Climate Change and the Textile & Apparel Industry Module

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Carbon Footprint Activity

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Instructional Procedure:

1. Show the class ***Slide #1*** from the *Carbon Footprint Activity PowerPoint* file.

2. Independently, have each student rank the two garments (a pair of jeans and a pair of nylon pants) in terms of which she or he thinks has the highest (1) and lowest (2) carbon footprint. In their consideration, have the students include activities related to fiber production, textile and garment manufacturing, and home washing and drying.

3. In small groups and have the students discuss share their rankings with each other and explain why they ranked the two pair of pants the way they did.

4. Show the class ***Slide #2*** (a pair of distressed jeans) from the *Carbon Footprint Activity PowerPoint* file.

5. In their small groups, have the students rank all three of the garments in terms of which they think has the highest (1), middle (2), and lowest (3) carbon footprint. Have the groups write their ranking for the distressed jeans on a piece of paper and hold up the ranking.

6. Ask a group that ranked the distressed jeans lowest (3) what they ranked first. Keep asking until you find a group that ranked the nylon pants highest and the distressed jeans lowest and then get them to explain why.

7. Ask the class what factors they used to rank the carbon footprint for each garment. List these factors on a whiteboard and continue until you have exhausted the options. Assess the completeness of the list by making sure the students have considered the carbon footprint

related to fiber production, textile and garment manufacturing, consumer washing, and consumer drying.

Notes: For the next part of the exercise, reference: http://www.edenproject.com/whats-it-all-about/climate-and-environment/online-tools/whats-your-carbon-footprint

8. Now, have the class focus on the differences in carbon footprints between the basic jeans and the nylon pants, and focus the students' attention on the distinct lifecycle stages.

    a. Fiber Manufacturing: Using Post-It Notes to represent 0.01 kg of carbon dioxide emissions (CO_{2e}), have the class suggest how much carbon is emitted in order to cultivate enough cotton for one pair of the basic jeans versus manufacturing enough nylon for the nylon pants. You can reference the carbon break down for each garment on the Eden Project website to guide the students. Discuss.

        - Correct Answer: Two Post-It Notes for the nylon pants and nine Post-It Notes for the basic jeans.

    b. Textile and Garment Manufacturing: Repeat the above process for comparing the textile and garment manufacturing of the basic jeans versus the nylon pants. Discuss. You may want to discuss with the students about the difference between the processing (ginning and cleaning) required to get cotton ready for spinning and the additives used to prepared cotton for weaving and then removing the additives to allow dying. Discuss that these processes require heat not required by nylon which does not need cleaning or as extensive preparation and can even by dyed during fiber manufacturing without additional heat.

        - Correct Answer: A half a Post-It Note for the nylon pants and one Post-It Note for the basic jeans.

    c. Washing and Drying: Tell them that the final carbon footprint of basic jeans is 20 Post-It Notes and the final footprint of the nylon pants is 3.5 Post-It Notes. There are currently 10 Post-It Notes for the jeans and 2.5 for the nylon pants. Ask the students to theorize why, in the washing and drying stage of the garment, the basic jeans will "emit" 10 more Post-It Notes and the nylon pants will only use 1more? (Answer: Nylon is hydrophobic so it uses less hot water to clean and requires no carbon to dry. Then ask them how should they split the Post-It Notes up between washing and drying for the basic jeans? (Answer: 3 for washing and 7 for drying in a dryer.)

9. Add back into the discussion of the distressed jeans. Talk about what might actually put those jeans above the basic jeans in terms of carbon emissions. Help the students focus in on the additional manufacturing requirements and on the shortened life-span of the jeans. Reveal that some calculations suggest that these jeans produce four times more carbon than regular jeans. Specifically zoom in on how quickly the jeans wear out and how washing and drying contribute to the shortened life-span.

10. End the lesson by directing them to the Eden Project.

Suggestions for Expanding this Activity in a Textiles Course

For a textiles course, move from this activity into an activity comparing the carbon footprint for a polyester blouse versus a rayon blouse. Estimate the relative difference between the two using cotton jeans and nylon pants as your guide. Confirm the difference in care and the benefit of not using a dryer for the polyester product. Discuss why a dryer might in fact be damaging to the polyester and talk about how likely they are to follow care label guidance. Now ask them if it is fair to assume that rayon uses the same amount of carbon in fiber product and garment manufacturing, having the distressed denim as your guide. The goal here is to illuminate the similarity of the reduced durability of rayon versus cotton with that of the distressed denim and plain denim. Now, talk about how the use of bamboo versus farmed pine trees would impact the carbon footprint. Both require fuel to harvest and process, both do not require carbon based inputs like fertilizer or pesticides, both require chemicals and heat to produce the fiber. This sets the stage for a future discussion of other sustainability impacts besides carbon emissions, such as water pollution.