

Topic 4:

Intelligent Consumption

Lesson Plans for Children and Youth

Rise Up Against Climate Change!

A school-centered educational initiative
of the Inter-American Development Bank



Rise Up

Against Climate Change

A school-centered educational initiative of the Inter-American Development Bank

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Rise Up Lesson Plans

Our Climate Is Changing

Energize!

Water to Treasure

Intelligent Consumption

Sustainable Cities for Smart Urban Growth

You Are What You Eat

Ensuring Healthy Environments

Protecting the Land

People Committed to Fight Climate Change



Rise Up

Against Climate Change

Rise Up is a climate change education initiative of the Inter-American Development Bank that seeks to encourage children and youth to use their creativity and energy to come up with feasible, sustainable, long-term strategies to mitigate and adapt to climate change. This set of lesson plans is one of nine on different climate change topics that can be used independently or together with the

other lesson plans and materials of the Rise Up initiative, including instructional videos, learning games and a Green School Toolkit. Each set of lesson plans includes an introductory text about the topic that can serve as a background material for the teacher or as a text for older students. The lesson plans can be used at the primary and secondary levels of education; they are divided into basic, intermediate, and advanced plans to help each teacher determine what activities are appropriate for his or her students. To find all the Rise Up materials please go to **www.iadb.org/riseup**

*Emiliana Vegas, Chief, Education Division,
Inter-American Development Bank*



Intelligent Consumption

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General Introduction to the

Lesson Plans

Like all living things, humans are “open systems.” We’re part of—not separate from—our environment, and we continually exchange materials, energy and information with it.

What happens when we eat a piece of fruit, for instance? First, we use our senses (taste, smell, sight, touch, hearing) to gather information (Is it ripe?). Then, the fruit’s material compounds enter our bodies.

As we digest the fruit and break down and absorb its nutrients, energy accumulated from **photosynthesis** is released. We use this energy to burn **carbohydrates**¹ through a process called cellular **respiration**. Being open systems, we return byproducts of respiration—carbon dioxide (CO₂) and water vapor (H₂O)—back to the atmosphere; and we return some of the fruit’s water and indigestible solid materials to the earth the form of liquid and solid waste.

In the natural world, each waste product (solid, liquid, or gaseous) serves as raw material for subsequent processes. Green plants need carbon dioxide and water vapor to perform photosynthesis. Solid and liquid waste from animals serves as fertilizer for the soil.

Left to her own devices, nature is the ultimate recycler. The energy, matter, and information involved in each natural process are reused time and again as they circulate through nature.

The problem is that in our quest for convenience, humans have disrupted many natural processes. Consider another complex system, human-made and alive in its own way: the city. Most of the energy and materials consumed in cities (water, food, building materials, industrial inputs, processed goods) come from somewhere else; they aren’t produced locally.

Megacities are megaconsumers

Like humans, cities use (metabolize) these materials (their “food”) to function and grow. Whereas we convert our food into health (or sickness), thought and movement, cities produce goods and services, some of which are shipped great distances.

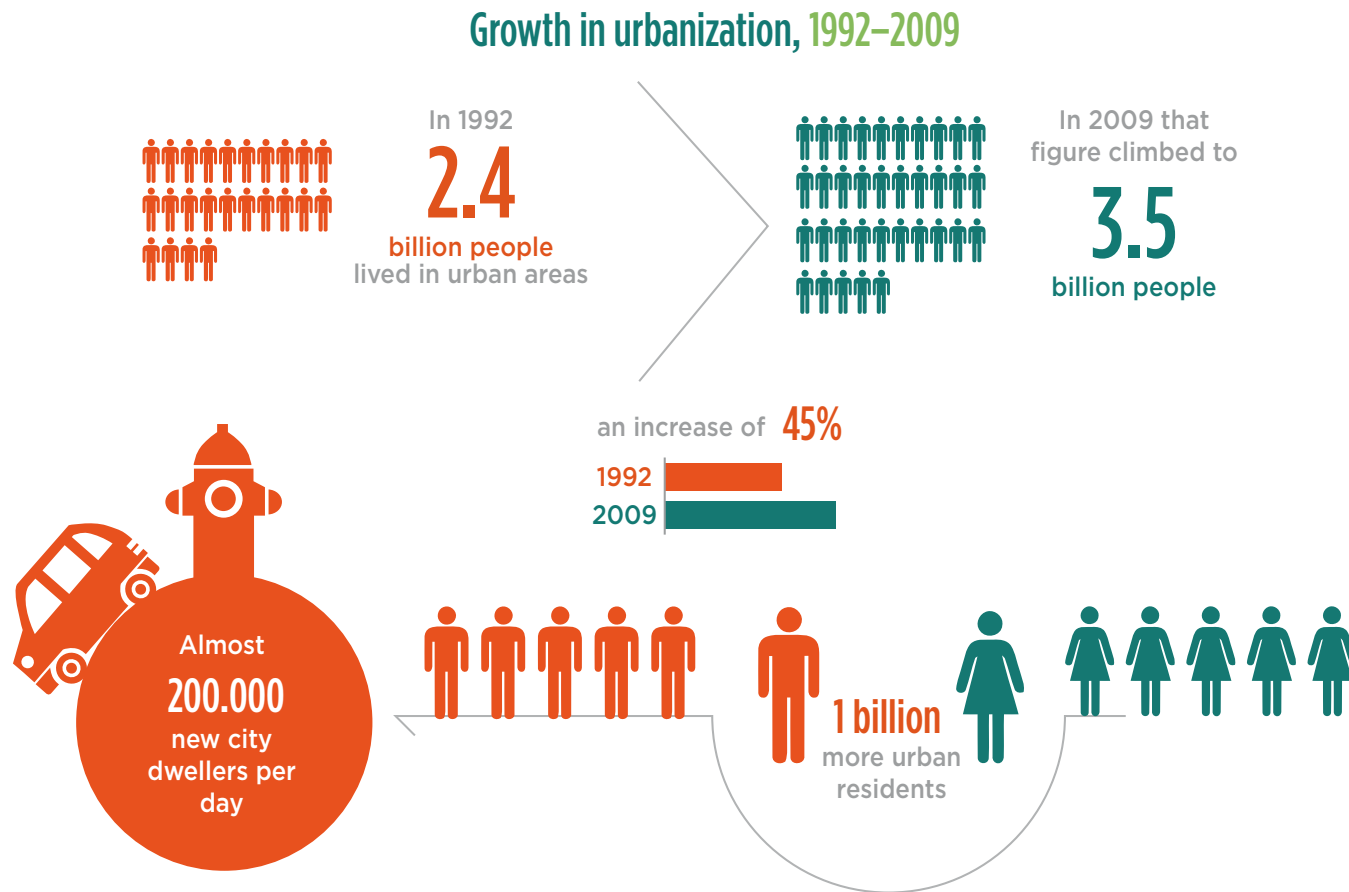
¹ Carbohydrates, which are composed of carbon, oxygen, and hydrogen, are the major compounds in fruit.

As open systems, cities also produce lots of solid, liquid, and gaseous wastes that end up in the soil, air, and water. Most of these wastes cause pollution because they are not recycled or otherwise reused as raw materials and energy for other processes and cycles.

As cities grow in size, they also consume more and more resources. According to UN-Habitat, the number of megacities worldwide more than doubled in less than two decades. Megacities are those having at least 10 million people. In 1992, there were 10, compared with 21 in 2010 (figures 1 and 2). That’s one new megacity every two years!



Figure 1. Growth in urbanization, 1992–2009



Developing countries are home to 15 of the 21 largest cities on the planet (figures 2 and 3).² Latin America already has three megacities (Buenos Aires, Sao Paulo, and Mexico City), and two more (Lima and Bogota) are expected to reach megacity status by 2025.

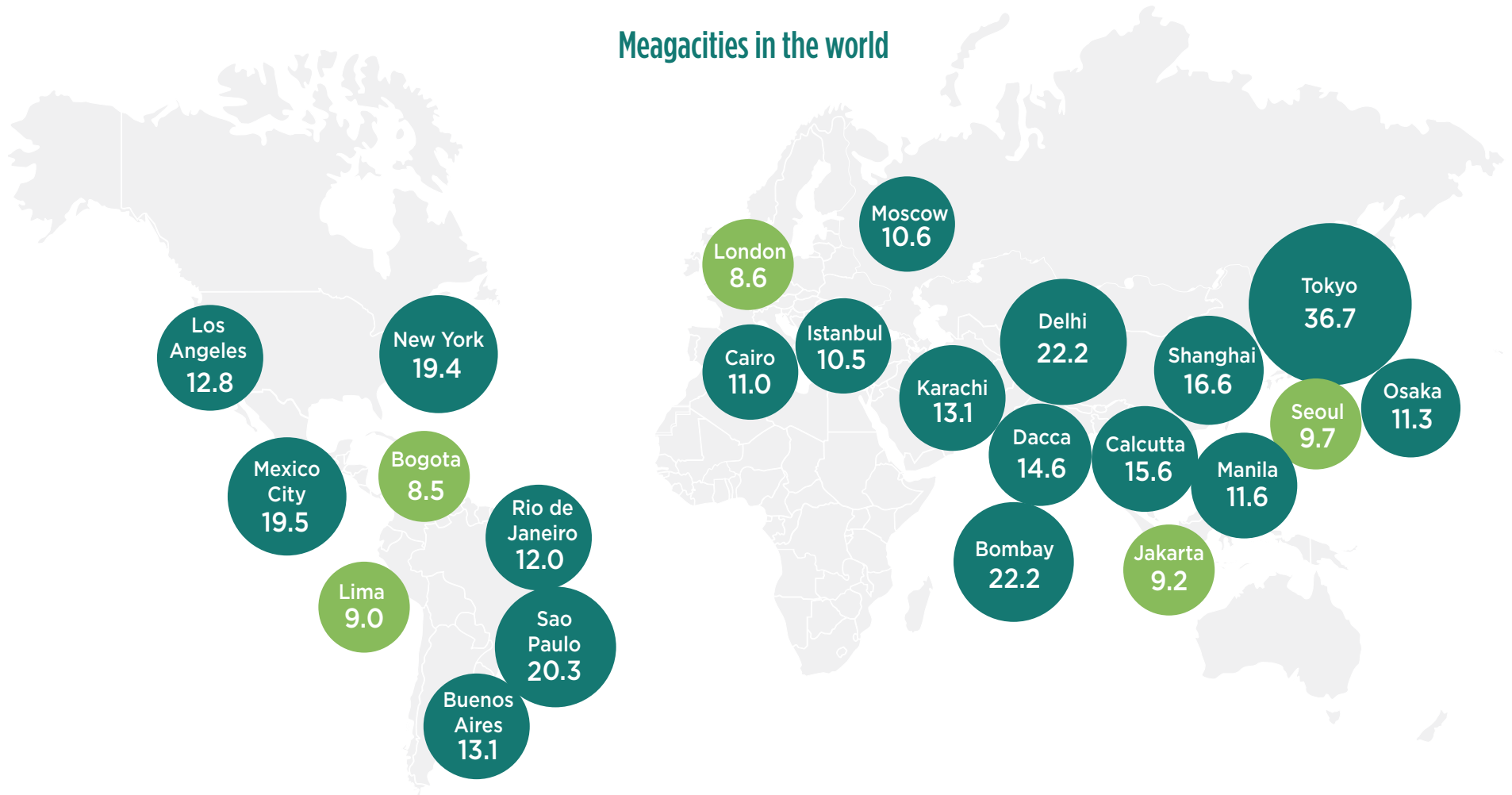
² Keeping Track of Our Changing Environment: From Río to Río +20 (1992–2012), UNEP 2012.

Consumption in developing countries has increased as more megacities emerge. The result is that today, many of the larger cities in developing countries now show levels of greenhouse gas emissions, consumption, and waste similar those of large cities in developed countries.³

³ Back to Our Common Future: Sustainable Development in the 21st Century (SD21) Project, United Nations and European Commission

Figure 2. The megacities of the world (millions of people)

Megacities in the world

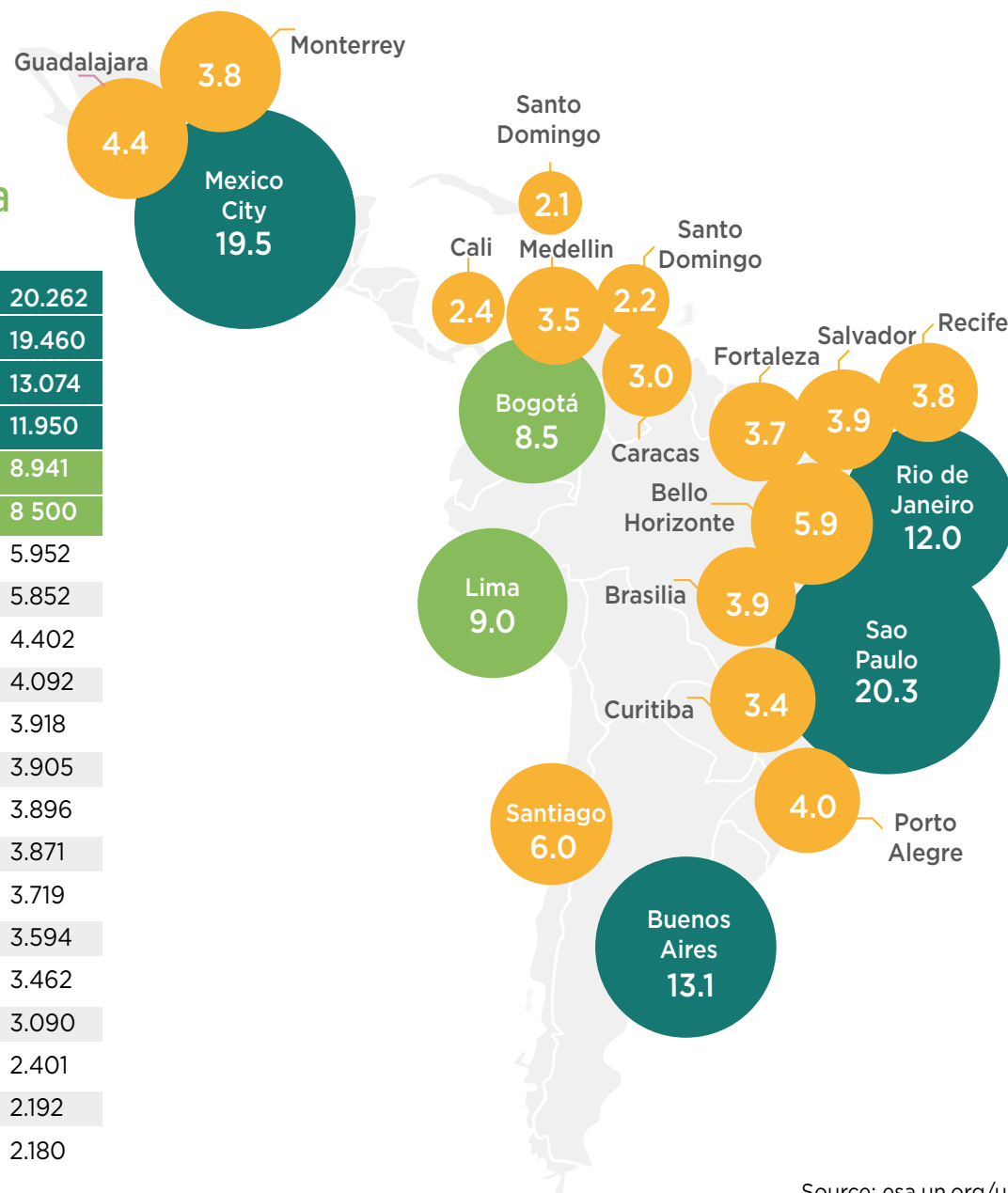


Source: esa.un.org/unpd/wpp/

Figure 3. The megacities of Latin America (millions of people)

Megacities in Latin America and the Caribbean

1	Sao Paulo (BRA)	20.262
2	Mexico City (MEX)	19.460
3	Buenos Aires (ARG)	13.074
4	Rio de Janeiro (BRA)	11.950
5	Lima (PER)	8.941
6	Bogota (COL)	8 500
7	Santiago (CHI)	5.952
8	Belo Horizonte (BRA)	5.852
9	Guadalajara (MEX)	4.402
10	Pôrto Alegre (BRA)	4.092
11	Salvador (BRA)	3.918
12	Brasilia (BRA)	3.905
13	Monterrey (MEX)	3.896
14	Recife (BRA)	3.871
15	Fortaleza (BRA)	3.719
16	Medellin (COL)	3.594
17	Curitiba (BRA)	3.462
18	Caracas (VEN)	3.090
19	Cali (COL)	2.401
20	Maracaibo (VEN)	2.192
21	Santo Domingo (DOM)	2.180



Source: esa.un.org/unpd/wpp/

Production throughout history

Humans have produced and traded goods and services for millions of years. Historically, villagers would make products from locally gathered raw materials to exchange with people in other villages.

As they traveled and traded, people also shared knowledge with their trading partners, including new technologies that made life easier for everyone. For example, once people discovered that putting salt on food kept it from spoiling, salt became so highly prized that people began using it as a currency for trading and making payments. In fact, the word “salary” came from this practice, as workers were paid with salt long before the coin was introduced.

With the Industrial Revolution that began in the late eighteenth century, new technologies made production much faster, people had access to more goods, and the price of those goods fell. The twentieth century brought more great industrial and technological developments, including mass production, which gave the middle class access to goods that used to be affordable only for the rich.

Mass production, massive resources⁴

As demand for goods grew, larger quantities of supplies were required. Thus began the destruction of many of our natural resources, ecosystems, and wildlife.

Deforestation increased as ever larger amounts of wood, minerals, and metals were harvested or extracted to produce more appliances and other devices, along with construction materials. Mines and roads to transport materials began to destroy areas that once housed wildlife. Pollution began to contaminate the world’s rivers, as companies and people dumped their waste products in the water.

Likewise, increasing levels of energy were needed to produce the large quantities of goods and services that the world was now demanding. Large factories were now using more coal, oil, and gas

⁴ “The Story of Stuff” is a documentary (available on YouTube) about the life cycle of goods and services. The video was produced by the Tides Foundation in 2007. Several of the points made in this text are drawn from it.

than ever before to produce electricity, leading to more pollution, increased greenhouse gases, and rising temperatures in the planet.

Today’s big buying trend: from quality to quantity

Looking around today, it’s apparent that we’ve moved from making our own things and producing our own food to buying everything from others. Not only are we buying more products, we’ve also gotten used to buying new ones more often. Who hasn’t heard their parents say that things used to last longer? Believe it or not, they’re not imagining things; it’s actually true!

Until the 1970s, a “good manufacturer” was one who produced durable items. But this changed as companies realized they could increase profits by adopting the “**planned obsolescence**” system, which ensures that items do not last too long. It works like this: rather than focusing on durability in product design as they did in the past, product engineers now purposely design products to last only a certain period of time.

Today, appliances that once had a life expectancy of 20 years or more are now expected to fail within five years; many appliances are planned to last just six months! Often, it’s difficult to repair these appliances because companies stop making replacement parts or providing customer service for them, ensuring that consumers must buy new products when the old ones break.

With the help of marketing and advertising, companies actively manage what’s known as the “perceived duration” of their products (that is, how long people believe products should last, which determines how much time companies must allow before launching new, “improved” versions that make the old ones seem outdated and “obsolete”).

Buying our way to success and happiness

Will Rogers summed it up nicely when he said, “Advertising is the art of convincing people to spend money they don’t have for something they don’t need.”⁵ While this may be an unfair

⁵ Original quote by humorist and popular philosopher Will Rogers, commonly modified these days with the addition of the final clause.

overstatement, we have all seen ads equating consumption with happiness and suggesting that buying the latest car, electronic device, or shoes somehow makes us “better” than others.

It’s not just the commercials; movies, soap operas, and even the news constantly show us that we can’t be truly happy if we’re dressed unfashionably, if our computer is obsolete, or if we don’t have the latest cell phone. And so what do we do? Go out and buy.

When we allow ourselves to get drawn into this vicious cycle, our lives start to revolve around buying. Rather than enjoying what we have, we focus on what we lack, work hard in order to buy it, and start the cycle all over again as what we buy goes out of style.

In our modern “consumer society” we’ve become so used to buying new things that we even measure our own success via purchasing or consuming power, meaning our ability to consume energy, materials, and services. Even governments have become slaves to industrialization, as they strive to strengthen economies by encouraging even more production and consumption.

Sometimes we forget that all the water, energy, food, and goods we enjoy come from Planet Earth, which took years (sometimes millions of years!) to create them. And we also forget that the more resources we use, the more waste we create and the greater our “environmental or ecological footprint” and the associated impact on the natural equilibrium of the planet

We need to keep all of this in mind as we make buying decisions and live our lives each day. Imagine how different the world would be if every time we’re about to buy something new, we asked ourselves: Do I really want and need this thing; or am I just letting someone trick me into thinking it’s cool?

It takes more than a cow to make milk

Creating products and services involves many processes, even for things as simple as a glass of milk. To obtain milk, someone has to raise, feed, and milk the cow. Others have to extract and transform petroleum or metal to make the bucket and sand to make the glass. We need energy, equipment, water, and other things to pasteurize the milk, which needs to be shipped, stored, refrigerated, shelved, and advertised before it’s sold. And that’s just for one glass of milk!

Where do we get materials to produce milk and even more complex goods and services? Let’s take a look at the types of raw materials and where we get them.

People get raw materials for production and manufacturing from nature. We then transform them into consumer goods or other materials.

Raw materials may be classified as follows:

- » **Animal and vegetable materials** come from living organisms, extracted by agriculture, fishing, forestry, and livestock breeding.
- » **Minerals** are mined and then transformed for industrial use. Some are metallic, such as ores used to make iron and aluminum; some are nonmetallic, such as those used for salt and fertilizers; some are rocks or gems, such as limestone, granite, and marble.
- » **Fossil fuels** include oil and natural gas.
- » **Liquids and gases** include air and water.

Raw materials may become depleted if we use them faster than nature can make them—such materials are called **nonrenewable resources**. Examples are minerals and fossil fuels, which take millions of years to be made, unlike vegetable or animal resources, which can be reproduced quickly and are considered **renewable**.

So why don’t we just stop using nonrenewable resources and, instead, use only renewable ones? While this seems like a good solution, unfortunately the real world isn’t that simple because we don’t always have affordable renewable alternatives to some of our nonrenewable materials (such as rocks or metals, for example). Also, even renewable resources may not be as “infinite” as they seem. They can be damaged and destroyed if we aren’t careful. For example, if the oceans get too polluted due to acid rain from human-caused climate change, fish and other marine life may disappear because they can’t adapt fast enough to survive.

Our choices affect the world

Whether or not we’re aware of it, our choices—including which foods we choose to eat and how much and which kinds of energy we produce and use—affect not just the environment, but also animals and people around the world.

Even the foods we eat and the way we produce them affect the environment and our health. Our current agricultural methods require large quantities of chemicals and fuel for transportation. To make things worse, refining and other modern food production processes lower its nutritional value and use tons of raw materials for packaging. Also, our meat-eating habit is becoming a problem because producing meat is so resource-intensive. Did you know that it takes 900 kilos of feed and 16,000 liters of water to produce just one kilo (2.2 lbs.) of meat?

As countries such as the United States use foods such as corn for animal feed and biofuel production, higher demand causes prices to skyrocket. (World corn production was already low, owing to a long drought stemming from climate change, which has also affected soybeans and wheat.) Higher prices fall heaviest on poor countries that import food (nearly all African countries). People in those countries spend 60–80 percent of their income on food, which is why the UN Food and Agriculture Organization has called on the United States to curtail its use of corn and other foodstuffs in the production of biofuels.

Biofuels gained popularity in part due to rising oil prices and increased awareness about the adverse impact of oil on the environment. Because biofuels are derived from plants and other renewable sources, many people believe they have no adverse impact on the environment. Unfortunately, this is not entirely true. In Borneo, farmers are destroying tropical rainforests to plant African palm trees for oil and biofuel, endangering the existence of orangutans and polluting aquifers with agrochemicals. In the Chocó area of Colombia, palm oil farmers have invaded collective territories of Afro-Colombian peoples, displacing communities and destroying their cultural heritage, altering the ancestral use of the land, and diverting and draining water sources, in addition to clearing forests.

It is up to us to make wise choices, including minimizing our reliance on fossil fuels and optimizing our use of biofuels. Is there any way we could take a bicycle or mass transit to work or school, rather than driving? What if we committed to buying locally produced products so fewer items would need to be shipped long distances? Not only would this use less fuel, it would also

discourage companies from seeking greater profits by setting up shop in countries with loose environmental controls and few protections and rights for workers.

The answer: Informed and responsible consumers

Human consumption plays an extremely important role in the continued availability of the natural resources that provide the raw materials for all the products and services we've come to enjoy. The only way to protect our natural resources—and to slow down the rate at which we're using up the earth's raw materials—is to become responsible consumers.

There are three “laws” that we must follow to become responsible consumers:

- » **Consume less:** Avoid buying things we don't need. If your coffee maker still works, why buy another one? Rather than buy that exercise machine, why not run or play soccer with my neighbor instead?
- » **Make informed decisions:** When you must buy something, look for certified products that were made specifically to limit environmental impact. Choose products that save energy and water and maintain them well to extend their useful life, so you won't need to replace them so quickly.
- » **Consume responsibly:** Think of ways to save energy and water while using items. For example, unplug products when you're finished using them, rather than just turning them off; think about what you'll need from the refrigerator before opening the door. Challenge your family and friends to reuse or repurpose things they already have, rather than buying new items. Be creative, have fun, and make it a game—or a contest! When something wears out or breaks and can't be reused, recycle it if possible, or dispose of it in an environmentally appropriate manner.

Following these three principles helps us determine our ecological footprint, which, like a report card, “grades” our performance as consumers. Do you have a perfect score, or is there room for improvement? You can find out by reading on.

How heavy is our ecological footprint?

The amount of pressure we exert on the planet—as individuals and via our school, community, and city—determines our “ecological footprint”: the area (in hectares or acres) that is needed to support either an entire population or one individual (figure 4). As a tool that measures how much land, water, and sea is needed to produce the resources we use, the ecological footprint is a pretty flexible measurement. We can use it to calculate the ecological footprint of a single person, a region or nation, or even the entire world.

The ecological footprint takes into account:

- » Population growth
- » Loss of fertile soil

- » Deforestation
- » Depletion of resources
- » Growth in consumption

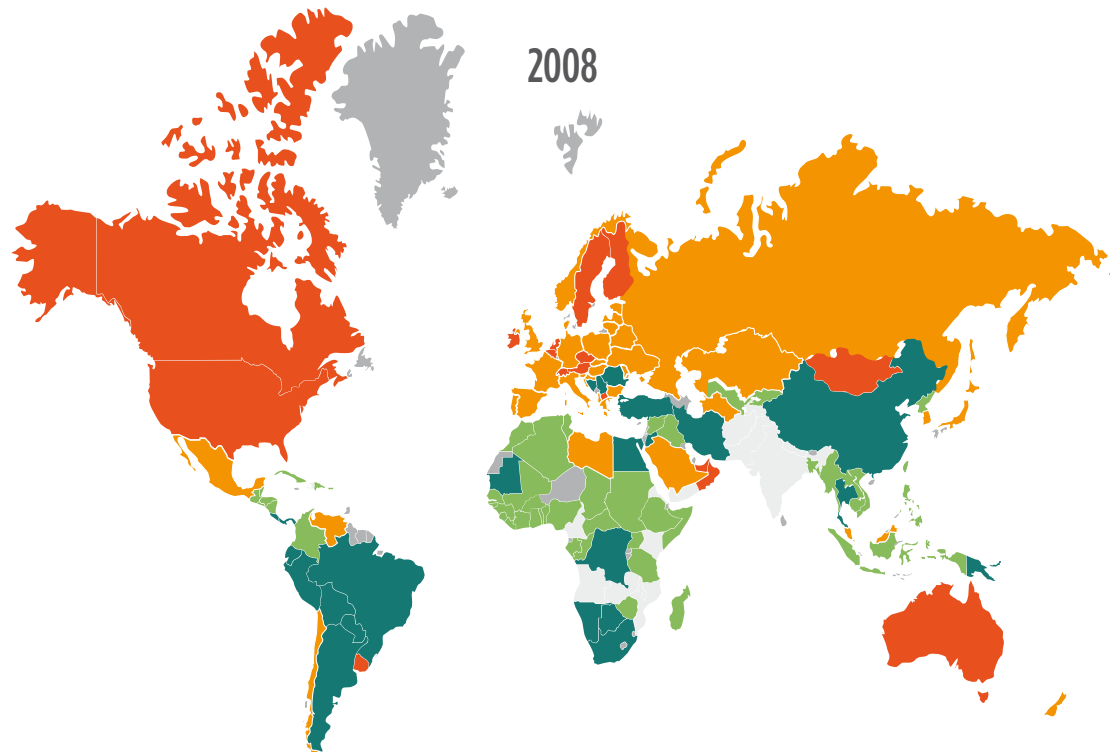
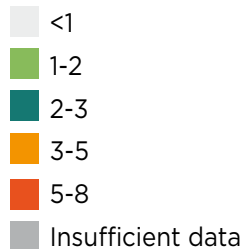
A measure that expresses these factors helps us understand the damage we do when we convert natural habitat into farmland, land for grazing, lumber-producing forests, fishing areas, homes, buildings, towns, and cities.

Currently, the overall ecological footprint of the world’s population exceeds Earth’s load capacity by 30 percent. In other words, at our current worldwide rate of consumption, we are depleting our planet’s resources by using them faster than Earth can replace them.

Figure 4. The planet’s ecological footprint, 2008

Ecological footprint in the world

Global area (in hectares) required to support each resident



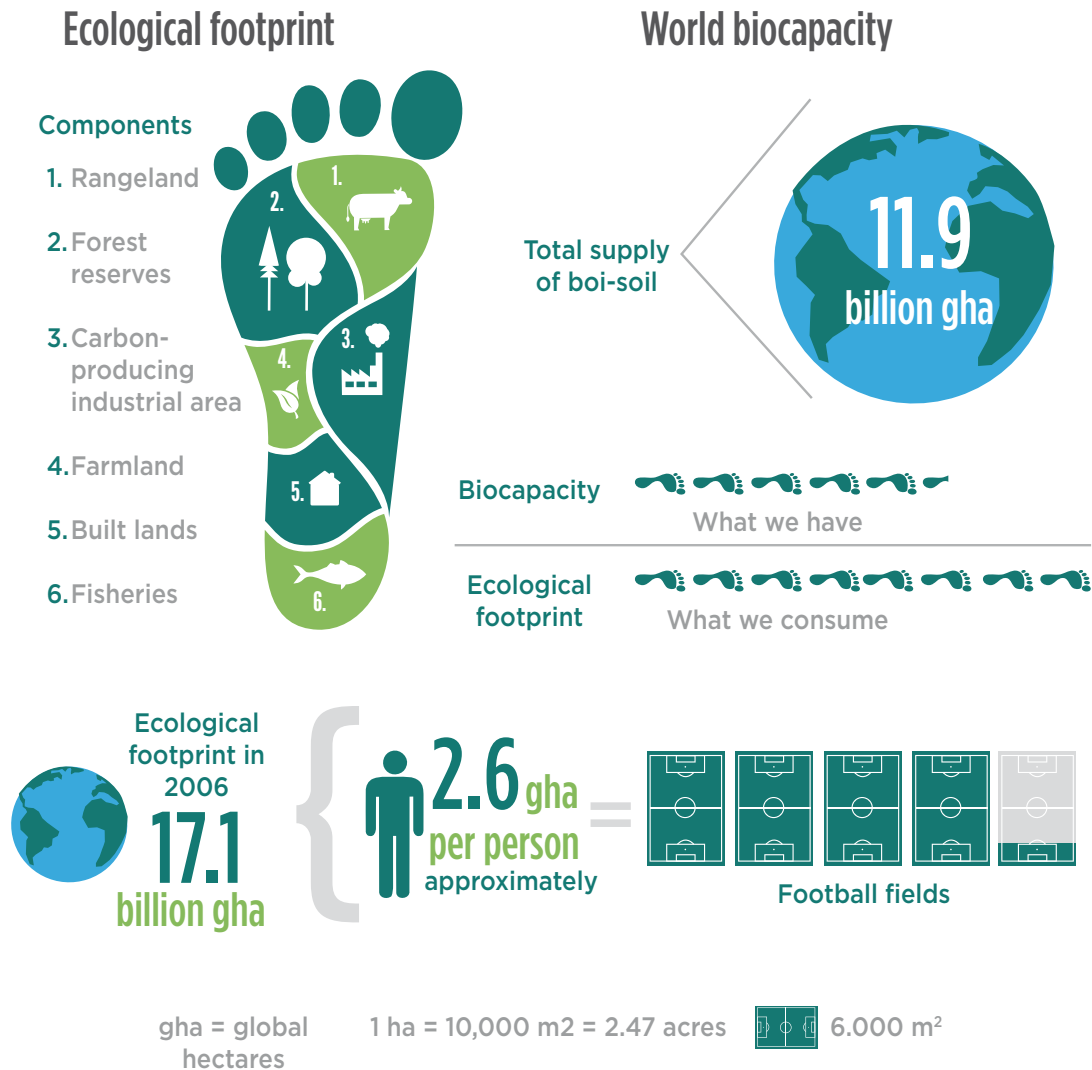
Source: Living Planet Report 2012 (WWF)

This estimate considers both the world's ecological footprint and the biological capacity, or "biocapacity," of each country and region. Biocapacity "refers to the capacity of a specific biologically productive area to generate a regular supply of renewable resources and to absorb the waste that results from their consumption."⁶ By combining the notions of ecological footprint and biocapacity, we can determine whether a country or region is an ecological debtor (that is, whether it owes an eco-debt) or an ecological creditor (has an eco-credit)—that is, whether or not it consumes more resources than it can regenerate and whether or not it produces more waste than it can absorb.

According to the 2009 edition of the *National Footprint Accounts*, the 2006 global ecological footprint was 17.1 billion global hectares (gha), while its biocapacity (total supply of bioproductive soil) was just 11.9 billion gha. Just as we can't keep spending money we don't have, we can't continue to consume more than we have on the planet. The longer we delay making needed changes so as to consume and waste less, the more we deteriorate the planet's future capacity to provide even those elements we need to survive.

⁶ www.greenfacts.org, "Glossary," accessed on January 30, 2013.

Figure 5. The relationship between the ecological footprint, biocapacity, and consumption footprint



Calculating your ecological footprint

Numerous websites allow you to calculate your own ecological footprint), among them those of the Center for Sustainable Economy, the Global Footprint Network, and the World Wildlife Foundation.

Once we know the size of our ecological footprint, we can take action to lower it—and thus our negative impact on the planet—by minimizing the volume of materials and energy we consume. It's possible to do this without lowering our quality of life, just by becoming more aware of the things that we allow to influence us and by making a habit of thinking carefully before buying or consuming.

Our ecological footprint measures more than just the resources we buy and use—it also includes how well we dispose of our trash. When we throw something in the trash, it either ends up in giant landfills or in incinerators that burn it before depositing the residue in a landfill, a dump, or a body of water.

Burning produces greenhouse gases and releases highly toxic chemicals into the atmosphere, which is extremely damaging to human, animal, and plant health. Landfills aren't much better, since the gases they produce increase the greenhouse effect, which is also toxic to human health and the earth.

Curtailing our waste overflow and managing waste better

One of the most important things we can do is to help people understand and adopt the five R's of consumption: **reflect, respect, reduce, reuse, and recycle** (box 1) This starts by asking people to **reflect** on the decisions they make every day and to **respect** living creatures and our environment. From there, we can educate people about the final 3 R's—**reduce, reuse, and recycle**.

Reuse: Find new ways to use existing materials without the need for recycling, including giving things we don't need away to others. Creating responsible consumers involves more than teaching them the five "R's." We also need to educate people about ecological labels and environmental seals, which contain important information about products and help consumers make informed decisions. The information conveyed by the label or seal may

include the product's origin, proper methods for its disposal, its energy and water-saving capacity, whether it is made from wood that meets environmental standards, whether it is recyclable, and whether it was produced using clean technologies, among other things.

We've already discussed what happens when we carelessly throw out plastic bags, but what about other things? According to 2011 UN estimates, each of the 7 billion people alive today produces between 800 grams and 2 kilograms of waste per day, depending on the country of residence.

All too often, we simply throw things away without thinking of the consequences, such as the damage that plastic bags do to wildlife (box 2). Other consequences are that cities have to find space for ever larger garbage dumps and that more and more trash piles up in riverbeds, streets, parks, and green areas.

Burning our trash doesn't solve the problem, either, as already noted. Various respiratory diseases have been linked to this practice. **Leachates** from dumps cause cancer, disorders of the nervous system, and genetic mutations. People living near such areas have high rates of skin disease; they also have to deal with large populations of disease carriers (rodents and insects).

We need to think about how we want to live, and find better ways of disposing of things we no longer need, such as recycling and reusing them.

Box 1. The five "R's" of responsible consumption

- » **Reflect** on how we consume and live, and how we relate to other people and to nature.
- » **Respect** living things and our environment, and remember that our actions affect them.
- » **Reduce:** Be responsible; before buying, decide whether we truly need the good or service and how we can use it most efficiently.
- » **Recycle**, but keep in mind that converting existing materials into something entirely different requires an industrial process.

When talking about proper waste disposal methods, it helps to know how wastes are categorized. Generally, they are categorized based on their composition and the time it takes for them to break down (a process known as decomposition).

Organic wastes come from living creatures and include such things as food wastes, plant materials, and even some paper products. Because they are biodegradable—they decompose fairly quickly—organic wastes are ideal for composting.

Inorganic wastes take longer to decompose (often much longer) and include all the products we think of as “man-made,” such as metal, glass, plastics, construction materials, and packaging. Hazardous wastes are inorganic wastes containing toxic materials, such as batteries, paint, pesticides, electronics, and cleaning products. These must be taken to waste sites that have been specially prepared to handle them. Many inorganic wastes and a few hazardous ones (such as electronics and batteries) can be recycled.

Plastic bags: Shopping’s dirty secret

In addition to the energy and materials it took to make, ship, store, and promote that new product we believed we had to have, think about the bag that came with it. Plastic bags are perhaps the shortest-lived and most wasteful objects that we use every day. On average, people use plastic bags from the supermarket for about 20 minutes before throwing them away; but they take 100–400 years to decompose (figure 6).

Made from polyurethane, which comes from petroleum, plastic bags literally use up tons of this nonrenewable natural resource. Around the world, we consume between 500 billion and 1 trillion plastic bags each year. It has been estimated that each person in the United States uses more than 1,200 plastic bags every year.

In addition to all the resources used to produce them, there’s also the problem of what happens to them after we

throw them away. Currently, in every square mile of ocean, 46,000 pieces of plastic litter are floating about. In the Central Pacific ocean, scientists have reported that there are six pounds of marine litter for every pound of plankton!

Plastic bags hurt marine wildlife in several ways. Turtles often mistake plastic bags for jellyfish and eat them. Fish and marine birds and mammals, such as dolphins, also sometimes consume bags. This causes blockage in the digestive tract or fills up the stomach, leading to death. As bags break down, the smaller fragments (petro-polymers) poison turtles, herons, and fish. Many animals become entangled in the bags and either drown or starve to death. This hazard also endangers wildlife living on riverbanks and near lakes.

The problem has gotten so bad that many countries have begun to curtail the use of plastic bags. For example, in 2002, Ireland began levying a tax on purchases for users of plastic bags. This cut consumption by 90 percent; the money collected is being spent on environmental and recycling programs.

The good news is that around the world many concerned people have replaced plastic bags with cloth ones. Another option is to go back to using baskets to carry groceries and other essential purchases home.

To encourage composting and recycling, set up two bins at home and label them “Recycling” and “Organic.” It’s a good idea to ask recyclers in your area which materials are currently being recycled. Then, ask everyone in your family to put only cans, glass, paper, cardboard, plastic, and other items bearing the recycling symbol in the recycle bin.

The golden rule is to clean and dry each waste item before depositing it in that bin to avoid contaminating those already there. As you gain more experience, you may even approach a recycling collection center and offer to sell them materials you have collected and cleaned.

Figure 6. Decomposition periods for some common products



Use the “organic” bin for biodegradable waste (vegetable and animal waste materials, eggshells). If you have a municipal organic waste service or a composter, you can also include used napkins, paper coffee filters, and teabags. However, if there is no regular pickup of organic waste in your area and composting is not an option, you will need to put those things in a third “nonrecyclable trash” bin, along with items such as toilet paper, disposable diapers, nonrecyclable packaging, and paper or cardboard packaging smeared with food residues or other contaminants.

By now, you’re probably wondering exactly how long it takes for wastes to decompose. Waste **breakdown periods** vary (figure 6), depending on what the waste is made of and conditions at the waste site (moisture, light, and temperature).

Fortunately, we’ve developed some pretty interesting technologies so we can recycle many materials that would otherwise go in the trash. For example, we can recycle a Tetra Pak (Tetra Brik®) by shaking it with water and separating it into its three components—paper fiber, aluminum, and polyethylene plastic. Each of these materials is then used to manufacture things such as egg cartons, paper towels, shopping bags, and packaging.

Even now, engineers around the world are working to create new recycling technologies. In Germany, recycled materials are mixed to form three wood-like components, which are used to make furniture. Brazilian and Spanish engineers have developed technologies called thermal plasma and pyrolysis (separation by heat) to produce paraffinic oils and high-quality aluminum from recycled materials using low amounts of heat.

How can we make less trash?

Recycling and reuse is an excellent step. And not just recyclable plastics, paper, cardboard, and cans, but also reusable items of clothing. Use your imagination to transform dresses or shirts into fun new items. Start a friendly contest among your friends or at school to see who can make the most creative item from just repurposed clothes or goods.

Simply *using less* helps, too. Buy only the things you will really use, and be especially careful when buying new clothes, toys, games, video games, and CDs. Remember: fashion is fake, fleeting, and only for followers. Instead, be a long-term trend-setter.

While it may take some guts to do this, it makes you a powerful leader! As family, friends, and others start to follow your lead, producers will be forced to manufacture fewer items, extract fewer natural resources, use less fossil fuels, and stop exploiting child workers. As they see their customers (you!) taking better care of the planet, they’ll start to look for and invest in ways to do the same. You really can make a big difference in this way—if you’re up to the challenge.

One way to get people’s attention is to calculate our ecological footprint and talk to them about it. Do they know how our own consumption affects the planet? Together, what can you do to get the whole school, community, and city to consume less and reuse or recycle more? Even something as simple as making and posting signs can remind people to think before they buy or throw something away.

If we think long and hard and do the analysis presented in this chapter each time we buy something, we’ll be doing our part to make our communities less wasteful and more environmentally friendly. Read on to learn more about the many things we can do every day to help the planet, our communities, and ourselves as well.

In life, everything begins with small gestures. In order to get where we are going, we have to take the first step. You can start creating a better world today, helping preserve it instead of continuing to damage it. How many small steps will you take today?

A family plan to fight climate change

A series of small steps is presented in figures 7–10. Bigger steps are illustrated in figures 11–16. And even bigger steps are shown in figures 17–22.

Small steps

Figure 7. Use less electricity

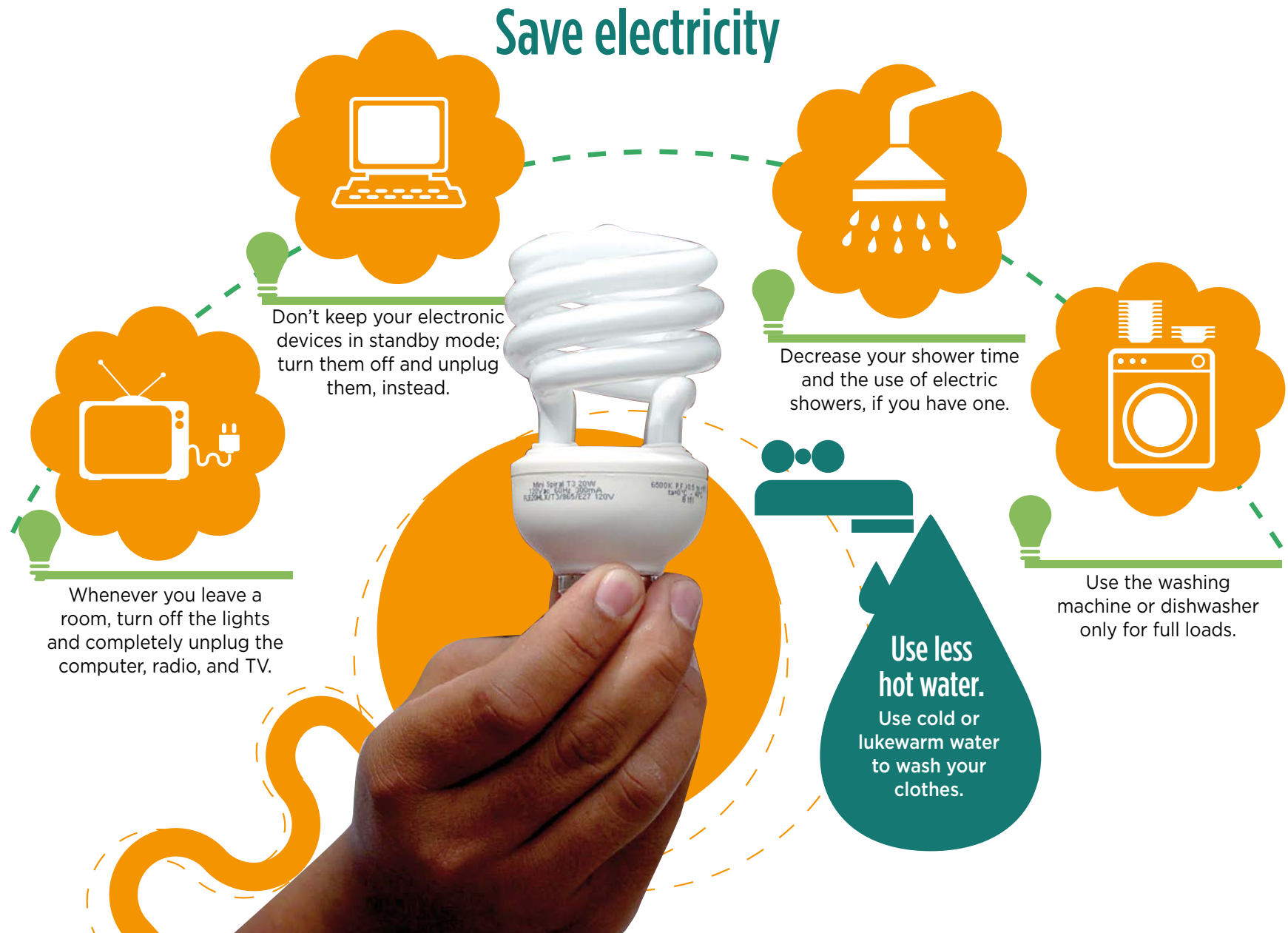


Figure 8. Heat and cool less



Heat and cool less



Make sure your family cleans the heating and cooling systems and changes filters regularly.



Roll down the windows in your car instead of using the air conditioning when driving at speeds below 50 mph (80 km/h).

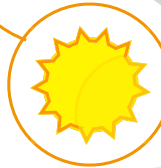
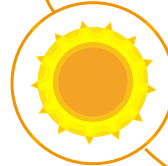


Keep the thermostat set at the highest safe temperature in your refrigerator and freezer.

- In the refrigerator **38°F or 3°C**
- In the freezer **5°F or -15°C**



Let hot foods cool before putting them in the refrigerator.



°C °F



Adjust the temperature for each season.



Figure 9. Use smarter transportation



Figure 10. Reduce, recycle, and reuse



Bigger steps

Figure 11. Make food choices count

Make food choices count

Much of what we consider to be waste may not be; some substances or materials can be used if you know how.

Avoid using foil or plastic wrap to store leftovers. Instead, use reusable dishes with lids.



Don't buy meat, cheeses, or cold products packaged on polystyrene trays.



Buy unpackaged foods.




Buy local products



Choose organic products



Figure 12. Economize with the car



Economize with the car

Keep the family car in good condition to reduce fuel consumption and pollution.

30 Drive slowly and steadily. Accelerating and braking cut fuel economy.

Pump up the tires regularly. Cars with even one pound less tire pressure than is recommended burn up to 2% more fuel.

While driving, maintain an average speed of between 80 and 110 km/h to save money and minimize greenhouse gas emissions. Obviously, always respect speed limits.

Figure 13. Shop smart



Figure 14. Learn to recognize product certifications

Reputable certification programs



For a broad range of products



Green-e

Renewable energy



Environmental



Paper and wood



Compostable



FAIRTRADE INTERNATIONAL

Fair production



Organic products



Good practices



Energy efficiency



Computers



Children's products



Building

To learn more, research the topic of “fair trade,” which consists of purposefully purchasing goods and services from small, independent producers, and ensuring that producers follow high ethical standards when purchasing raw materials and paying their producers and workers. Fair trade favors the use of technologies that have a low or negative environmental impact and that contribute to the preservation of local cultures.

- » When you go shopping, take your own bags instead of using plastic ones. If you forget to bring them, try to use as few plastic bags as possible.
- » Make sure you really need the things you buy. Don't give into fashion or change your wardrobe, computer, or an appliance just because a new one is available.
- » Think about your values when shopping: Are you willing to pay a bit more for products from companies that respect the environment and their employees? Favor farmers who favor the Earth.

Figure 15. Use less paper

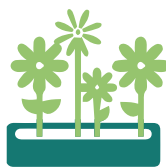


Figure 16. Go green with plants

Go green with plants



Plant seeds and care for plants.



Keep plants in and around your home to improve air quality and the climate.



Even bigger steps

Figure 17. Wood

Work with the right wood



Choose certified or reforested wood, such as eucalyptus and pine.

Choose wood from your area to minimize greenhouse gas emissions from transportation.



When building or renovating



Try to find demolition material. You may be able to find special wood that can be reused for window frames, doors, and even furniture.



Use only legally harvested wood. Know the origin of the wood you buy.

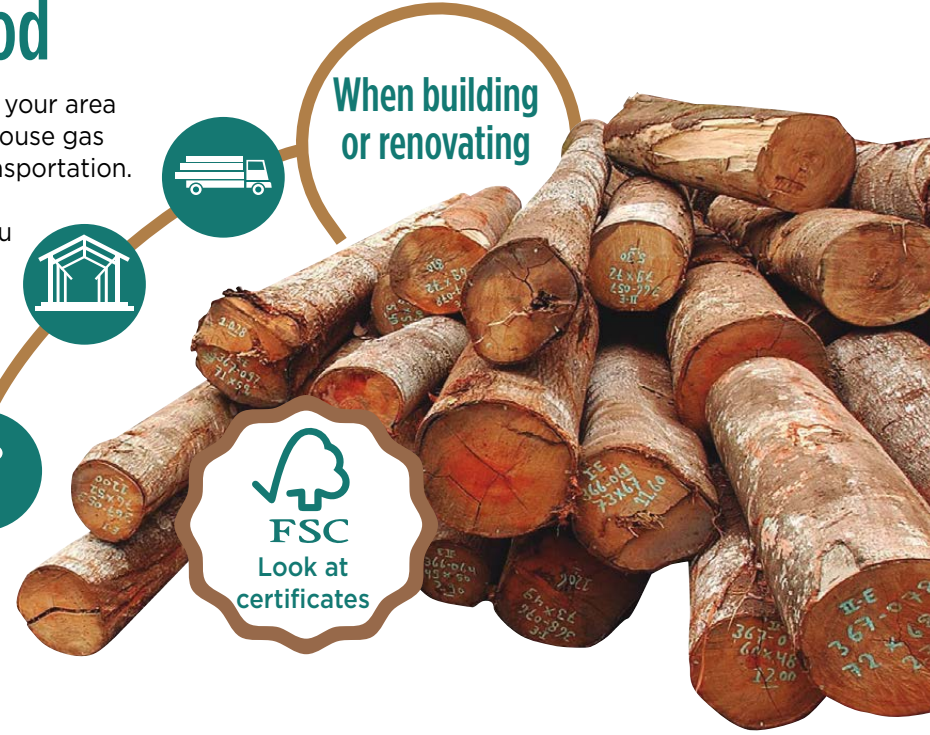


Figure 18. Avoid charcoal



Avoid charcoal

Charcoal comes from burning wood in furnaces.



It generates large amounts of air pollution.



If you must use it, buy only charcoal with the seal of approval of an environmental organization.



Figure 19. Be stingy with water

Be stingy with water

Wasting water creates shortages in other areas and harms many people.

Ensure that wastewater is adequately treated.



Take used cooking oil to a collection point, where it can be used to make soap, animal feed, and biodiesel.



Keep your faucets well regulated and stop any dripping.



Fix leaks.



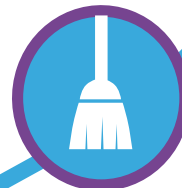
Collect rainwater to water plants, wash the car, etc.



Install faucet aerators to increase water pressure.



Reuse water whenever possible.



Use a broom, not water, on porches and sidewalks.



Figure 20. Promote sustainability

Promote sustainability

Share what you've learned with others and be a model for your community.

Monitor decisions made by the governors and legislators of your city, state, or country and ask them to promote sustainability.

Talk about policies that promote sustainability in your civics or social studies class.

Figure 21. Recognize, value, and preserve biodiversity

Recognize, value, and preserve biodiversity

Learn how biodiversity benefits your region or country—and protect it!



Do not buy illegally harvested native plants.

Do not buy wild animals. Report confinement and illegal trade in wild animals.



Eat only cultivated heart of palm that is registered with an environmental organization.



Get involved in initiatives to maintain forests and protect biodiversity.



Care for the flora as you care for your home, school, or business. Trees and plants improve the climate and air quality.

Figure 22. Leave no trace



Going out into nature

When going to the great outdoors, follow these simple principles:



Plan ahead and prepare.



Dispose of waste properly.



Leave what you find.



Respect wildlife.



Travel and camp on durable surfaces.



Be considerate of others.



Minimize campfire impacts.



Most people love going to the countryside, the woods, or the park to, breathe fresh air and roll around in the grass. But nowadays, we find trash almost everywhere we go.

Let's do our part to stop this trend by following the adage: "Leave no trace." Just as we bring things with us in our backpacks, we can also take our waste back with us and reuse, recycle, or dispose of it properly at home. This simple act is of immense value.

The most important thing we can do is to set a good example for and respect others. If someone else left their trash behind and we can pick it up and dispose of it properly, perhaps others will observe us and do the same. When people see others doing something good that makes sense, it lives on forever in their hearts and minds.



Lesson Plans at the
Basic Level

1

Basic lesson plan 1: The death of one object may mean the birth of another

General objectives

- » Understand where materials come from and how they are produced, used, and discarded.
- » Distinguish between organic and inorganic materials—and the time it takes for them to break down.
- » Learn to think about the environmental impact of buying items we don't need.

Class activity 1: The life of an object

Objective	Time	Place
Learn where objects come from and reflect on their fate—it may not be the garbage can.	1 hour	Classroom

Materials

- » Three sheets of paper already used on one side, colored markers, crayons of various colors, pencils

Class preparation

- » Read the text for this chapter.
- » Make sure each student has three sheets of used paper and several colored markers.

Step by step

- » Have the students select an item they use daily (e.g., pencil, notebook, clothes, shoe, toy).
- » Have them label one sheet with the name of the item and the word “Past.” Ask them to look closely and identify the materials that make up the object. For instance, a pencil is composed of wood, graphite, metal, and rubber.

Ask them to draw or write their answers to the following two questions: Where in nature do you believe each of these materials comes from? What processes occurred to transform the raw materials into the object you have now?

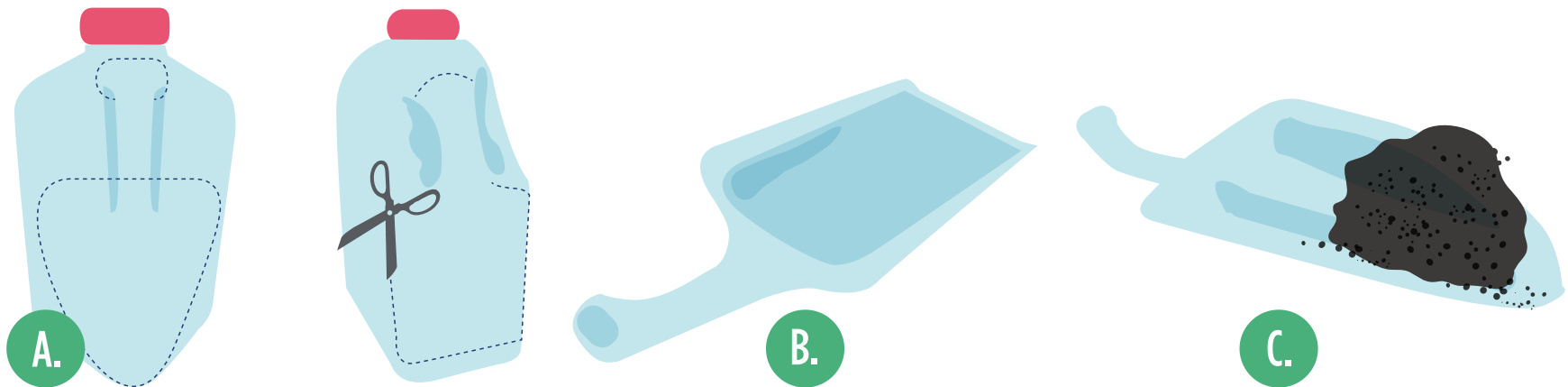
- » On another sheet, have them write the name of the object and the word “Present.” Then, have them describe how the object got to them and how they use it.
- » Have them label the third sheet with the name of the object and the word “Future.” Then, ask them to respond to the following three questions: When do you think this object will stop being useful and be thrown away? Where will it go after it is thrown out? Could it be used in some other way?
- » Finally, reflect with students on the following questions as a springboard. In the questions, replace “raw material” and “object” with the name of the material and object.
- » What kind of raw materials went into producing the object and where did they come from?
- » Do you believe the raw material that was used to make this object is affected by its continuous use? How?
- » How do you think this raw material got to the factory?
- » Did its transportation create pollution?
- » Do you think that it took any energy or water to make it? Where did they come from?
- » Do you think any pollution was produced in its manufacture? What was polluted?

- » How did this object get to you?
- » Can you think of another way to use this object so it is not thrown out? Or can you give it to someone else? Explain.
- » What do you think happens to all the things we do not use? What would your home look like if all the garbage just piled up and stayed there? Doesn't the same thing happen to the planet?
- » Talk about the need to learn how things are designed, made, sold, and discarded, so we will appreciate the things we have, find ways to use them more fully, and think hard about when and how we throw them out.

Class activity 2. Experiment: Waste amid waste—Which will vanish first?

Ask students to make a shovel (with their parents' assistance) from a sturdy plastic jug using the model in figure 23.

Figure 23. Making a shovel from a plastic milk bottle



Objective	Time	Place
<ul style="list-style-type: none"> » Observe the rates at which various organic and inorganic wastes decompose. » Understand the positive and negative effects of waste materials on the environment and learn ways to discard them other than throwing them in the garbage. 	1 hour (plus monitoring for 1 month)	Outdoors

Materials

- » Plastic shovel
- » At least eight plastic containers in which to put waste
- » Inorganic waste (plastic bottles, glass beads or marbles, beer or soft drink cans, cardboard or Tetra Pak, used paper)
- » Organic waste (fruit or vegetable peels, animal bones, eggshells, food scraps)

Preparation

- » Explain what “organic,” “inorganic,” and “decomposition” mean (see chapter text).
- » Find a place outside the school building where you can leave each group’s containers for a month. The place must allow full contact with the air, and not be accessible to dogs and cats.
- » Make sure students use care in handling the wastes.
- » Since this experiment requires students to monitor their containers on a weekly basis over the course of a month, select the start date carefully.
- » Check students’ data regularly during the monitoring period to ensure it is complete.

Step by step

- » Organize students into groups of four. Each group should have both organic and inorganic wastes. They will need plastic containers to hold the wastes and a plastic shovel for handling them.
- » Ask each group to note any residue on the wastes. Ask them about the wastes’ composition and where they are from. Propose the hypothesis that all waste takes the same amount of time to decompose. Do they believe that? Why?

- » Take students to the place where they will keep their containers and have them mark each with a different number, indicate whether it contains organic or inorganic matter, and note which waste material it contains. For example:

- Container 1 Inorganic: soft drink cans
- Container 2 Inorganic: glass beads or marbles
- Container 3 Inorganic: plastic bottle
- Container 4 Inorganic: piece of cardboard
- Container 5 Inorganic: cut-up used paper
- Container 6 Organic: banana peel or other fruit peel
- Container 7 Organic: chicken bones or other animal bones
- Container 8 Organic: egg shells

- » Next, ask them to place the indicated waste in the appropriate marked plastic container using the shovel and expose them to the air.
- » Ask them to draw the following table in their notebooks and each week, write down any changes they observe:

Sample decomposition record: Container 1 Inorganic: soft drink can

	Color	Consistency	Presence of animal life	Presence of plant life	Degree of decomposition (on scale of 1 to 5)
Week 1 Date					
Week 2 Date					
Week 3 Date					
Week 4 Date					

- » Ask them to consider the following when recording the extent of decomposition:
 - 1 = Initial waste no longer recognizable; complete transformation has occurred
 - 3 = Initial waste is partially intact, showing signs of wear
 - 5 = Waste material is completely unchanged.
- » Tell students to monitor the waste materials for one month and record any changes they observe in their tables.
- » After a month of monitoring, ask them the following questions:
 - Which waste material decomposed the quickest? How do you account for this?
 - Which waste material did not decompose? Why?
 - Do organic and inorganic wastes decompose the same or differently? Why?
 - What can we turn organic waste materials into? Explain.
 - What happens when a material does not decompose quickly?
- » Talk to the students about the importance of nature's decomposition process and how we are affected by wastes that do not easily decompose.
- » When students realize that many of the wastes used in the experiment failed to decompose, talk about options, such as recycling and reuse.

Formative assessment

Before proceeding to the next topic, make sure your students:

- » Understand the origin of products on the market.
- » Can distinguish between organic and inorganic wastes and understand the decomposition process.
- » Portray the life story of a plastic bottle, including the origin of its materials (past), its typical use (present), and what happens when it becomes trash (future).

- » Inorganic waste materials are ones that: _____

- » Inorganic waste materials are characterized by: _____

Integration with other subjects

- » **Science:** Research microorganisms that help decompose wastes.
- » **Language Arts:** Write a letter to a child in the future, explaining to him or her how to handle wastes and why it is important to practice these habits.
- » **Mathematics:** Record how many waste materials you discard daily, from the time you get up until you go to bed at night. Do this for a week and compare with your classmates. Then, take action to lower your numbers.

Tip for the teacher

Try to get students to reflect on the objects they use daily and to reevaluate the point when an object stops being useful and is considered garbage.

Suggested reading and viewing

- » The Tetra Pak website offers information on the transformation of Tetra Pak packaging waste.
<http://www.tetrapak.com>.

2

Basic lesson plan 2: What and how much do we need to live?

General objective

Understand what it means to be a responsible consumer and what changes people can make in their consumption patterns to benefit themselves and the environment.

Class activity 1: Everything I do affects the planet!

Objective	Time	Place
<ul style="list-style-type: none">» Identify our basic needs, e.g., nourishment.» Evaluate our daily habits and examine their positive or negative impacts on the environment and our health.» Learn practical ways to live better that do not adversely affect the environment or our health.	1 hour	Outdoors and classroom

Materials (for each group)

- » Six cards for evaluating habits at home (figure 24), notebook, pen

Preparation

Set up six stations around the school and put the evaluation cards in a conspicuous place at each station. Make sure each station is in a location that's relevant to the topic covered by the corresponding cards (e.g., set up the "food" station in the kitchen or cafeteria,

the "mobility" station in the parking lot, the "waste management" station near trash bins or garbage cans, etc.).

Step by step

- » Organize students into groups of four. Each group must visit all six stations.
- » Explain to your students that they must search the school for evaluation cards, and that on them, there is a series of questions that they must answer on basic needs, such as nourishment, mobility, waste management, water, and energy. They will also find a card with good habits related to each area covered by the other cards.
- » Ask students to write down the topics in their notebook, think about their daily habits, and answer honestly.
- » Back in the classroom, review each card with your students and discuss their answers. Ask your students the following questions:
 - How do your daily habits affect you and your environment?
 - What good habits can you begin to apply in your daily life?
 - How about the habits of others in your family?
 - Which good habits would you suggest that they adopt to ensure their good health and a healthy environment?
- » Wrap up with a reminder that our personal habits affect us and our environment. Adopting good habits benefits us and others.

Figure 24. Cards to help students evaluate habits at home

Food



1 Do you eat animal products (meat, eggs, milk, cheese, fish)?

2 Do you eat plant products?

3 Do you eat packaged foods that come from far away?

4 Do you buy products from the shopping center or local market?

Mobility



1 Do you travel by car?

2 Do you take public transportation, ride your bike, or walk?

3 Do you go on long trips on vacation?

4 Do you go on vacation nearby?

Water



1 Do you try to conserve water when doing your chores or personal care activities?

2 Do you fix leaks quickly at home?

3 Do you turn off the tap while soaping your hands or in the shower?

4 Do you collect rainwater for use in housework?

Good habits



1 Use less packaging and recycle paper, cardboard, glass, cans, and plastic.

2 Walk or ride a bike instead of driving.

3 Make crafts with leftover paper, cardboard, cans, and plastic; get creative and help the environment.

4 Give the clothes, toys and books you no longer use to someone who can use them.

5 Turn off the tap and the lights; and unplug electrical appliances when you are not using them.

6 Do not waste food; you are lucky to have it!

Waste management



1

Do the products you buy have more than one package or wrapping?

2

Do you recycle the materials you use?

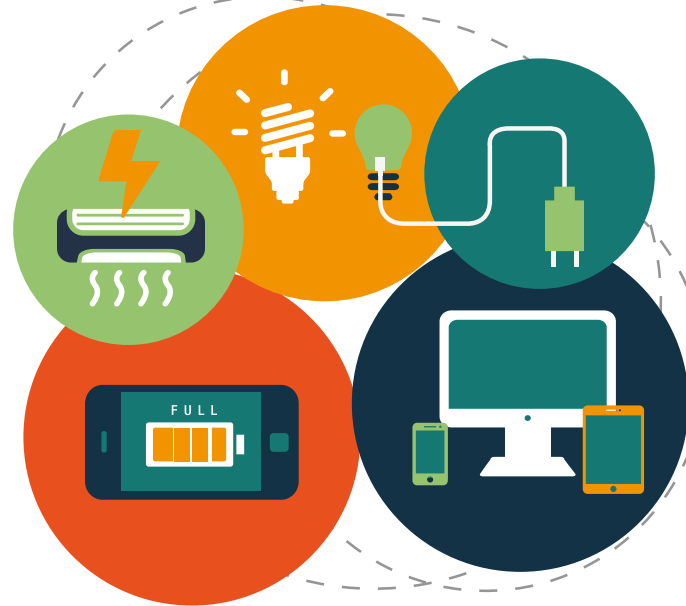
3

Do you use plastic bags?

4

Do you waste paper?

Electricity



1

Do you use more than one appliance at a time?

2

Do you leave electronic equipment or chargers plugged in when not in use?

3

Do you leave the lights on?

4

Do you use electrical appliances?

Class activity 2: Let's make our trip neat!

Objective	Time	Place
Through play, understand how human activities affect ecosystems and how to avoid having a negative impact.	1 hour	Outdoors

Preparation

- » Several days in advance, ask students to wear hats and dress appropriately for the outdoors on the day of the activity. Read the section on “Going out into nature” in the introduction to the lesson plans. Select a green area or a field designed for sporting events for doing the activity, which should be done on a rain-free day.
- » Divide the area in half and assign one group to each half.
- » Provide some context and explain the dynamics of the game to the students. Ask them to use their imaginations and pretend they're in a nature preserve, surrounded by waterfalls, lakes, rivers, high mountains, etc.

Step by step

- » Divide the class into two groups. Tell them that the whole class is taking an imaginary trip to a nature preserve in your region. One group will be the “guests,” and the other will be the “hosts.”
- » Take the “hosts” to one side and tell them that their mission is to invite the other group to the nature preserve and to accept or reject the items they plan to bring with them. Acceptable items include food or other objects that do not interfere with the ecosystem. Prohibited items include highly packaged foods, devices that create noise, light,

or air pollution, and items that may injure someone or adversely affect nature.

- » The teacher should be the first “guest,” setting an example of what students in that group should say. Such as: “When I go to the nature preserve, I am going to take a can of Viennese franks and a garbage bag to carry out the can when I leave.” The “hosts” should approve, saying: “That sounds fine, guest, go on into the nature preserve...”
- » If the “guest” does not say how items will be discarded, the host should say: “I’m sorry, guest, but we can’t take you to the nature preserve at this time...” (For example, the following would not be acceptable: “On the trip to the nature preserve, I will take a piece of candy”).
- » Tell “guests” that their job is to get admitted by the “hosts,” and that they should pay close attention to every word you say, because this will be key to their getting admitted to the nature preserve.
- » Start the game by having the “hosts” and “guests” form lines in their half of the field. Thus, each “host” will have a turn to decide whether or not to admit a “guest.”
- » When a “guest” passes the test, he/she switches groups and becomes a “host.”
- » If the “guests” don’t catch onto the dynamics of the game, give a second example, such as: “When I go to the nature preserve, I will take a pair of gloves, and I will keep them in my backpack so I don’t lose them,” or “When I go to the nature preserve, I am going to take a bottle of water, and I will put the bottle in a garbage bag in my backpack.”
- » Continue the game until all of the students have participated, or until all the “guests” have played the part of a “host.”
- » Afterwards, ask them:
 - What was the object of the game?
 - Why weren’t we allowed to bring along everything we wanted to?

- What would happen to the nature preserve if everybody brought things in and left them there?
 - Each time we go on a trip to a park, river, lake, stream, or the mountains, what must we do with our trash, such as packaging, plastic bags, and bottles?
 - When you get home from your trip, what should you do with the garbage you brought back?
- » Wrap up the activity by telling your students that it is important to be aware that our activities affect the planet, and to look for ways to minimize this impact. By changing some of our habits, we're contributing to a great change on a larger scale, and taking care of the earth and our own environment.

Class activity 3. Online game—Rise up for responsible consumption

(www.iadb.org/riseup)

Objectives

Understand that it is important to consider our true needs before buying new products; and to think about whether it will be recycled or reused later on.

After playing the game, have students engage in activity 4.

Class activity 4: Let's create!

Objective	Time	Place
Understand that with a little creativity, we can reuse many things.	1 hour	Classroom

Materials

- » 1-2 sheets of used paper (one side used, the other clean); pencil, eraser, paints, and rulers (quantity depends on the number of participants)

Preparation

- » Explain to your students the concept and importance of reusing items.
- » Ask students to think of an object that they have at home and no longer use, but that could be used to create something new (toys, clothing, containers, etc.). On the clean side of the paper, students should paint the original object. Then, have them begin painting a step-by-step description of how they would transform it into a new item. They should also think about the person to whom they would give the new object and why.
- » Discuss how much fun it is to create and have a new toy (or other item) without having to buy it, just by transforming objects we no longer use into something new.

Formative assessment

Before proceeding to the next topic, make sure your students:

- » Understand that while consumption is part of life, we must take care to always respect the environment
- » Can identify appropriate ways to change their daily habits
- » Can name five ways to use everyday objects (e.g., lights, the shower, electronic equipment) better to minimize damage to the environment
- » Can name five products they consume that cause pollution

Integration with other subjects

Science: Research products that have the greatest impact on nature, both in their manufacture and in the waste they create.

Language arts: Create a story about the origin of consumption and the consequences for society and the environment.

Tip for the teacher

Be a good role model for your students; examine your own daily habits, just as you ask your students to do.



Lesson Plans at the

Intermediate Level

1

Intermediate lesson plan 1: Calling responsible earthlings!

General objectives

- » Encourage students to use the ecological footprint as a tool for understanding the relationship between consumption and the environment and the importance of proper use of resources such as water, energy, and food.
- » Encourage students to adopt habits that contribute to the responsible use of resources.
- » Understand that we are responsible for the waste that we produce.

Class activity 1:

Profession: Responsible earthling!

Objective	Time	Place
Encourage students to form habits conducive to the proper use of resources.	1 hour	Classroom

Preparation

Read and distribute copies of “The responsible earthling.”

Step by step

- » Organize students into pairs and give each pair a copy of the reading.
- » Ask them to read the text and then engage in a discussion with the entire class. Set a time limit for each session and establish rules. Consider the following list of questions and lead the debate on what it means to be a responsible earthling.

- » Use the following list of questions as a guide and add your own, as well:
 - What are the characteristics of a responsible earthling?
 - What are some things that a responsible earthling should not do?
 - Do you know any earthlings who are 100 percent responsible?
 - What things make it difficult to be a responsible earthling?
 - Where should people be trained to be responsible earthlings?
 - What things should schools teach about being responsible earthlings?
 - What changes need to be made at school to get kids to act like responsible earthlings at home and in the community?
 - Is it the sole responsibility of the school to train you to be responsible earthlings? Who else should do this job?
 - When would you say a student is ready to graduate as a responsible earthling?
- » Reflect with students about caring for the planet. Remind them that this is the lifelong responsibility of each and every person. Regardless of age, we each must contribute to the common good in our daily lives.

Short Story: The Responsible Earthling

Once upon a time, there was a responsible earthling who went on a trip to outer space. He had always been a good earthling; he'd even been honored by presidents, ministers, mayors, and his friends and neighbors. Whenever they saw him, they would say "you are a responsible earthling;" and he'd feel proud. All his friends and neighbors saw him as a role model.

As a good earthling, he always only bought just what he needed. He carefully separated his waste materials, had a small compost pile, planted a vegetable garden, and bought fresh produce at a local open-air market, where he'd chat with the vendors. He took good care of the trees he'd planted around his home; they provided shade and were his pride and joy. He was careful not to waste water, and he used energy-saving bulbs, rode his bicycle, and used mass transit to get around. He truly was a responsible earthling.

While he was traveling in space, he had a friend look after his home. His friend gladly stayed there because he knew there would be food from the garden, and the house was cool and comfortable.

The responsible earthling's trip took several months. Outer space was beautiful, and he loved observing the earth from afar and gazing out at the stars, but he missed being among the green plants, listening to the birds sing, chatting with his friends and neighbors. He was homesick for Earth.

Upon his return he couldn't wait to get out of the spaceship, and he eagerly ran to greet his friends. But little did he know, things had changed while he was away...

As the earthling drew near his home, he began to notice things that weren't there before: garbage! Heaps of it—

exceedingly high mounds of trash! And the gardens were all dead. The streets were jammed with cars, and the smog made it almost impossible to see. His favorite market had closed because nobody went there after he'd left.

The responsible earthling couldn't understand what had happened. His neighbors had always emulated him, but now disaster reigned everywhere he looked!

The friend who had taken care of his home was there waiting for him. His expression gave no hint that anything was wrong. In fact according to his friend, everything was just fine. He'd taken care of the house; it was still standing, after all! What had happened was that over time, he had just stopped doing all the things that the responsible earthling had asked him to do. He hadn't understood the value of doing all those chores.

All of his neighbors and friends kept on doing just what they had always done. That is, they emulated him, thinking, "if it's OK for the responsible earthling's house, it's OK for our house, too; after all, he is a good earthling." And so, they stopped taking care of their homes, too.

Since the responsible earthling was such a good earthling, he didn't get angry. He realized that his neighbors and friends had just been emulating him and that he was partly to blame: He had never explained the reasons why we should all be good earthlings.

So, he began organizing groups and discussing why everyone must take care of the environment. He spoke with his neighbors, to students at schools and universities, and even on the radio and television. Now, everyone knows why they should be responsible earthlings.

—Isabel Cristina Tobón Belalcázar

Class activity 2: The responsible earthling's spaceship

Objective	Time	Place
Practice being a responsible earthling.	1 hour	Classroom

Materials

- » 1 plastic bottle per student, scraps of cardboard, pasteboard, glue, scissors, paintbrushes, various colors of acrylic or vinyl paint, glasses of water for the paintbrushes

Preparation

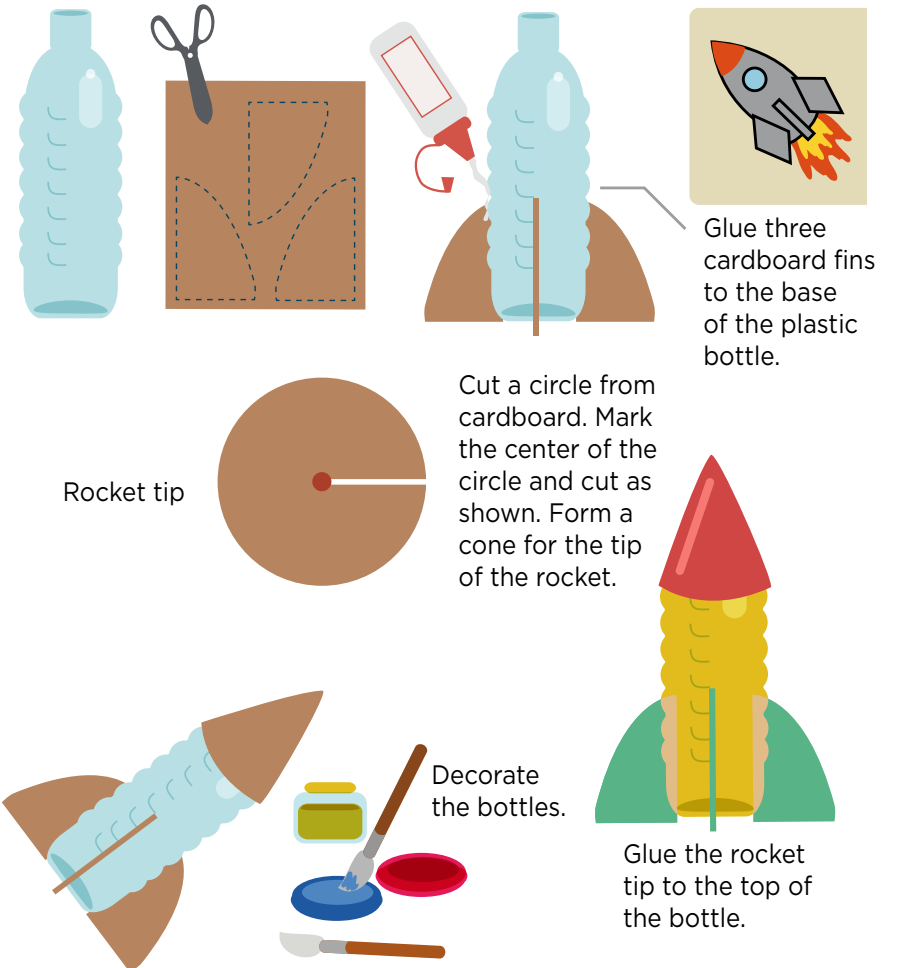
Tell the students in advance which materials they need to bring from home. They can get some items from the waste produced at school or in stores (cardboard and plastic bottles).

Step by step

- » Each student should cut out three fins from the cardboard and glue them to the base of the bottle, as shown in figure 25.



Figure 25. Materials for building the earthling's spaceship



- » To make the tip of the rocket, cut out and paint a large circle on the pasteboard that fully covers the top end of the bottle, cut from the edge to the center of the circle, and fold the two edges over themselves to make a cone.
- » Glue the tip of the rocket tightly to the top of the bottle.
- » Using your imagination, decorate the bottle.
- » Discuss that there are many ways to use “trash” creatively, such as making toys, crafts, or decorations and giving them as gifts. It feels good to make things with our own hands.

Class activity 3: How many planets do you need to survive?

Objective	Time	Place
Encourage students to measure their ecological footprint, use resources such as water, energy, and food efficiently, and dispose of their waste responsibly.	1 hour	Computer lab

Materials

- » Computers with Internet connection

Preparation

- » Before class, make sure that the computers, Internet connection, and ecological footprint website (www.footprintnetwork.org or similar—see suggestions in the Green School Toolkit at www.iadb.org/riseup) are working.
- » Tell students that by measuring the consumption of resources, we can assess our impact on the planet and change our habits to lower it.

Step by step

- » In the computer lab, have students access the calculator, select their language, click on the “Footprint” section, select “Individual Footprint,” and click on “Answer the Questionnaire.”
- » Have them select the place or country where they live on the world map and answer the questions on topics such as energy, food, raw materials, and soil.
- » At the end of the questionnaire, the tool will tell them how much land is required to sustain them.
- » Ask students:
 - Do you think it is important to reconsider your habits?
 - Is it possible to change them for everyone’s sake? For the sake of the environment?
 - How can you shrink your ecological footprint?
 - Which habits need changing?
- » Tell students that everything we do has consequences for the planet. If we go through life doing things without thinking about the harm we may be causing, our time on this planet will not be so pleasant. But if we are conscientious and aim to do the least harm possible, we can accomplish great things.

Formative assessment

Before proceeding to the next topic, make sure your students:

- » Understand that the ecological footprint tool helps us manage water, energy, and waste materials more efficiently
- » Adopt habits that contribute to the responsible use of resources

Integration with other subjects

Science: Find out which organisms are the first ones affected when our ecological footprint increases.

Mathematics: Measure your own ecological footprint every day for a week. Draw up comparative tables and measure any changes over that time.

Social Studies: Ask your students to look up their country's footprint at www.footprintnetwork.org. Discuss it in class.

Tips for the teacher

Discuss the following with students:

- » Sometimes advertising creates needs that we really do not have.
- » Reflect on natural resources and the time it takes to make and use them. Think about how long it takes a tree to grow and how quickly it can be cut down.
- » Prices can distract us from considering the conditions under which things were produced. Low-priced items may have high environmental costs.
- » Whenever possible, get vegetables from organic or home gardens, where chemical fertilizers are not used and people are fairly compensated for their labor.
- » Start a school garden or encourage students to garden at home.
- » We are citizens first and then consumers; and we have both rights and responsibilities.
- » As you adopt good consumption habits, you'll steadily lower your impact on the environment.

Suggested reading and viewing

- » For information from the United Nations about water use around the world using figures, videos, and stories, visit <http://www.un.org/en/> then search on "Water for the World" and select the "Facts and Figures" tab.
- » For information on how cutting food waste can help feed the world, visit the website of the UN Food and Agriculture Organization, <http://www.fao.org/>, and search on "Food Waste."

2

Intermediate lesson plan 2: Together we can do it!

General objectives

- » Encourage students to make sound decisions and to help people in their communities do the same by creating responsible consumers' movements.
- » Reflect on consumption's effects on the environment and promote the practice of the 5 Rs: reflect, respect, reduce, reuse, and recycle.

Class activity 1: Skip the bag

Objective	Time	Place
Start a campaign to get people to use cloth or reusable bags instead of plastic bags.	1 hour (plus monitoring for one week)	Classroom and neighborhood or block

Materials

- » Recycled pasteboard, recycled cardboard, tempera paints, paintbrushes, recycled fabric, recycled materials for decoration, scissors, glue, adhesive tape

Preparation

- » Make arrangements with the managers of one or more stores or markets where you can take your students to conduct a campaign, keeping traffic and student safety in mind. Make sure that the sites you select are close to the school. Ask other teachers or students from higher grades to accompany your students.
- » Distribute the materials evenly among the student groups.
- » Discuss the importance of minimizing the use of disposable items such as plastic bags, which are used for a short time

and then thrown away. Explain that they require energy, water, and raw materials to produce. Tell them that using bags made of fabric last longer, can be used repeatedly, and disintegrate more quickly than plastic bags once they wear out and are thrown away.

Step by step

- » Organize students into groups of four. Each group should devise and carry out a campaign to curtail use of plastic bags in local stores and supermarkets.
- » Each campaign must have a song, reminders, and a poster or banner encouraging people to help their community and the environment by using fabric or reusable bags rather than plastic bags. The students must use recycled materials to make the reminders and their poster or banner.
- » The song must include a direct message that resonates with the community and creates an impact. Reminders should contain explanations on why cloth bags are better than plastic ones.
- » As students leave the school grounds to visit the stores, have them sing their songs together, hand out reminders to store customers, and leave some of the reminders at the store. They should do this every day for one week.
- » At the end of the week, ask students:
- » Why was this campaign important?

- » What did you learn from it?
 - Do you think it is important to teach others what you have learned? Why?
 - Do you think this type of activity in the community is effective? Why?
 - What other issues should be considered when conducting a campaign?
- » Discuss how campaigns educate people about responsible consumption and how they can help improve their environment. Tell them that doing this type of work will help them become environmental leaders in their communities.

Class activity 2: Responsible consumer's guide

Objective	Time	Place
Promote the practice of the five Rs: reflect, respect, reduce, reuse, and recycle—and other habits for conscientious, responsible consumption.	1 hour	Classroom

Materials

- » Notebook, pen, sheets of recycled paper (one side used, one side clean), colored markers

Preparation

Talk about some of the things that individuals can do to care for their environment, such as employing resources conscientiously—using cloth bags, buying durable products that can be reused, reusing rather than wasting paper and pasteboard, recycling, composting organic waste (food scraps, teabags, coffee grounds, fruit peels, garden waste), and practicing the five Rs.

Step by step

- » Organize students into groups of four and give each student a sheet of paper and markers.
- » Ask them to discuss how to be a responsible consumer. After coming to an agreement, they should devise the “Ten Commandments,” or ten things that all responsible consumers must do.
- » Discuss the “Ten Commandments” lists of each group and condense them into a single list that represents the class consensus.
- » Ask students to take the class’s “Ten Commandments” home, discuss them with their families, and display them prominently for everyone to see.
- » Discuss the following questions:
 - What do you think it means to need something?
 - What are your family’s basic necessities?
 - Are all of these needs currently being met? Which ones aren’t? Why/why not?
 - What else does your home need?
 - Are there any differences between your last answer and your basic needs?
 - Which things are paramount to survival?
- » Help them to understand that the things we do every day are geared toward meeting our essential needs and that those needs cannot be met without healthy soil, food, and water. That’s why it’s urgent that we talk to everyone we can to raise awareness about caring for, respecting, and taking responsibility for natural resources and the environment.

Class activity 3: How should we recycle?

Objective	Time	Place
Learn how to recycle by sorting everyday waste materials according to composition.	1 hour	Outside the classroom

Materials

- » Recyclable materials from home, the cafeteria, or the store (pieces of paper, plastic and metal beverage containers), eight trash bins of different colors or cardboard boxes in which to place these materials, a scale.
- » If you have a composter, you'll need two more bins.

Preparation

Ask students to bring waste materials from home or a local store. Label the bins or boxes: paper and cardboard (two bins), glass and metal (two bins), plastic (two bins), nonrecyclable trash (two bins), and if you have a composter (two bins).

Step by step

- » Divide the class into two groups to see which can collect the most waste for recycling.
- » Arrange the two sets of bins separately in a large area; designate one set for each group. Tell students to deposit the waste they collect into the respective bins.
- » Once each group has separated and deposited all the wastes into their bins, they should weigh each bin and note their totals. They will have 20 minutes to do this.
- » After both groups have obtained their total weights, the teacher must verify that the wastes were separated properly, correct any errors, and declare a winner.
- » Have students dispose all the wastes in the school's recycling bins.

Formative assessment

Before proceeding to the next topic, make sure your students:

- » Recognize what it takes to become a responsible consumer
- » Understand how to practice the five R's: reflect, respect, reduce, reuse and recycle

Integration with other subjects

Science: Investigate the origin of plastic and polyurethane foam and learn why these materials are among the most damaging for the environment.

Language arts: Create a comic strip about following the five R's.

Civics: Study your area's waste management plan and propose strategies for raising awareness in the community and putting that awareness into practice.

Tips for the teacher

- » Stimulate discussion about the various issues raised by the lesson plan and continuously challenge students with questions.
- » Reinforce the importance of these issues by asking students questions about their daily lives, practices, and habits.

Suggested reading and viewing

- » To learn how to build a garden and choose and plant crops, read "How to Start Your Own Organic Garden" at <http://sustentator.com>.
- » Get information on energy efficiency and sustainability from Endesa, a Spanish power company. Endesa offers information on saving energy, saving water, alternative sources of energy, energy sources, sustainable architecture, recycling, environmental education, and our carbon footprint. <http://www.endesa.com/en/Home>.
- » How big is your ecological footprint? Help children learn about our dependence on natural resources and the relationship between the lifestyle choices we make and our impact on the environment at www.greenteacher.com.



Lesson Plans at the

Advanced Level

1

Advanced lesson plan 1: What is in this product?

General objective

Explore consumption and production patterns, particularly in industrialized countries, as one of the main causes of continued deterioration of the environment.

Class activity 1: Game—Understanding population pressure

Time	Place
1 hour	Classroom or patio

Materials

- » 8 chairs

Preparation

Find a place where you can comfortably perform the activity.

Step by step

- » Ask for or randomly pick nine volunteers to participate in a game.
- » Place eight chairs in a circle, all facing out, in the center of the classroom, schoolyard, or other available open space.
- » Explain that the volunteers will play musical chairs. They should walk around the chairs until the music stops; when it does, they must sit on one of the chairs immediately. Rather than using sound equipment, the rest of the class could sing or clap until the teacher signals them to stop.
- » In the traditional game, whoever does not get a chair is eliminated. However, in this game, more than one person

can sit in the same chair. Every time the music stops, have another student join the game until more than one person sits on every chair.

- » Make sure to tell the students participating in the game to be careful, because as the number of students increases, it will be harder to sit.
- » Talk to the class about what it took to ensure the game stayed safe and fun: more and more attention, care, and gentleness as the available space for sitting shrank.
- » Allow 10 minutes for the class to discuss their perceptions and opinions of the game, and then ask: If we think about this game and what's happening to the planet as the world's population continues to grow, what parallels do you see? Give them time to come to the conclusion that each day there are more people, but less space for them live comfortably. Tell them that this is called **population pressure**.
- » Talk about existing resources and their relationship to what students observed. Discuss the use of water, metals, and energy, and ask: What happens to the waste those uses generate?
- » Explain that one of the biggest problems in the world right now is that more and more humans are living in the same area, using more resources, and generating more waste than ever before. See the Megacities section in the chapter text for more details.

Class activity 2: What is in this product?

Time	Place
1.5 hours	Classroom

Materials

- » Cardboard, colored markers, tape, and photos of raw materials such as water, oil, wood, cotton, aluminum, gold, silicon, etc.

Preparation

- » Research the production processes of the most important materials in the region or of some of the objects that students commonly use. Also, ask students to research some of the products they use every day to find out what materials they are made of, where and how the raw materials are extracted, how they are produced and disposed of, and so on.
- » Review the steps listed below to guide your students and help them focus their research.
- » Organize the classroom into groups. Find photos of the processes involved in obtaining raw materials.

Step by step

- » Divide the class into groups of five or six students.
- » Ask each group to choose an item and research its manufacturing, distribution, and disposal processes. Examples are a notebook, backpack, pen, or item of clothing.
- » Use the following questions to guide them:
 - What is this product made of? (Observe all of its components; for example, a spiral notebook is made of paper, some type of cover, ink, and a metal or plastic spiral.)

- Where did these materials come from? How were they extracted?
 - What kind of labor was needed to make the chosen product? (Think about the working conditions of the labor force.)
 - Was energy used to extract the raw material? Was water used?
 - Were bodies of water contaminated during the extraction process?
 - Were trees cut down?
 - Were the raw materials transported to the object's manufacturing facility?
 - Where was the product manufactured? How many miles did it travel to get to you?
 - What will happen to the product when it is no longer useful? Where will it be discarded? What will it become?
 - On average, how many of these products are consumed or disposed of by the group per year? (Add the annual consumption totals of each group member and divide the sum by the total number of group members.)
- » Ask each group to create a poster describing their findings via flow charts, drawings, illustrations, or text. They will use these again for the next activity in this lesson plan.
 - » Have a spokesperson from each group present the group's results to the class, showing each product's life cycle as well as its social and environmental impacts.
 - » After the groups finish, ask: Knowing the life cycle of some of the objects you use and that the population is increasing, what can we conclude? Allow them to discuss. Make sure they talk about overexploitation of natural resources, transportation of materials, generation of greenhouse gases, and large amounts of solid waste, as well as the social and economic impact of these products.

Class activity 3: Evaluating consumption and its impact on the environment

Time	Place
1 hour	Classroom

Materials

- » White board or chalk board, video projector, computer with Internet access.

Preparation

- » Read the chapter text.
- » Arrange the presentations created in Activity 2 in a visible place.
- » Research consumer inequalities between developing nations and developed nations.
- » Bring in relevant graphs or charts to share with the class, such as those found in the section on suggested reading and viewing.

Use and disposal of objects

Item	No. of students who use it daily	Usage time before disposal in months	No. of students who use it twice a week	Usage time before disposal in months	No. of students who use it once a week	Usage time before disposal in months	No. of students who use it once a month	No. of students who own it but don't use it	No. of students who don't own it
Average	No. x 100/ total no. of students = % of students	Sum of usage times/no. of entries = average time	No. x 100/ total no. of students = % of students	Sum of usage times/no. of entries = average time	No. x 100/ total no. of students = % of students	Sum of usage times/no. of entries = average time	No. x 100/ total no. of students = % of students	No. x 100/ total no. of students = % of students	No. x 100/ total no. of students = % of students

Step by step

- » Tell your students to study the posters they made in the previous activity. Ask them: Which of these items do you commonly use? Which do you use because they are popular? Which are used out of necessity?
- » Ask the class to calculate: How many students use each item daily, twice a week, once a week, once a month, and not at all?
- » Next, have them estimate how long each product typically lasts before being discarded.
- » Fill in the following chart with the information obtained. Encourage students to discuss their data and to talk about other personal items, as well. Do they not have enough of a given item? Do they consume excessive amounts of any items? Do they have items they don't use? How often do they go through their belongings and discard things they don't use? How often do they replace items because earlier versions go out of style (especially electronic devices)?
- » Ask students to consider the environmental consequences of the way they consume and dispose of items, as well as the resources required to produce the items they enjoy. Remind them that it takes more than raw materials to produce these items; it also takes water, fossil fuels to operate the machinery, and fuel to transport the items.
- » Ask your students if they have ever wondered about the decomposition times of the materials that make up the objects. Allow them to talk freely.
- » Talk about the differences in consumption around the world, between high- and low-income groups, and more- and less-developed countries. See the chapter text, or show the class the video "A Planet Drowning in waste" at www.iadb.org/riseup.
- » Have your students write an essay as homework on the use and disposal of objects and their effect on the environment. They should hand in their work, but they can also publish it on their blogs or share it with their classmates by e-mail.

Formative assessment

Upon completion of this lesson plan, students should comprehend the following concepts:

- » The life cycle of an object
- » The processes involved in object's production, distribution, sale, use, and disposal
- » Planned obsolescence
- » Population pressure
- » The relationship between consumption and climate change

Integration with other subjects

Biology: Ask students to research consumption and solid waste management in the world today. Look at the process of decomposition: make a list of the main products found in a classroom and organize them from fastest to slowest to decompose.

Math: Have students develop graphs using the following information:

- » 15 percent of the world's population is responsible for 56 percent of total global consumption, while the poorest 40 percent consume only 11 percent of the total.
- » Since 1992, the world's population has increased at an annual rate of 1.3 percent, which means that the planet has grown by almost 1.5 billion people since then. Between 1992 and 2010, the world's population grew from approximately 5.5 billion to nearly 7 billion, an increase of 26 percent.
- » If everyone in the world lived like an average citizen of a high-income country, we would need another 2.6 planets to sustain life.
- » The world's annual economic output increased from \$31 billion in 1990 to \$42 billion in 2000, compared with only a \$6.2 billion increase during the prior 40 years. This increased economic activity created millions of new jobs and allowed people to consume more. For example, global telephone connections increased from 520 million in 1990 to 844 million in 1998—a 62 percent increase."

- » Nearly 60 percent of the world’s population lives in Asia, 15 percent in Africa, and 15 percent in North America and Europe. However, between 1992 and 2010 the population increased much faster in Western Asia (67 percent) and Africa (53 percent) than in Europe (4 percent). The world’s energy consumption has increased significantly since 1992 and is expected to increase at a rate of 2 percent per year until 2020. Global consumption of fossil fuels increased by 10 percent between 1992 and 1999.

Tip for the teacher

Invite a solid waste collector, preferably one working in a cooperative, to share his work experience with the class and talk about the objects he finds in the trash every day.

Remember

- » Economic growth and technological developments require larger quantities of supplies, such as metals, wood, and minerals, to make new products. Excessive consumption is destroying our natural resources, ecosystems, and wildlife.
- » “Planned obsolescence” is an economic production model that intentionally makes products of limited duration in order to motivate consumers to buy new ones, thus increasing sales and profits.
- » Governments try to stimulate consumption during economic slowdowns to improve the circulation of money, but this has major environmental impacts.
- » “We are being persuaded to spend money we don’t have on things we don’t need to create impressions that won’t last on people we don’t care about.” —Tim Jackson, economist, from talk at TED.com.

Suggested reading and viewing

- » “The Story of Stuff” offers videos, a podcast, and other teaching tools on the production, transportation, use and disposal of objects. <http://www.storyofstuff.org>.
- » The United Nations Environment Programme offers information on responsible production and consumption, summarizes current problems of consumption and sustainability, and tracks national decisions on the subject. www.unep.org.
- » Searching the United Nations website for “Patterns of Consumption and Production” yields a vast amount of useful information. <http://www.un.org/>.
- » The UN’s Sustainable Development Knowledge Platform is a rich resource of information and documentation on all aspects of sustainable development, including national reports emanating from the Rio+20 Conference on Sustainable Development in 2012. <http://sustainabledevelopment.un.org>.
- » To learn about trends in population, economic development, the environment, transportation, tourism, and energy over the past 25 years, visit the site of the UN Environment Programme. <http://www.unep.org>.
- » “An Economic Reality Check” is Tim Jackson’s proposal for sustainable development. The economist discusses how we view consumption and how to invest in social and environmental matters without slowing down economic growth. Revised June 2013. www.ted.com.
- » “Disappearance of the Aral Sea” is Wagener Tesla’s video on how the Aral Sea was affected by a government decision to side with the cotton industry against nature, causing an environmental, social, economic, and public health disaster. www.youtube.com.
- » In “The Case for Collaborative Consumption,” Rachel Botsman discusses new forms of consumption that focus not on objects, but rather on services and our contentment with objects. She encourages sharing objects and knowledge. Several businesses already follow this model. Revised June 13, 2013. www.ted.com.

2

Advanced lesson plan 2: Monitoring and reducing your ecological footprint

General objective

- » Use the ecological footprint to show how we contribute to production and consumption patterns—and how we can help make them more sustainable and inclusive.

Class activity 1: The ecological footprint of consumption vs. biocapacity

Objective	Time	Place
Understand the relationship between the ecological footprint and biocapacity.	1.5 hours	Computer room

Materials

- » Ecological footprint maps, computers with Internet access

Preparation

- » Read the sections on the ecological footprint of consumption and biocapacity in the introduction to the lesson plans.
- » Review the maps of the world's ecological footprint for 2006 (figures 26 and 27).
- » Review the maps and infographics in the chapter text.
- » Reserve the computer lab; make sure the room has Internet access and a projector.

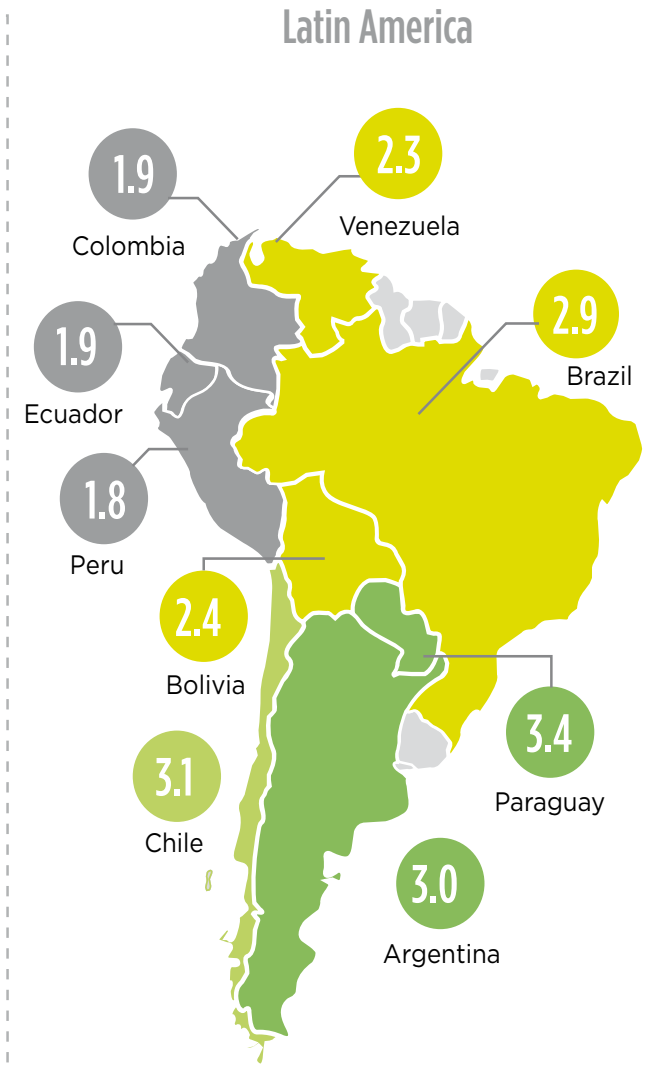
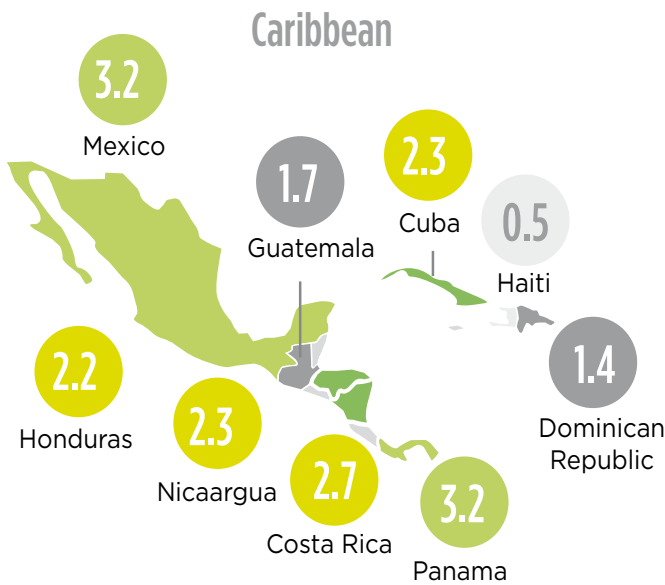
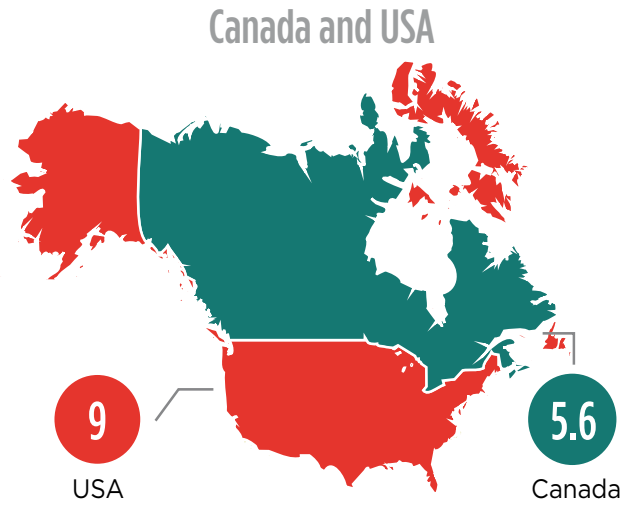
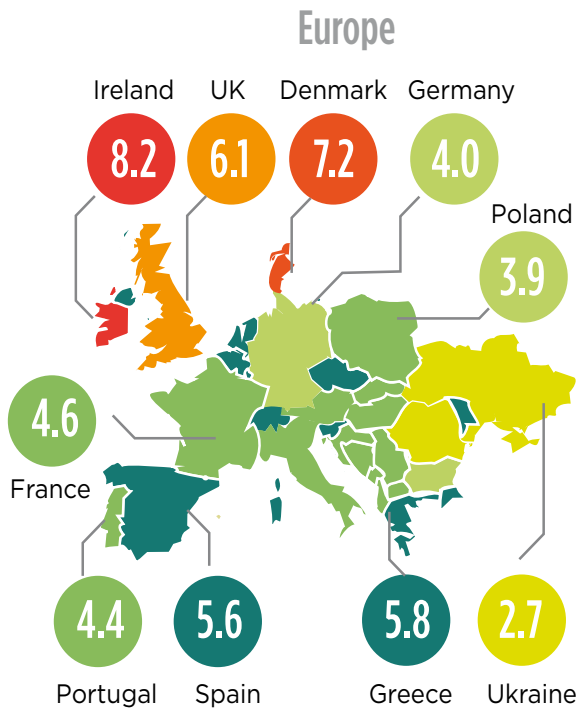
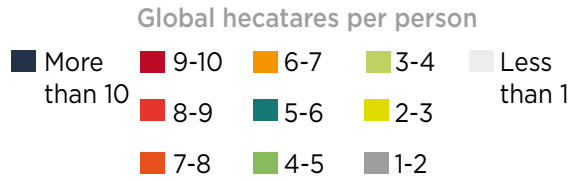
Step by step

- » Show students the maps of the world's ecological footprint in 2006 (figures 26 and 27).
- » Without any explanation, ask:
 - What is a developing country?
 - What is a developed country?
 - What is an underdeveloped country?
- » Then ask: Which countries consume the most, and which consume the least?
- » Now ask students about the term **ecological footprint**, which they should already know from the lessons on climate. If they don't remember what it is, give them the definition again: it is the impact of human activity on nature, its components, its resources, and its ability to provide environmental services. This impact is **negative** when it deteriorates the structure and function of the ecosystems and **positive** when it helps improve their integrity and biodiversity.
 - Ask: Does consumption generate an ecological footprint?
 - Looking at the map, encourage students to talk about the countries and regions with the largest and smallest ecological footprints.
- » Ask them to consider the following questions: Where are we going? Would it be possible to improve the overall quality of life with a smaller ecological footprint?

- » Ask: What does “biocapacity” mean? Allow your students to guess the meaning, saying whatever comes to mind. Define the word (using their responses, if possible) as: the capacity of a specific biologically productive area to generate a regular supply of renewable resources and to absorb the waste that results from their consumption.
- » Ask: What do you think happens when a country consumes more resources than it generates, and when it runs out of the capacity to absorb the waste it generates? After your students discuss the crisis that is caused, tell them that this is called “ecological debt.” A country with an ecological debt is called an “eco-debtor.” On the other hand, when a country consumes fewer resources than it has at its disposal, it is an “eco-creditor,” because its unused resources (its “ecological credits”) benefit other countries.
- » Divide your class into as many groups as there are computers with Internet access. Have the groups access information about ecocredit and ecodebt in the world. Ask them to color the countries on a blank map according to their eco debts or credits. Explain to them that the activity is about learning which countries are the world’s largest ecological debtors and creditors. Their findings will resemble those presented in figure 28.

Figure 26. Ecological footprint of consumption, 2006

Ecological footprint of consumption, 2006



Source: WWF Living Planet Report 2009.



By country
income group



Low Income
Countries

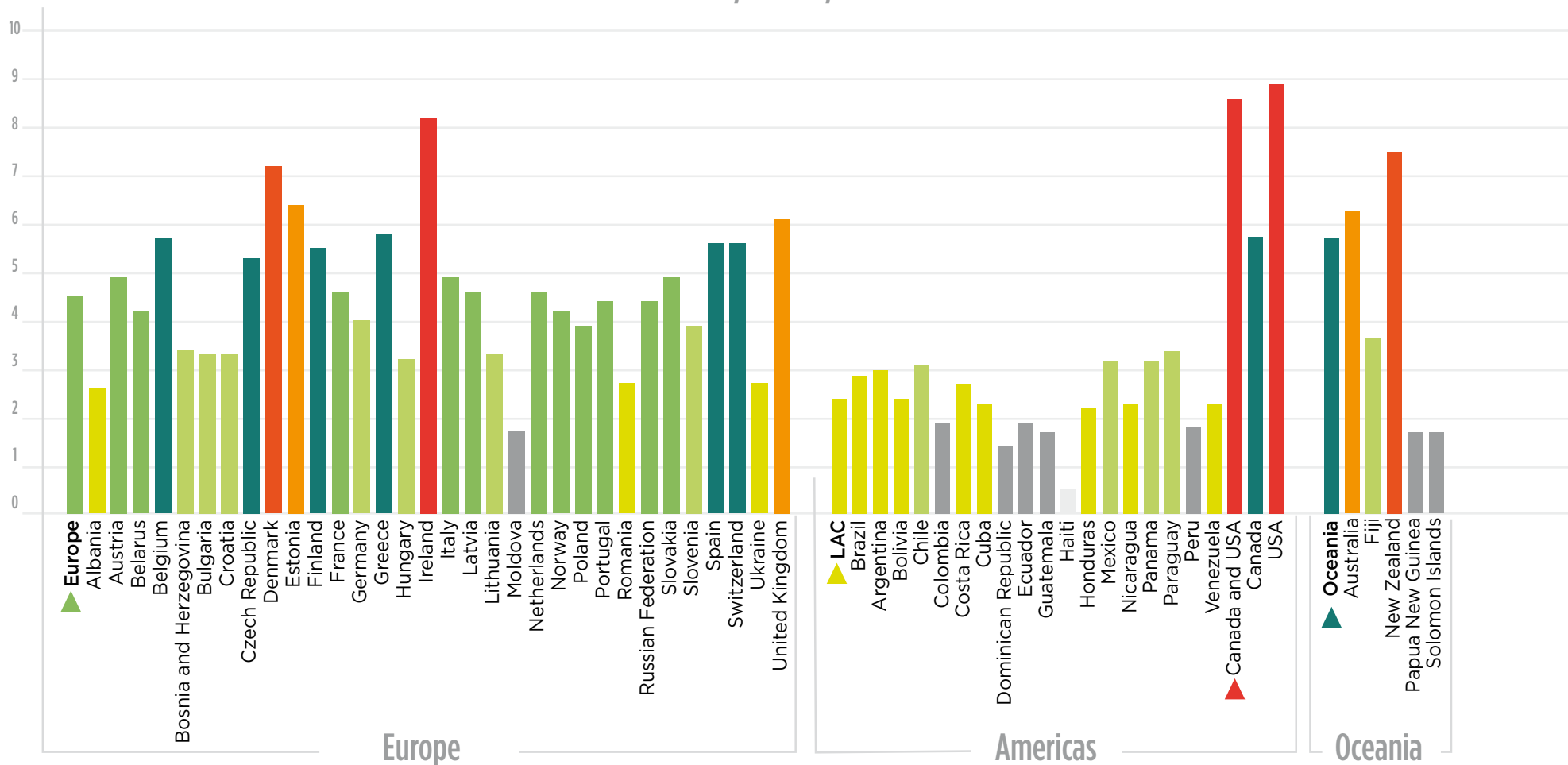


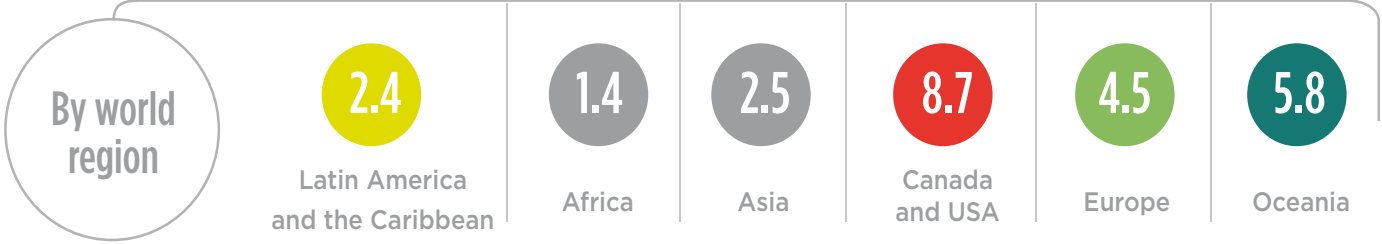
Middle Income
Countries



1.8
High Income
Countries

By country





By country

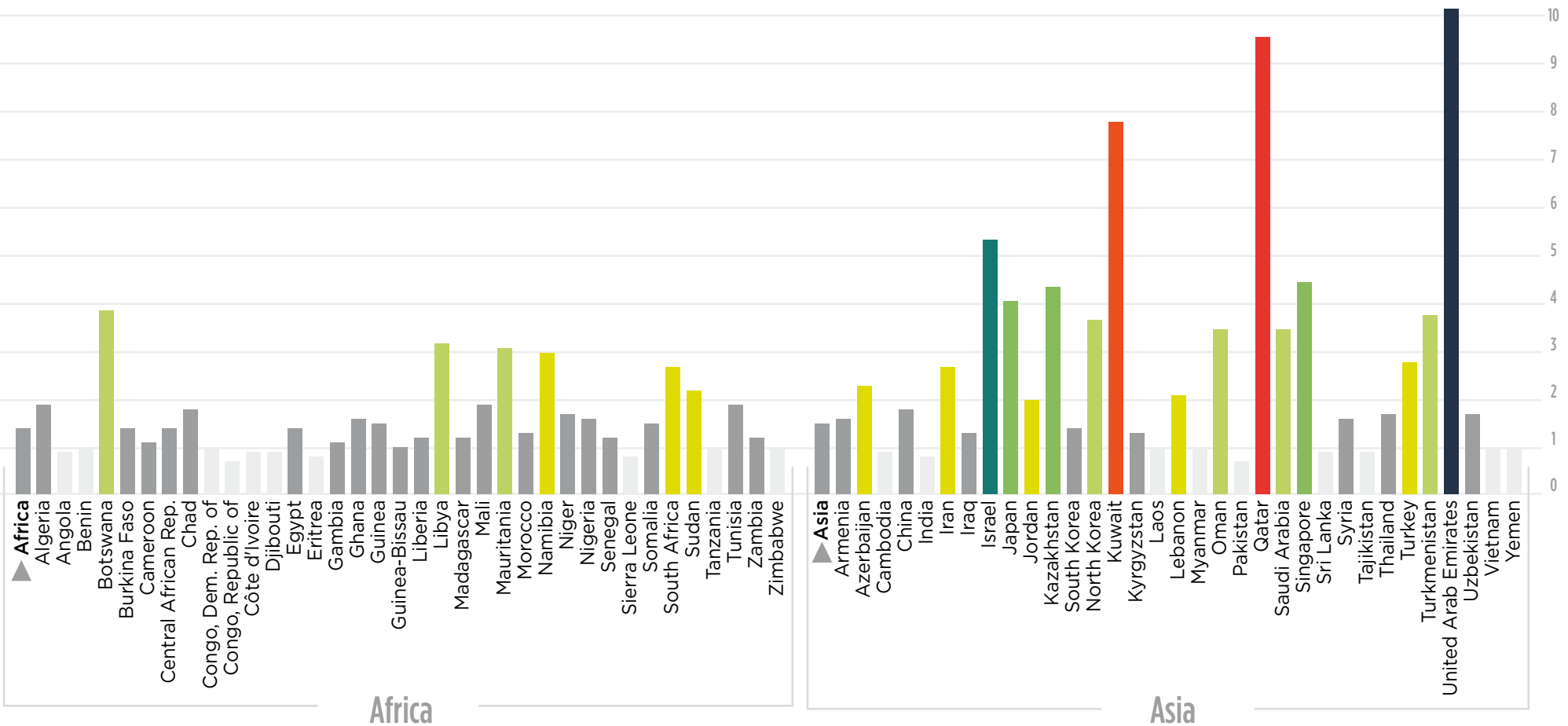
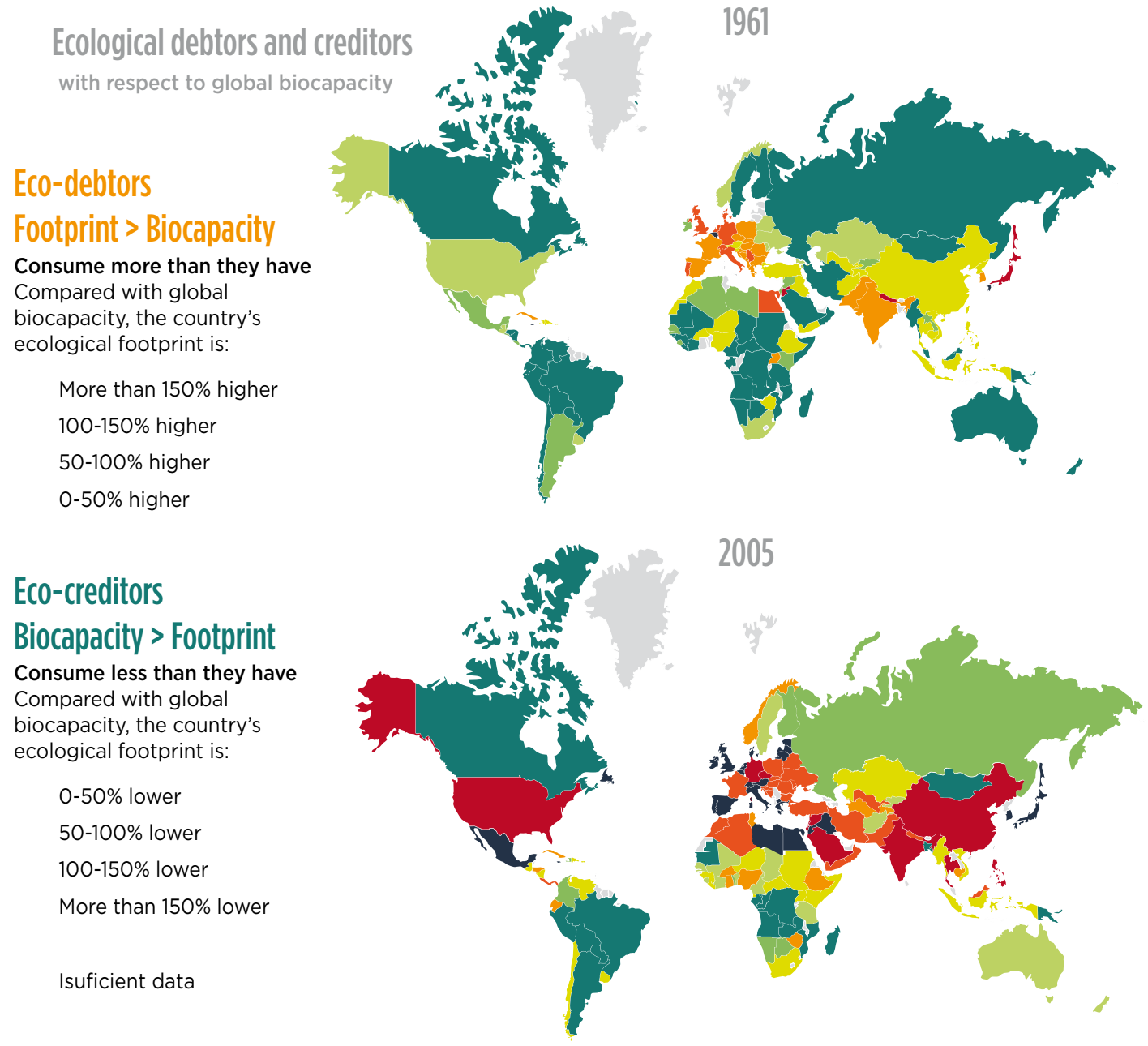


Figure 28. Ecological debtors and creditors with respect to global biocapacity, 1961 and 2005



Source: WWF Living Planet Report 2008.

Class activity 2: Understanding the Ecological Footprint

Objective	Time	Place
Understand the ecological footprint of Latin America and the Caribbean.	1.5 hours	Classroom

Materials

- » Copies or projection of the following chart; computer and projector; chart of your country's ecological footprint and biocapacity from figures 29 (domestic biocapacity) and 30 (global biocapacity). You can find extra information at www.footprintnetwork.org. (Footprint for nations)

Preparation

- » Read the introduction to the lesson plans. Arrange students in groups. Review figures 29 and 30, and make sure that you have the chart showing the ecological footprint and biocapacity of your country: <http://www.footprintnetwork.org> (Footprint for nations).
- » Reserve a room where you can project the chart for the class.

Step by step

- » Start the conversation by recalling the earlier discussion about the items students use daily, average consumption of each item, the resources required to produce the item, and possibilities for its reuse and disposal.
- » Show the following picture and ask students to interpret it.

If students do not mention it, explain that humanity's current ecological footprint indicates that we need a planet and a half to support global consumption.

- » Share the chart showing the ecological footprint and biodiversity for your country between 1961 and 2005 (figure 28). Allow students to study it for a while and then ask: What do you see in this chart? How has the relationship changed over time? Talk about declining biocapacity versus our ecological footprint. Ask students to reflect on responsible consumption and ways to improve current conditions.
- » Share the 2007 map of ecological creditor and debtor countries with respect to each country's domestic biocapacity (figure 29).
- » Although the map shows that most Latin American countries are now ecological creditors, we are already seeing a reduction in biocapacity relative to the ecological footprint in a few countries. If your students say that their countries are doing well and they don't need to reflect on their consumption, since developed countries are the ones in debt to the planet, explain that this map shows only the *domestic biocapacity* of these countries. Then, show them the map comparing the ecological footprint to global biocapacity (figure 30).
- » Say: Our planet is undergoing an environmental crisis. Does this map change your perception about our role and your views on consumption?
- » For homework, ask students to write an essay about the ecological footprint, biocapacity, and the role of Latin America and the Caribbean in solving the current environmental problem.

Formative assessment

Upon completion of this module, students should comprehend the following concepts:

- » Ecological footprint
- » Biocapacity
- » Ecological debt
- » Ecological credit
- » Responsible consumption

Figure 29. Ecological creditor and debtor countries with respect to each country's domestic biocapacity, 2007

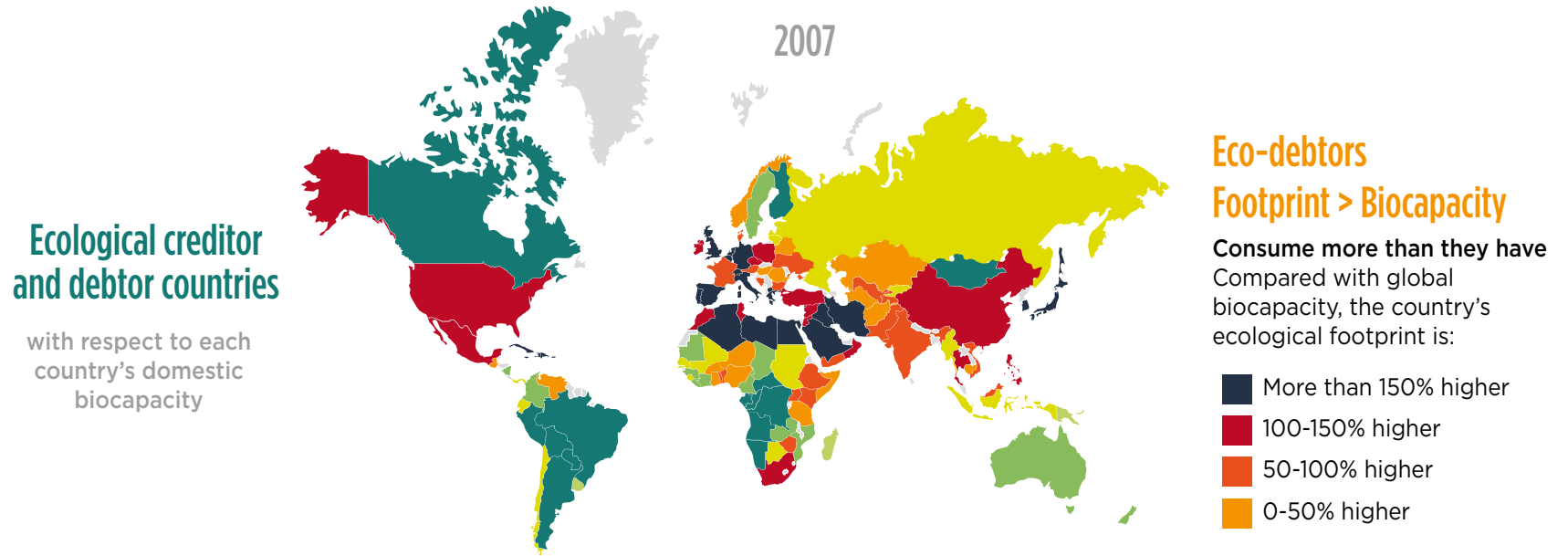
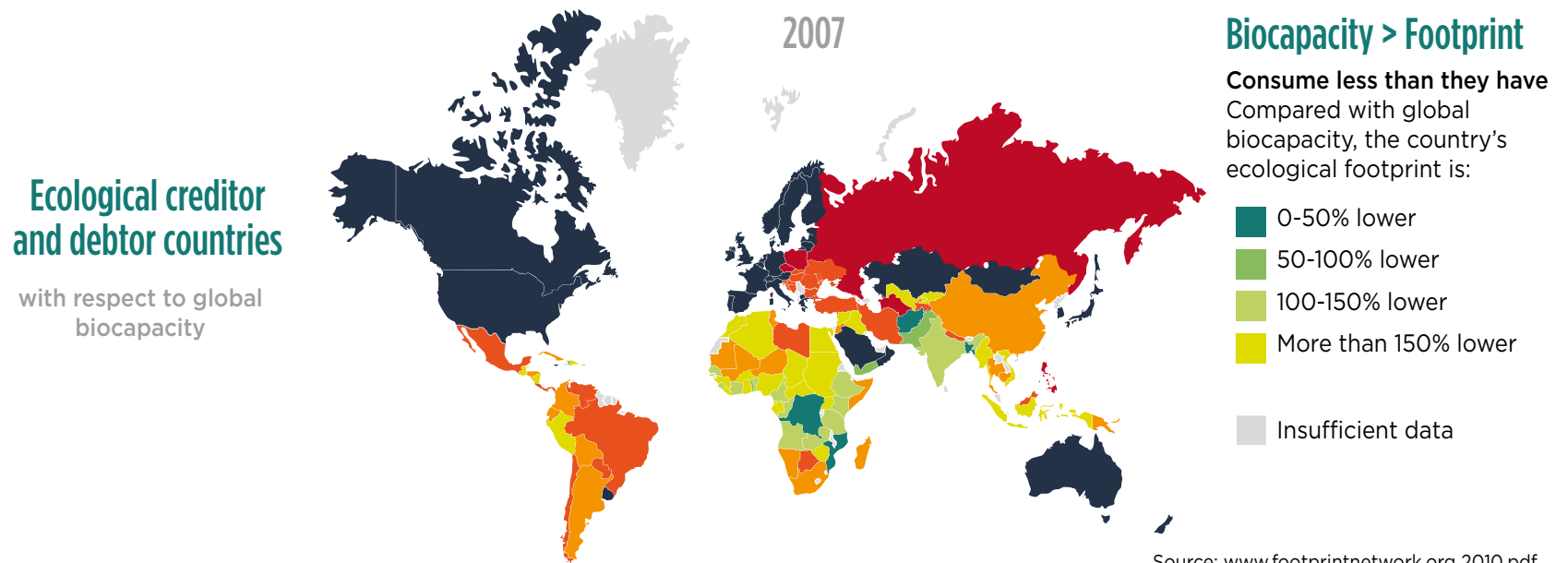
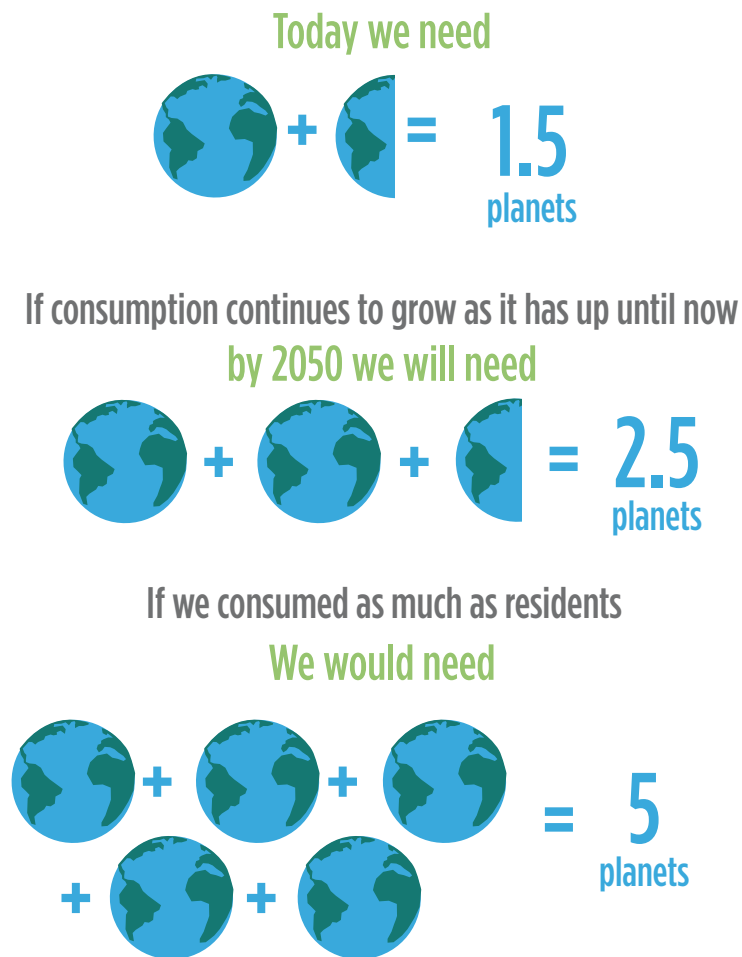


Figure 30. Ecological creditor and debtor countries, according to global biocapacity, 2007



Source: www.footprintnetwork.org 2010.pdf.

Figure 31. How many planets do we need?



Is this sustainable?



If we are more aware of our consumption and become more responsible, in 2050 the planet will not have ecological debt.



Integration with other subjects

Geography: Review the countries of the world as students learn about ecological debt and credit.

Mathematics: Teach your students how to make charts using statistical data.

Remember

The ecological footprint of consumption measures human demand for resources based on the total consumption of products and services by a given population. It is an index that measures the impact of consumption on the global ecosystem.

Biological capacity, or biocapacity, “refers to the capacity of a specific biologically productive area to generate a regular supply of renewable resources and to absorb the waste that results from their consumption.”

Taking the ecological footprint and biocapacity into account, we can determine whether a country or region is an ecological debtor (has an eco-debt) or creditor (has an eco-credit). Ecological debtors consume more than their capacity to regenerate resources; creditors consume less than their capacity to absorb waste.

Suggested reading and viewing

- » The concepts of the ecological footprint and biocapacity are explained by the Global Footprint Network, with charts of the global ecological footprint of each country. <http://www.footprintnetwork.org>.
- » “To Reduce Climate Change, Reduce Consumption,” from Inside Climate News, focuses on consumption and its relationship to climate change. Use the search box to find the article. The site offers a variety of articles on climate and the environment. <http://insideclimatenews.org/news/>.
- » UNESCO and UNEP collaborate to produce Youth X Change to help people understand and communicate about sustainable lifestyles. <http://www.youthxchange.net>.

3

Advanced lesson plan 3: How can my family adjust its consumption habits?

General objective

- » Plan and practice more sustainable behavior for students' families and community.

Class activity 1: Involving the family

Time	Place
1.5 hours + 1 month of monitoring	Classroom and students' homes

Materials

- » Printed copies of "A family plan to fight climate change," which you can find in the introduction to this module. Project it for the class if you don't have access to a color printer.
- » Sample tracking table.

Preparation

Read the section on "A family plan to fight climate change" in the introduction to the lesson plans and review the tracking table. If you need more information, see the Green School Toolkit at www.iadb.org/riseup for additional tips.

- » Organize the class into groups.
- » Print "A family plan for climate change" from the introduction to the lesson plans (figures 7-22) so you can share it with your students.
- » Draw the tracking table on the board so students can copy it in their notebooks.

Step by step

- » Divide the class into groups, present "A family plan for climate change," and give students time to read the tips. Project it on the board if you don't have printed copies.
- » Discuss the tips in class. Do they seem reasonable? Are they useful? Which are the most interesting? Would they add anything else?
- » Ask students to develop strategies to engage their families. Each student must make at least one suggestion on effectively presenting the tips to their families. When would be the best time for a family meeting? How should students present them so everyone pays attention?
- » Students should describe their strategy on paper so they can share it with their classmates. Choose a few students to talk about how they plan on sharing the tips with their families and motivating them to take action.
- » Tell students that each family should commit to doing at least one of the "Small Steps," one of the "Big Steps," and one of the "Even Bigger Steps."
- » Have students track behavior changes using the table below.
- » In the first column, they should write the steps that their family selected from "A family plan to fight climate change."
- » In the second column, they should describe their family's current behaviors.

- » In the third column, they should write the change their family expects to make.
- » In the fourth column, have them describe any actual changes that their family made over the course of one month. Ask the students to be completely honest when recording results. Also, ask them to keep an audiovisual or written record of the process (photos, a diary, letters, videos, voice recordings, etc.).

- » After a month has passed, have students present their family's results. Ask them to bring in pictures, taped interviews with family members, letters, videos, or other materials that corroborate the changes or lack of commitment.

Sample family plan for climate change

Steps	Current situation	Proposed change	Results (after one month)
Small step: "Ride your bike whenever it is safe to do so."	We almost always leave the house by car or bus.	Clean our bikes and begin to ride them whenever we go out.	All family members ride their bikes at least three times a week (whenever we can go out and come back during daylight). We are saving time and money when we go out, and it's fun, too.
Bigger step: "To preserve food, avoid using foil or plastic wrap. Instead, use reusable dishes with lids."	We use plastic wrap for everything and we wrap our snacks with paper and aluminum trays. We spend approximately \$X per month on these packages.	Find a set of plastic containers to store food and take it to school, work, or elsewhere.	We looked in the back of our cupboard, found a set of plastic containers, and stopped using aluminum foil and plastic wrap. Food is better conserved and stays fresher longer, and we saved about \$X at the end of a month.
Even bigger step: "When building or remodeling, should you choose to use wood, try to find demolition material. You may be able to find special wood that can be reused for window frames, doors and even furniture."	We are remodeling part of our house. We are going to replace the doors and want to buy some new furniture, such as shelves and tables. Stores that sell cheaper wood do not have a seal of origin.	Find places that sell demolition wood and reuse old furniture.	We found a place that works with demolition wood. They recommended a cabinetmaker who made us nicer, stronger, and more creative doors than the ones we were going to buy. We saved almost 20 percent of what we would have spent. We found a website that sells and exchanges second-hand products and we bought furniture in good condition that worked for what we wanted. We used some of the money we saved to restore it. Our furniture is more elegant and stronger than what is sold in stores.

Tips for the teacher

Have students use their experiences from this activity with their families to do a similar activity at school. Students' presentations about the changes in their family's attitudes may motivate the school community to take action as well. This activity might even be duplicated in every family in the school community!

Formative assessment

After this activity, students should understand that it's possible for individuals, families, and communities to change their consumption habits for a more sustainable planet. They should be able to talk about these changes and encourage others to adopt them.

Integration with other subjects

Language Arts: Have students write an article describing their experiences during the experiment: their family's reactions, difficulties they encountered, things that went well, the arguments they used to convince their families to participate, what they learned, and how they handled the conversation with their family after the experiment.

Social Studies: Have students write a letter asking the local government to sponsor a campaign to promote behavior change in the community using the changes proposed in "Sample family plan for climate change."

Remember

The best way to support our environment and the climate is to improve society's production processes and consumption habits. The easiest place to start is with our families; from there, we can take small, medium, and big steps.

Suggested reading and viewing

- » The Green School Toolkit provides a set of tools to be used by teachers to prompt their students to take ownership and safeguard their world. Particularly relevant to this lesson are the modules on sustainable water management, selecting and using sustainable materials, environmentally friendly school infrastructure, energy, and motivating the school community. You can see what it's all about in the video, "Greening Your School." Find it at www.iadb.org/riseup.

2016

Intelligent Consumption

Lesson Plans for Children and Youth

Emma Näslund-Hadley, María Clara Ramos, Juan Paredes,
Ángela Bolívar, and Gustavo Wilches-Chaux



Rise Up Against Climate Change!

A school-centered educational initiative
of the Inter-American Development Bank