



engineers without borders  
ingénieurs sans frontières  
Canada

## EWB Food for Thought

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### Rice Activity Instructions

This rice activity is the central component of the EWB Food for Thought high school outreach presentation. A fun way to integrate technology into the topic of world hunger, students are put into country groups and are challenged to process a sample of raw unhulled rice into a marketable product.

#### Materials

The following is a list of materials you need for this activity:

- 15 tbsp of unhulled rice (rice paddy)
- 2 tbsp of poppy seeds
- 3 tbsp of sand
- 2 tbsp gravel
- 8 feet of 2 x 4-inch wood
- 1 sheet of 80D grit sandpaper
- All purpose white glue
- ¼ inch mesh
- 1/16 inch mesh
- electrical tape or duct tape
- 12 balloons
- 6 sheets of black construction paper
- Monopoly money
- Photocopies of country profiles and instruction handouts
- Teaspoon

Here are some suggestions of where you can find the materials you need:

<b>Material</b>	<b>Where to find it</b>
Balloons	Dollar store
Construction paper	Craft or dollar store
Electrical tape	Hardware store
Gravel (Fine)	Hardware store
Mesh (1/4 inch and 1/16 inch)	Hardware store
Poppy Seeds	Bulk food store
Sand	Hardware store
Sandpaper (80D grit)	Hardware store
Unhulled rice	Special order from Lundberg Farms ( <a href="http://www.lundberg.com">www.lundberg.com</a> )
White glue	Hardware or craft store
Wood (2x4-inch)	Hardware or lumber store

## Advance Preparation

EWB Canada has shipped each chapter a box of some harder to find raw materials. Many of the components still require some assembly before they are ready to take to a presentation.

### 1. Construct rice huskers (x 6)

The rice husker is used to remove the outer layer of the rice grains. It is made out of a slotted piece of wood and a polishing block that moves along the slot. To assemble the rice husker, glue sandpaper to the surfaces of both pieces of wood for added friction.

For the slotted block, glue the sandpaper to the bottom of the slot. For the polishing block, glue the sandpaper across the bottom of the block and partway up the front and partway up the back of the block.

### 2. Prepare sieves (6 x ¼ inch mesh and 6 x 1/16 inch mesh)

Use electrical tape or duct tape to cover up the sharp edges of the metal screen.

### 3. Make impurity mixture

Mix together poppy seeds, gravel and sand.

### 4. Assemble country packages

Each group will receive a handout that includes a country profile, instructions on how to process the rice, and a quantity and quality of raw paddy based on the table below.

Country	Paddy	Impurities
United States	4 tsp	0 tsp
Botswana	5 tsp	1 tsp
Indonesia	1 tsp	2 tsp
Cuba	3 tsp	2 tsp
Ghana	2 tsp	2 tsp
Afghanistan	1 tsp	3 tsp

## Activity Procedure

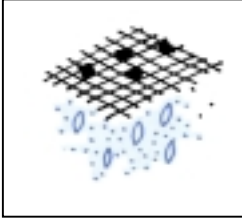
1. Divide the students into 6 working groups (4-5 students per group). Distribute a country package to each group.
2. Explain to the students that they are to process their rice as outlined on their instructions sheet.
3. After about 20 minutes, have a representative from each group come up to the front of the room, and measure the group's rice sample measured in front of the class. Give each group the equivalent amount of Monopoly money based on the quantity and quality of the finished rice.
4. Follow-up the activity with a discussion on how the activity relates to the real world. Follow the slide and script provided in the accompanying PowerPoint presentation.

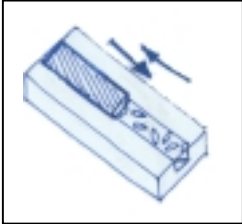


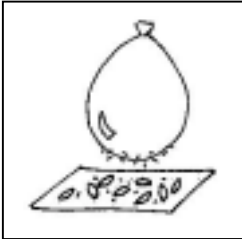
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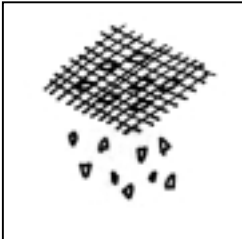
## Rice Processing Instructions

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**Paddy Cleaning:** Pass your sample of rice paddy through two sieves to remove the solid impurities. Passing the rice through the larger-mesh sieve will remove impurities that are larger than rice, such as rocks, or small twigs. Impurities that are smaller than the paddy rice, such as other seeds, sand and dirt, will pass through smaller-mesh sieve while the rice remains on top.
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**Husking:** Spread the rice grains evenly inside of the slot of the large block. Place the small block, sandpaper down, into the slot of the large block. Apply a slight downward pressure on the small block as you slide it back and forth in the slot until husks are removed from the rice grains, approximately 10 times back and forth. Remove the mixture onto a piece of paper.
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**Husk Separation:** Inflate a balloon and ask a group member to rub it on his or her head to create static electricity. Hold the charged balloon just above the pile of rice and the husks will stick to the balloon. Repeat until you have separated all the husks from the grains.
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**Grade Separation:** Separate the whole grains of rice from the broken grains by passing your rice sample through the smaller-mesh sieve. The broken grains should pass through the sieve while the whole grains stay on top. Place your finished product on a sheet of black construction paper. Count the number of whole grains and the number of broken grains to determine what grade of rice you have produced.

Grade	% Broken Grains	Market Rate for Finished Product	Agricultural Subsidy (US only)
Grade A	10% breaks	\$100/tbsp	\$50/tbsp
Grade B	25 % breaks	\$50/tbsp	\$25/tbsp
Grade C	50% breaks	\$20/tbsp	\$10/tbsp



# UNITED STATES

## Land

Area: 9,631,400 km<sup>2</sup>  
 Arable land: 19%

## Population

Population: 239,027,600  
 Urban: 78%  
 Rural: 22%  
 Growth Rate: 0.92% per year

## Health

Life expectancy: 77 years  
 Infant mortality rate: 7 infant deaths per 1000 live births

HIV/AIDS prevalence rate: 0.6%  
 Calorie supply per capita: 3754

## Literacy

Adult literacy: 97% of population age 15 and above

## Economy

GDP per capita (PPP US\$): \$37,800  
 % of population living below poverty line: 13%

% of GDP spent on foreign aid: 0.11%  
 % of GDP spent on war: 3.9%

Sources: 1. CIA World Factbook, <http://www.odci.gov/cia/publications/factbook/>  
 2. World Resources Institute EarthTrends, <http://earthtrends.wri.org/>



# BOTSWANA

## Land

Area: 600,370 km<sup>2</sup>  
 Arable land: 61%

## Population

Population: 1,562,000  
 Urban: 53%  
 Rural: 47%  
 Growth Rate: -0.89% per year

## Health

Life expectancy:	31 years	HIV/AIDS prevalence rate:	39%
Infant mortality rate:	66 infant deaths per 1000 live births	Calorie supply per capita:	2288

## Literacy

Adult literacy: 79.8 % of population age 15 and above

## Economy

GDP per capita (PPP US\$):	\$8,800	% of GDP received as foreign aid:	5.3%
% of population living below poverty line:	47%	% of GDP spent on the military:	3.6%

Sources: 1. CIA World Factbook, <http://www.odci.gov/cia/publications/factbook/>  
 2. World Resources Institute EarthTrends, <http://earthtrends.wri.org/>



# INDONESIA

## Land

Area: 1,919,440 km<sup>2</sup>  
 Arable land: 9.9%

## Population

Population: 238,453,000  
 Urban: 46%  
 Rural: 54%  
 Growth Rate: 1.5% per year

## Health

Life expectancy: 69 years	HIV/AIDS prevalence rate: 0.1%
Infant mortality rate: 37 infant deaths per 1000 live births	Calorie supply per capita: 2931

## Literacy

Adult literacy: 88.5% of population age 15 and above

## Economy

GDP per capita (PPP US\$): \$3,200	% of GDP received as foreign aid: 5.7%
% of population living below poverty line: 27%	% of GDP spent on the military: 1.3%

Sources: 1. CIA World Factbook, <http://www.odci.gov/cia/publications/factbook/>  
 2. World Resources Institute EarthTrends, <http://earthtrends.wri.org/>



# CUBA

## Land

Area: 110,860 km<sup>2</sup>  
 Arable land: 33%

## Population

Population: 11,308,800  
 Urban: 76%  
 Rural: 24%  
 Growth Rate: 0.34% per year

## Health

Life expectancy: 77 years	HIV/AIDS prevalence rate: 0.1%
Infant mortality rate: 6 infant deaths per 1000 live births	Calorie supply per capita: 2490

## Literacy

Adult literacy: 97 % of population age 15 and above

## Economy

GDP per capita (PPP US\$): \$2,800	% of GDP received as foreign aid: 2.2%
% of population living below poverty line: N/A	% of GDP spent on the military: 1.8%

Sources: 1. CIA World Factbook, <http://www.odci.gov/cia/publications/factbook/>  
 2. World Resources Institute EarthTrends, <http://earthtrends.wri.org/>



# GHANA

## Land

Area: 239,000 km<sup>2</sup>  
 Arable land: 15.9%

## Population

Population: 20,757,000  
 Urban: 41%  
 Rural: 59%  
 Growth Rate: 1.36% per year

## Health

Life expectancy: 60 years	HIV/AIDS prevalence rate: 3%
Infant mortality rate: 66 infant deaths per 1000 live births	Calorie supply per capita: 2590

## Literacy

Adult literacy: 74.8% of population age 15 and above

## Economy

GDP per capita (PPP US\$): \$2,200	% of GDP received as foreign aid: 15.5%
% of population living below poverty line: 32%	% of GDP spent on war: 0.6%

Sources: 1. CIA World Factbook, <http://www.odci.gov/cia/publications/factbook/>  
 2. World Resources Institute EarthTrends, <http://earthtrends.wri.org/>



# AFGHANISTAN

## Land

Area: 647,500 km<sup>2</sup>  
 Arable land: 12.1%

## Population

Population: 28,513,700  
 Urban: 24%  
 Rural: 76%  
 Growth Rate: 4.9% per year

## Health

Life expectancy: 42 years	HIV/AIDS prevalence rate: 0.01%
Infant mortality rate: 166 infant deaths per 1000 live births	Calorie supply per capita: 1755

## Literacy

Adult literacy: 36% of population age 15 and above

## Economy

GDP per capita (PPP US\$): \$700	% of GDP received as foreign aid: 9%
% of population living below poverty line: 23%	% of GDP spent on the military: 1%

Sources: 1. CIA World Factbook, <http://www.odci.gov/cia/publications/factbook/>  
 2. World Resources Institute EarthTrends, <http://earthtrends.wri.org/>