



MO'OLELO
PERFORMING
ARTS COMPANY

CREATE

Mo'olelo exists to uncover and research stories within different communities and bring them to life on stage, using all the artistic and technical elements of the performing arts.

PRODUCE

Mo'olelo exists to produce original stories by contemporary playwrights and lesser-known stories by master playwrights.

EDUCATE

Mo'olelo exists to educate youth in technical theatre and design, exposing them to potential careers, and grooming this new generation of theatre artists so they can tell stories on stage with integrity.

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**Mo'olelo Performing Arts Company
GREEN THEATER CHOICES TOOLKIT**

August 9, 2010

As part of Mo'olelo Performing Arts Company's *Greening Initiative*, we partnered with Brown & Wilmanns Environmental Consulting to develop this Green Theater Choices Toolkit, a reference guide to assist in making environmentally-friendlier choices in theatre production.

Commonly used scenic design, costume design, lighting and audience interface materials were rated on a scale of 0 to 4 based on their ecosystem impacts, energy and water requirements, generation of waste, human health impacts, potential for recycle, and toxicity.

The rating scale is as follows:

4 Exceptional material

3 Good material

2 Material that has as many negative as positive attributes

1 Materials with below average environment, health and safety issues

0 Materials that should be avoided

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Please direct any questions about the Toolkit to Seema Sueko.

GREENING MO'OLELO

As part of Mo'olelo Performing Arts Company's Greening Initiative, this document is printed on recycled paper (30% post-consumer content).

Wood Products Scorecard

	Item	Pros and Cons
4	Wood products with recycled (PCR) content greater than 75%	+ Using wood products with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to the use of virgin forest products
	Forest Stewardship Council (FSC) certified woods	+The Forest Stewardship Council (FSC) is recognized worldwide as an independent organization that establishes certification and labeling standards ensuring the sustainability of the management of forest products. Other parties certify forest management and/or wood products to the FSC standards. In addition to virgin wood certification, FSC standards are also available for recycled wood products
	Cork	+Cork can be sustainably harvested in a low impact manner
	Reclaimed wood or wood products	+ Reusing materials is even better than using materials with recycled content as there are almost no impacts related to the reprocessing of the materials. This reduces waste and greatly reduces the environmental and human health impacts related to harvesting and processing wood products
	Homasote	+Homasote is a brand name generically cellulose-based fiber wallboard. Homasote is made up of recycled paper which is compressed and held together with a small amount of non-toxic PVA glue
3	Wood products with recycled (PCR) content between 10 and 75%	+ Using wood products with a moderate recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
	Sustainable Forest Initiative (SFI) certified	+The Sustainable Forest Initiative (SFI) is an independent certification and standard setting organization focusing on U.S. and Canadian forests and ensuring that wood products are from well managed forests; originally established by the American forestry industry -On some issues SFI standards are less stringent than FSC
	Canadian Standards Association (CSA) certified	+The Canadian Standards Association (CSA) is similar to SFI and focused exclusively on Canadian wood harvested from well managed forests -On some issues CSA standards are less stringent than FSC
	American Tree Farm System (ATFS) certified	+The American Tree Farm System (ATFS) focuses on certifying the forestry practices of non-industrial private landowners in the U.S. -On some issues ATFS standards are less stringent than FSC

Wood Products Scorecard *(continued)*

	Item	Pros and Cons
2	Engineered woods including plywood, chipboard, fiberboard, MDO (medium density overlay plywood), OSB (oriented strand board), MDF (medium density fiber board), hardboard (e.g., Masonite)	+Can be a resource efficient use of lumber and lumber by-products -Unless otherwise stated, these types of ply and fiber boards usually use adhesives that can release free formaldehyde – a known human carcinogen. Nonformaldehyde adhesives would move up 1 point
	Boron-Based Preservatives: Bora-Care®, Tim-Bor®, Shellguard® and Guardian®	+Use of boron-based wood treatment chemistry is the least toxic of all wood treatments. If FSC, SFI or CSA certified base wood move up 1 point
1	Ammonia Copper Quaternary (ACQ) preserve treated wood: Preserve® and Preserve Plus®, NatureWood®, ProGuard™	+Ammonia copper quaternary (ACQ) treated wood is the oldest better option to CCA treated lumber. If FSC, SFI or CSA certified move up 1-point -Because of the toxicity of copper to aquatic organisms and because ACQ may leach, it is not recommended for applications near aquatic ecosystems.
	Veneers from threatened species <small>(www.rainforestrelief.org/What_to_Avoid_and_Alternatives/Rainforest_Wood/What_to_Avoid_What_to_Choose/By_Tree_Species.html)</small>	+Using a small amount of wood to produce a veneer is better than using a solid piece of wood from species' that are threatened or endangered -Logging of these woods is destroying rare and fragile habitat
	Endangered woods	-Logging of these woods is destroying rare and fragile habitat <small>(www.rainforestrelief.org/What_to_Avoid_and_Alternatives/Rainforest_Wood/What_to_Avoid_What_to_Choose/By_Tree_Species.html)</small>
	Virgin clear-cut old growth	-Logging of these woods is destroying rare and fragile habitat that can not be replaced
	Lauan products (non-FSC certified)	+If FSC certified this moves up 2 points. If SFI or CSA certified move up 1 point - Lauan is a group of tropical hardwood that are being logged at an unsustainable rate with habitat destructive practices
0	Wolmanized® pressure treated Lumber (CCA)	+If FSC, SFI or CSA certified wood this moves up 1 point -Wood treated with chromated copper arsenate (CCA) poses certain environmental and health risks, including the leaching of chemicals such as arsenic and chromium into the environment and workers' risk of exposure to hazardous chemicals. Disposal of treated wood also proves to be an issue, particularly disposal by incineration.
	Melamine laminate woods	-Melamine is harmful if swallowed, inhaled or absorbed through the skin. Chronic exposure may cause cancer or reproductive damage. It is an eye, skin and respiratory irritant. Relatively more toxic and harmful production chemistry as compared to other polymers

Glass, Ceramics, Earthen Materials Scorecard

	Item	Pros and Cons
4	Glass, ceramics, and mineral products with recycled content greater than 75%	+ Using materials with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials -None
	Unfired clay products	+ These materials have very low resource requirements and environmental impacts - Mining on very large scales for these clays can have a negative impact on local habitat
3	Glass, ceramics, and mineral products with recycled content between 10 and 75%	+ Using materials with a moderate recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
	Beverage bottle glass (clear, brown, green)	+ These types of glass typically have a high recycle content which means that the mining impacts and energy requirements for producing virgin glass is reduced -Glass manufacture requires a significant amount of energy to melt raw materials for making glass; use of recycled glass in making new glass reduces the energy used in the manufacturing process
	Gems (tourmaline, quartz, etc.)	+ These types of gemstones commonly do not require the removal and displacement of huge amounts of earth to produce and require almost no resources to process once found -Poor mining operations can still have negative impacts to habitat
	Marble	+Marble does not require further processing after its initial quarry and cutting requirements -Quarry operations can have negative impacts on habitat
2	Fiberglass, non-formaldehyde resin coated	+Fiberglass can have high-recycled glass content, reducing the energy and processing requirements to produce new glass. Binders are typically used with fiberglass to maintain the functional integrity of the product (e.g, batt insulation, fiberglass mat); Non-formaldehyde resins eliminate the chance of the product off-gassing formaldehyde – a known human carcinogen -Fiberglass can irritate skin, eyes, nose and throat, and aggravate asthma and bronchitis
	Glass, ceramics, and mineral products (other than bottles and jars), recycled up to 10%	+ Using materials with a low recycled content still reduces waste and reduces the environmental and human health impacts related to manufacturing virgin materials
	Granite	+Durable material that can withstand extensive use with minimal wear -Dust from manufacturing processes, such as cutting, sanding, and polishing can result in exposure to crystalline silica, a carcinogen; some granite may also emit radon, a radioactive substance. Granite quarries may have an adverse effect on habitat

Glass, Ceramics, Earthen Materials Scorecard *(continued)*

	Item	Pros and Cons
2	Slate	+Durable material that can withstand extensive use (e.g., in flooring, roofing, etc.) with minimal wear -Dust from manufacturing processes, such as cutting, sanding, and polishing can result in exposure to crystalline silica, a carcinogen; some slate may also emit radon, a radioactive substance. Slate quarries may have an adverse effect on habitat
	Drywall (gypsum board)	+Drywall can have a recycled content – if >10%, move up to a 3 -Dust from sanding (generally tape and joint compound) is a potential respiratory irritant; gypsum mining may have an adverse effect on habitat
1	Non-recyclable glass (blue glass, tempered/safety/Pyrex glass, drinking glass, window glass)	-These types of glass can not be easily recycled because they contain compounds that would contaminate the typical recycled glass stream (clear, brown, green bottle glass) and adversely affect reuse
	Concrete (Portland cement, sand, and aggregate)	+Concrete can be a stable long lasting product. If concrete uses appropriate recycled fly ash and/or aggregate move up one point -Portland cement production uses huge amounts of energy and its production is among the largest sources of greenhouse gases worldwide. Sand and gravel/aggregate mining may have an adverse effect on habitat
0	Ceramics with non-FDA approved glazes (www.cfsan.fda.gov/~lrd/fdaact.html#lead)	- Non-FDA approved glazes can contain toxic heavy metals as colorants
	Fiberglass with formaldehyde binders	+Fiberglass can have high-recycled glass content, reducing the energy and processing requirements to produce new glass. Binders are typically used with fiberglass to maintain the functional integrity of the product (e.g., batt insulation, fiberglass mat) -Phenol formaldehyde binders can offgas formaldehyde, a human carcinogen; fiberglass can irritate skin, eyes, nose and throat, and aggravate asthma and bronchitis
	Glass and epoxy (bisphenol-A) resin laminates	-Bisphenol-A is a key ingredient in epoxy and is a suspected human reproductive toxin and known skin sensitizer
	Leaded glass	-Lead may leach from glass in use; lead is a toxic metal that can impair the mental functions and affect the central nervous system. Leaded glass is also not readily recyclable. Glass manufacture requires a lot of energy to melt the glass

Textile Treatments and Colorants Scorecard

	Item	Pros and Cons
4	Sustainably sourced plant-based dyes and auxiliaries that meet GOTS requirements	+ Natural dyes sourced from sustainable sources can be a low impact way to color small quantities of textiles - Long-term colorfastness may be a problem
	Undyed	+Undyed materials (ecru and colored cotton) have minimal impacts
3	Garment washing (wash only)	+Simple garment wash can reduce shrinkage and impart a degree of added softness with minimal impacts -Should be done at facility with adequate wastewater treatment
	Low impact synthetic dyestuffs that meet	+Low impact dyes generally use less water, fewer additional chemicals and fewer or no heavy metals in the dye stuff -These dyestuffs still require additional chemicals, water and heat, and wastewater treatment
	Solution colored polymers	+Solution dyed (pigments added directly to the molten polymer) eliminate the water and energy use of traditional dye methods and there is no dye house wastewater to treat
2	Fabric sanding	+Sanding is a common textile treatment to mechanically soften the fabric and achieve a specific aesthetic -Sanding changes the physical structure of the fabric and can shorten its life. The process creates dust and waste.
	Natural dyes from conventional sources	+ Natural dyes sourced from sustainable sources can be a low impact way to color small quantities of textiles -Conventional farming practices (synthetic pesticides and fertilizers) can have negative environmental and human health impacts
	Procion dye	+ Specific dyestuff for cotton and other cellulosic fibers with high dye uptake
	Softeners without VOCs	+Improves hand of fabric -Wide variety of softeners on the market; conventional products may have solvents that are volatile organic compounds (VOCs) contributing to air pollution
	Synthrapol	+Detergent used as a pre-wash and post-wash for household dyeing -Contains isopropyl alcohol which can cause skin, eye, and mucous membrane irritation; the surfactant (detergent) is an ethoxylated compound; some of which are problematic in the environment
	Water repellent waxes	+A reasonable alternative for water repellent treatments

Textile Treatments and Colorants Scorecard *(continued)*

	Item	Pros and Cons
1	Acetone or other solvents for color removal	- Acetone is a solvent that can negatively affect the central nervous system and can be a skin and eye irritant
	Aerosol sprays (e.g. Design Master)	-Contains solvents that can be harmful to human health and solvents and/or propellants that are volatile organic compounds (VOCs) contributing to air pollution
	Barge Cement	-Contains the solvent toluene, which is on the California Proposition 65 list of chemicals that are thought to be a female reproductive toxin. Toluene is also harmful if inhaled or absorbed through the skin. Toluene may affect liver, kidneys and blood system or the central nervous system
	Cut pile	-Pile made by this method is very wasteful as up to 30% of the fibers are lost in the process
	Fluoro-based water repellent/stain release finishes	-These water repellent and stain resistant finishes are based on fluorocarbon chemistry that can bioaccumulate in humans and wildlife if released to the environment during production or use and some of these compounds are suspected human endocrine disrupters
	Garment treatments (stone wash, acid wash, distressing)	+Used to obtain a specific aesthetic -Drastically shortens the life of the garment by damaging the physical structure of the materials; also can create significant waste problems
	Household all-purpose dyes (e.g., "Rit Dye")	+A mixture of different dyestuffs that cover a wide variety of fibers; useful for dyeing blends -Dyeing with these is very inefficient, due to the fibers being dyed taking up only the fiber-specific dyestuffs (e.g., cotton and reactive dyes, polyester and disperse dyes); the rest will end up in wastewater
	Softeners with VOCs	+Improves hand of fabric -Wide variety of softeners on the market; conventional products may have solvents that are volatile organic compounds (VOCs) contributing to air pollution
0	Garment treatments (pumice wash)	+Used to obtain a specific aesthetic - Shorter garment life; pumice is typically strip-mined with significant environmental impacts for the mining region
	PVC Coatings	-PVC (polyvinylchloride) plastic has many negative environmental and human health impacts throughout its lifecycle. During its formation and disposal (if by incineration) it can release very toxic dioxins and furans. PVC commonly has additives such as toxic heavy metals and plasticizers (some of which are suspected human hormone mimics).
	Polyurethane laminates and coatings	+There are plant based alternatives for some of the chemical compounds used in polyurethane manufacture -The manufacture of polyurethanes uses some very toxic compounds called isocyanates; polyurethane coatings are often applied to textiles with harmful solvents

Metals Scorecard

	Item	Pros and Cons
4	Metals with a recycled content greater than 75%	+ Using materials with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials -Exceptions to this would be the use of toxic metals such as lead and mercury
	Reused metals	+ Reusing materials without processing is even better than using materials with recycled content as there are almost no impacts related to the reprocessing of the materials. This reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
3	Metals with a recycled content between 10 and 75%;	+ Using materials with a moderate recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials -Exceptions to this would be the use of toxic metals such as lead and mercury
	Brass	+Most commonly available brass has recycled content. Brass does not require surface treatments such as paints or coatings. -As with all metals, mining practices and extraction of the metal from its ore can be very destructive to habitat and energy and chemically intensive
	Copper	+Most commonly available copper recycled content (average is 45%). Copper does not require surface treatments such as paints or coatings -As with all metals, mining practices and extraction of the metal from its ore can be very destructive of habitat and energy and chemically intensive; copper released to the environment can have adverse effects on aquatic life
	Iron	+Most commonly available iron has recycled content -Iron typically requires some sort of surface coating, i.e. paint, to protect it from oxidation damage (rust). As with all metals, mining practices and extraction of the metal from its ore can be very destructive to habitat and energy and chemically intensive
	Pewter (lead-free)	+Pewter is an alloy of tin and copper that can have recycled content; it does not require a surface finish to resist destructive oxidation -As with all metals, mining practices and extraction of the metal from its ore can be very destructive to habitat and energy and chemically intensive
	Stainless steel	+Stainless steel is a mixture of steel with other metals, primarily chrome and nickel, to form an alloy that resists rusting; it is typically used with any surface treatment. Most commonly available stainless steel has some recycled content -As with all metals, mining practices and extraction of the metals for the alloy from ore can be very destructive to habitat and energy and chemically intensive

Metals Scorecard *(continued)*

	Item	Pros and Cons
3	Steel	+Steel is a mixture of iron with other metals in what's called an alloy. Most commonly available steel has recycled content (average is 20-25%) -Steel typically requires some sort of surface coating, i.e. paint, to protect it from oxidation damage. As with all metals, mining practices and extraction of the metals for making steel from ore can be very destructive to habitat and energy and chemically intensive
	Tin	+Tin does not require surface treatments such as paints or coatings -As with all metals, mining practices and extraction of the metal from its ore can be very destructive to habitat and energy and chemically intensive. Some forms of tin are very toxic (tributyl tin)
	Zinc	+Zinc does not require surface treatments such as paints or coatings; zinc is often used in an alloy or as a plating metal over a substrate (zinc plating is called galvanizing). Most commonly available zinc has recycled content (average is 30%) -As with all metals, mining practices and extraction of the metal from its ore can be very destructive to habitat and energy and chemically intensive. Zinc dust can cause metal fume fever; dust can be generated by grinding galvanized materials
2	Aluminum	+Most commonly available aluminum has recycled content (40+%). Aluminum does not require surface treatments to resist rust or oxidation damage -Aluminum requires an enormous amount of energy to extract the metal from the ore. Recycled aluminum uses 5% of the energy used to make virgin metal. As with all metals, mining practices and extraction of the metal from its ore can be very destructive to habitat and energy and chemically intensive
1	Gold	+Gold does not require surface treatments to resist rust or oxidation damage - Most precious metal mining and processing disturbs great amounts of habitat and some chemical ore processing uses compounds such as cyanide that can be released into the environment if not properly managed
	Silver	-Silver requires a surface treatment or regular cleaning to maintain its luster. Most precious metal mining and processing disturbs great amounts of habitat and some chemical ore processing uses compounds such as cyanide that can be released into the environment if not properly managed
	Alloys with low lead levels (less than less than 5%), e.g., some bronzes, old pewter	- Lead is a toxic metal that can impair the mental functions and affect the central nervous system
0	Lead and alloys with higher lead levels (5% or more)	-Lead is a toxic metal that can impair the mental functions and affect the central nervous system.

Plastics and Foams Scorecard

	Item	Pros and Cons
4	Plastics with recycled content greater than 75%	+ Using materials with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
	Reused plastics and foams	+ Reusing materials is even better than using materials with recycled content as there are almost no impacts related to the reprocessing of the materials. This reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
3	Plastics and foams with recycled content between 10 and 75%	+ Using materials with a moderate recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
	Polypropylene (PP)	+ Polypropylene (#5 plastic) requires relative little energy and water as compared to other plastics and its manufacture uses less harmful chemical intermediates - Polypropylene is not currently commonly recycled in municipal waste systems
	Polyethylene (LDPE, HDPE, LLDPE and UHMWPE)	+ Polyethylene requires relative little energy and water as compared to other plastics and its manufacture uses less harmful chemical intermediates. Both HDPE (#2 plastic) and LDPE (#4 plastic) are commonly recycled in municipal waste systems
	Polyester (PET), antimony free	+ PET (#1 plastic) is commonly recycled in both industrial and municipal waste streams. Recycled PET can be used in many applications – from structural materials to textiles. Antimony free PET does not contain antimony trioxide (as commonly available PET does) which is considered a possible human carcinogen
2	Plastics and foams with a PCR content between 1 and 10%	+ Even using materials with low recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
	Polyester (PET)	+ PET is commonly recycled in both industrial and municipal waste streams. Recycled PET can be used in many applications – from structural materials to textiles - Somewhat more energy and harmful chemistry than polypropylene and polyethylene plastics. Antimony trioxide is used as a catalyst in the polymer production and is considered a possible human carcinogen
	Bioplastics and foams (e.g., PLA, PDO)	+ Plastics made from plant-sourced materials have the possibility to be renewable sourced - Most plant-based polymers are produced from conventionally grown crops that rely on toxic synthetic pesticides and resource intensive synthetic fertilizers. Depending on the source material and technology, bioplastics can use more or less energy than equivalent petro-based polymers (In the future there is the potential for organically sourced biological materials to be used in the manufacture of biopolymers – In that case the resultant materials could move up to a 3 or 4 position)

Plastics and Foams Scorecard *(continued)*

	Item	Pros and Cons
2	Ethylene vinyl acetate (EVA)	+Moderate chemistry used in its production -No common recycling program for this polymer
	Latex	+Well managed natural latex stands can be a decent source of a renewable rubber. If the stands are managed in an organic system the score for this polymer would move up to a 3 -Many plantations are managed in a manner that has limited habitat value. Not all latex products are 100% “natural” items. Many materials that use natural latex have additive chemicals or processes that can be harmful
	Surlyn	+Surlyn is a resin that can be injection molded, extruded and thermoformed; it can contain as much as 40% plant based ingredients -The plant-based ingredients can be from poorly managed resources. Some of the compounds used in its manufacture, such as methacrylic acid, have acute and chronic health effects associated with their use. Not recyclable
	Silicone	+Modern high performance silicones are made with less toxic chemistry than previous silicones -Not recyclable
1	Acrylic (“Plexiglass”)	+Durable polymer -Manufacturing chemistry includes some very toxic compounds including acrilonitrile which is a possible human carcinogen
	Delrin	+Durable polymer -Relatively more toxic and harmful production chemistry as compared to other polymers
	Melamine	-Melamine is harmful if swallowed, inhaled or absorbed through the skin. Chronic exposure may cause cancer or reproductive damage. It is an eye, skin and respiratory irritant. Relatively more toxic and harmful production chemistry as compared to other polymers
	Neoprene	-Relatively more toxic and harmful production chemistry as compared to other polymers. The compound chloroprene is used in neoprene’s manufacture and is considered a possible human carcinogen
	Nylon	- Most nylons also require more energy and water to manufacture than many other polymers. The manufacturing chemistry involves some toxic compounds
	Phenol-formaldehyde resins	-These resins can release small amounts of free formaldehyde. Formaldehyde is a known human carcinogen
	Polystyrene (PS) (e.g., Styrofoam® -- white, blue, green, etc., laminated to paper such as Gator Board®)	+Polystyrene foam can often be reused, such as shipping “peanuts” -Polystyrene foams and resins can contain free styrene – a possible human carcinogen and a cause of other adverse health effects. Polystyrene is not commonly recyclable

Plastics and Foams Scorecard *(continued)*

	Item	Pros and Cons
1	Polytetrafluoroethylene (PTFE) (e.g., Teflon®)	-Polymers of fluorinated organic materials May have contaminants that can have adverse health effects from skin contact
	Polyester resins (MEK hardener)	-These resins commonly use methyl ethyl keytone which is a suspected reproductive toxin
0	Polyurethane (PU) and polyurethane foams	+There are plant based alternatives for some of the chemical compounds used in polyurethane manufacture -The manufacture of polyurethanes uses a group of very toxic compounds called isocyanates. Polyurethanes are not commonly recycled.
	Acrylonitrile butadiene styrene (ABS)	-The production of this plastic requires the use of many toxic compounds
	Epoxy (with bisphenol-A) resins and laminates (e.g., fiberglass)	-Epoxy is manufactured with bisphenol-A, a suspected human reproductive toxin and known skin sensitizer
	Polycarbonate (PC) Lexan®	-Polycarbonate is manufactured with bisphenol-A, a suspected human reproductive toxin and known skin sensitizer
	Polyvinyl chloride (PVC) “Sintra®”	-PVC manufacture and disposal is one of the major contributors of the production of unwanted and toxic compounds dioxins and furans. The primary intermediate chemical (vinyl chloride monomer) used to make PVC is a carcinogen. Both of which are highly toxic and bioaccumulte in the environment. Additives to PVC plastic can also be quite toxic. Some plasticizers used to make PVC softer are known reproductive toxins. Some PVC has toxic heavy metals, such as lead or cadmium, added as stabilizers
	Styrene butadiene rubber (SBR)	-SBR manufacture requires the use of many toxic compounds in its manufacture. Styrene is a known human carcinogen and small amounts of free styrene can sometimes be found in SBR. The manufacture of butadiene requires the use of toxic compounds such as acetonitrile or dimethylformamide
	Urea-formaldehyde resins	-These resins can release higher amounts of free formaldehyde. Formaldehyde is a know human carcinogen

Paint and Adhesives Scorecard

	Item	Pros and Cons
4	Paints and coatings with greater than 75% recycled content	+Some communities and suppliers offer recycled or off spec paint
	Bead blast etching of metal and wood	+Bead blasting can impart texture to metals and woods with no additional chemical use - Worker should use proper protective equipment
	Certified organic produced/low VOC milk paint	+Low toxicity, easy clean up -Color choice is only moderate - few bright colors or dark shades
	Natural lacquer	+Natural based ingredients low toxicity
	Natural varnish	+Natural based ingredients low toxicity
	Powder coating	+Powder coating provides a durable paint like surface with little waste and uses no harmful solvents -You need special equipment to apply and an oven to cure
	Pure raw linseed oil	+Low toxicity as raw oils don't contain harmful heavy metal dryers or organic solvents
	Pure tung oil	+Low toxicity as raw oils don't contain harmful heavy metal dryers or organic solvents
	Unfinished metals such as stainless, gold, silver, copper, brass, etc.	+No extra chemical or manufacturing required
	Wax, from bees and plants	+No petroleum in product life cycle
3	Zero VOC paints (<5 g/l), coatings, adhesives with low/no VOC colorants	+No potentially harmful organic solvents – so safer to apply and better for indoor air quality (The definition of “zero” is actually <5g/l) -Paints and coatings that have the colorant added at the retail store may actually have a lot more VOC from the colorants rather than the paint. There are no-VOC paints and colorants available
	Paints and coatings with a recycled content between 10 and 75%	+Some communities and suppliers offer recycled or off spec paints
	Paints, coatings, adhesives with low VOC (<50 g/l) and without formaldehyde, halogenated solvents, cadmium, mercury, lead, chromium VI or any of their oxides	+Paints with low VOCs and without the listed harmful auxiliary compounds have a lower toxicity and are safer to work with -Colorants added at the retail store may increase the VOCs; look for low/no VOC colorants as well as paints. Hard to source as manufactures often don't list entire product components
	PVA adhesive (common white and yellow glue)	+This is the old-fashioned school glue. Low toxicity, easy to clean up
	Water-based paints and coatings with low biocide levels (<0.025%)	+Water-based paints typically mean less VOCs in the paint and no solvents used for cleanup (water cleanup) -Biocides are used to both help preserve paint in the can and on the surface (especially in marine applications) these can be harmful to users
	Wax, petroleum based	+Low toxicity no VOC coating -If it contains solvents move down to 1

Paint and Adhesives Scorecard *(continued)*

	Item	Pros and Cons
2	Paints and coatings with a recycled content of less than 10%	+Some communities and suppliers offer recycled or off spec paints
	Anodizing (without chromic acid)	+This method to color the surface of aluminum imparts a durable smooth surface that requires little maintenance -Anodizing is a chemical process that commonly uses toxic compounds to oxidize the bare surface of aluminum
	Cold zinc plating	+Zinc plating provides a durable rust resistant finish for iron and steel items. Cold plating is basically a zinc laden paint that avoids the emissions associated with hot galvanizing (dipping in molten zinc)
	Low VOC paints, coatings, adhesives (50-250 g/l)	+These paints and coatings have fewer VOC so should be safer for both applicators and indoor air quality There are even lower or “No” VOC coatings
1	Shellac	+Shellac is a natural resin excreted from the lac bug that is dissolved in alcohol -The alcohol is a VOC, which is why shellac isn't a 2
	Acid etching	+Durable low maintenance finish -Use of very high corrosive chemicals
	Alkyd-based paint (these are modern “oil base” paints)	-Often contain VOCs and require solvents for clean-up
	Anodizing (with chromic acid)	+Durable low maintenance finish -This method of anodizing requires the use of quite toxic compounds, especially chromic acid which can contain chrome +VI a known carcinogen
	Boiled linseed oil	+ “Boiled” linseed oil has some naturally based ingredients (linseed) -But it typically has heavy metals to hasten the drying process are potential health hazards and these coatings usually have VOCs as well
	Barge contact cement (and other solvent based cements)	-Contain solvents such as toluene and heptanes which can harm applicators and negatively impact indoor air quality
	Danish oil	+Some natural based ingredients -Typically has some VOCs and heavy metal drying agents that are potential health hazards
	High VOC (>250 g/l) paints, coatings, stains, varnishes, waxes, adhesives, etc.	-High VOC can have acute and chronic health impacts to those working with these materials. Also negatively impacts indoor air quality
	Low VOC polyurethane paints, coatings, adhesives (50- 250 g/l)	-Polyurethanes can cause skin sensitization and even “low” amounts of VOC can negatively impact health and indoor air quality
	Synthetic lacquer (e.g., nitrocellulose and acrylic-modified lacquer)	-Less natural ingredients. More synthetic polymers with negative lifecycle impacts

Paint and Adhesives Scorecard *(continued)*

Item	Pros and Cons
Epoxy (with Bisphenol-A) paints, coatings, adhesives	-Most epoxies contain the chemical Bisphenol-A which is a known skin sensitizer and suspected reproductive toxin
High VOC polyurethane paints, coatings, adhesives (>250 g/l)	-Skin sensitization and other potential health hazards. Chronic exposure to some solvents can cause central nervous system disorders
Metal plating including hot zinc plating (galvanizing)	-Regular metal plating involves the use of cyanide baths and solvents; galvanizing uses molten zinc with solvent and acid baths for cleaning
Resorcinol adhesives	-May cause a variety of acute health effects (used for high performance waterproofness.)
Urea formaldehyde adhesives	-Adhesive commonly used in many plywood and particle board constructions. Releases free formaldehyde that is a known carcinogen and will impact indoor air quality

Textile Scorecard

	Item	Pros and Cons
4	Textiles with recycled content greater than 75% (except those incorporating any material with a -2 score)	+Includes textiles constructed from some recycled natural fibers (e.g., cotton, wool), synthetics (meaning made from fossil fuels such as polyester), and blends (cotton-poly). Natural fiber garments are shredded into fiber that is respun; textile mill waste is also collected and shredded/spun into yarn. Polyester film and soda bottles may be recycled mechanically (chopped up and remelted into pellet for spinning) or chemically (brought back to the intermediate chemicals for making polyester). Polyester garments may be recycled chemically. All these recycled versions greatly reduce most of the impacts associated with creating virgin materials -The quality of the material is typically lower than the virgin version with the exception of chemically recycled polyester which is equivalent in quality to virgin
	Bio-based polymers from certified organic sources	+Biobased polymers are derived from agricultural (corn, soy, castor, cotton waste) and forest products (wood) that use plant-based chemistry to create fibers. Biopolymers made from certified organic crops have a moderately low environmental impact and compare very favorably with synthetics that they may replace (e.g., polyester) -No certified organic biopolymers are commercially available
	Certified organic textiles (cotton, hemp, linen, wool, etc.)	+In general, organically produced fibers processed in accordance with GOTS (Global Organic Textile Standard) have a lower environmental impact compared to conventional farming practices (synthetic pesticides and fertilizers) and textile processing -Cotton is a very water intensive crop; wool processing generates a high rate of contaminated wastewater that requires treatment
	Blends of certified organic fibers	+Blends of organic fibers have the same attributes as a single organic fiber -Blends can be harder to recycle and might require more chemistry in the dye and finishing processes
3	Textiles with a recycled content between 10 and 75%	+Lower recycled content reduces the environmental benefits of recycled fibers, although overall it is still favorable to recycled
	Biopolymers from non-genetically modified organism sources	+Biobased polymers from conventional sources can have a moderate environmental impact, due primarily to the use of synthetic pesticides and fertilizers in conventional crop production. The primary benefit is in reduced energy use
	Green cotton (also “better cotton”)	+Green cotton refers to cotton that is grown conventionally following integrated pest management (IPM) practices that are similar to organic growing practices. Some types of green cotton are handpicked to reduce chemical use in harvesting -Unless dry farmed, cotton is a water-intensive crop

Textile Scorecard *(continued)*

	Item	Pros and Cons
3	Hemp, linen, ramie, jute conventionally grown	+These “bast” fibers typically require less synthetic pesticides and fertilizers as compared to conventionally grown cotton. Hemp requires the least pesticide used -Breaking down the chemical structure of the plant stalk so that the fiber can be easily separated (retting) can be chemically intensive; ramie in particular requires degumming, typically with caustic soda (sodium hydroxide/lye)
	Certified organic fibers/polyester blend	+This blend benefits from the organic cotton content and cotton poly blends can be more readily recycled than other fiber blends. A poly blend might require less maintenance than a 100% cotton textile -This blend could require more chemicals to dye and finish as sometimes two separated chemistry are required to dye the cotton and polyester fibers
	Colored cotton (e.g., Foxfibre™), conventional	+Colored fibers don't require the dye chemistry and processing -Limited color choices, conventional grown colored cotton still uses potentially harmful synthetic pesticides
2	Textiles with a recycled content less than 10%	+A little recycled is better than none
	Polypropylene	+Polypropylene is a synthetic polymer that has relatively low environmental impacts (less toxics and lower energy requirements) compared to other synthetic fibers -Difficult to dye; typically solution dyed, which limits color choices
	Tencel (lyocell)	+Tencel is a brand name of the generic fiber lyocell developed by Lenzing (which now owns the Tencel brand), which is a cellulose derived fiber using special solvents in an enclosed process. The solvents are typically recovered and reused with little exposure to workers and the environment. It is similar to rayon, but because it is manufactured in an enclosed system, it has fewer adverse health and environmental impacts. Unlike rayon, Tencel/lyocell is typically machine washable -Primary issue is growing of wood source via non-sustainable method
1	Acetate	+Cellulose acetate is a wood-based fiber manufactured using acetic and sulfuric acids and other chemicals; relatively durable -Typically requires dry cleaning; requires special dyes
	Acrylic	+Durable synthetic fiber -Hazardous chemistry required for manufacture; relatively high environmental impacts (energy and greenhouse gas emissions)

Textile Scorecard *(continued)*

	Item	Pros and Cons
1	Cotton, conventional	+Some conventionally grown cotton is dry farmed (no irrigation); use of genetically modified cotton seeds can reduce some types of pesticide use and allow decrease use of tillage thereby reducing soil erosion -Water intensive crop, in many regions, cotton is intensively farmed with synthetic pesticides and fertilizers. In many regions, conventional cotton growers use genetically modified herbicide-resistant seed (e.g., “Roundup Ready”) and larger quantities of herbicide
	Nylon	+Very durable synthetic fiber; high efficiency of dyeing -Energy intensive process to manufacture; water and energy intensive to dye fiber; some hazardous chemicals used in manufacture
	Polyester	+Durable synthetic fiber; can create polyester laminates for waterproof textiles/garments that can be chemically recycled back to virgin quality; moderate energy and water intensity to manufacture - Some hazardous chemicals used in manufacture; moderately efficient dyeing
	Rayon, Modal brand	+A cellulosic manufactured fiber with the same basic chemistry as generic rayon (-2) but conducted in arguably better facilities and the cellulose inputs (trees) are from a certified sustainable source -Rayon requires some very toxic compounds for manufacture; generic rayon typically uses wood as the source of cellulose, which may be from plantations that have replaced native habitat; dry cleaning is typically recommended
0	Bamboo Rayon	+Potential for sustainable managed bamboo inputs – but not always the case. Some bamboo is high yield and some is not. Some bamboo clear cutting is negatively impacting the environment -Rayon requires some very toxic compounds for manufacture; generic rayon typically uses wood as the source of cellulose, which may be from plantations that have replaced native habitat; dry cleaning is typically recommended
	Fluorofibers (e.g., PTFE)	+Effective water resistance -May have contaminants that can have adverse health effects from skin contact
	PVC	+Durable synthetic fiber -The primary intermediate chemical for making PVC is a carcinogen; poorly run manufacturing facilities may release dioxins (a high hazard chemical family); when burned PVC release toxic fumes and dioxins. Additives to PVC include phthalates (plasticizers for flexibility and specific hand attributes), heavy metals (e.g., lead and others) for durability and other hazardous chemicals that make PVC problematic in use and disposal

Textile Scorecard *(continued)*

	Item	Pros and Cons
0	Rayon, generic	-Rayon requires some very toxic compounds for manufacture; generic rayon typically uses wood as the source of cellulose, which may be from plantations that have replaced native habitat; dry cleaning is typically recommended
	Spandex (e.g., Lycra)	-Spandex (Lycra is a trade name) is a polyurethane fiber typically made from a polyol and a diisocyanate. Isocyanates are very toxic compounds. Most polyurethane is made from fossil fuels, although polyols may be made from soy or other plant sources -It is relatively energy and water intensive to manufacture; diisocyanates are relatively high hazard chemicals; the solvent required to make the fiber is also a highly hazardous substance

Lighting and Electronics Scorecard

	Item	Pros and Cons
4	Day lighting (with glare and heat gain controls)	+Appropriate for office space, although not for the theatre itself.
	Fluorescent (mercury-free), electronic ballast T-5, Super T-8, CFLs (regular A-line, flood and spot)	+These lights have the energy savings and long life of standard fluorescent lights and have very low mercury content. -Contains minute amounts mercury that depending on how they are disposed of is not captured and recycled
	LEDs	+ LED lamps are about twice as energy efficient as CFLs and contain no mercury. LED Exit signs are readily available; LED down lights and accent lights are common
3	Fluorescent (low mercury) electronic ballast T-5, T-8, CFLs (regular A-line, flood and spot)	+These lights are energy efficient and have a long lifetime
	High pressure sodium	-Contains small amounts of mercury that, depending on how they are disposed of, is not captured and recycled at the end of the lamps life
2	Fluorescent (standard mercury) electronic ballast T-5, T-8, CFLs (regular A-line, flood and spot)	+ Is 5 to 7 times more efficient than a standard incandescent bulb and can last 10 times longer -Contains mercury that depending on how they are disposed of is not captured and recycled
	Halogens for spot lighting	+Halogen bulbs can last x2 longer than standard incandescent lights -Halogen bulbs are similar to standard incandescent but typically use tungsten for the filament and a halogen gas (hence the name). These are some of the least energy efficient lighting technologies
	Low pressure sodium	+ This lighting can be 3 to 15 times more energy efficient that a standard incandescent light and last 10 times longer
	Metal halide	+ Metal halide lamps are about as efficient as CFLs but have a shorter lifetime as compared to sodium lamps
1	Fluorescent T-12s with electronic ballasts	+Although these lights were energy efficient and have a relatively long lifetime, virtually all T-12s should be upgraded to T-8s or even T-5s to improve efficiency -A mass relamping of T-12s will require management of the old fluorescent tubes as a special waste
	Fluorescent (standard mercury) with magnetic ballast that does not contain any PCBs	+These lights are energy efficient and have a long lifetime -Older magnetic ballast can greatly reduce the energy efficiency of these lamps down to efficiency's common to incandescent lighting
	Halogen for ambient lighting	+Halogen bulbs can last x2 longer than standard incandescent lights. -Halogen bulbs are similar to standard incandescent but typically use tungsten for the filament and a halogen gas (hence the name). These are some of the least energy efficient lighting technologies.

Lighting and Electronics Scorecard *(continued)*

	Item	Pros and Cons
1	Standard incandescent bulbs and floods	- Short bulb life and energy intensive to operate. The US intends to phase out sales of common home wattage incandescent bulbs by 2014
	Mercury vapor	+Long lifetime - Uses a lot of energy per lumen (just half as much as standard incandescent) and contains mercury
0	Fluorescent (standard mercury) with magnetic ballast that contains PCBs	-This type of lighting has the negative health and environmental aspects associated with the large amounts of mercury used in lighting and the toxic and bioaccumulative PCB that were banned in the US in the 1970s.

Audience Interface Materials Scorecard

	Marketing Postcards, Mailers and Playbills	Pros and Cons
4	Certified recycled paper with greater than 75% postconsumer recycled content	+ Using wood products with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to the use of virgin forest products
	FSC certified paper made from ECF bleached pulp and printed with soy based inks	+The Forest Stewardship Council (FSC) is recognized worldwide as an independent organization that establishes certification and labeling standards ensuring the sustainability of the management of forest products. Other parties certify forest management and/or wood products to the FSC standards. In addition to virgin wood certification, FSC standards are also available for recycled wood products +Low toxicity bleaching technology resulting in fewer toxic by-products +Lower impact printing inks have fewer toxins and soy based inks are more renewable as compared to petroleum based inks
	Plastic sheeting with greater than 75% post consumer recycled content	+ Using materials with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to manufacturing virgin materials
3	Certified recycled paper with 10-75% post consumer recycled content	+ Using wood products with a moderate recycled content reduces waste and reduces the environmental and human health impacts related to the use of virgin forest products
	Recycled plastic sheet with 10-75% post consumer recycled content	+ Using materials with a moderate recycled content reduces waste and reduces the environmental and human health impacts related to manufacturing virgin materials
3	SFI or CSA certified papers	+The Sustainable Forest Initiative (SFI) is an independent certification and standard setting organization focusing on U.S. and Canadian forests and ensuring that wood products are from well managed forests; originally established by the American forestry industry +The Canadian Standards Association (CSA) CSA is similar to SFI and focused exclusively on Canada wood harvested from well managed forests -On some issues both SFI and CSA standards are less stringent than FSC
	Paper with less than 10% recycled content	+ Using materials with a little recycled content is better than using virgin materials
2		

Audience Interface Materials Scorecard *(continued)*

Marketing Postcards, Mailers and Playbills		Pros and Cons
1	Coated (shiny) paper	-Coated papers usually have mineral or polymer fillers that hamper recycling process
	Paper from conventional cotton fiber	+Some conventionally grown cotton is dry farmed (no irrigation); use of genetically modified cotton seeds can reduce some types of pesticide use and allow decrease use of tillage thereby reducing soil erosion -Water intensive crop, in many regions, cotton is intensively farmed with synthetic pesticides and fertilizers. In many regions, conventional cotton growers use genetically modified herbicide-resistant seed (e.g., "Roundup Ready") and larger quantities of herbicide
	Traditional petroleum based printing inks	-Made from non-renewable petroleum feedstock's and can contain heavy metals other toxic pigments
	Uncertified paper from virgin origin wood	+Generally common availability -Increasing shift to plantations replace native forest habitat with use of fertilizers and pesticides.
0	PVC	-PVC manufacture and disposal is a contributor to the production of unwanted and toxic compounds called dioxins and furans. The primary intermediate chemical (vinyl chloride monomer) used to make PVC is a carcinogen. Both of which are highly toxic and bioaccumulate in the environment. Additives to PVC plastic can also be quite toxic. Some plasticizers used to make PVC softer are known reproductive toxins. Some PVC has toxic heavy metals, such as lead or cadmium, added as stabilizers
	Single sided printing	- Utilizes 50% less of the material
	Uncertified paper from clear-cut old-growth origin wood	-Logging of these woods is destroying rare and fragile habitat that can not be replaced
Food and Beverage Containers		Pros and Cons
4	Reusable glassware, flatware and napkins	+ Reusable materials can be used repeatedly. Washing and laundering generally has fewer impacts than creating new items from virgin resources
3	Materials with 75% recycled content that are recycled after use	+ Using materials with a high recycled content reduces waste and greatly reduces the environmental and human health impacts related to the use of virgin products -If not recycled these items are a 1
2	Plant origin compostable cups, plates and flatware	+ Made from renewable materials + Only a 2 if actually composted - If not composted these are a 1
	Materials with 10-75% recycled content	+ Using materials with a moderate recycled content reduces waste and reduces the environmental and human health impacts related to manufacturing virgin materials

Audience Interface Materials Scorecard

Food and Beverage Containers		Pros and Cons
1	Disposable materials from renewable resources	+Sourcing materials from renewable resources is generally preferable to those from non-renewable resources (i.e. petroleum based plastics) as they can be sustainably managed -Throwing out these materials generates waste and/or emissions (from land filling or incineration) and wastes the energy, water and resources that went into producing the material initially
0	Synthetic polymer based Disposable glassware, flatware and napkins with no recycled content	-Sourcing materials from non-renewable resources is generally undesirable as these are unsustainable materials -Throwing out these materials generates waste and/or emissions (from land filling or incineration) and wastes the energy, water and resources that went into producing the material initially
Food and Beverage		Pros and Cons
4	Fish and shellfish from MSC certified fisheries <i>http://www.montereybayaquarium.org/cr/SeafoodWatch/web/sfw_regional.aspx</i>	+Sustainably harvested, collected or organic agricultural products
	Organic fruits and nuts	+Sustainably harvested, collected or organic agricultural products
	Shade grown organic coffee (Swiss process decaf)	+Sustainably harvested, collected or organic agricultural products
3	Fish and shellfish from sustainable fisheries Typical Farmers Market	+Sustainably harvested, collected or organic animal products +Lower impact farmed agricultural products can have substantially fewer impacts compared to conventionally grown items +Local or regional in season crops can be fresher and have fewer transportation and storage related impacts
2	“Spray free” “Pesticide free”	+Lower impact conventionally farmed agricultural products can have substantially fewer impacts compared to conventionally produced foods
1	Conventional, processed foods	-Conventional agriculture can pose moderate to significant ecosystem impacts due to loss of diversity, water use and runoff and the use of synthetic pesticides and fertilizer
0	Fish on “avoid” list <i>http://www.montereybayaquarium.org/cr/SeafoodWatch/web/sfw_regional.aspx</i>	-Harvesting of these fish causes extreme ecosystem impacts