

Course Schedule



Week 1: Class Introduction	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none">■ Use this forum to tell your classmates a little about yourself. Please also share your learning goals for the semester. <p>Lectures</p> <p>Lecture 1: Introductions - https://www.youtube.com/watch?v=opgE06eI9AE Lecture 1: Syllabus Review - https://www.youtube.com/watch?v=6ZewN4czSy0 Lecture 2: Intros Continued (Part 1 of 2) - https://www.youtube.com/watch?v=2s-TfnU8Irc Lecture 2: Intros Continued (Part 2 of 2) - https://www.youtube.com/watch?v=qVamSohxYvw</p> <p>Assignments/Activities</p> <ul style="list-style-type: none">■ Week 1 Quiz<ul style="list-style-type: none">■ Question 1: Of the materials and artifacts discussed in class this far, which one(s) are you most passionate about recycling? We will use this information to assign research tasks and hands-on tasks throughout the semester.■ Question 2: Do a little independent research and see if you can find an estimate of the volume and mass that... ..makes on a daily basis.<ul style="list-style-type: none">■ A. the average human■ B. the average US citizen, and■ C. the average Montanan
Week 2: Introduction to Recycling Technology	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none">■ In this forum, I would like you to post a photograph of your own waste stream. This week we will be accounting for and triaging artifacts and materials in the Missoula College bullpen with the goal of being zero waste. Each of the items will be “owned” by an individual at the end of the week and passed along to another entity who values the artifact or material more than the original owner. Please post a photo along with a brief discussion of your methods.■ For those of you who visited the recycling center today, please share your notes and photos here. <p>Lectures</p> <p>Lecture 3: Cradle to Cradle (part 1 of 3) – https://www.youtube.com/watch?v=nuzQ0541EBI Lecture 3: Drafting a Recycling Policy (part 2 of 3) – https://www.youtube.com/watch?v=oQ4giQpRvSc</p>



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Lecture 3: Review (part 3 of 3) – <https://www.youtube.com/watch?v=nTee17WcVps>
Lecture 4 (part 1 of 1) - <https://www.youtube.com/watch?v=CmEeo21orls>

Assignments/Activities

- Week 2 Quiz
 - Question 1: How many types of nay-sayers were discussed in Lecture 4?
 - Question 2: What is the name of the recycling coordinator at UMontana?
 - Question 3: How much does the University of Montana pay each year to its landfill service?
 - A. \$120,000
 - B. \$1,000,000
 - C. \$400,000
 - D. \$220,000
 - Question 4: How much money does UMontana spend on its recycling station per year?
 - A. \$400,000
 - B. \$20,000
 - C. \$120,000
 - D. Nothing. It is subsidized by the State.
 - Question 5: How much does the University earn on its recycled materials per year?
 - A. \$1,000 to \$1,500
 - B. \$10,000 to \$15,000
 - C. \$120,000 - \$125,000
 - D. Nothing. It's all donated.
 - Question 6: The three B's discussed in lecture are burn, bury, and _____.
 - Question 7: What are the first two words in the title of Professor Layton's book?

Week 3:

Forum Prompt/Statement

- Let's use this week to start getting more quantitative. Grab your favorite material and look at what it takes to purify it and shape it into an artifact. A good place to start is this wiki on Embodied Energy:
https://en.wikipedia.org/wiki/Embodied_energy

Lectures

Lecture 5: Forum Catch Up (1 of 4) – <https://www.youtube.com/watch?v=EcMQbRMXack>
Lecture 5: Energy Density (2 of 4) – <https://www.youtube.com/watch?v=UNVFaxMCqUM>



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	<p>Lecture 5: Embodied Energy of Plastic (3 of 4) – https://www.youtube.com/watch?v=sDkkZXskGsc</p> <p>Lecture 5: Embodied Energy (4 of 4) – https://www.youtube.com/watch?v=OKtaH1dOlvg</p> <p>Lecture 6: Embodied Energy of Gold Refining (1 of 2) – https://www.youtube.com/watch?v=N0cyU9-Ml64</p> <p>Lecture 6: Forum (part 2 of 2) - https://www.youtube.com/watch?v=Q5Cc2nYyR8E</p> <p>Assignments/Activities</p> <ul style="list-style-type: none"> ■ Week 3 Quiz <ul style="list-style-type: none"> ■ Question 1: What technological achievement is discussed in the opening paragraphs of Ch 1 of Cradle to Cradle? <ul style="list-style-type: none"> ■ A. the first steel foundry ■ B. the first landfill ■ C. the Titanic ■ D. the automobile ■ Question 2: A hospital is considering adding a pyrolysis unit. Given that the hospital disposes of 1000 kg of waste per day and that the energy density of solid waste is 10 MJ/kg, how much thermal power could the unit generate? Give answer in kW.
<p>Week 4: Landfill Practices</p>	<p>Forum Prompt/Statement</p> <p>Please use the forum to discuss the current state of the art in landfilling, as well as strategies for moving away from this suboptimal practice.</p> <p>Lectures</p> <p>Lecture 7: Landfill (part 1 of 2) – https://www.youtube.com/watch?v=NV5-GXzjOg</p> <p>Lecture 7: Landfill (part 2 of 2) - https://www.youtube.com/watch?v=wzF4TPsD72Q</p>
<p>Week 5: Glass</p>	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none"> ■ How craft Beer Brewers Brought Bottle Recycling to Montana http://www.alternet.org/environment/craft-beer-brewers-have-brought-bottle-recycling-montana <p>Lectures</p> <p>Lecture 10 (part 1 of 4) – https://www.youtube.com/watch?v=SyOGglkid04</p> <p>Lecture 10: Forum (part 2 of 4) – https://www.youtube.com/watch?v=3AtybogQTdw</p>



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	<p>Lecture 10: Forum (part 3 of 4) – https://www.youtube.com/watch?v=PhIghakmvFE Lecture 10: Forum (part 4 of 4) – https://www.youtube.com/watch?v=PhIghakmvFE</p> <p>Assignments/Activities</p> <ul style="list-style-type: none">■ Week 5 Quiz<ul style="list-style-type: none">■ Question 1: Using the specific heat equation, $K = c_p m (T_H - T_L)$, where E is energy, c_p is the specific heat capacity of water, T_H = the high temp, and T_L is the low temp, find the additional embodied energy on a per bottle basis if it takes 200 gallons of water that begins a cycle at 20 C and is heated to 100 C to wash 100 bottles? Give your answer in kJ. For example if the answer is 102 kJ, you would enter 102.
<p>Week 6: Cellulosic Materials</p>	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none">■ Use this space to discuss best practices on cellulosic material recycling: compost, insulation, waste to energy, etc. <p>Lectures</p> <p>Lecture 11: Forum Review (part 1 of 3) – https://www.youtube.com/watch?v=scZmcFLcMLI Lecture 11: Embodied Energy Follow-up (part 2 of 3) – https://www.youtube.com/watch?v=2qgci0BcNsA Lecture 11: Cellulose (part 3 of 3) - https://www.youtube.com/watch?v=AuvMdbVrVuk</p> <p>Assignments/Activities</p> <ul style="list-style-type: none">■ Week 5 Quiz<ul style="list-style-type: none">■ Question 1: Match the author with his or her quote or prediction<ul style="list-style-type: none">■ Author Options: Mathus, Marsh, Thoreau, Godwin, Carson, Leopold■ Quote/Prediction 1: Wildness is the preservation of the word■ Quote/Prediction 2: Silent Spring■ Quote/Prediction 3: Population: The first Essay■ Quote/Prediction 4: Lasting destruction on the environment■ Quote/Prediction 5: Humankind's perfectibility■ Quote/Prediction 6: Guilty feelings of environmentalism



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<p>Week 7: Metals I</p>	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none"> ■ This week I would like everyone to do a little bit of independent research on the exchange rates of metals. Please track your progress, include any correspondence, and come up with some prices as well as estimates as to how much money in the metal of your choice Missoula deposits into the landfill on an annual basis. <p>Lectures</p> <p>Lecture 13: Forum (part 1 of 2) – https://www.youtube.com/watch?v=kgIFHXJXZIM Lecture 13: Metals (part 2 of 2) – https://www.youtube.com/watch?v=VBuX1rhLkUM Lecture 14: OSHA and Forum (part 1 of 3) – https://www.youtube.com/watch?v=yEDwNx5V3kg Lecture 14: Metals and Toxicity (part 2 of 3) - https://www.youtube.com/watch?v=yvRTp2NutvA Lecture 14: Metals Composition and Pricing (part 3 of 3) - https://www.youtube.com/watch?v=Tvw6JZp_vlw</p>
<p>Week 8: OSHA 10</p>	<p>OSHA 10 All Day Course</p>
<p>Week 9: Midterm</p>	<p>Lectures</p> <p>Lecture 17: Forum (part 1 of 2) - https://www.youtube.com/watch?v=i_M-kpHI3uE Lecture 17: Midterm (part 2 of 2) - https://www.youtube.com/watch?v=ZDWdMfKGv50 Lecture 18: Syllabus Review Zero Waste Made Fair (part 1 of 3) - https://www.youtube.com/watch?v=B8zYgWQAxNM Lecture 18: Lord Kelvin (part 2 of 3) - https://www.youtube.com/watch?v=B8zYgWQAxNM Lecture 18: Midterm (part 3 of 3) - https://www.youtube.com/watch?v=ibJFsOFN2is</p> <p>Assignments/Activities</p> <ul style="list-style-type: none"> ■ Midterm <ul style="list-style-type: none"> ■ Question 1: In Chapter 3, who stated that the growth of industry for the sake of the growth of industry is a cancer? ■ Question 2: Write an essay on one of the following or a combination of the three: <ul style="list-style-type: none"> ■ 1) Aspects of recycling you are optimistic about. ■ 2) Aspects of recycling you are pessimistic about.



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	<ul style="list-style-type: none">■ 3) A quantitative self-assessment of what you're doing to be part of the solution■ Question 3: What furniture manufacturer did the authors design a building for?■ Question 4: According to the authors of Cradle to Cradle, what is "love of the outdoors?"■ Question 5: You have decided to go into the aluminum can recycling business. Your truck costs \$1.00 per mile to operate and it's five miles to your can purchaser (10 miles round trip). Aluminum cans have a mass of 15 grams each and aluminum is selling at \$0.25 per pound. How many cans do you need to collect to make the venture break even?
Week 10: Plastics	<p>Lectures</p> <p>Lecture 19: Toxicity of PVC Research (part 2 of 2) - https://www.youtube.com/watch?v=OeLgxOMMz6M</p> <p>Lecture 19: HDPE and LDPE (part 1 of 2) - https://www.youtube.com/watch?v=DmwSeVyTSJQ</p> <p>Lecture 20: Plastics Intro with Edi Stan (part 1 of 3) - https://www.youtube.com/watch?v=5gHw9adKv5w</p> <p>Lecture 20: Plastics Demonstration (part 2 of 3) - https://www.youtube.com/watch?v=ycy9ikMJgEU</p> <p>Lecture 20: Plastics: Questions and Conclusions (part 3 of 3) - https://www.youtube.com/watch?v=hdVOSRSCFlg</p> <p>Assignments/Activities</p> <ul style="list-style-type: none">■ Week 10 Quiz<ul style="list-style-type: none">■ Question 1: What unique animal was mentioned at minute 25 during one of the lecture recordings for lecture 19?■ Question 2: What materials were discussed during the Week 10 Lectures?■ Question 3: Match each Chemical with its description (Answer Choices: HDPE #2, PETE #1, LDPE #4, PP #5, PS #6, PVC #3)<ul style="list-style-type: none">■ $(C_2H_3Cl)_n$■ $(C_2H_4)_n$ branch-chained■ $(C_2H_6)_n$■ $(C_2H_8)_n$■ $(C_2H_4)_n$ long-chained■ $(C_{10}H_8O_4)_n$■ Question 4: Which of the following is NOT an element found in doxins?

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	<ul style="list-style-type: none"> ■ Chlorine ■ Nitrogen ■ Carbon ■ Hydrogen ■ Oxygen ■ Question 5: Which of the following is not a valid reason for landfilling a material or artifact at the University of Montana: <ul style="list-style-type: none"> ■ Too much #5 plastic in a recycling bag ■ An opaque bag ■ Observation of a health hazard ■ Glass present ■ Question 6: Which of the following did Edi Stan not use or recommend using during his recycling demonstration? <ul style="list-style-type: none"> ■ Eye protection ■ Ear protection ■ Rubber gloves ■ Dust mask ■ Leather gloves ■ Apron
<p>Week 11: Organic Waste</p>	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none"> ■ How does the message in this video pertain to recycling? https://www.youtube.com/watch?v=GOrWy_yNBvY <p>Lectures</p> <p>Lecture 21: CHON (part 1 of 2) – https://www.youtube.com/watch?v=1yR25EAjoGk</p> <p>Lecture 21: Dilution vs. Concentration (part 2 of 2) – https://www.youtube.com/watch?v=lv6GXMbV8z4</p> <p>Lecture 22: Big Picture on Organics (part 1 of 4) – https://www.youtube.com/watch?v=MUHEbDs-ecE</p> <p>Lecture 22: OSHA (part 2 of 4) – https://www.youtube.com/watch?v=4wbz9TvKM-Y</p> <p>Lecture 22: New Biomass (part 3 of 4) – https://www.youtube.com/watch?v=i1WLbDwhags</p> <p>Lecture 22: Econ of Chipping (part 4 of 4) - https://www.youtube.com/watch?v=ZiumUJLXykk</p> <p>Resource Material</p>



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	<p>BioGas Production - http://www.motherearthnews.com/renewable-energy/other-renewables/biogas-generator-zm0z14aszrob.aspx</p> <p>Assignments/Activities</p> <ul style="list-style-type: none">■ Week 11 Quiz<ul style="list-style-type: none">■ Question 1: Which of the following is not a potential issue with industrial fertilizers? Cradle to Cradle Ch 4<ul style="list-style-type: none">■ A. Labor intensive■ B. No return of nutrients to soil■ C. Radioactive phosphate■ D. Cadmium■ Question 2: What is the name of the author of the biomass paper from lecture 22?■ Question 3: How many J/K are produced by a biomass plant that burns through 10,000 BTU of fuel at an atmospheric temperature of 250 k?■ Question 4: According to Schramski et al (2015), how many years of biomass remain on planet earth at our current rate of consumption?
<p>Week 12: Electronic Waste</p>	<p>Forum Prompt/Statement</p> <ul style="list-style-type: none">■ Use this space to discuss E-Waste or any other Week 12 topic. <p>Lectures</p> <p>Lecture 23: Quiz 4 Review (part 1 of 3) - https://www.youtube.com/watch?v=wdzW3NUARrU</p> <p>Lecture 23: Forum Review (part 2 of 3) - https://www.youtube.com/watch?v=qRcuAkXfkME</p> <p>Lecture 23: Project Review (part 3 of 3) - https://www.youtube.com/watch?v=0tYPUi89ACs</p> <p>Lecture 24: E Waste (part 1 of 2) - https://www.youtube.com/watch?v=EOtG6-9d2eE</p> <p>Lecture 24: E Waste (2 of 2) - https://www.youtube.com/watch?v=UgvfVV7KQxI</p> <p>Lecture 12.5 Review (part 1 of 2) - https://www.youtube.com/watch?v=Y8Fu-DKxsuw</p> <p>Lecture 12.5: Made Fair Response (part 2 of 2) - https://www.youtube.com/watch?v=Y8Fu-DKxsuw</p> <p>Assignments/Activities</p> <ul style="list-style-type: none">■ Week 1 Quiz<ul style="list-style-type: none">■ Question 1: Which of the following is a form of energy not likely to be used in recovering and recycling electronic waste?<ul style="list-style-type: none">■ A. Chemical



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	<ul style="list-style-type: none"> ■ B. Mechanical ■ C. Thermal ■ D. Nuclear ■ Question 2: What is the current price of gold? Give your answer in \$/oz. Do not include the units, only the number. ■ Question 3: What is the last name of the student who led the E-Waste project during the 2013 Practicum?
Week 13: HAZMATs	<p>Lectures</p> <p>Lecture 25: Forum Review (part 1 of 2) - https://www.youtube.com/watch?v=1XLN1VHA0nw</p> <p>Lecture 25: HAZMAT and Research Strategy (part 2 of 2) - https://www.youtube.com/watch?v=P2qb1YA2GiE</p> <p>Lecture 26: HAZMAT Thermogravimetric (part 1 of 1) - https://www.youtube.com/watch?v=k237NQkifRc</p>
Week 14: Towards a Solar Forge	<p>Lectures</p> <p>Lecture 27: Solar Forge (part 1 of 1) - https://www.youtube.com/watch?v=b8dTmc0mNfk</p> <p>Lecture 28: Final and Paper (part 1 of 3) - https://www.youtube.com/watch?v=b8dTmc0mNfk</p> <p>Lecture 28: Finals and Paper (part 2 of 3) - https://www.youtube.com/watch?v=UOh3rTfXzA4</p> <p>Lecture 28: Final Exam and Paper (part 3 of 3) - https://www.youtube.com/watch?v=YfyFKYK5k8c</p>
Week 15: Finals	<p>Final Paper Materials</p> <p>Final Paper Template</p> <p>Assignments/Activities</p> <ul style="list-style-type: none"> ■ Final Exam <ul style="list-style-type: none"> ■ Question 1: In Ch 5, McDonough & Braungart state that while the fittest may survive, the _____ thrive. ■ Question 2: On the first page of Ch 5, what do the authors say “broke loose”? ■ Question 3: According to the bibliography, who authored <i>The Earth Dwellers</i>?



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	<ul style="list-style-type: none">■ Question 4: In Ch 5 what group of youths grew up in tents and were trained to build solar-thermally efficient structures with local materials?■ Question 5: What name does biologist John Todd give to systems designed to process human biological waste?■ Question 6: What are the Indiana residents mentioned in Ch 5 careful not to mix in their waste stream?<ul style="list-style-type: none">■ A. Business and pleasure■ B. Water and oil■ C. Acids and bases■ D. Technological and biological materials■ Question 7: Who wrote <i>Inquiry into the Nature and Causes of the Wealth of Nations</i>?
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