On a bicycle built for two

Developed by: by Janet Brewster

Subject Area: Social studies, science, and math

Intended Learners: Grades 5–7

Prior knowledge: Map reading, geography, exposure to other cultures, exposure to environmental issues, and foreign aid ideas

Rationale explaining the global dimensions of the lesson aid
Students here have limited experience with the rigours of everyday life in developing countries. If they are to develop empathy, understanding, and/or a desire to effect change, they need to experience some of the challenges which are faced everyday by the people who populate the developing world.

Global education objectives
• expand awareness of how the process of getting our needs met affects the daily lives of children and adults around the world
• increase awareness of the state of the planet
• instigate the desire to improve the well-being of the planet and the people who populate it
• raise awareness of lifestyles in developing countries and how our lifestyle perpetuates it
• create empathy for those whose lives are more challenging than our own
• stimulate critical thinking about global issues like foreign aid
• raise awareness of the interdependence of local, national, and international communities
• solve problems in a peaceful way
• value diversity
• exercise democratic responsibilities
• participate and contribute to the class and to small groups
• treat others fairly and respectfully; show a sense of ethics
• articulate and work towards a preferred future locally and globally.

Themes
• basic human rights
• the rights of the child
• basic education
• environment.
Description of lesson aid
This collection of activities is designed to put students in the position of experiencing an ordinary challenge faced by thousands of workers around the world so that they might develop empathy and a desire to explore potential options. It also provokes discussion about the concept of foreign aid.

Timeline: Six lessons, approximately 60 minutes each, except lesson four.

Assessment strategies
- self assessment by students
- teacher observation
- parent feedback
- oral presentations
- write-up and/or diagrams
- math computations/graphing skills.

Bibliography
As a warm up exercise for group work, these resources will aid with vocabulary development for global education concerns and concepts, and cognitive growth related to seeing both sides of an issues and the bigger picture.

- Mr. Bigger Chocolate Bar lesson aid: Co Development Canada
- ...Who is in Charge of our Future? by Ginette Dube, 1999, codev@codev.org.

Lessons
1. An Unwieldy Load (partners): oral communication, listening skills, language development, social studies
2. Basic Needs—Extravagant Wants...A Continuum (individual): social studies
3. Vignette (individual): writing, social studies
4. A Bicycle Built for Two (group, partner): science, math, writing, social studies
5. Economics vs. Ergonomics (group): oral language, debating
6. Foreign Aid (whole class).
Lesson 1: An Unwieldy Load

Global education objectives
- raise awareness of lifestyles in developing countries and how our lifestyle perpetuates it
- create empathy for those whose lives are more challenging than our own; stimulate critical thinking about global issues like foreign aid
- value diversity
- participate and contribute to the class and to small groups.

Themes
- basic education
- environment.

Brief overview
Students will examine and discuss images of goods being transported in rural/urban parts of developing countries. Hypothesize how much they could transport.
**Materials/equipment**
- slide projector
- images.

**Africa**
1. banana bike
2. lady with baskets
3. shoulder planks
4. women lined up to fill containers with water.

**Time required:** 30–40 minutes

**Procedure**
1. Students get into pairs. One partner faces the screen, and the other has their back to the screen.

2. Image #1 is shown. The student facing the screen describes what is being shown in as much detail as possible. Notes may be taken and five questions may be asked.

3. Allow about 3–4 minutes for each of the two pictures to be shown and questions asked.
4. Present a blank scene while partners switch roles. Show the next two images following the same procedure.

5. Ask if the students can find a theme or common thread that runs through the images.

6. Provoke a discussion about what is being transported, how it is being transported, why, and the distance it will travel in that mode. Have students estimate the weight of each load while you go back through each image.

7. Ask students to project how much they could carry based on what they carry now (i.e. backpacks) and what method they think would be most effective. (Effective = maximum amount of weight with minimal amount of human impact)

8. Challenge students to bring in a bicycle and an unwieldy load to test their theories. Students discuss how they might load the bikes to for best results. Sketch a diagram of how they will load the bike. (See Lesson 4: Bicycle Built for Two)

**Assessment strategies**
- teacher observation.
Lesson 2: Basic Needs vs. Extravagant Wants...A Continuum

Global education objectives
- increase awareness of the state of the planet
- raise awareness of lifestyles in developing countries and how our lifestyle perpetuates it
- create empathy for those whose lives are more challenging than our own
- raise an awareness of the interdependence of local, national, and international communities
- value diversity
- participate and contribute to the class and to small groups
- treat others fairly and respectfully
- articulate and work towards a preferred future locally and globally.

Themes
- basic human rights
- the rights of the child
- environment.

Brief overview
Students will increase their awareness of how the media impacts our view of the world both explicitly and implicitly.

Materials/equipment
- selection of fashion magazines, National Geographic magazines, home improvement magazines, etc.
- large sheets of paper
- scissors, glue, and felt markers.

Time required
- in-class time 60 minutes divided into two lessons
- homework time required.

Procedure
1. Conduct a discussion on the differences between needs and wants.

2. Clarify the difference between a basic need versus its closely related want. (i.e. shoes to protect one’s feet versus shoes for each activity or event; basic protein and carbohydrates daily versus hot lunch from Subway every Wednesday, etc.)

3. Students brainstorm a list, then use images from magazines or newspapers to demonstrate their understanding of the differences. These are placed on a continuum from one extreme to the other. A tri-fold piece of card works well.
4. **Session 2:** Each student presents his/her continuum backtracking from the end to the start or beginning with the original basic need then explaining how this progressed to the extravagant want.

- Example 1: basic water, bottled water, flavoured bottled water, fizzy soda pop, wine or champagne.
- Example 2: water, filtered water, coffee, flavoured coffee, lattes, cappuccino or mochas, after dinner coffees
- Example 3: cave, lean-to, tent, hut, shack, heated homes with indoor plumbing.

**Assessment criteria**

0 = continuum shows no differentiation between images.

1 = continuum shows a limited understanding of how the want arose from the initial basic need.

2 = continuum consistently shows an understanding of the original need and how it has been magnified and altered into a more upscale want.

3 = the opposing images show a complex understanding of the minimalist nature of a basic need and the materialistic, over consumption of many of our wants.
Lesson 3: Vignettes—A Snapshot

Global education objectives
- increase awareness of the state of the planet
- instigate the desire to improve the well-being of the planet and the people who populate it
- raise awareness of lifestyles in developing countries and how our lifestyle perpetuates it
- create empathy for those whose lives are more challenging than our own
- valuing diversity.

Themes
- basic human rights
- the rights of the child
- basic education
- environment.

Brief overview
Students will create a piece of writing which demonstrates their ability to describe and empathize using an image of a person living and working in a developing country.

Materials and equipment
- image: Africa #1 (man with bike full of bananas)
- overview of vignette.

Time required
- in-class: 60 minutes
- follow up and publishing: 60 minutes.

Procedure
1. Show the picture of the man with the bike loaded with bananas. On the board write Vignette. Explain what a vignette is (see page 10 for overview). At the top of the board, write Paragraph one and underline it.

2. Using bullets, write brief notes about the man, bananas, bike, and background. Students should copy them into their notebooks.

3. Orally rehearse possible ways of constructing descriptive, objective sentences using this information. Students can spend 6–10 minutes getting their ideas on paper.

4. Write Paragraph Two and underline it.

5. Use bullets to jot down ideas about what the man might be thinking as he walks. Prompt ideas about his surroundings, other people, family, the weather, time involved
in doing this job, what he did earlier, and what he might do when he reaches his destination. Students should copy them into their notebooks.

6. Orally rehearse putting these ideas into first person perspective. Reinforce the use of “I statements” only from the man’s perspective. Give students 10–15 minutes to put down their ideas. Ask for volunteers to read what they have aloud so you can steer any misguided writers towards the “I statement” perspective.

7. Write Paragraph 3 on the board and underline it.

8. Ask students under what conditions they might have observed this man, and taken this photograph? Using bullets, jot down how the two of you (you and the banana man) might have made contact, even just visually. What would you be wondering? What would he be thinking?

9. Model the sort of “I” language needed in this paragraph as the focus shifts back to the writer who is the onlooker, and how his/her presence in this scenario makes an impact on the writer.

10. Ask pointed questions like, “How would you feel to have someone staring at/looking at/photographing you?” This must be written from the writer’s perspective, but reflects their understanding of how they might be perceived as the outsider.

11. Model some sentences on the board using clauses to help students explore these ideas fully, for instance:

   As I watched the bike wobble under the weight of the bananas, I thought about the times I have complained about having to ride with my backpack full of homework.

   While I stood there lost in thought staring at the man, I realized that I was being rude. How would I like someone to stare at me as I worked?

12. This is often the most challenging paragraph. Orally rehearse as many examples as possible. Although you can give students 15 minutes to work on this in class, they will be tired by then and need to take it home for completion anyway. The final editing can be done in collaborative consultation next class before they publish.
Overview: Vignettes

A vignette is a style of writing whereby an image is used as the impetus for a specific piece of writing. A vignette captures a moment in time. It is three paragraphs in length and uses two voices. It is an interesting measure of a student’s ability to empathize and put themselves in the footsteps of another. The image of the man on the bicycle with all of the bananas is one that works well.

The Format of a Vignette

**Paragraph 1:** Describe the physical aspects of the image, this includes the main character and the environment itself. A minimum of six sentences is needed to do this justice. Additional ideas can be included like what sound might be in the background.

**Paragraph 2:** Written from the perspective of the character in the image. Using the voice of the character, write the self-talk that you think might be going on inside his/her head. This would include commentary about the type of day it is, the weather conditions, thoughts about the task at hand, how the day began, how the day might end, and worries or concerns.

**Paragraph 3:** Back into the voice/words of you the onlooker, this paragraph describes how a connection between your two worlds happens. This could be a look, a wave, one helping the other, or simply the thoughts regarding the variations between your worlds. How do you view each other? What impact does this incident have on your thinking?

Each paragraph is a minimum of six sentences long. The middle one is to be done in italics to indicate to the audience that it is not only a different speaker, but that it is an inside or thinking voice.

Assessment

This activity provides you with information about the degree to which a student can get inside someone else’s head and write from another’s perspective. You can see which children view tasks as an arduous burden, regardless of the degree of necessity. Many students express a sense of sympathy which provides a great opportunity to address the reality of third world life and that we feel badly for them because we use our own measure of quality of life. Great discussion opportunity.

**This can be done either before the actual attempt to balance the bananas or after.**
Lesson No. 4: A Bicycle Built for Two

Learning outcomes
- learn to confront a concrete problem, hypothesize a solution, test a theory, evaluate potential outcomes, and reformulate or modify a hypothesis and retest
- learn to come to a peaceful solution through the hands-on exploration of each other’s ideas
- practice problem-solving strategies
- create and interpret a graphic representation of resulting data.

Global education objectives
- increase awareness of the state of the planet
- instigate the desire to improve the wellbeing of the planet and the people who populate it
- raise awareness of lifestyles in developing countries and how our lifestyle perpetuates it
- create empathy for those whose lives are more challenging than our own
- stimulate critical thinking about global issues like foreign aid
- raise an awareness of the interdependence of local, national and international communities
- solve problems in a peaceful way
- value diversity
- exercise democratic responsibilities
- participate and contribute to the class and to small groups
- treat others fairly and respectfully; show a sense of ethics
- articulate and work towards a preferred future locally and globally.

Themes
- basic human rights
- the rights of the child
- basic education
- environment.

Brief overview
Students will attempt to pile as heavy a load as possible onto a bicycle without compromising its ability to transport the goods.

Materials/equipment
- 8–10 bicycles
- 8–10 sacks, 1 meter of string per child, various awkward items such as balls, rocks, pylons, skittles, baseball gloves, basketballs, etc.
- bathroom scales, a watch
- student examples.

Time required
Approximately 120–150 minutes
Procedure
1. Review the plans students made in at the conclusion of Lesson 1 (Step 8). Discuss the theories, encouraging students to visualize each plan and analyze the strengths and potential weaknesses for each one.
2. Select two–three of your smaller students and have each climb into a sack. Ask how much they weigh. See if this demonstration alters anyone’s thinking.
3. Take out equipment from P.E. room and load it into sacks. Give each group of three students a sack to fill. Provide one metre of string to tie the ends. Give the students the task of accurately weighing each sack. (This works best when the student weighs self first, then with sack, and then record the difference)
4. Have students bring their bicycles to the basketball court where the sacks are waiting. Reinforce the importance of testing each of the theories presented by the members of that group.
5. Our challenge was to see who could transport the heaviest load in the shortest time with the ultimate understanding that as a daily job they might be expected to transport 100lbs per day. The predetermined distance for us was around our neighbourhood twice. It involves both uphill and downhill, with a distance of 1.5km.
6. Record the departure time for each bicycle. I sent two children together so the bike owner would have a helper.
7. As the bicycle returns to the home base, record the time again. The difference in the time shows how long it took to transport the goods.
8. Back in the classroom, discuss the results of the experiment. Compare how easy or how challenging it is to distribute weight evenly on the bike. Students draw a new diagram showing the successful loading design, the final weight, and the distance.
9. The writeup included a section entitled “Modifications to my original theory.” This is where students explained what they learned about weight distribution, the awkwardness of a load, and the difficulty in securing the load. A section entitled “Observations” explained what happened as they loaded and transported the goods, as well as the actual time and weight. The final section was “Conclusions.” This explained how much time it would take for them to transport 100lbs of goods daily, realizing that we only recorded the travel time, not the loading or unloading or returning home for a new load. It was a cold day when we went and the kids were sweating buckets by their return. They need to project what it might be like about 20 degrees Celsius hotter, on a dirt road being passed by diesel trucks. Also, each student was accompanied by a helper, and this would not be possible in reality, as all manpower is utilized fully. Even the loading and unloading would involve fewer people.

Notes: We had four parents located along the route for safety, encouragement, and to help reload tipped bikes. One of the parents had a digicam with her which worked well for enroute photos.

Follow up
1. The time keeper, who has also recorded the weights, submits data so that a graphic display can be made. Using an overhead graph grid, students plot their time and load.
2. What can we interpret about the average time?
3. What does this tell us about how a community might decide who is the best candidate to fulfill this job?
4. Is there a causal relationship shown with this data?

**Assessment Strategies:**

- self assessment
- assess diagrams of weight distribution before and after experiment
- how realistic is the diagram?
- where is the weight distributed?
- does the loaded bike resemble the diagram?
- writing rubric (BC Writing standards, procedural writing rubric)  
  [www.bced.gov.bc.ca/perf_stands/writeg5.pdf](http://www.bced.gov.bc.ca/perf_stands/writeg5.pdf)
- accurate completion of graph, including answering questions.
Lesson 5: Economics vs. Ergonomics

Learning outcomes
- identify and clarify an issue or problem
- describe ways social and economic organizations satisfy needs and wants in a variety of cultures
- describe daily life and work in Canada and developing countries
- describe and compare different economic systems
- assess effects of urbanization and technology on lifestyles and environments.

Global education objectives
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- stimulate critical thinking about global issues like foreign aid
- raise an awareness of the interdependence of local, national and international communities
- solve problems in a peaceful way
- value diversity
- participate and contribute to the class and to small groups
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Themes
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- the rights of the child
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Brief overview
Students will work in five groups to discuss the economics of transporting goods using human labour versus mechanized methods, the human impact, social issues, Canadian method, and the impact of urbanization.

Materials/equipment
- thinking cards
- video camera.

Time required: 60 minutes

Procedure
1. Divide the class into five groups. Give each group one thinking card.
2. Each group must be ready to respond to the six questions, and every student within the group must be capable of responding on behalf of the group; therefore, the children must have spent time discussing and rehearsing their responses.

3. Each student must select a question to respond to and write out the answer he/she is to present.

4. It is important for the teacher to guide the students towards deepening their initial responses by helping them to understand the statements as fully as possible. Each statement should invoke not only an obvious answer, but also a more subtle inference based on assumptions about cultural groups and/or lifestyles.

**Assessment Strategies**
Student self assessment based on video footage

0  =  I did not participate.

1  =  I needed prompting or help from my peers to say my part.

2  =  I spoke hesitantly, my ideas were not always clear, and I’m not sure others understood me or knew what I was trying to say.

3  =  I think I was clear with what I said, but my peers looked confused, and there are a few things I could have explained better.

4  =  I felt confident in what I said, I sounded clear and knowledgeable, and others appeared to understand me.
Lesson 6: Foreign Aid

Learning outcomes
- Students will identify and clarify an issue or problem.
- Students will consider the impact of international intervention.
- Students will articulate their personal opinion.

Global education objectives
- instigate the desire to improve the well-being of the planet and the people who populate it
- create empathy for those whose lives are more challenging than our own
- stimulate critical thinking about global issues like foreign aid
- raise an awareness of the interdependence of local, national and international communities
- solve problems in a peaceful way
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- articulate and work towards a preferred future locally and globally.

Theme
- environment.

Brief overview
Following a discussion about what foreign aid is, students express their own opinion with a committed vote, yes or no. The discussion following this initial vote explores the ramifications and repercussions of aid. Students revote and explain the reasons why they did or did not change. Total of three votes.

Prior knowledge
- exposure to the practice of foreign aid or charity.

Materials and equipment
- name cards
- chart or board with two columns labeled “Yes” and “No”
- recipe size cards
- masking tape or tacks.

Time required
- Approximately 60 minutes depending on group
Procedure
1. Define foreign aid and provide a brief overview: What is it? Who does it do? What is its purpose?

2. Students put their name card onto the chart in the appropriate space. They vote in support of foreign aid or against it: yes or no. Ask some students to explain why they voted as they did.

3. Describe Project Shoebox (1) and Project Love (2).
   - In Project Shoebox, students are asked to fill a shoebox with gifts for a child overseas so he/she can have a Merry Christmas too (sponsored by Safeway). There is no information about how many children in that community will get a gift box, whether only one child will get a box, or guidelines about what types of gifts are realistic (i.e., small hot wheels style cars designed for hard surfaces aren’t very useful on dirt floors and roads.)

   - In Project Love every child in a classroom gets a small package of supplies and a personalized Valentine’s card. The teacher gets a box with communal supplies, such as glue, coloured pens, sharpeners, etc.

   - Act this out by giving one child in the room something special (i.e. half a dozen fancy erasers) which he/she can keep for themselves or share with a few friends. Talk about the fairness and the impact on classmates. Give every child some small token—less impressive but more equitable.

1. Revote. Ask all students to return to the chart and vote again. Ask students to explain their choices to the class.

2. Having already experienced the banana bike activity and follow up on how bicycles can improve efficiency, should Canada send bikes to communities in Africa/Asia/South America? Encourage discussion.

3. Using the recipe cards, students choose yes or no to foreign aid and explain why they believe as they do. When finished, they replace their name cards with their recipe card explanation on the chart in the column which reflects their belief.

Assessment Strategies
- teacher observation of student participation in activity and/or discussion
- degree to which student articulates opinion.
Rubric
0= demonstrates apathy, no opinion voiced, does not bother to change card
1= participates by physically moving card but struggles to articulate why
2= actively participates in discussion; agrees or disagrees with the opinions of others
3= eagerly involves self in debate/ dialogue; expresses own ideas clearly and passionately
4= everything in #3 plus shows respect and consideration for other’s opinions by paraphrasing or referring to other’s words and adding to or expressing opposing ideas.

The Transportation of goods: Human energy vs. mechanized energy
(thinking cards)

Card 1: Developing Countries—Human energy

Time
• How much time is required to move goods from source to sale?
• How does this use of time impact daily life?

Costs
• Physical
  o How much energy is involved in transporting heavy loads over time?
  o What impact does this have on the physical condition of an individual?

• Financial
  o What outlay of money is needed to get people to move goods from source to sale?
  o Does it cost money or save money?

• Social
  • How does the need to transport awkward goods effect a village or community?

• Intellectual
  o Is there an impact on the thinking skills of those who spend many hours a day lugging heavy loads from source to sale?

• Convenience
  o what are the conveniences of using people to move goods?
  o What are the inconveniences?
  o Does it support social opportunities?
o Does it impact family life?
o Does it give the people more control or autonomy over their own lives?

Card 2: Developing Countries—Mechanized energy

- **Time**
  - How much time is required to move goods from source to sale?
  - How does this use of time impact daily life?

- **Costs**
  - **Physical**
    - How much energy is involved in transporting heavy loads over time?
    - What impact does this have on the physical condition of an individual?

- **Financial**
  - What outlay of money is needed to get people to move goods from source to sale?
  - Does it cost money or save money?

- **Social**
  - How does the need to transport awkward goods effect a village or community?

- **Intellectual**
  - Is there an impact on the thinking skills of those who spend many hours a day lugging heavy loads from source to sale?

- **Convenience**
  - What are the conveniences of using people to move goods?
  - What are the inconveniences?
  - Does it support social opportunities?
  - Does it impact family life?
  - Does it give the people more control or autonomy over their own lives?

Card 3: Environmental impact

Whether goods are transported by human labour, animal labour (what types of animals) or motor vehicles, a ripple effect occurs throughout the environment.

How does each of these methods impact:
- air quality
- water quality
- erosion
- desertification
- habitat
- biodiversity.
Card 4: Community impact

A community which relies on human labour to transport salable goods will organize itself differently from one which uses motorized transport.

- Explain why this is so.
- Is there an advantage one way or the other?
- Which community is making the best choice? Is there a choice? (Refer to graphing lesson).
- What other considerations need to be addressed if motorized transport is used? (cost of fuel, upkeep, initial cost, etc.) Can the cost be borne by one community or would it be beneficial to join another local community and work together? How would this work?

Card 5: Canada—Mechanized energy

Time
- How much time is required to move goods from source to sale?
- How does this use of time impact daily life?

Costs
- Physical
  - How much energy is involved in transporting heavy loads over time?
  - What impact does this have on the physical condition of an individual?

- Financial
  - What outlay of money is needed to move goods from source to sale?
  - Does it cost money or save money?
  - Who absorbs the cost of roads, railroad lines, and shipping needs?

- Social
  - How does the need to transport goods effect a community?
  - What does a strike do to the system? How are “truckers” viewed in society?

- Intellectual
  - Is there an impact on the thinking skills of those who spend many hours a day lugging heavy loads from source to sale?

- Convenience
  - What are the conveniences of using vehicles to move goods?
  - What are the inconveniences?
  - Does it support social opportunities?
  - Does it impact family life?
  - Does it give the people more control or autonomy over their own lives?
African women are incredibly talented at carrying enormous loads on their heads. This picture was taken in Rwanda on the main road heading to Uganda. Within each of the eight baskets she carried grain, using only one hand to support the weight. A headscarf wrapped securely to prevent slippage is the only protection available. The scarves are tied to provide a small platform upon which the weight is balanced. Notice her bare feet.

One major paved road runs through Uganda into Rwanda. Anyone wanting to transport anything to market, local or otherwise, travels along the side of this road. There was no time during either the day or the night when the road was without a parade of brightly robed people traveling to and fro. Trucks, spewing diesel fumes and kicking up dust as they chugged past are few in number but their importance cannot be underestimated. From homes, farms, and villages, all goods are lugged to the roadside where they await the arrival of motorized transportation. With each step away from the source, the cost increases. Those who take the product to market receive only a small sum. Those who transport it to a larger centre can demand a higher fee. To offset the cost of transportation, non-motorized options are utilized. Push bikes are a good option. They cost little to operate, can carry three–five times more than a single person, and are simple to use and/or repair. The most amazing
thing I saw was a man pushing his bike with an entire single bed on it. I cannot imagine how he balanced it up there and then travelled who knows how many kilometers with it.

The Batwa pygmies who live on the Uganda-Rwanda border incorporate jumping into their dances. The dry earth rises up, choking onlookers. The clothing comes originally from overseas charities that send used clothing to developing countries to be distributed freely to those in need. But who decides who is in the greatest need? Generally, the clothing shipment is intercepted and the contributions are sold at market. While the prices are kept low, those with the greatest need still go without. How fortunate the man on the right is; he has secured footwear for himself, unlike the other villagers.