

Age Appropriate Climate Change Communication & Resources Cheat Sheet

Grade	Developmental Stage	What this means for communicating climate change	Climate Change Ladder of Environmental Responsibility Examples	Examples Relating to TMMC	Age Appropriate Visuals & Resources	NGSS DCI Related to Climate Change
K	Empathy	Imagination and intuition are strong, but lack the ability to think abstractly.	Develop connection to the nearby natural world and encourage sense of agency. For this age group, this is best accomplished through play, creation, guided exploration and modelling environmentally-friendly behaviors as norms.	Turning off the lights when you leave a room	TMMC uses Automatic Lights to save energy and money so that if someone forgets to turn off a light or fan, it will turn off automatically after a set amount of time. Lighting energy - http://michaelbluejay.com/electricity/lighting.html Decorate your switch plates - http://climatekids.nasa.gov/light-switch-plates/	ESS3.C Human Impacts on Earth Systems
1				Packing no waste lunches	Waste leads to litter and the production of greenhouse gases as it decomposes, but greenhouses gases are also created in the process of making things like plastics, which are made from petroleum, a fossil fuel. That's why at TMMC, we try to avoid disposable items, but using things like Reusable gloves in the fish kitchen. Journey of a plastic bag - https://www.youtube.com/watch?v=GLgh9h2ePYw A brief history of the 5 cent bag tax - https://www.youtube.com/watch?v=gpxEstCqUfY How to reduce food waste - http://www.imperfectproduce.com/#ugly-produce-delivered	LS1.D Information Processing
2				Composting	TMMC Composts food, fish & necropsy to reduce our waste. When food breaks down in a landfill, it produces greenhouse gases, carbon dioxide (CO2) and methane (MH4). However, this can be prevented by composting, which you can do at home, at school and beyond. Some neighborhoods have composting programs (green bins) or you can start a compost in your backyard. Compost infographic - http://www.domyownpestcontrol.com/images/content/composting_infographic.jpg Meet the greenhouse gases - http://climatekids.nasa.gov/greenhouse-cards/	ETS1.C Optimizing the Design Solution
3	Exploration	Conceptual thought is developing, but is not easily applied from one concept to another.	Sense of agency should be increased incrementally. They are ready to start exploring farther from home and beginning to understand more abstract concepts. This should be done through less structured explorations and can begin to focus on the larger community and more distant places.	Switch to CFL/LED lightbulbs	TMMC uses Automatic Lights to save energy and money so that if someone forgets to turn off a light or fan, it will turn off automatically after a set amount of time. We also turn off lights during the daytime when there is plenty of sunlight. LED CO2 Reduction Infographic - http://www.delmarfans.com/educate/basics/efficient-light-bulbs/ Bulbs explained - http://climatekids.nasa.gov/light-bulbs/	LS2.C Ecosystem Dynamics, Functioning and Resilience
4				Bike or walk to school	TMMC installed EV Charging Stations to encourage more people to use electric vehicles, which means less carbon dioxide (CO2) emissions. Car Impact Explained - https://www.youtube.com/watch?v=y-n7kSanDtY http://teambikechallenge.com/welcome	ESS3.A Natural Resources
5				Unplug electronics when not in use	Even when electronics like your phone are not plugged in, the cord might still be using energy if left plugged in. At TMMC, we use Surge protectors to stop this flow of energy and to make it easy to turn off all electronics with one switch when they are not being used. Vampire Electronics - http://www.rock.coop/content/electronics-can-use-energy-even-when-not-use Cost - http://www.cheapism.com/blog/save-easy-100-unplugging-these-devices-2998/	ESS3.C Human Impacts on Earth Systems
6				Use smart plugs and thermostats	Ocean Warming impacts our patients because their food follows the preferred cooler water deeper and farther out to sea meaning that marine mammals must exert more energy hunting. We can reduce warming by reducing our carbon footprint. One way to do that is to use less energy by installing smart plugs and thermostats that stop using energy when it is not needed. Dr. Whizzlepuff animation - https://www.youtube.com/watch?v=dBTy4JfJUQM Rise in SST - https://www3.epa.gov/climatechange/science/indicators/oceans/sea-surface-temp.html Whales and ocean warming - https://www.youtube.com/watch?v=f9SbbZ_kxnM	
7				Use public transportation	Climate change also can increase the intensity of Storms , which can lead moms and pups to be separated before they are ready. Carpooling or switching to public transportation can help to reduce your carbon footprint and mitigate these kinds of climate change impacts. Superstorms quote - http://climate365.tumblr.com/image/45911815260 Take the bus - https://www.youtube.com/watch?v=zfkIh_4ZaNs	LS2.C Ecosystem Dynamics, Functioning and Resilience LS4.D Biodiversity and Humans ESS3.A Natural Resources ESS3.C Human Impacts on Earth Systems ESS3.D Global Climate Change
8				Reduce meat consumption	Sea Level Rise means less space on breeding beaches for seals and sea lions leading to moms and pups being separated before they are ready. Reducing your consumption of meat even by one meal per week can make a substantial reduction to current warming trends by reducing CO2 outputs in meat production and transport. Thermal Expansion - https://www.youtube.com/watch?v=Jm6Mf9RPVUY Bay Area Sea Level Rise - http://data.prbo.org/apps/ocof/index.php?page=flood-map World Wide Sea Level Rise - http://sos.noaa.gov/Datasets/dataset.php?id=184 Meatless Monday Infographic - https://gardein.com/meatless-monday/ http://www.meatlessmonday.com/take-the-meatless-monday-pledge-for-food-day-2015/	

9	Environmental Action	Theoretical, hypothetical and abstract thought develop. Strategy and planning become possible.	Now that abstract thought is developed, it is possible to explore global concepts. Once a sense of agency has been established, solutions can be incrementally placed in their hands. What issues are most compelling to them? What solutions can they imagine?	Buy local	<p>Ocean Acidification impacts our patients because it leads to increases in harmful algae blooms that produce toxins. These toxins work their way up the food chain making marine mammals and even humans sick. Buying local is one way to reduce transportation related CO2 emissions meaning less CO2 in the ocean and less acidification. It also supports local business and often means less packaging too!</p>	<p>Ocean Acidification Comic - http://shermanslagoon.com/comics/October-10-2014/</p> <p>Ocean Acidification Animation - https://www.youtube.com/watch?v=Wo-bHt1b0sw</p> <p>Domoic Acid Attack - https://www.youtube.com/watch?time_continue=2&v=123k3Ao53T0</p> <p>Buy local - http://www.elocal.com/infographics/why-buy-local.html</p>	<p>LS2.C Ecosystem Dynamics, Functioning and Resilience</p> <p>LS4.D Biodiversity and Humans</p> <p>ESS2.D Weather and Climate</p> <p>ESS3.A Natural Resources</p> <p>ESS3.C Human Impacts on Earth Systems</p> <p>ESS3.D Global Climate Change</p>
10				Switch to renewable energy	<p>TMMC uses Solar Panels to save energy and money by using the sun's energy, which is renewable, meaning that it exists in infinite amounts and won't run out. You can do this in your home or you can purchase solar energy from others that produce more than they use. The solar panels also help reduce our use of fossil fuels and output of CO2 to mitigate climate change.</p>	<p>Global Warming - http://climate.nasa.gov/climate_resources/28/</p> <p>MCE - https://www.mcecleanenergy.org/</p> <p>Google Project Sunroof - https://www.google.com/get/sunroof#p=0</p>	
11				Self-directed action based on interests	Education/Patient Stories	<p>https://www.facebook.com/NASA/photos/a.10151367442216772.490373.54971236771/10151391212036772/?type=3@theater</p>	
12				Self-directed action based on interests	Research/Patient Stories	<p>California Drought - http://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=30521</p> <p>Projected Drought - svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4270</p>	
				Other Action Ideas	Buy energy star appliances, energy efficient windows, improve insulation, combine errands to reduce number of trips, write your political representatives	<p>Ocean oxygen - https://vimeo.com/173739456</p>	