

# (DE) CONSTRUCT MY TECHNOLOGIES, GRADE 8

OTTO WEVERS (/USERS/OTTO-WEVERS)

**Strand(s) and Unit(s):** Addresses components of: Understanding Structures and Mechanisms: Systems in Action; Understanding Matter and Energy: Fluids

**Overview:** Students will learn to describe mechanisms and how to reverse engineer (deconstruct or dissect) a technology of their choice and present it as a poster. I would not suggest other forms at this point because the poster can be easily accessed in the classroom as an exemplar for following years and provides a high level of proof that an actual technology has been explored rather than a compilation of virtual dissections. They will complete a case study of a business enterprise that solves a developing world social issue for women and girls. Students will then consider how to make a better world through an innovation or invention they identify and create a potential business which they will present in a Dragon Den style format to the class and potentially to the Dragon Den.

## Inquiry Focus

**Key Words:** Product, service, input, output, forces, energy changes, components, materials, lifecycle, benefits, drawbacks, optimization, design, ergonomics, 1<sup>st</sup> law of thermodynamics.

## Key Questions

What is the function of the technology?

Why is this technology (could be a product or service) designed and made this way?

How does it serve a purpose for benefitting humans, other living things and the environment?

What are the benefits and drawbacks of this technology?

What is the true cradle to grave lifecycle of this technology so we can fully evaluate the cost of its use?

## Introductory Hook

Have you ever wondered what was inside the technologies you use every day and how to make money from that? In this series of 3 activities you will be able to dissect a technology of your choice, analyse it for its components, inputs and outputs. Secondly, do a case study of a company that wants to reduce the 4 million deaths from cooking fires each year by bringing energy to everyone with cleaner fire and thermocouple technology. Finally, using what you have learned about technologies, innovate a current product or invent a product that will make the world a slightly better place and market it to investors at the Dragon's Den.

## Timeline

2-3 periods for teacher directed learning about how to analyse technologies, safety considerations in deconstruction, life cycles and the marking rubrics and their interpretation.

The student inquiries, part 1 (deconstruct), part 2 (business case study) and part 3 (invent or innovate) could be done in 2-3 50 minute periods each.

A ½ period gallery walk for the posters is the most efficient way to share the dissection poster product.

## Big Ideas

Technology can be a product or a service to meet human needs and wants (this one focuses on products). Technologies have benefits and drawbacks that are optimized on very complex competing priorities including aesthetics, costs of materials and manufacturing and other values such as profit, worker needs, environmental concerns and life cycle consequences. The laws of thermodynamics apply to all technologies.

## Key Concepts

The **first law of thermodynamics** basically states that energy is conserved; it can neither be created nor destroyed, just changed from one form to another. The energy in a system can do work, be converted to heat energy and sound energy, but you always have the same total amount of energy that you started with

Technology is a product or service that has at its fundamental goal to meet human needs and wants more efficiently or comfortably.

Technological Design is the process of invention or innovation and is about making new or more efficient products or services that will also have less negative impacts on humans and the environment and be more sustainable than currently available products.

## Prior Skill Sets

Able to identify how components are connected together physically (glue, tape, screw, rivet, nut and bolt, latch and catch, friction) so that technologies can be taken apart.

Able to search for YouTube tear-down or analysis videos or find exploded view diagrams for their technology product. For example: [https://www.youtube.com/watch?v=0s\\_zg4\\_DZp8](https://www.youtube.com/watch?v=0s_zg4_DZp8) ([https://www.youtube.com/watch?v=0s\\_zg4\\_DZp8](https://www.youtube.com/watch?v=0s_zg4_DZp8))

Safe use of tools for deconstruction and construction of products (see STAO's *Safety in Elementary Science and Technology*, resource for planning and teaching safety [stao.ca/res2/unifElemSafety/document.pdf](http://stao.ca/res2/unifElemSafety/document.pdf) ).

Presentation skills to present and pitch their product.

## Prior Knowledge

Know the 1<sup>st</sup> law of Thermodynamics.


Be able to identify energy inputs, energy outputs, amount of work done, energy losses to friction, sound and heat.




Be able to identify kinetic and potential energy and their transformations (including losses to heat and sound or friction) in a machine.

Be able to identify and make use of simple machines and electrical circuits to create a new or improved machine (grade 4 and grade 6).

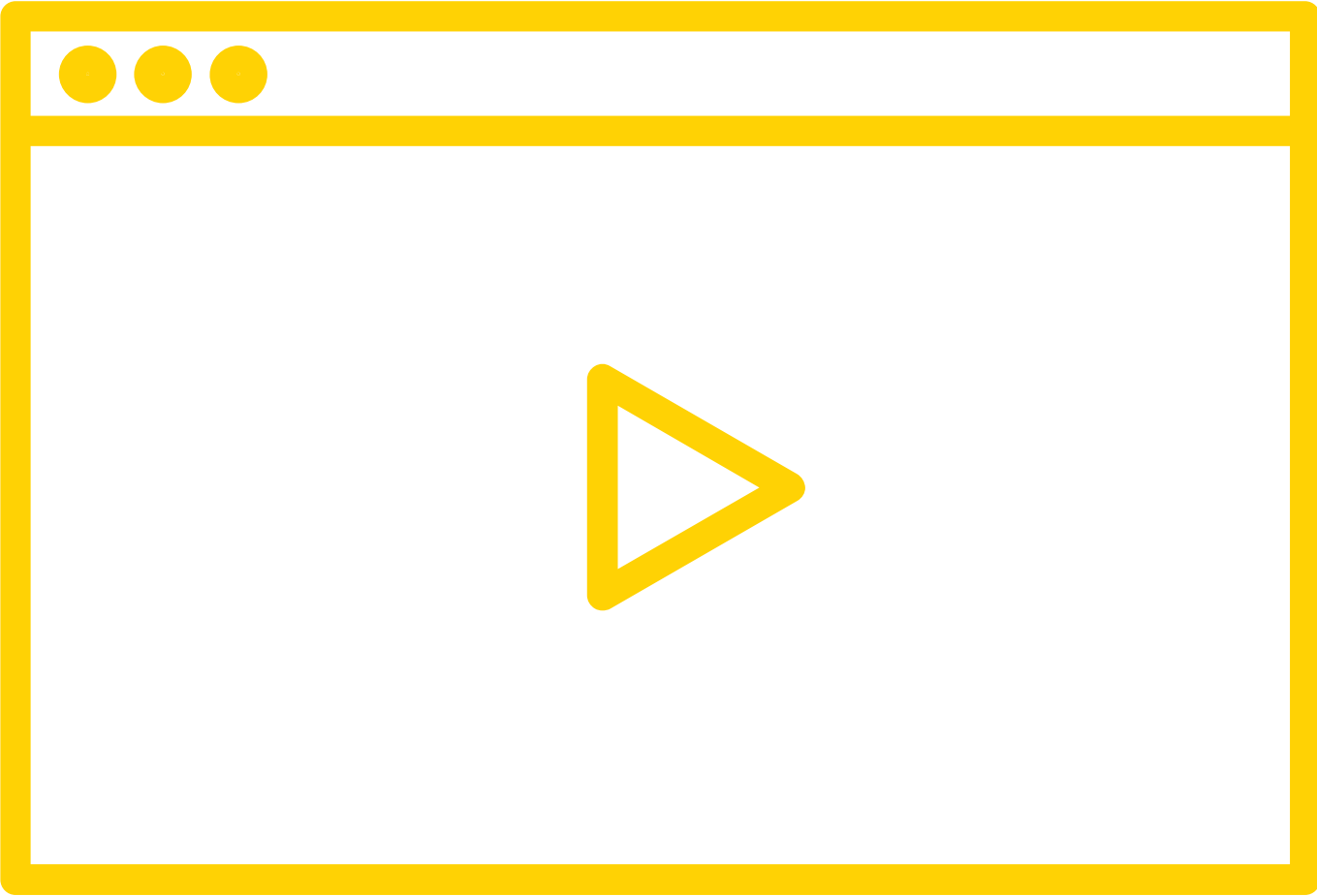
Please see the file in file resources at the right "Complete teaching notes, suggestions and plan" for more details and student deconstruction exemplars.



  
(mailto:  
subject  
out



this  
(http://stao.ca/files/  
https://connex.stao.ca/  
catalyst/grade-8/de-construct-my-technologies-grade-8)  
my-my-my-my-technologies-grade-8)  
grade-8) 8) 8) 8)








WATCH THE VIDEO


01:44 min

(//www.youtube.com/embed/XKdACLZ\_WWI?width=800&height=450&iframe=true)

RESOURCES

-  cell phone life cycle example (<http://www.mass.gov/eea/docs/dep/recycle/reduce/06-thru-l/life-cell.pdf>)
-  cell phone infographic ([https://www.epa.gov/sites/production/files/2015-06/documents/smart\\_phone\\_infographic\\_v4.pdf](https://www.epa.gov/sites/production/files/2015-06/documents/smart_phone_infographic_v4.pdf))
-  life cycle of a soccer ball ([https://www.epa.gov/sites/production/files/2015-09/documents/the\\_life\\_of\\_a\\_soccer\\_ball.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/the_life_of_a_soccer_ball.pdf))
-  Activity 1 Deconstruction of a technology ([https://connex.stao.ca/sites/default/files/part\\_1\\_technology\\_deconstruct\\_-1.final\\_\\_1.docx](https://connex.stao.ca/sites/default/files/part_1_technology_deconstruct_-1.final__1.docx))
-  Activity 2 Biolite Case Study ([https://connex.stao.ca/sites/default/files/part\\_2\\_biolite\\_case\\_study-1.final\\_\\_1.docx](https://connex.stao.ca/sites/default/files/part_2_biolite_case_study-1.final__1.docx))
-  Activity 3 Innovate a technology ([https://connex.stao.ca/sites/default/files/part\\_3\\_invent\\_or\\_innovate.final\\_\\_1.docx](https://connex.stao.ca/sites/default/files/part_3_invent_or_innovate.final__1.docx))
-  Overall Expectations rubric for Inquiry ([https://connex.stao.ca/sites/default/files/gr\\_8\\_system\\_inquiry\\_oe\\_assess\\_1.doc](https://connex.stao.ca/sites/default/files/gr_8_system_inquiry_oe_assess_1.doc))
-  Complete teaching notes, suggestions and plan ([https://connex.stao.ca/sites/default/files/gr\\_8\\_deconstruction-final.docx](https://connex.stao.ca/sites/default/files/gr_8_deconstruction-final.docx))

## ELEMENT


 Inquiry (/expert-elements/inquiry)



**RETURN**  
 (/classroom-catalysts) **TO CATALYSTS** (/classroom-catalysts)

**STAO/APSO WEBSITE** (<http://stao.ca/cms/>)  
**SEARCH** (/search)  
**PRIVACY POLICY** (/privacy-policy)  
**TERMS OF USE** (/terms-of-use)  
**CONTACT** (/contact)

 **FACEBOOK** (<https://www.facebook.com/STAOAPSO?fref=ts>)

 **TWITTER** (<https://twitter.com/staoapso>)

 **GOOGLE+** (<https://plus.google.com/u/0/+ScienceTeachersAssociationofOntarioDresden/about>)

 **INSTAGRAM** (<https://instagram.com/staoapso/>)

© 2015 STAO . ALL RIGHTS RESERVED