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Who Are The Best Ice Hockey Players?

2023 MMA Summer Datathon

Objective

A team of five top players from all over the world

Who are the top five hockey players?

Given women's hockey data from the NWHL, we wonder that, among over a hundred of players participating in the game, who are the top five players excelling in all areas of the game.

Thus, our goal is to form a team of five top players for the next competition. The group of five players come from different teams, among which we have at least 3 excellent goal scorers and at least 2 excellent passers. Among the 5 players, there will also be two faceoff specialists and one takeaway specialist.

How to find the best hockey players?

To evaluate each player's performance, we introduced the NWHL Game Score and NWHL Play Score. The Game Score evaluates each player's performance on scoring goals, and the Play Score evaluates each player's performance on passing the puck. Both Scores are created based on various factors, such as the player's ability to successfully earn a goal, the ability to pass puck, takeaway and faceoff win performance, puck recovery ability, penalty taken times and the ability to conduct penalty draw.

Based on the Game Score and the Play Score, together with the amount of faceoff win and takeaway conducted by each player, we will be able to form a comprehensive assessment of each player and thus select our desired five.

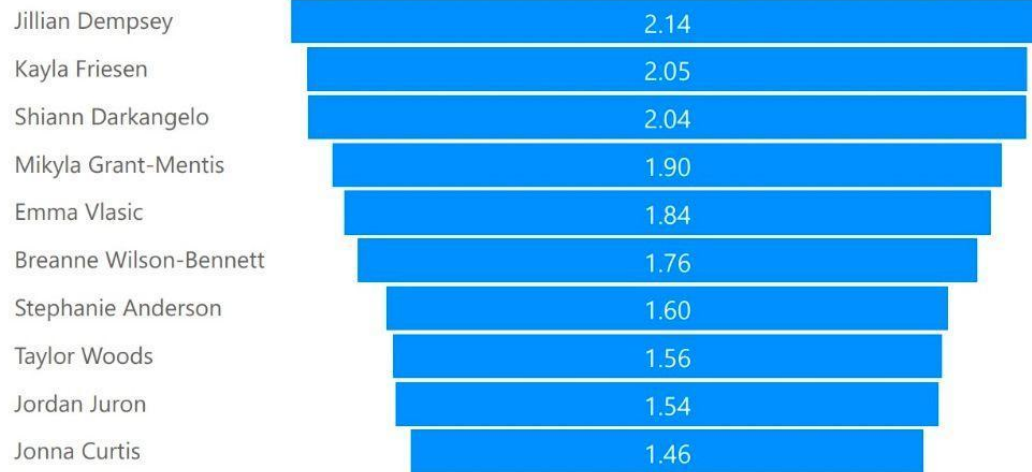**Rotman**

Method

Game Score and Play Score

- We use **Game Score** to evaluate individual player's overall performance in different events regarding earning a goal.
  - The idea is to compare all of a player's valuable events to the frequency in which goals are scored.
  - **Game_Score= goals +0.0071*play + 0.0383*shot + 0.0898*faceoff win + 0.0629*takeaway - 0.0139*penalty taken + 0.0139*penalty draw +0.0093*puck_recovery**
    - Factors are obtained by taking the frequency of each stat to successful goals.
    - <u>For example</u>, there were 1985 shot attempts (including both successful and unsuccessful attempts), and 76 goals. Take the 76 goals and divide them by the 1985 shot attempts, we get the factor of 0.0383.
    - We add value to players who conduct favorable events such as a penalty draw and a puck recovery
    - We minus value to players for bad event such as a penalty taken.

- We use **Play Score** to evaluate individual player's overall performance in different events regarding passing a puck.
  - **Play_Score= plays + 0.6788*goal + 3.6519*incomplete_play + 8.5686*faceoff win + 6.0058*takeaway - 0.3889*penalty taken + 0.3889*penalty y draw +0.8825*puck_recovery**
    - Similarly, factors are obtained by taking the frequency of each stat to successful pass attempts.

- We divide the individual Game Score and Play Score by the total number of games played by individual player to find the average score for individual player. The **average Game Score** and **average Play Score** will then be the performance evaluation standards.

Below is a link to the article where we get insights on the Game Score and Play Score formulas:
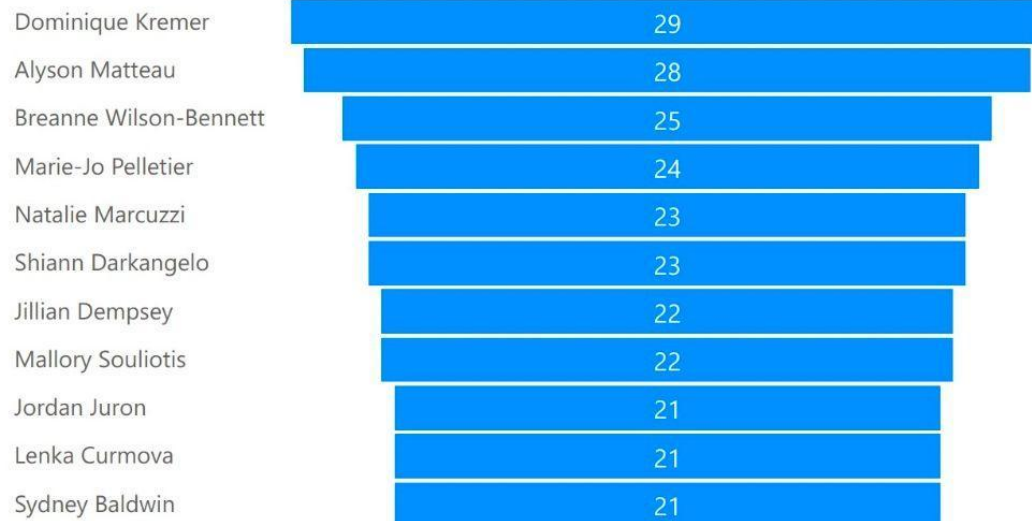https://hockey-graphs.com/2019/08/21/revisiting-nwhl-game-score/#more-23764

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Important Event Summaries

Statistics on Game Score, Play Score, number of takeaway & faceoff win

Top 10 Game Scores

Player	Score
Jillian Dempsey	2.14
Kayla Friesen	2.05
Shiann Darkangelo	2.04
Mikyla Grant-Mentis	1.90
Emma Vlasic	1.84
Breanne Wilson-Bennett	1.76
Stephanie Anderson	1.60
Taylor Woods	1.56
Jordan Juron	1.54
Jonna Curtis	1.46

Top 10 Play Scores

Player	Score
Shiann Darkangelo	220.3
Kayla Friesen	175.5
Jillian Dempsey	168.3
Stephanie Anderson	168.1
Emma Vlasic	162.8
Jordan Juron	143.4
Breanne Wilson-Bennett	142.9
Jonna Curtis	135.0
Sydney Baldwin	132.1
Shannon Doyle	132.0

Top 10 Takeaway Specialists
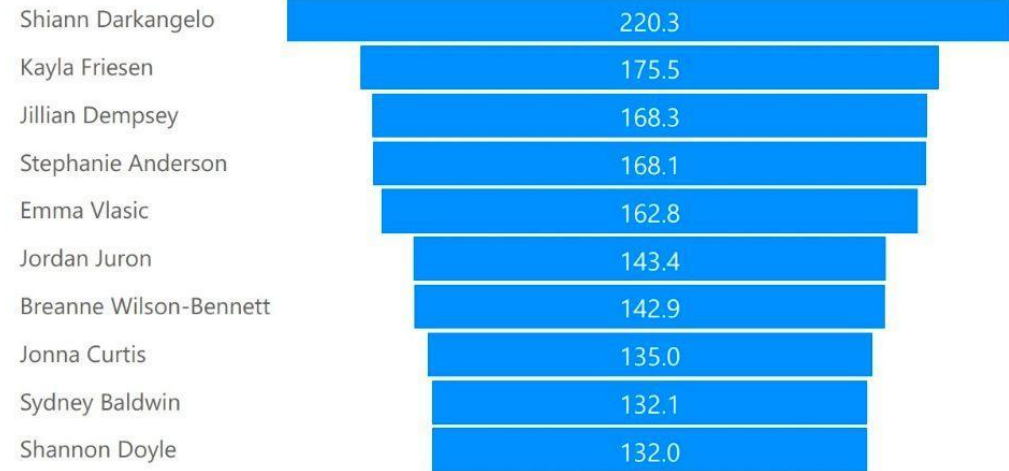
Player	Count
Dominique Kremer	29
Alyson Matteau	28
Breanne Wilson-Bennett	25
Marie-Jo Pelletier	24
Natalie Marcuzzi	23
Shiann Darkangelo	23
Jillian Dempsey	22
Mallory Souliotis	22
Jordan Juron	21
Lenka Curmova	21
Sydney Baldwin	21

Top 10 Faceoff Specialists

Player	Count
Shiann Darkangelo	79
Jillian Dempsey	70
Lexie Laing	55
Tereza Vanisova	51
Jordan Juron	49
Breanne Wilson-Bennett	45
Emma Vlasic	45
Cassidy MacPherson	38
Stephanie Anderson	38
Carlee Turner	32

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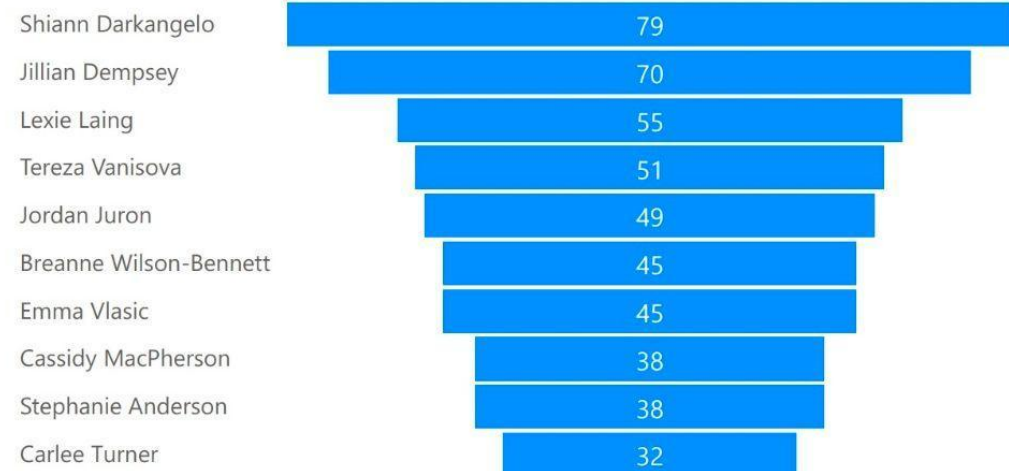
Results

1) Goal Scorer

Jillian Dempsey
Boston Pride

Attributes:
- Goal Scorer
- Good Passer
- Faceoff Specialist
- No Penalty taken

6
Games Played

3
Number of Goals

11.1%
Goal Rate

1.33
Average Period to Score a Goal

Goals vs Shots
Jillian Dempsey — 3 | 24
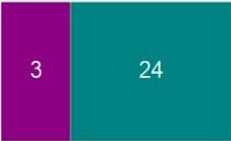
80
Number of Passes

Game Score
0.0 — 2.1 — 2.1

69.0%
Passes Rate

Passes vs Incomplete Passes
Jillian Dempsey — 80 | 36

22
Number of Takeaways

Play Score
1.9 — 168.3 — 220.3

70
Number of FaceoffWins

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Top 5 players across all teams — Breanne Wilson - Bennett

2) Goal Scorer

Attributes:
- Goal Scorer
- Good Passer
- Take away Specialist
- Less Penalty taken

Breanne Wilson-Bennett
Toronto Six

6
Games Played

2
Number of Goals

6.1%
Goal Rate

1.50
Average Period to Score a Goal

Goals vs Shots

Breanne Wilson-Bennett | 2 | 31

95
Number of Passes

Game Score

0.0 — 1.8 — 2.1

73.1%
Passes Rate

Passes vs Incomplete Passes

Breanne Wilson-Bennett | 95 | 35

25
Number of Takeaways

Play Score

1.9 — 142.9 — 220.3

45
Number of FaceoffWins

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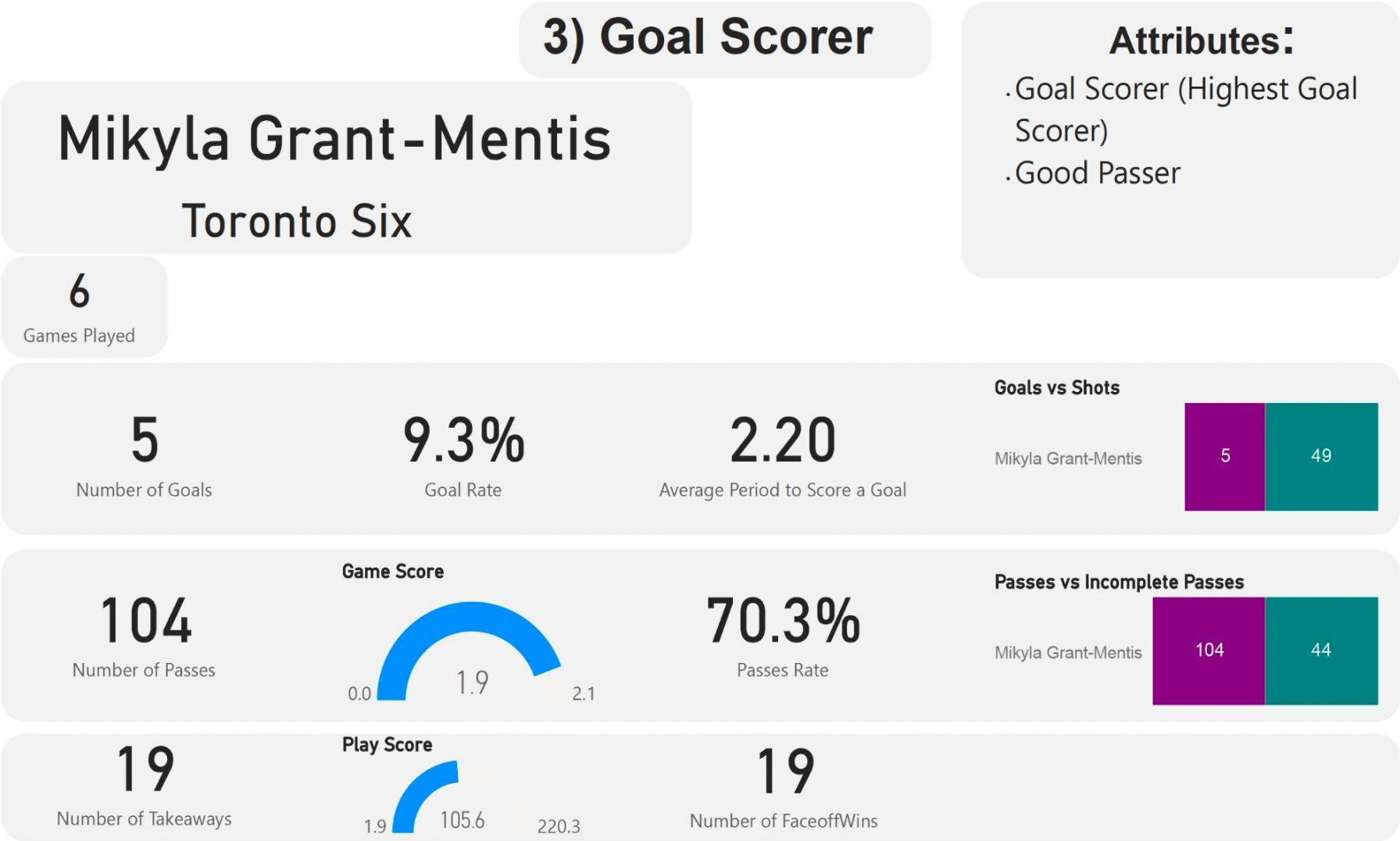
3) Goal Scorer

Attributes:
- Goal Scorer (Highest Goal Scorer)
- Good Passer

Mikyla Grant-Mentis
Toronto Six

6
Games Played

5
Number of Goals

9.3%
Goal Rate

2.20
Average Period to Score a Goal

Goals vs Shots

Mikyla Grant-Mentis | 5 | 49

104
Number of Passes

Game Score

0.0   1.9   2.1

70.3%
Passes Rate

Passes vs Incomplete Passes

Mikyla Grant-Mentis | 104 | 44

19
Number of Takeaways

Play Score

1.9   105.6   220.3

19
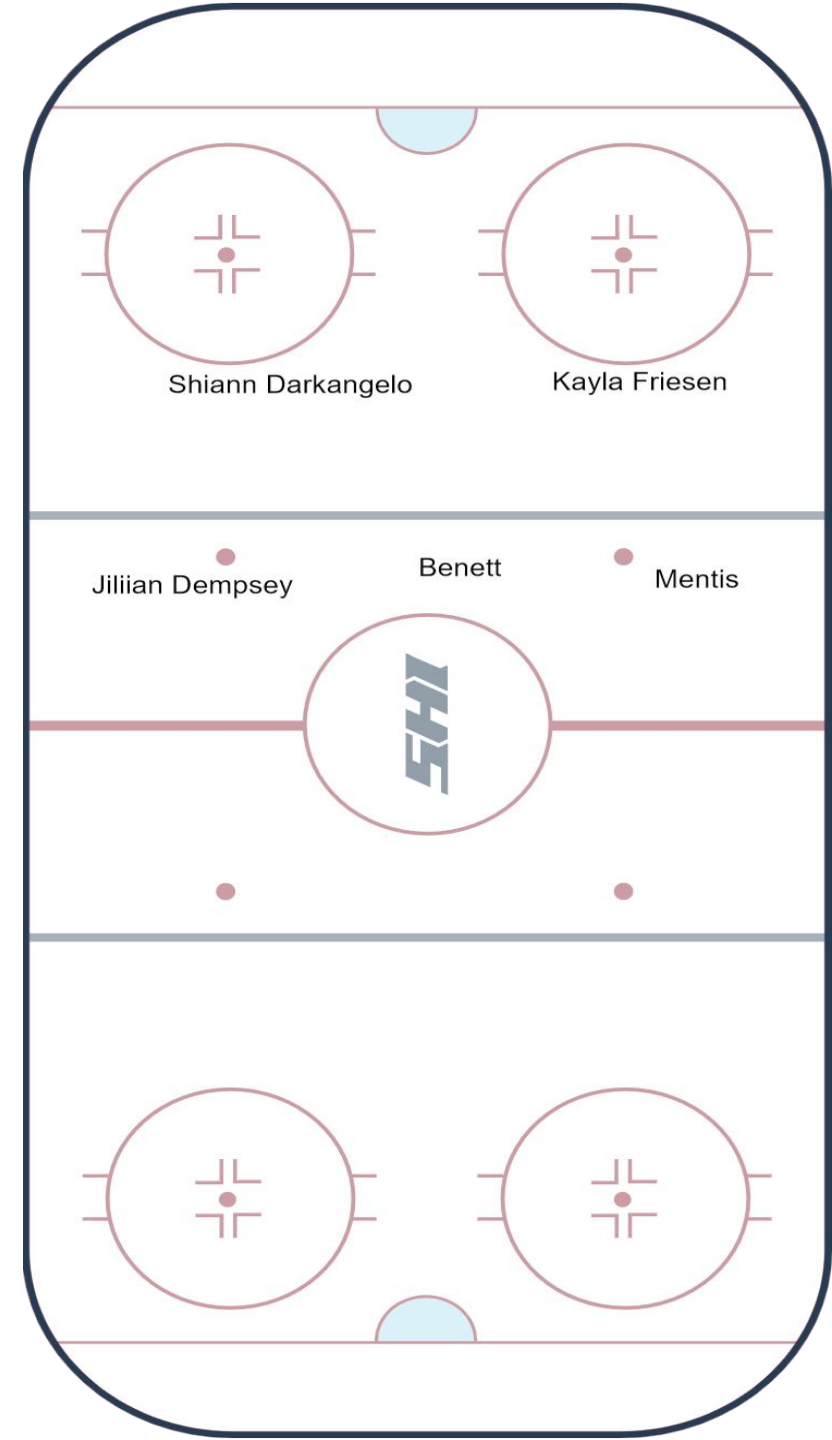Number of FaceoffWins

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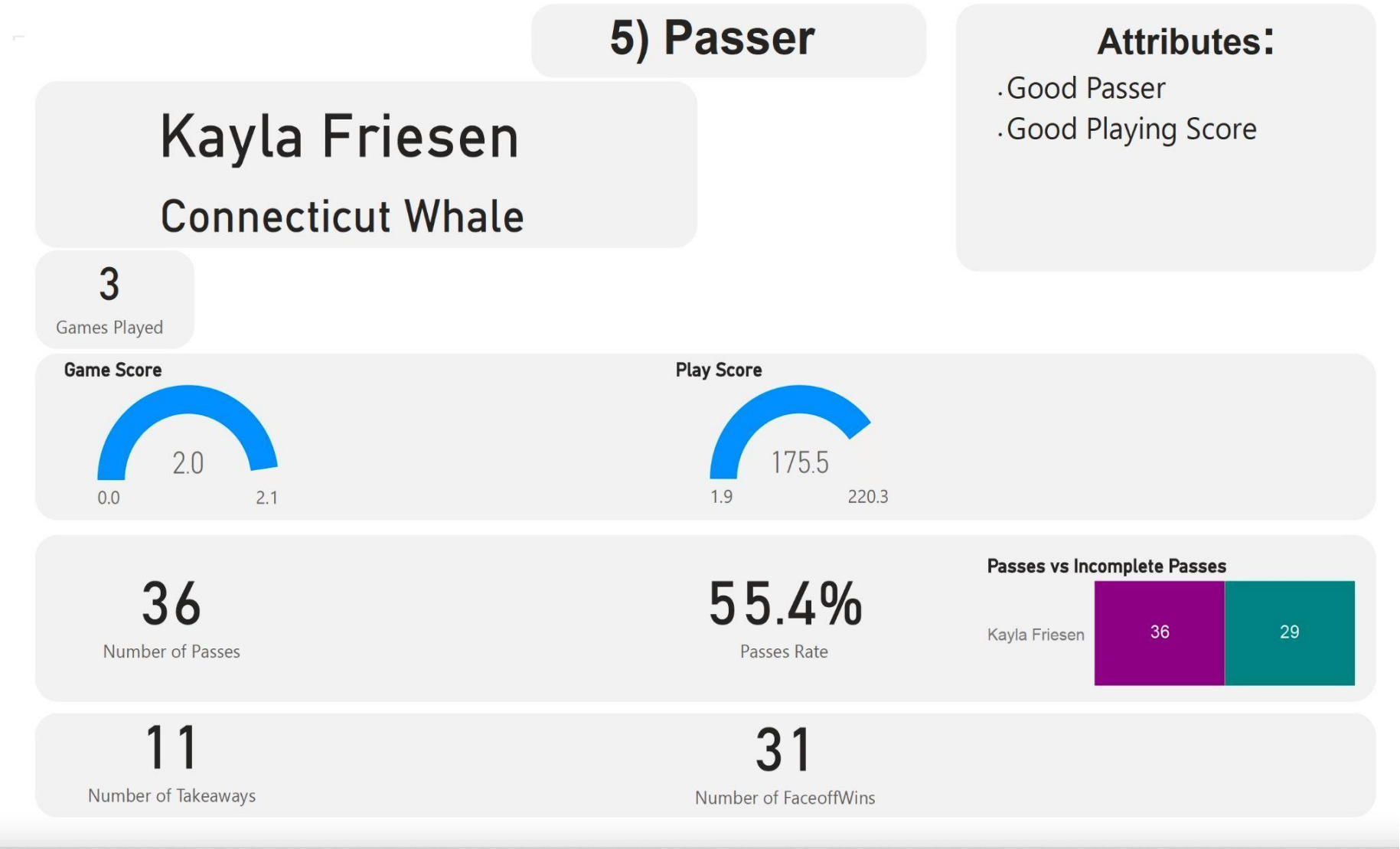
Conclusions & Limitations

- **Conclusions:**
  - We have chosen 5 top players across all teams in the NWHL Dataset (See image on the right for their names and positions).

- **Limitations**:
  - The sample size of our NWHL Dataset is too small.
    - Recommendation: we can conduct more research to extract more comprehensive sample data in the future.

  - We lack information on other types of events (e.g. faceoff lose, primary and secondary assists).
    - As a result, our Game Score and Play Score formulas might not be perfectly comprehensive, and there is room for improvement.

Appendix

- Previously, we selected top 5 players **across all teams** in the NWHL Dataset.
  - We made sure there are at least 3 excellent goal scorers, 2 excellent passers, 2 faceoff specialists, and 1 takeaway specialist.
  - Due to the nature that these 5 players are from different teams, they lack track records on completing successful passes between each other (i.e., Players won't tend to pass the puck to other players from different teams).

- As a result, we didn't investigate whether the top 5 players we chose were familiar with each other.

- To compensate for this, we did the same procedure to select **top 5 players** from only team **Toronto Six.**
  - We calculated Game Score & Play Score for each player.
  - We looked at Game Score, Play Score, number of takeaways and faceoff wins of each player.
    - We chose: Shiann Darkangelo, Mikyla Grant-Mentis, Breanne Wilson-Bennett, Taylor Woods, & Lindsay Eastwood.
  - We made sure there are at least 3 excellent goal scorers, 2 excellent passers, 2 faceoff specialists, and 1 takeaway specialist.
  - We also calculated **play success rate** (i.e., proportion of successful passes) between each pair of top players.

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Appendix

Who are the best ice hockey players? — A special case for team Toronto Six

- We chose 5 top players from team Toronto Six.

  - Shiann Darkangelo

  - Mikyla Grant-Mentis

  - Breanne Wilson-Bennett

  - Taylor Woods

  - Lindsay Eastwood

- We also calculated **play success rate** (i.e., proportion of successful passes) between each pair of players (See image on the right for details).

  - Play success rate indicates how familiar players are with each other.

- Note: the players highlighted in green are also present in our top 5 players from **across all the teams.**

Player 1	Player 2	Passing %
Shiann Darkangelo	Mikyla Grant-Mentis	61%
Shiann Darkangelo	Breanne Wilson-Bennett	85%
Shiann Darkangelo	Taylor Woods	97%
Shiann Darkangelo	Lindsay Eastwood	84%
Mikyla Grant-Mentis	Breanne Wilson-Bennett	67%
Mikyla Grant-Mentis	Taylor Woods	81%
Mikyla Grant-Mentis	Lindsay Eastwood	79%
Breanne Wilson-Bennett	Taylor Woods	73%
Breanne Wilson-Bennett	Lindsay Eastwood	67%
Taylor Woods	Lindsay Eastwood	100%

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