 12, 2016. <http://time.com/4475628/the-new-science-of-exercise/>
- (17) Merrill J. Melnick & Steven J. Jackson. "Globalization American-Style and Reference Selection: The Importance of Athlete Celebrity Others among New Zealand Youth." International Review for the Sociology of Sport. December 1, 2002. <http://journals.sagepub.com/doi/abs/10.1177/1012690202037004027>
- (18) Jesper Andreasson & Thomas Johansson. "The Fitness Revolution. Historical Transformations in the Global Gym and Fitness Culture." Sport Science Review. September 19, 2014. <https://www.degruyter.com/downloadpdf/j/ssr.2014.23.issue-3-4/ssr-2014-0006/ssr-2014-0006.pdf>
- (19) Lynne Luciano. *Looking Good: Male Body Image in Modern America*. New York: Hill and Wang. 2001.
- (20) "Physical Activity and Health: The Benefits of Physical Activity." Centers for Disease Control and Prevention. Accessed November 4, 2018. <https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm>
- (21) Marc Stern. "The Fitness Movement and the Fitness Center Industry, 1960-2000." Business and Economic History On-line. Accessed September 24, 2018. https://www.thebhc.org/sites/default/files/stern_0.pdf
- (22) Anne Fisher. "Putting a Price Tag on Employee Fitness." Fortune. October 10, 2014. <http://fortune.com/2014/10/10/employee-fitness-exercise/>

- (23) “68% of the world population projected to live in urban areas by 2050, says UN.” United Nations, Department of Economic and Social Affairs, News. May 16, 2018. <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>
- (24) David Biello. “Gigalopolises: Urban Land Area May Triple by 2030.” Scientific America. September 18, 2018. <https://www.scientificamerican.com/article/cities-may-triple-in-size-by-2030/>
- (25) “Vinyl Chloride: Hazard Summary.” U.S. Environmental Protection Agency. Accessed November 4, 2018. <https://www.epa.gov/sites/production/files/2016-09/documents/vinyl-chloride.pdf>
- (26) Holli-Anne Passmore. “Feeling Blue – Get Green: The Benefits of Nature on our Mental Health and Well-being.” Earth Common Journal. Vol. 1, No. 1. September, 2011.
- (27) “Fitness Industry Statistics: Growth, Trends & Resources 2018.” Wellness Creative Co. Accessed April 26, 2018. <https://www.wellnesscreatives.com/fitness-industry-statistics-growth/>
- (28) “Consumer Fitness Trends Statistics & Insight for Fitness Facilities.” Nielsen: Les Mills Global Consumer Fitness 2013 Survey. August 2014. <https://www.wellnesscreatives.com/fitness-industry-statistics-growth/>
- (29) Aditi Pai. “Flurry: Millennials use health and fitness apps more than other age groups.” Mobi Health News. June 17, 2013. <http://www.mobihealthnews.com/23117/millennials-use-health-and-fitness-apps-more-than-other-age-groups/>
- (30) “Health & Fitness Clubs – Statistics & Facts.” The Statistics Portal. Accessed April 15, 2018. <https://www.statista.com/topics/1141/health-and-fitness-clubs/>
- (31) Frank W. Booth, Christian K. Roberts, Matthew J. Laye. “Lack of Exercise is a Major Cause of Chronic Diseases.” Comprehensive Physiology. April 1, 2012. <https://onlinelibrary.wiley.com/doi/pdf/10.1002/cphy.c110025>
- (32) B.K. Pedersen & B. Saltin. “Evidence for prescribing exercise as the therapy in chronic disease.” Medicine & Science in Sports. February 01, 2006. <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1600-0838.2006.00520.x>
- (33) Ian Jassen. “Healthcare Costs of Physical Inactivity in Canadian Adults.” Applied Physiology, Nutrition, & Metabolism. June 06, 2012. <http://www.nrcresearchpress.com/doi/10.1139/h2012-061#.W83aKi8ZM1g>
- (34) Billy Loizou. “A Framework for Innovation #Design Thinking.” The Vision Blog. January 31, 2016. <https://www.billyloizou.com/thoughts/a-framework-for-innovation-designthinking>
- (35) “What is Design Thinking.” IDEO-U. Accessed September 19, 2018. <https://www.ideo.com/blogs/inspiration/what-is-design-thinking>
- (36) Adam Bienenstock. “Keynote: Getting Past the Grown-ups.” Natural Playgrounds. Accessed October 3, 2018. <https://www.naturalplaygrounds.ca/keynotes/getting-past-the-grown-ups;>
- Rusty Keeler. *Natural Playscapes: creating outdoor play environments for the soul*. Redmond, WA: Exchange Press. 2008.
- (37) Jeff Link. “Designer Profile: Michelle Mathis, RLA, Learning Landscapes Design.” Designer Spotlight. April 19, 2017. [https://goric.com/designer-profile-michelle-mathis-rla-learning-landscapes-design/;](https://goric.com/designer-profile-michelle-mathis-rla-learning-landscapes-design/)
- Richard Louv. *Last Child in the Woods*. Chapel Hill, North Carolina: Algonquin Books of Chapel Hill. 2008;
- “Forest School: 9 ways children benefit from learning and playing outside.” BT. June 10, 2018. <http://home.bt.com/lifestyle/health/wellness/forest-school-9-ways-children-benefit-from-learning-and-playing-outside-11364276783242;>
- E. Paul Roetert, Todd S. Ellenbecker, Dean Kriellaars. “Physical literacy: why should we embrace this construct?” British Journal of Sports Medicine. March 26, 2018. <https://bjsm.bmj.com/content/early/2018/04/13/bjsports-2017-098465>
- (38) Julian Nguyen. “The Fundamental Human Movements.” ASI Recreations. October 26, 2016. <https://www.asirecreation.org/recreport/ask-trainer/63-ask-a-trainer-archive/302-the-fundamental-human-movements>

APPENDICIES:

- (39) “What is Biophilic Design.” International Well Building Institute. Accessed October 09, 2018. <https://skylineartservices.com/wp-content/uploads/Biophilic-well-building-Handout.pdf>
- (40) “About Ecopsychology.” International Community for Ecopsychology. Accessed October 09, 2018. <https://www.ecopsychology.org/about-ecopsychology/>
- (41) Exercise Definition. Medical Dictionary. Accessed September 19, 2018. <https://medical-dictionary.thefreedictionary.com/exercise>
- (42) “What is Physical Fitness.” Health Galaxy. Accessed September 19, 2018. <http://www.health-galaxy.com/What-Is-Physical-Fitness.html>
- (43) “Friluftsliv Fact Sheet.” Visit Norway. Accessed October 09, 2018. <https://thenoec.files.wordpress.com/2011/05/friluftsliv-fact-sheet-2.pdf>
- (44) Erwan Le Corre. “An Explanation of MovNat.” Breaking Muscle. Accessed October 09, 2018. <https://breakingmuscle.com/fitness/an-explanation-of-movnat-from-erwan-le-corre>
- (45) “Octalysis Framework – Making Everything more Playable.” Monetizr. Accessed October 09, 2018. <https://medium.com/monetizr/octalysis-framework-making-everything-more-playable-1bd3092bf3c>
- (46) Laura Williams. “Par Course Exercise Outdoor Fitness for Everyone.” Health – Love to Know. Accessed October 09, 2018. <https://exercise.lovetoknow.com/par-course-exercise-outdoor-fitness-everyone>
- (47) Physical Literacy Definition. Sport for Life. Accessed October 09, 2018. <http://sportforlife.ca/physical-literacy/>
- (48) Darryl Edwards. “Primal Play.” Primal Play. Accessed October 10, 2018. <https://www.primalplay.com/what-is-primal-play/>
- (49) Sandra Kerka. “Somatic/Embodied Learning and Adult Education: Trends and Issues Alert.” ERIC. Accessed October 10, 2018. <https://eric.ed.gov/?id=ED462550>

(Title page). Beatrix Lencses. "Forest Pathway." Image provided October 1, 2018. (Courtesy) Photographybybeatrix.

Fig. 1. (Slide 8). Brown tree trunk Icon. "Brown tree bare." Clipart. Accessed October 11, 2018. <http://www.clker.com/clipart-brown-tree-bare.html>.

Green speech bubble Icon. "Speech bubble." Icons Database. Accessed October 11, 2018. <https://www.iconsdb.com/green-icons/speech-bubble-icon.html>

Fig. 2. (Slide 11). "FortWhyte Alive Area Visual." Image provided March 2018. (Courtesy) FortWhyte Alive.

Fig. 3. (Slide 14-18). "Living Principles for Design Symbol." AIGA. Accessed March 2018. <https://www.aiga.org/the-living-principles-for-design>.

Fig. 4. (Slide 16). "Environmental Impacts from Indoor Exercise and Fitness Systems Map." Mind Map Software. Created April 2018. www.coggle.it.

Fig. 5 & 6. (Slide 17). "Consumer Fitness Trends Statistics & Insight for Fitness Facilities." Nielsen: Les Mills Global Consumer Fitness 2013 Survey. August 2014.

<https://www.wellnesscreatives.com/fitness-industry-statistics-growth/>

Fig. 7. (Slide 20). "FortWhyte Alive Area Visual." Image provided March 2018. (Courtesy) FortWhyte Alive.

Fig. 8. (Slide 20). Google maps image. Google Maps. Accessed October 09, 2018. www.maps.google.ca

Fig. 9. (Slide 21-39). "Design Thinking honeycomb symbol." Drawing Software. Created October 02, 2018. www.lucidchart.com, (Image representation of IDEO's Design Thinking Process.)

Fig. 10. (Slide 22). "4-circle Venn diagram." Drawing Software. Created October 02, 2018. www.lucidchart.com. (Image representation of *Okala Practitioner: Integrating Ecological Design*. Phoenix, AZ. 2013. P.31.)

Fig. 11 & 12. (Slide 24). "Forest images." Shutterstock. Accessed May 2018. www.shutterstock.com

Fig. 13. (Slide 24). "Diorama images." Photographed by Tim Coffin (author). July 2018.

Fig. 14. (Slide 26). "Outdoor exercise barriers." WordArt Software. Created October 02, 2018. www.wordart.com

Fig. 15. (Slide 29, 32-36). "Circle Arrow Icon." ClipArt. Accessed October 02, 2018.

https://melbournechapter.net/explore/circle-arrow-clipart/#gal_post_104_arrows-in-a-circle-clipart-6.png

Fig. 16. (Slide 30). "Natural Objects." WordArt Software. Created October 02, 2018. www.wordart.com

Fig. 17. (Slide 31, 33). "Felled trees." Arborist Site. Accessed October 03, 2018.

<https://www.arboristsite.com/community/threads/stihl-193t-vs-husky-435.282312/page-3;>

(Slide 31, 34). "Willow bushes." Victoriana Nursery Gardens. Accessed October 03, 2018. [https://www.victoriananursery.co.uk/Shirleys_Whispering_Willows/;](https://www.victoriananursery.co.uk/Shirleys_Whispering_Willows/)

(Slide 31, 35). "Boulders." Wikimedia Commons. Accessed October 03, 2018. [https://commons.wikimedia.org/wiki/File:Boulders_beach_Cape_Peninsula.jpg;](https://commons.wikimedia.org/wiki/File:Boulders_beach_Cape_Peninsula.jpg)

(Slide 31, 36). "Driftwood." American Southwest: Photographs of the Hidden Beach Trail. Accessed October 22, 2018.

http://www.americansouthwest.net/california/redwood/hidden-driftwood_1.html

Fig. 18. (Slide 38). Google maps image. Google Maps. Accessed October 09, 2018. www.maps.google.ca

Fig. 19. (Appendix E). "Diorama images." Photographed by Tim Coffin (author). July 2018.

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APPENDIX A – Glossary of Terms

BIOPHILIA: “is defined as the inherent human inclination to affiliate with nature. Biophilic design, an extension of biophilia, incorporates natural materials, natural light, vegetation, nature views and other experiences of the natural world into the modern built environment.”³⁹

ECOPSYCHOLOGY: “is the study that explores the synergistic relation between personal health and well-being and the health and well-being of our home, the Earth.”⁴⁰

EXERCISE: “is considered any physical activity that is planned, structured and repetitive for the purpose of conditioning any part of the body. Exercise is used to improve health, maintain fitness and is important as a means of physical rehabilitation.”⁴¹

(PHYSICAL) FITNESS: “is considered a measure of the body’s ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypo-kinetic diseases, and to meet emergency situations.”⁴²

FRILUFTSLIV: “is a Norwegian word loosely translated as ‘open air life,’ which characterizes Norwegian culture. Norwegians embrace nature and enjoy the outdoors as a way of life. Ultimately, *friluftsliv* offers the possibility of recreation, rejuvenation and restoring balance among living things.”⁴³

NATURAL MOVEMENT FITNESS (MOVNAT): “is a physical education and fitness system that is entirely based on natural movement skills, mainly including locomotive and manipulative skills, but also combative ones.”⁴⁴

OCTALYSAS: “is the act of turning everyday life into a game. It’s the practice of applying game-like design elements to otherwise serious business or professional disciplines that usually don’t have anything to do with gaming.”⁴⁵

PAR COURSE: “are courses (trails) that are designed to enable you to take your fitness routine from inside the gym to out in the park. Par courses are almost always located on public property, making them easily accessible and free for all users.”⁴⁶

PHYSICAL LITERACY: “is the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life.”⁴⁷

PRIMAL PLAY: “is a combination of primal movement with solo, partner and group-based activities that are engaging, fun and transformative. Its purpose is designed for those who wish to reclaim the joy of movement and who relish a new challenge.”⁴⁸

SOMATIC LEARNING: “implies education that trusts individuals to learn from and listen to the information they are receiving from the interaction of self with the environment. Somatic is experiential knowledge that involves senses, perceptions, and mind-body action and reaction.”⁴⁹

APPENDIX B – Client’s List of Requirements (Fitness Trail)

CLIENT LIST OF REQUIREMENTS

- The fitness trail must align with FortWhyte Alive’s values and mission statement
 - **Mission Statement** – “FortWhyte Alive is dedicated to providing programming, natural settings and facilities for environmental education, outdoor recreation and social enterprise. In so doing, FortWhyte promotes awareness and understanding of the natural world and actions leading to sustainable living.”
<https://www.fortwhyte.org/about/>
- Target Audience – the main focus will be on children and youth, with the flexibility to be used by adults.
- Sought after fitness components – the fitness trail should work on an individual’s balance, coordination, agility, reaction time, speed, power, and mental capacity.
- Ideal number of stations should be somewhere between 5-10.
- Length of the fitness trail to be based on number of stations and overall time to complete (aim for 20-30 minutes). An additional stretching station would be ideally sought after.
- The location of the fitness trail is to be situated on the south side of FortWhyte Alive, with a preference to use existing trail systems vs. establishing new trails.
- The fitness trail to be utilized year-round in all weather conditions.
- Types of materials used – the preference will be sustainable/natural materials; recycled materials will be a secondary choice.
- Funding to be covered by grants and fundraising.

MEETING DETAILS

Information based on February 09, 2018 meeting with Ian Barnett, Renee Olafson-Dyck & Tim Coffin (In support of MA Thesis Work)

Ian Barnett – Director of Operations at FortWhyte
Renee Olafson-Dyck – Interim Director of Education

APPENDIX C – Online Focus Groups (x2)

FOCUS GROUP INVITE LETTER

As part of my Sustainable Design Master's Thesis, I am working with a client to develop an outdoor fitness trail. Unlike most outdoor fitness trails and/or areas that you may be accustomed to seeing (i.e. fixed stations with body-weight machines, chin up bars, etc.), I am attempting to create/design something truly unique; one that uses only natural/local materials, with an emphasis to not only encourage fitness through 'play,' but to help reconnect people to nature and being outdoors.

So why do you care?

As part of my design process, I'm trying to utilize various approaches to generate ideas, and 'outside-the-box' thinking. This sort of approach does not dictate constraints and can thus lead to some very radical and innovative solutions. I'm hoping I can lean on you to gain some input, ideas, and to possibly develop ideas further as I continue on my thesis work. My Thesis is set to be completed this November.

The plan would be to create a Facebook Group of 4-6 people (including myself). You may know some of the others, but perhaps not all. I will provide some guidelines, thoughts, and perhaps questions to get the conversation started; and, periodically chime in to either zoom in on an idea or zoom out on a topic to gain some further thoughts/insight/ideas.

The commitment is by no means a big one. If you agree to help me out, I only ask that you check into the Facebook Group periodically (perhaps every couple of days) and participate by adding comments/ideas/thoughts as required. I anticipate the commitment to last 2-3 weeks once started (hopefully started by the end of the week), but no longer than the end of June.

If interested (which I hope you will be), I will send you a Facebook Group invite and we can get started right away. I really think that this will be a lot of fun, and prove to be a unique way to converse with others on this topic.

I look forward to drawing heavily on your creativity, connection with fitness, and connection to the outdoors.

Best,

Tim

PARTICIPANT DEMOGRAPHICS:

*All participants are identified by their initials below.

Online Focus group #1:

S.A. – engineer, naturalist, passion in sustainability, mom

I.F. – engineer, runner, naturalist, mom

J.F. – pilot, cross-fit athlete, outdoor enthusiast & competitor

J.F. – artist (painter), indoor fitness guy, dad

S.G. – physiotherapist, naturalist, gardener, mom

Online Focus group #2:

P.F. – chaplin, lover of nature, dad

N.M. – entrepreneur, adventurer, mom

A.J. – entrepreneur, fitness & life style coach, mom

K.S. – pilot, outdoorsmen, dad

C.C. – lifestyle coach, runner, mom

DESIGN THINKING TECHNIQUES EMPLOYED:

*The following Bootleg Bootcamp techniques/exercises were used during the month long focus groups:

- *Assume a beginner's mindset.* Question everything, be curious.
- *Use Analogous Empathy.* Focus on users/nature; identify needs.
- *How Might We.* Short questions to direct brainstorming.

<https://dschool.stanford.edu/resources/the-bootcamp-bootleg>

APPENDIX D – Summer Camp Building Challenge Instructions

OUTDOOR FITNESS TRAIL BUILDING CHALLENGE

To encourage fitness, we would like to construct a fitness/exercise trail here at FortWhyte Alive. We would love to have your input and ideas.

Objective: To construct a miniature model of an outdoor fitness trail – a hiking/running trail with obstacles along the way, as a means of fitness & exercise.

Things to think about:

- What elements in nature can be used for exercise? (trees, boulders, hills, logs, etc.)
- How can we use natural materials and what would these obstacles look like? How can these obstacles be used for climbing, jumping, leaping, crawling, etc.?
- How can we make exercise fun? How can the trail/obstacles encourage ‘play’ for people of all ages?
- How can this type of fitness trail force the use of our senses?
 - Sight – what features would make these obstacles visually/naturally appealing?
 - Hearing – what design features could require the use of sound? Or perhaps to heighten the sounds of the surrounding nature?
 - Smell – what kind of vegetation could be planted? How could this be a part of the obstacles?
 - Touch – how can we vary the trail and obstacles to have different textures and use different materials to give variety!
- How can we use this means (an outdoor fitness trail) to reconnect people to the outdoors and with nature?
- Do the obstacles have to be fixed in place? Or, can they change like the seasons to vary in difficulty? What would this look like?

How: Generate ‘outside-the-box’ thinking, ideas, thoughts, and/or questions as to how we view outdoor fitness. This exercise is an attempt to redesign/recreate our perception of what this should look like. Feel free to let your imagination go!

Your task:

1. Using loose paper and writing utensils provided, plan and sketch what your trail & obstacles will look like.
2. Use the materials provided along with any other materials found in nature to construct a miniature version of what your group perceives as the best way to accomplish the above objective.
3. Thinking in terms of an obstacle course, draw a path (a trail) to follow using the markers provided and create 5-10 obstacles for participants to overcome. Feel free to write descriptions beside each obstacle.
4. Think of how you can force problem solving at each obstacle (i.e. there could be multiple ways to overcome an obstacle, varying heights/difficulties to encounter, etc.)
5. Complete the challenge for a ‘show & tell’ on Friday!

PARTICIPANT DEMOGRAPHICS:

Children’s Focus Group:

Fox Bay summer camp July 09-13

Ages 11-13

24 kids divided into 4 groups of 6

Results received in the form of dioramas; one per group.

APPENDIX E – Summer Camp Building Challenge Images

APPENDICES



APPENDIX F – Natural Objects/Human Movement Matrix

Natural Object	Pull	Push	Squat	Lunge	Hinge	Rotation	Gait	Total
Trees (upright)	X -pull one's body up towards a tree, perhaps from another tree and/or stationary position.	X -push off of a tree to reverse direction and/or to grab another	X -Lower one's body onto a felled tree; exercise can be used to work on balance and core strength	X -can be seen in the transfer of body weight from one log to the next	X -lowering one's body at the waist to deadlift a log to a new position	X -rotating of one's body at the core to move fluidly through closely grown trees	X -traversing one's body through log piles	3
Felled Trees (log pile)	X -pull one's body up towards a felled tree that is higher than one's body. -pulling one's body up to a tree from a hanging position	X -push off a felled tree from a horizontal position while down in push up position	X -Lower one's body onto a felled tree; exercise can be used to work on balance and core strength	X -can be seen in the transfer of body weight from one branch/root to the next	X -lowering one's body at the waist to deadlift a log to a new position	X -rotating one's body at the core to navigate through a pile of logs	X -traversing one's body through log piles	7
Branches & Tree Roots	X -pull one's body towards different branches/roots	X -push off a branch and/or tree root to change direction	X -pull one's body onto a stump; exercise can be used to work on balance and core strength	X -can be seen in the transfer of body weight onto and/or off of a tree stump	X -lowering one's body at the waist to deadlift a log to a new position	X -rotating one's body at the core to navigate through branches in a tree	X -traversing one's body from one stump onto the next in a continual motion	4
Stumps			X -lower one's body onto a stump; exercise can be used to work on balance and core strength	X -can be seen in the transfer of body weight onto and/or off of a tree stump			X -traversing one's body from one stump onto the next in a continual motion	3
Willow Bushes (thick vegetation)			X -in the case of a low hanging bush, the squat can be used to lower one's body in preparation to traverse beneath.	X -can be seen with the careful transfer of one's body weight while traversing through thick vegetation	X -lowering one's body at the waist in order to pass through low-to-the-ground archways	X -rotating one's body at the core to navigate through thick vegetation	X -traversing one's body through thick vegetation	5
River Rocks (varying sizes)				X -can be seen with careful transfer of one's body weight onto the next rock or uneven surface			X -traversing one's body over rocks of varying sizes	2
Boulders	X -pull one's body up onto a rock from a lower body position	X -push off a boulder to change direction or to reach another boulder	X -lower one's body in preparation to jump to another boulder and/or to work on balance	X -the transfer of one's body weight from one boulder to the next		X -rotating one's body at the core to navigate through boulders in close proximity	X -traversing one's body from one boulder to the next	6
Granite Rock / Cliffs	X -pull one's body tight to cliff, similar to rock climbing		X -lower one's body in preparation to jump up to a higher perch	X -the transfer of one's body weight from one position to the next			X -traversing one's body alongside cliffs and jagged edges	4
Rivers (over one's head)								0
Streams / creeks (knee deep)				X -careful transfer of one's body weight in a forward motion while traversing a stream/creek			X -traversing one's body through knee deep water while maintaining balance	2
Silt & Sand				X -careful transfer of one's body weight in a forward motion on an uneven surface			X -traversing one's body over silt and sand	2
Dirt hills				X -careful transfer of one's body weight in an uphill/downhill direction			X -traversing one's body up, over, and down hills of varying sizes	2
Drift wood			X -lowering one's body to pick up pieces of driftwood while maintaining a straight/vertical spine	X -lunging forward to lower one's body in order to pick up or drop off a piece of driftwood	X -lowering one's body at the waist to deadlift pieces of driftwood	X -rotating one's body at the core to pick up and throw pieces of wood from one side to the next	X -traversing one's body through an area containing numerous pieces of driftwood	5

APPENDIX G – Six Lens Analysis Guidelines/Criteria

LENS CRITERIA:

***Criteria used to further define and shape how a natural object can be used as a fitness platform. Lenses are in no specific order.*

Encourages Play

- Does the space engage one's sense of excitement and creativity?
- Is the space large enough to warrant one's sense of excitement and creativity?
- Does the space allow for exploration?

Disconnect from Technology

- Does the space void the requirement and use of technology?
- Does the space enhance a sense of being and connection to that specific natural space?

Uses 5 Senses – How can each sense be heightened through design? Does the design provide an opportunity to really focus in on one sense?

- Sight:* Does the space identify/highlight features that will make it visually appealing? Does the space highlight aspects of the natural material to engage one's sense of wonder and awe?
- Sound:* Does the space include design features that provide variations in sound? Hollow vs. dense materials? Varying foliage/ground materials?
- Smell:* Does the space contain vegetation that releases unique natural smells? Does the space include other forms of 'natural' smells that will help connect users to this outdoor environment (smell of cedar woodchips, etc.)?
- Taste:* Does the space include wild berries that are edible? Does the space highlight edible leaves and/or plants along the trail?
- Touch:* Does the space include texture variation? Is one material different from the next? Vary texture for touch (hands & feet)?

Uses Natural Materials

- Does the obstacle/structure use natural materials?
- Do the materials originate from the local area?
- Does the structure use recycled materials?
- Does the obstacle/structure limit use of virgin produced materials?

Forces Problem Solving

- Does the space allow for multiple passage points?
- Does each path through an obstacle lead to different fitness opportunities?

Allows for Competitiveness

- Does the space allow for consecutive attempts to be timed on a personal device?
- Can the space be used by an individual as well as by a team?

APPENDIX H – Six Lens Post Analysis Data

Felled Trees (log pile):

Encourages Play

Create a space that contains a lot of logs placed in different directions – to resemble a chaotic mess.

Logs can be all the same or in varying shapes and sizes. Space must be large enough to allow for multiple users at a time; play is often shared with friends! Create a space where it is not all to be seen; some aspects will be hidden from the starting point!

Disconnect from Technology

No requirement for use. A locker system could be placed at the beginning of the fitness trail for people to leave valuables (including phones).

Uses 5 Senses

Sight: Make use of real trees; that will show tree knots as well as its growth rings where cut! Could include signage pointing to a larger cross section of a tree or log (placed at the start for educational purpose), to show the rings/age. The log pile could be placed in a pattern that resembles a tree's branches!

Sound: Use trees of different densities to allow for different sounds. Could use hollowed-out logs to play with sound.

Smell: Cedar trees give off a prominent smell when wet. Include other vegetation to surround the space that might give off unique smells!

Taste: Edible berries and plants!

Touch: Try to refrain from having smooth surfaces throughout the space. Depending on where the log is placed on the structure – vary its surface texture to expose to the user (i.e. non-slip grip on the lower half for feet / hatched grip above for hands, etc.).

Uses Natural Materials (Local materials)

Structure to use real trees. Bark should be skinned to reveal smoother surface. Trees should be taken from local area so as to minimize possible travel and carbon emissions. Vertical trees should be placed in the ground, anchored and possibly treated? Connecting rods will ensure that the obstacle is structurally sound. Recycled rebar and/or large bolts will be required.

Forces Problem Solving

Create a space that is large enough and wide enough for multiple passages. Allow for passage over, under, and around parts of the obstacle. Pay attention to building the structure too high – too much vertical height is not necessary.

Allows for Competitiveness

By having the structure wide enough, more than one person can attempt the structure at once. Try to ensure a visible start and finish point – will allow for it to be timed.

Willow Bushes (thick vegetation):

Encourages Play

Create a willow maze, using tunnels and walls hidden from the starting point. Force users to squat, crabwalk, jump, climb, etc.. Willow obstacle will focus primarily on agility. Unique design could highlight shape of a snake (giving homage to local breeding grounds)!

Disconnect from Technology

No requirement for use. A locker system should be placed at the beginning of the fitness trail for people to leave valuables (including phones).

Uses 5 Senses

Sight: Maximize use of willow bushes and hedges; changing seasons will bring automatic changes in plant growth and color. To create certain shapes and corridors, use bamboo interlocking structures. Growth of willows will fill in structures; follow-on maintenance will be required.

Sound: Brushing up against willow branches and leaves will result in varying sounds. Falling leaves (as foliage) in the fall will provide new sounds. Make use of different ground materials (i.e. mulch).

Smell: Willow leaves will provide some smell with moisture. Surrounding vegetation could be planted to enhance smells in the area.

Taste: Edible berries and plants!

Touch: Willow branches and leaves will provide unique touch and feel opportunities as one goes through the space. Fall time will result in foliage (falling leaves) that one will walk over.

Uses Natural Materials (Local materials)

Structure to be made of interconnecting bamboo or other natural (found local if able) materials. Willow bushes to be used as main hedging material. Willow plants to be taken from local area / spliced from others currently growing within confines of FortWhyte Alive.

Forces Problem Solving

Create maze like structure with more than one access/exit point to overcome obstacle.

Allows for Competitiveness

Built to resemble an agility course – passage can be timed for quickness or used as a follow-the-leader type of event. Multiple passage points will lead to multiple sequences.

APPENDIX H – Six Lens Post Analysis Data

Boulders:

Encourages Play

Boulders should be placed similar to the log pile obstacle – a chaotic mess. Multiple towering spires will inspire ‘child-like’ play to climb, boulder and shimmy around. Possible smaller cave-like wedges to entice other ways to traverse obstacle.

Disconnect from Technology

No requirement for use. A locker system should be placed at the beginning of the fitness trail for people to leave valuables (including phones).

Uses 5 Senses

Sight: By having towering spires, it will be visually appealing. Boulders and rocks should be interlocking and rely on one another for strength and durability (could be an educational piece).

Sound: Ground surface between boulders could contain pebbles of varying sizes (make it different for each section). Possible use of thinner slab rock to bridge gaps – may allow for varying sounds if knocked or walked on!

Smell: Surrounding vegetation will enhance this sense.

Taste: Edible berries and plants!

Touch: Boulders will by nature have varying surface feel. Some boulders and rock can be roughed up to ensure variation.

Uses Natural Materials (Local materials)

Boulders should be sourced from local area. Every effort should be made to bring in larger boulders/rocks to build base. Use of gabions (rock cages), berms and swales can also be used to build up the area.

Forces Problem Solving

Multiple towering spires, crevices, and caves will provide multiple entry and exit points. Each passage will trigger different muscle groups and fundamental human movements.

Allows for Competitiveness

Have multiple lateral entry points and exit points – will allow for multiple users on obstacle at once.

Driftwood:

Encourages Play

Supply a variation of drift wood – different shapes, sizes, and weights.

Allow users to build structures using one’s imagination (especially good for younger participants).

Create mini obstacle course for drift wood to be carried if desired (i.e. felled tree logs in diagonal patterns, rock and/or stump hopping, etc.). Various aspects would have to be included in this space, so as to entice one’s playfulness. Driftwood comes and goes with the flow of water, and is never positioned in sequence. The clutter and disorganization will be key.

Disconnect from Technology

No requirement for use. A locker system should be placed at the beginning of the fitness trail for people to leave valuables (including phones).

Uses 5 Senses

Sight: This space should have lots of different kinds of wood – shape, size, weights, etc.

Organized clutter! All wood pieces should resemble that of driftwood – smoothness, density, rounded edges, etc.

Sound: Have wood pieces with varying hollowness and density. Play with different surface materials within the driftwood ‘collection area.’ Think of using river rocks (smaller in size) that will provide different sounds when the wood is dropped!

Smell: Surrounding vegetation to increase smells throughout the space.

Taste: Edible berries and plants!

Touch: Obstacle course to use different materials such as: Felled trees with varying texture. Rocks and boulders to jump on. Stepping stumps (up and down / side to side). Driftwood to have varying textures, as well as shape and size. To be carried in different ways. Surface materials to vary. Collector area to have river rocks.

Uses Natural Materials (Local materials)

All driftwood should be source/recycled from surrounding rivers. All rocks and felled trees to be sourced locally as well. Proper anchors to be installed for any climbing structures.

Forces Problem Solving

Obstacle course to contain a variation of materials and to allow for multiple paths throughout the course. Course must be wide enough to allow for lateral movement as well as forward/aft movements.

Course can be completed with one’s own body weight and/or carrying provided driftwood pieces.

Allows for Competitiveness

Mini course should allow for variation of routes, follow-the-leader, timed, and with or without an extra carrying load (i.e. driftwood).