Fast Fashion

Numeracy Opportunities in Fast Fashion PBL (Grades K-12)

Regardless of grade level, students working with numeracy opportunities and demands will also be engaging in some/many of the guiding principles and standards for mathematical practices.

- **Guiding Principles:**
    - A clear and effective communicator
    - A self-directed and lifelong learner
    - A creative and practical problem solver
    - A responsible and involved citizen
    - An integrative and informed thinker

- **Standards for Mathematical Practice:**
    - Make sense of problems and persevere in solving them
    - Reason abstractly and quantitatively
    - Construct viable arguments and critique the reasoning of others
    - Model with mathematics
    - Use appropriate tools strategically
    - Attend to precision
    - Look for and make use of structure
    - Look for and express regularity in repeated reasoning

The following pages will provide you with information regarding naturally occurring numeracy opportunities focused on food waste:

- **Childhood (K-5)**
- **Early Adolescence (6-8)**
- **Adolescence (9-diploma)**
- **Possible guiding questions**

Fast Fashion

Childhood (K-5)

Math Focus Strands:

- **Quantitative Reasoning:**
  - **Counting and Cardinality** – Counting items of clothing owned vs. needed.
  - **Numbers and Operations in Base Ten** – Comparing the cost of fast fashion vs. sustainable fashion.
  - **Numbers and Operations: Fractions** – Understanding fractions of clothing donated, recycled, or wasted.

- **Statistical Reasoning:**
  - **Measurement & Data** – Measuring fabric waste and water use in textile production.
  - **Measurement & Data** – Creating bar graphs and pictographs of clothing consumption.

Example Activities:

1. **Clothing Audit** – Students count and categorize their clothing items (new, secondhand, or donated).
2. **Graphing Waste Data** – Students create a pictograph showing how much clothing is thrown away each year.
3. **Basic Cost Comparison** – Students compare the price of a fast fashion outfit vs. a secondhand or sustainable one.
4. **Textile Waste Fractions** – Students calculate what fraction of old clothing is recycled vs. sent to landfills.
5. **Advertising Audit** - Students count and categorize the advertisements (tv, magazine, social media) for fast fashion and impact on purchases vs advertisements to purchase from second hand establishments or donate/sell clothing.

Fast Fashion

Early Adolescence (6-8)

Math Focus Areas:

- **Quantitative Reasoning:**
  - **Ratio and Proportional Relationships:** researching significant ratios related to fast fashion, such as
    - gal H_2O per lb of material created
    - cost per usage given the life-cycle of these articles

- **Algebraic Reasoning:**
  - **Expressions and Equations:** Modeling historical trends in Fast Fashion production and consumption.

- **Geometric Reasoning:**
  - **Geometry:** Estimating landfill volume occupied by discarded clothing.

- **Statistical Reasoning:**
  - **Statistics & Probability:** Basic statistics around Fast Fashion (e.g. https://earth.org/statistics-about-fast-fashion-waste/)

Example Activities:
1. **Comparing economics related to different clothing acquisition strategies** – buying new high-quality garments (slow fashion?), fast fashion, buying second-hand clothing, making clothing yourself.

2. **Statistical Predictions** – Use data to illustrate trends in economic activity and pollution related to fast fashion.

3. **Mapping**: global maps of where fast fashion is bought vs where it is produced and where the waste is dumped

Adolescence (9-diploma)

Math Focus Areas:

- **Algebraic Reasoning:**
    - **Advanced Algebra & Functions** – Modeling the long-term impact of fast fashion as it relates to its inputs and waste streams.

    - **Linear & Exponential Modeling** – Modeling the long-term impact of fast fashion waste trends with and without abatement strategies**.**

- **Statistical Reasoning:**
    - **Statistics & Probability: Interpreting Categorical & Quantitative Data:** Analyzing fast fashion trends using measures of central tendency (mean, median, mode).
    - **Statistics & Probability: Making Inferences & Justifying Conclusions:** Examining spoilage rates and expiration dates in relation to food storage practices.

Example Activities:

1. **Linear & Exponential Waste Models** – Students create functions to illustrate trends in fast fashion production, marketing and consumption..

2. **Cost-Benefit Analysis** – Students analyze the financial impact of fast fashion on the production end and to consumers.

Fast Fashion

Alignment with Maine Solutionaries Framework

- **Systems Thinking** – Understanding how the fast fashion industry affects economies, labor, and the environment.

- **Problem-Solving & Critical Thinking** – Using math to analyze sustainable fashion alternatives.

- **Collaboration & Civic Engagement** – Presenting data-driven solutions to encourage ethical shopping.

- **Innovation & Advocacy** – Using mathematical models to advocate for sustainable fashion policies.

Some guiding questions about fast fashion

Note: these questions might be good for all of the age ranges but might be answered differently by them.

1. Measuring it
   - How can we measure it?
   - Volume? How might we do that?
   - Weight? How might we do that?
   - Can we say anything about the relationship between weight and volume?
   - Are there ideas other than measuring weight or volume?
   - What role might sampling play in helping us measure it?

2. What is "fast fashion"?
3. What are some of the alternatives to fast fashion?
4. When did fast fashion start to arise?

Addendum: some notes from the prior version which may be useful

Middle School (6-8)

Math Focus Areas:

- **Ratios & Proportions** – Comparing the environmental impact of fast fashion vs. sustainable alternatives.
- **Measurement & Unit Conversions** – Converting water usage in textile production from gallons to liters.
- **Geometry & Spatial Awareness** – Measuring fabric efficiency in clothing production.
- **Statistics & Probability** – Analyzing trends in clothing waste and consumption habits.
- **Functions & Algebraic Thinking** – Modeling the cost savings of thrifting vs. fast fashion over time.

Example Activities:

1. **Carbon Footprint of Clothing** – Students analyze the carbon emissions of different fabrics.
2. **Water Waste Calculation** – Students convert the water used per garment into bathtubs or swimming pools to visualize waste.
3. **Proportions in Clothing Production** – Analyzing the percentage of clothing made from synthetic vs. natural materials.
4. **Statistical Analysis of Clothing Habits** – Surveying classmates on shopping habits and graphing the results.

High School (9-12)

Math Focus Areas:

- **Advanced Algebra & Functions** – Modeling the long-term environmental impact of fast fashion.
- **Statistics & Data Science** – Analyzing global fast fashion production and waste statistics.
- **Probability & Risk Analysis** – Assessing the likelihood of clothing waste reduction strategies being effective.
- **Financial Mathematics** – Evaluating the cost-effectiveness of sustainable fashion choices.
- **Calculus Applications** – Exploring the rate of increase in textile waste over time.

Example Activities:

1. **Mathematical Models of Fashion Waste** – Students use regression to predict future textile waste trends.
2. **Cost-Benefit Analysis of Sustainable Fashion** – Students compare the long-term financial impact of quality clothing vs. disposable fast fashion.
3. **Statistical Comparison of Fashion Industries** – Analyzing differences in waste, pollution, and wages across fashion brands.
4. **Optimization Problems in Sustainable Fashion** – Designing the most cost-effective way to reduce waste using mathematical modeling.

Interdisciplinary Enhancements (Optional)

- **Science Connection** – Studying the environmental impact of different textile materials.
- **Social Studies Connection** – Analyzing labor conditions and economic impacts of fast fashion.
- **ELA Connection** – Writing persuasive essays using statistical evidence on sustainable fashion.

Example Project-Based Learning (PBL) Activities

1. **Tracking Clothing Consumption Trends** – Students collect and analyze historical and current fashion consumption data.
2. **Fashion Waste Reduction Plan** – Students calculate and propose solutions for reducing textile waste.
3. **Mapping the Global Fashion Industry** – Using spatial reasoning to visualize where clothes are produced and disposed of.
4. **Community Sustainable Fashion Initiative** – Students use statistics to create an awareness campaign about ethical shopping.