LESSON TITLE: Can We Predict the Future? Examining Population Pyramids
SUBJECT/GRADE: GCG C1D1 Grade 9 Academic: Issues in Canadian Geography
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Activity Overview

This is the second lesson about population changes in Canada. This lesson goes over the features and types of population pyramids and the stages of the demographic transition model. Students will use the Philippines and Canada as a frame of reference when examining the importance of understanding the demographic breakdown of a population in terms of services and development. Students will discover the Philippines has a larger and younger population than Canada, which would indicate the need for economic incentives to keep young working population in the Philippines. Students will be building on the idea of push and pull factors and will gain further understanding as to why many people are compelled to leave the Philippines in search of greater opportunities elsewhere. Students will use the concepts from the TedTalk by Kim Preshoff, "Population pyramids: Powerful predictors of the future." Students will apply these concepts to other community groups.

Overall Expectation(s):	Specific Expectation(s):
A1. Geographic Inquiry: use the geographic inquiry process and the concepts of geographic thinking when investigating issues relating to Canadian geography; **D1.** Population Issues: analyse selected national and global population issues and their implications for Canada **D2.** Immigration and Cultural Diversity: describe the diversity of Canada's population, and assess some social, economic, political, and environmental implications of immigration and diversity for Canada **D3.** Demographic Patterns and Trends: analyse patterns of population settlement and various demographic characteristics of the Canadian population	**A1.4** interpret and analyse data and information relevant to their investigations, using various tools, strategies, and approaches appropriate for geographic inquiry **A1.6** evaluate and synthesize their findings to formulate conclusions and/or make judgements or predictions about the issues they are investigating **D1.1** analyse the impact of selected population trends on people living in Canadian communities **D2.1** identify factors that influence where immigrants settle in Canada, and assess the opportunities and challenges presented by immigration and cultural diversity in Canada (e.g., expansion of business opportunities, cultural **D3.3** analyse the major demographic characteristics of the Canadian population

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Catholic Graduate Expectation(s):

An effective communicator who:
CGE2b: reads, understands and uses written materials effectively
CGE2c: presents information and ideas clearly and honestly and with sensitivity to others
CGE2d: writes and speaks fluently one or both of Canada's official languages
A self-directed, responsible, lifelong learner who:
CGE4b: demonstrates flexibility and adaptability
CGE4f: applies effective communication, decision-making, problem-solving, time and resource management skills
A reflective, creative and holistic thinker who:
CGE3c: thinks reflectively and creatively to evaluate situations and solve problems
CGE3e: a holistic approach to life by integrating learning from various subject areas and experience;
CGE3f: examines, evaluates and applies knowledge of interdependent systems (physical, political, ethical, socio-economic and ecological) for the development of a just and compassionate society.
A collaborative contributor who:
CGE5a: works effectively as an interdependent team member

Evidence of Learning (Assessment and Evaluation Plan):

- Prior knowledge: understanding of the definitions of push and pull factors
- Observation
- Oral feedback as lesson progresses
- Population pyramid activity
- Discussion
- Peer evaluation

Teaching/Learning Strategies

Minds-On [20 minutes]
Have students close their eyes and imagine they are a leader of a country. Ask them what would be the benefit of having the ability to predict the future of their country in terms of population. Get students to write their answers on post-its and stick them to the board. Group the answers together to highlight major themes.

Video and Quiz [10 minutes]
Show the TedTalk, "Population Pyramids: Powerful Predictors of the Future" by Kim Preshoff.
The video can be found here:
https://ed.ted.com/lessons/population-pyramids-powerful-predictors-of-the-future-kim-preshoff. Complete the 9 multiple choice questions that follow the video as a way to assess student understanding of population pyramids.

Understanding Population Pyramids [30 minutes]
Go over what a population pyramid is with your class. Show students how to construct their own population pyramid on the board or chart paper from the data from "Ontario Population Table, 2018" (BLM.CGC9.2.1). For step-by-step instructions on how to manually create a population pyramid, view the video "How to draw a population pyramid" on YouTube, found here: https://www.youtube.com/watch?v=eGyoKWRC2es (Mrs. Geography, 2016). You will need markers and a ruler. You will need to calculate the percentage of the population for each age group before graphing the values. Model for your students how to determine this value. To find the percentage for each age group, divide the number of male/females by the total population and multiply by 100.

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This wordle was produced using an article on population pyramids and the online application Edwordle, found here: http://www.edwordle.net/index.html

Based on the Minds-On activity, have students recall what the data on population pyramids can tell you about the population it represents and/or the services they may need. Take this up on the board or use a Wordle (see the above example) projected onto a screen to emphasize the main points. Choose one or two of the examples provided by students and explain them in greater detail. For example, point out that if a population pyramid shows higher numbers of older people, that will indicate a greater need for geriatric services and programs. In the case of the Philippines, they have a larger younger population so the government should be investing in more education, youth programming and job development to meet the needs of the younger generation

Matching Game: Types of Population Pyramids [15 minutes]
Review the features of the three types of population pyramids:

a. **Expansive pyramids**: used to describe populations that are young and growing. They are often characterized by their typical 'pyramid' shape, which has a broad base and narrow top.
b. **Constrictive pyramids:**used to describe populations that are elderly and shrinking. Constrictive pyramids can often look like beehives and typically have an inverted shape with the graph tapering in at the bottom. Constrictive pyramids have smaller percentages of people in the younger age cohorts and are typically characteristic of countries with higher levels of social and economic development, where access to quality education and health care is available to a large portion of the population.
c. **Stationary pyramids:** used to describe populations that are not growing. They are characterized by their rectangular shape, displaying somewhat equal percentages across age cohorts that taper off toward the top. These pyramids are often characteristic of developed nations, where birth rates are low and overall quality of life is high.

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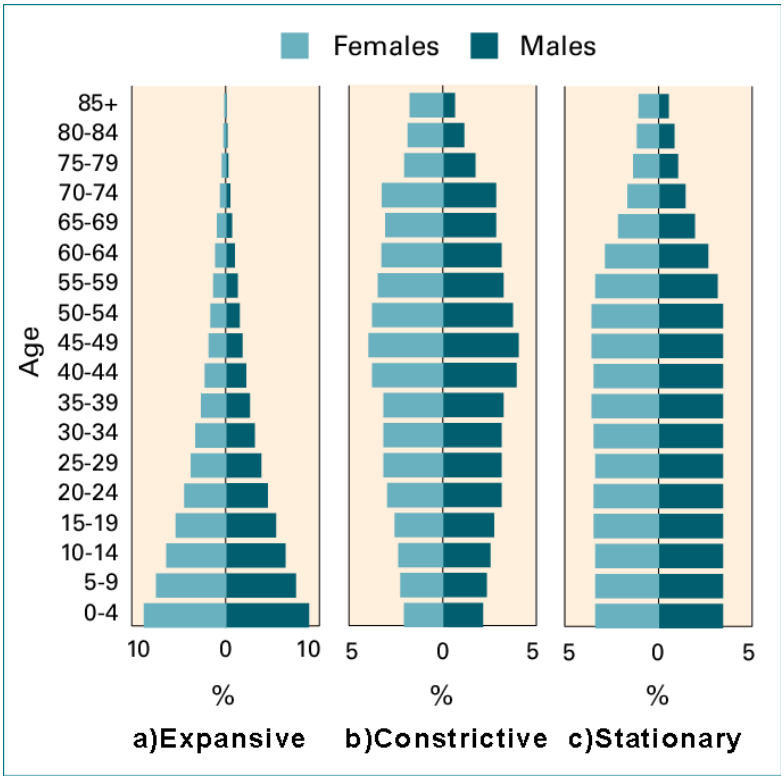

The three different types of population pyramids. Adapted from *Daniel L Staetsky*, 2015.

Using "Types of Population Pyramids Matching Game" (BLM.CGC9.2.7), project images of the three different types of population pyramids onto a screen using a projector and poll students to see if they can accurately match them to the correct type. See the above diagram for the correct answers.

Extension: Demographic Transition Models [30 minutes]
Expand the population pyramid concepts to include the demographic transition models, highlighting the key features of each stage. Students can use pp. 238-242 in the textbook Making Connections: Issues in Canadian Geography, 3rd ed.

Guided Class Activity [15 minutes]
As a class, look at "POPULATION PYRAMIDS OF CANADA AND THE PHILIPPINES, 2018" (BLM.CGC9.2.2). Prompt the class with the following questions:

1. What do you notice about the population pyramids?
2. What kind of pyramid is it?
3. What are the similarities and/or differences between the two pyramids?
4. What can the population pyramid tell us about the country and the services the community provides/should provide?
5. What stage of the demographic transition model is the region/country in? How can this help us understand what services and institutions are necessary for that community?

Distribute "POPULATION TRENDS" (BLM.CGC9.2.4) Working in small groups, have your students select an ethnic group in Toronto. Statistics Canada has not released full datasets for individual ethnic groups, so have students identify the ethnic neighbourhoods within Toronto to obtain their data. Datasets can be accessed through the City of Toronto website:
https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/

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Using the website, students will then examine the population trends for the group for the past 60 years, using 5-year intervals.

- Create a population pyramid reflecting the data they collected
- Determine what type of pyramid is it (expansive, constrictive, stationary)
- Look at their own community statistics and compare to a different neighbourhood in Toronto (give each group a different neighbourhood for comparison).
- What is similar, different? Why might this be the case?
- Examine infrastructure and accessibility to resources within that neighbourhood that make settlement "attractive" to immigrants and explain why?

Have students present their findings to the class. Students will give each group two things they did well and one area of improvement on sticky notes after their presentation. See the rubric (BLM.CGC9.2.4) for evaluation criteria.

Consolidation [20 minutes]
Distribute "FIND A FIRST GRADE STUDENT EXIT SLIP" (BLM.CGC9.2.5). Have students confer in groups and summarize what population pyramids are and why they are important. Summaries must be simple enough that someone in grade one would understand. Students will present their summaries to the class.

Extension [20 minutes]
Based on what they learned, have students answer the following question as a literacy test preparation: "Should the government consider the information from population pyramids when making decisions?" Students may compose their paragraphs on the worksheet "OPINION PARAGRAPH" (BLM.CGC9.2.6).

Differentiated Instruction and Accommodations/Special Needs:

- Use translation applications like google translate to help with ELL
- Group collaboration
- Choice for activity
- Rephrase and repeat instructions and major concepts
- Write answers on the board for visual learners
- Grouping of major ideas
- Chunking of tasks
- Use of multimedia to highlight key concepts

Learning Materials

- BLM.CGC9.2.1 "Ontario Population Table, 2018"
- BLM.CGC9.2.2 "Population pyramids of Canada and the Philippines, 2018"
- BLM.CGC9.2.3 "Population Pyramids of Canada and the Philippines, 2018: Answer Key"
- BLM.CGC9.2.4 "Population Trends"
- BLM.CGC9.2.5 "Opinion Paragraph"
- BLM.CGC9.2.6 "Find a First Grade Student Exit Slip"
- BLM.CGC9.2.7 "Types of Population Pyramids Matching Game"

Elements of 21st Century Learning

Critical Thinking and Problem Solving: Acquires, processes, interprets, and analyzes information to make informed decisions

Innovation, Creativity, and Entrepreneurship: Makes discoveries through inquiry research

Collaboration: Students work together, sharing responsibility, making substantive decisions, interdependently

Communication: Asks effective questions to acquire knowledge

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- Post-it notes
- Computer and digital projector
- Chart paper, markers, ruler

Resources

- City of Toronto. (2016). Neighbourhood Profiles. Retrieved July 31st, 2019 from https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/
- Clark, B., & Wallace, J. K. (2015). Making connections: Issues in Canadian geography.
- Mrs. Geography (2015). *How to draw a population pyramid* [video file]. Retrieved August 18, 2019 from: https://www.youtube.com/watch?v=eGyoKWRC2es
- Population Pyramids of the World from 1950 to 2100. (n.d.). Retrieved from https://www.populationpyramid.net/
- Statistics Canada. Table 17-10-0005-01 Population estimates on July 1st, by age and sex. Retrieved July 31, 2019 from https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501&pickMembers%5B0%5D=1.7&pickMembers%5B1%5D=2.3
- Statistics Canada.(2016). 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016001. Retrieved July 31st, 2019 from https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=109523&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2016&THEME=115&VID=0&VNAMEE=&VNAMEF=
- TED-Ed. [Screen name]. (2014, May 05). Population pyramids: Powerful predictors of the future [video file]. Retrieved July 31, 2019 from: https://youtu.be/RLmKfXwWQtE

Teaching Notes

- Students may have difficulty reading the pyramid. You may have to go over how to read and plot information on a population pyramid.
- Students may have difficulty finding datasets. Have them refer to the Population Pyramid website for the pyramids and statistics for the task.

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Ontario Population Table, 2018

Age group	Males	Women
All ages	7,069,861	7,252,896
0 to 4 years	371,504	353,444
5 to 9 years	388,245	373,509
10 to 14 years	396,895	382,473
15 to 19 years	442,236	416,543
20 to 24 years	528,919	482,003
25 to 29 years	521,392	492,615
30 to 34 years	490,250	485,529
35 to 39 years	457,837	477,081
40 to 44 years	438,816	467,086
45 to 49 years	466,122	482,044
50 to 54 years	507,211	513,243
55 to 59 years	520,316	529,281
60 to 64 years	444,033	469,312
65 to 69 years	361,729	396,064
70 to 74 years	289,879	324,049
75 to 79 years	195,068	231,381
80 to 84 years	132,282	170,087
85 to 89 years	78,517	119,897
90 to 94 years	31,150	63,643
95 to 99 years	6,825	20,789
100 years and over	635	2,823

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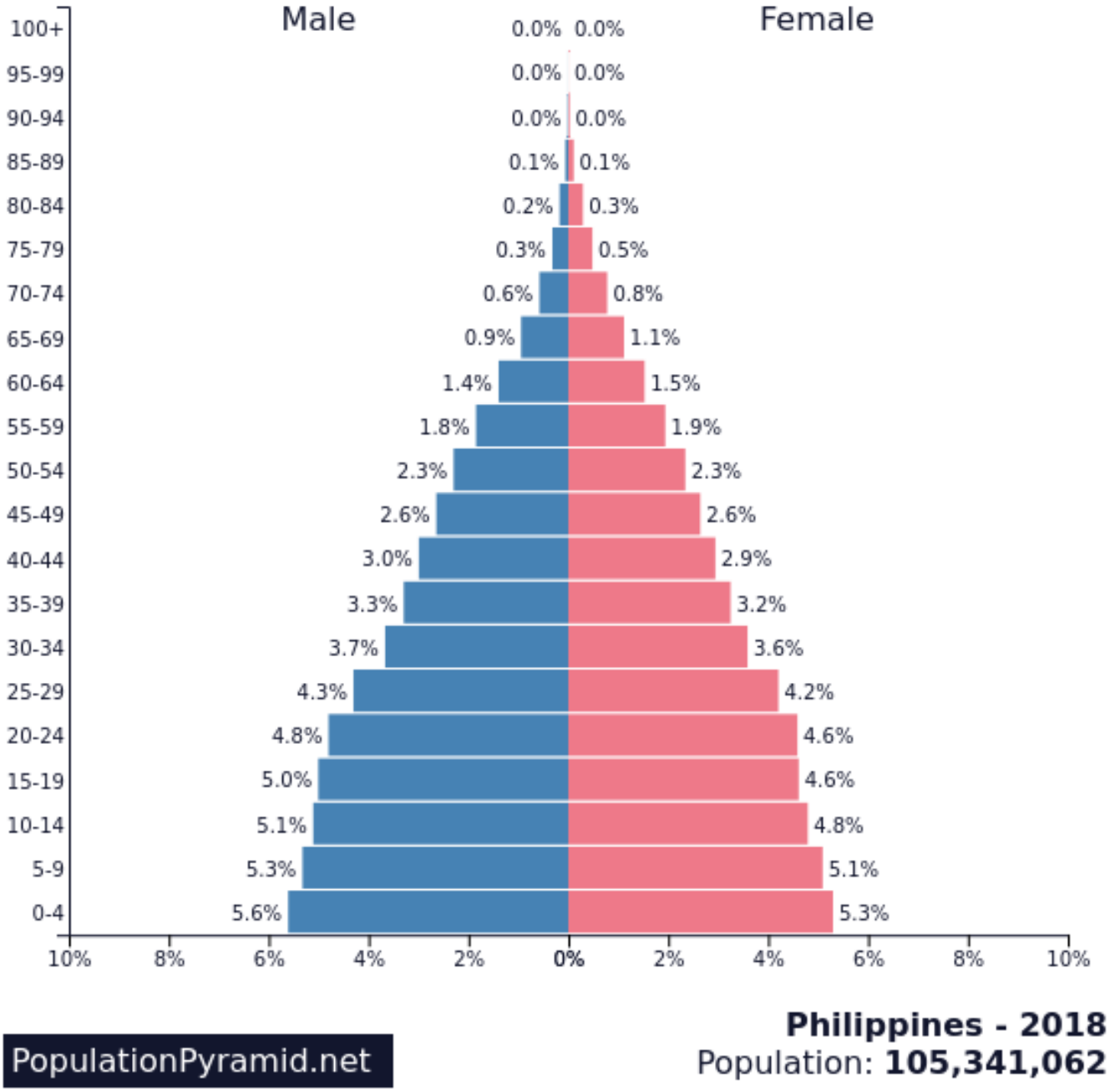
POPULATION PYRAMIDS OF CANADA AND THE PHILIPPINES, 2018



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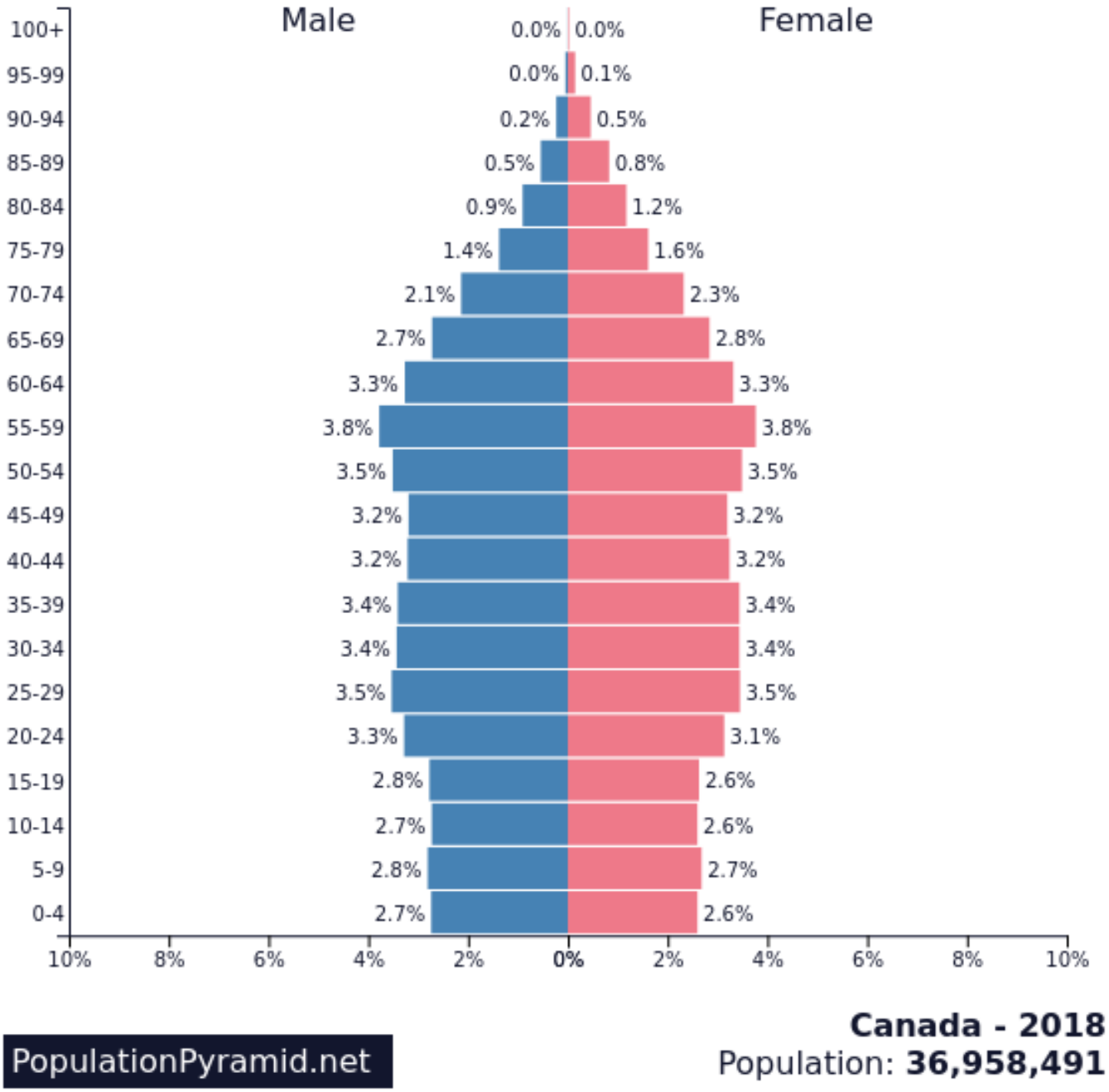

Based on the graphs, answer the following questions on a separate piece of paper:

1. What do you notice about the population pyramids?
2. What kind of pyramid is it?
3. How are the population pyramids similar? Different?
4. What can the population pyramid tell us about the country and the services the community provides/should provide?
5. What stage of the demographic transition model is the region/country in?
6. How can this help us understand what services and institutions are necessary for that community?

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BLM.CGC9.2.3

POPULATION PYRAMIDS OF CANADA AND THE PHILIPPINES, 2018: ANSWER KEY

1. **What do you notice about the population pyramids?**

Canada	• Population seems to be a bit bigger around the middle but overall the numbers seem steady (even base) • Very few people living to be over 100
The Philippines	• Smaller number of older people at the top • Larger number of younger people (wider base)

2. **What kind of pyramid is it?**

Canada	stationary
The Philippines	expansive

3. **How are the population pyramids similar? Different?**

Similarities: male to female ratio is the same. Have very few people living 100+ years

Differences: The Philippines has a growing number of young people whereas Canada has a more steady population growth. Canada has a larger number of the population making it to 80+ years

4. **What can the population pyramid tell us about the country and the services the community provides/should provide?**

Canada	Has a good healthcare system because people are living longer. Might have more opportunities because the number of working aged people is steady and not declining, indicating job opportunities. Canada has a larger aging population so it would need more services targeted at seniors (healthcare, recreation, housing, etc). Pyramid also indicates a good education system as there are less children being born showing that women have greater access to education and information.
The Philippines	Although the number of children being born is still increasing, it is doing so at a slower rate. There seems like there is a decline in the number of working aged people indicating that they are leaving the

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	country. This might mean that there is less economic incentive to stay, forcing people out. Will need more services for children and mothers (daycare, schools, healthcare) and can benefit from developing more financial incentives to get people to stay in the country.

5. What stage of the demographic transition model is the region/country in?

Canada	Stage 4, which means birth rates and death rates are low, strong economy, accessible education, healthcare is very good, greater economic opportunities
The Philippines	Stage 2 moving into Stage 3, which means birth and death rates are starting to decrease. Population may be increasing because birth rates are still somewhat high but death rates have decreased.

6. How can this help us understand what services and institutions are necessary for that community?

Answers will vary. Here is a sample:

Understanding what stage of the demographic transition model a country is in, helps to determine and predict what services are needed in the future. For example, Canada has less children being born indicating that there will be a lesser need for teachers and schools in the future (excluding increases due to immigration). The Philippines on the other hand shows a pattern of increasing population so the opposite is true. More money would need to be invested into education to provide services for the number of children being born.

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BLM.CGC9.2.4 Name: _____

POPULATION TRENDS

Task:
Break off into groups and choose a specific ethnic group in Toronto for research. You will have to examine the population trends for the group for the past 60 years (10-year intervals) and create a short presentation for the class. With the data you collected you will complete the following tasks:

- Create a population pyramid
- Determine the type of population pyramid your data shows
- You will then look at your community statistics and compare it to a region in Canada
- What is similar, different? Why might this be the case?
- Examine infrastructure and accessibility to resources that make a settlement in Toronto/that neighbourhood "attractive" to immigrants and explain why

During the class presentations, you will be asked to provide each group feedback indicating two things they did well and one area of improvement on a post-it note after their presentation.

RUBRIC

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
D1.1 analyse the impact of selected population trends on people living in Canadian communities	Information is missing Has limited understanding about the importance of infrastructure and population growth Presentation is not engaging Too short/too long	Information presented needs more details Has some understanding about the importance of infrastructure and population growth Somewhat engaging presentation Too short/too long	All information is present with details Understands the infrastructure needed to support different communities Engaging presentation Timing is well done	All information is present with great detail Demonstrates a great understanding of the connection between population growth and infrastructure Very engaging presentation Well-timed

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BLM.CGC9.2.5 Name: _____

FIND A FIRST GRADE STUDENT EXIT SLIP

Summarize the key idea of this lesson in three sentences or less so that a 1st Grade student can understand.

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BLM.CGC9.2.6 Name: _____

OPINION PARAGRAPH

Should the government consider the information from population pyramids when making decisions?

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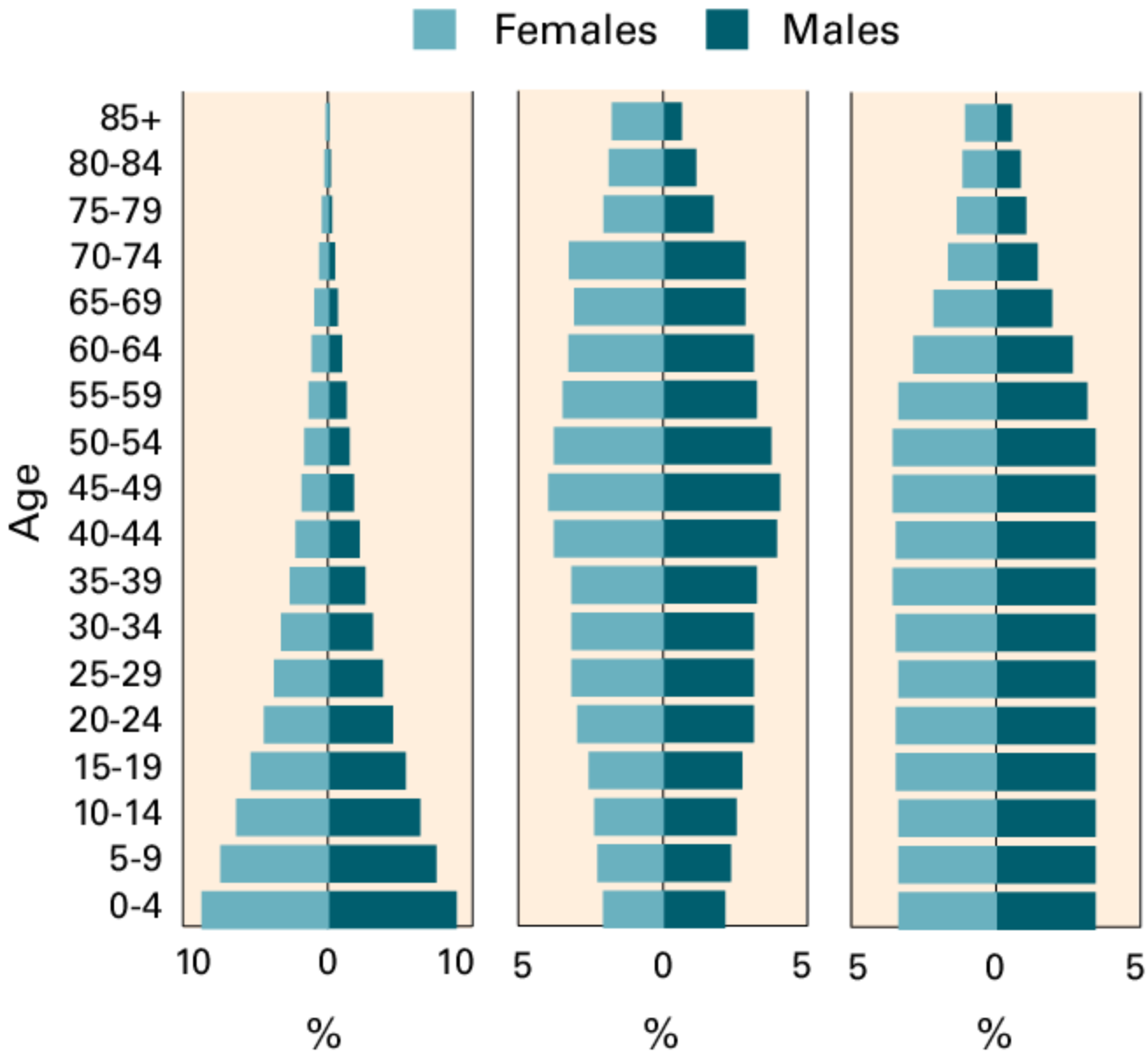
Types of Population Pyramids Matching Game



Adapted from *Daniel L Staetsky*, 2015.

Determine which population pyramid is:

a) Expansive
b) Constrictive
c) Stationary

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