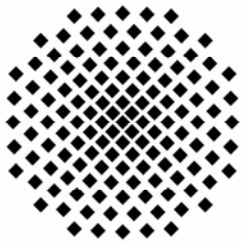
Steeluniversity.org



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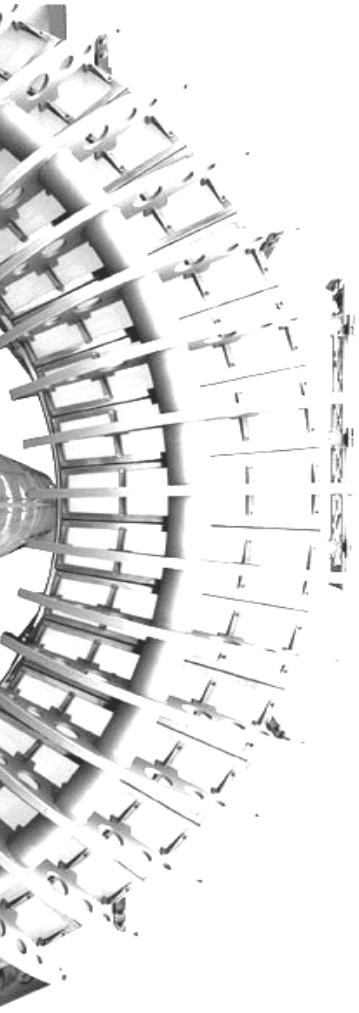
Life Cycle Engineering (GaBi)

www.LBPGaBi.uni-stuttgart.de



Steeluniversity.org:

A new Internet E-Learning Resource on Sustainability

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Project Manager, steeluniversity.org, International Iron and Steel Institute, Brussels, Belgium

3rd International Conference on Sustainable Development Indicators in the Minerals Industry (SDIMI 2007)

Milos, June 17-20, 2007

A new Internet E-Learning Resource on Sustainability

Overview

1 Motivation for steeluniversity.org

2 Aims, Objectives and Target Audiences

3 Structure of the E-Learning Resource – The Modules

4 The module “Sustainability”

5 Conclusion

A new Internet E-Learning Resource on Sustainability

Basis for steeluniversity.org

Need:

Comprehensive tool for knowledge transfer
combined with the challenge and fun of a game and realistic simulation of industrial processes

Form:

Freely-available web-based e-learning tool

⇒ www.steeluniversity.org

initiated and developed by IISI

steelmaking
steel products
steel applications
underlying scientific principles
associated sustainability issues
environmental issues

Motivation for an E-Learning Resource on Sustainability

Aims, Objectives & Target Audiences

- ✓ Recruitment of high calibre graduates into the steel industry
- ✓ Sustainability of ferrous metallurgy knowledge in academia / industry

- ✓ Excite students/teachers about steel; enhance image of steel industry
- ✓ Reduce in-company training costs
- ✓ Enhance knowledge transfer and collaboration between academia an industry

- ✓ Undergraduate students, their professors and lecturers
- ✓ Steel company employees, recent graduate recruits
- ✓ Researchers and technical experts in academia and steel industry supply chain

Structure of steeluniversity.org

The Modules

- Secondary Steelmaking
- Continuous Casting
- Materials Selection for Car Door Panels
- Steels in Construction
- Sustainability

…

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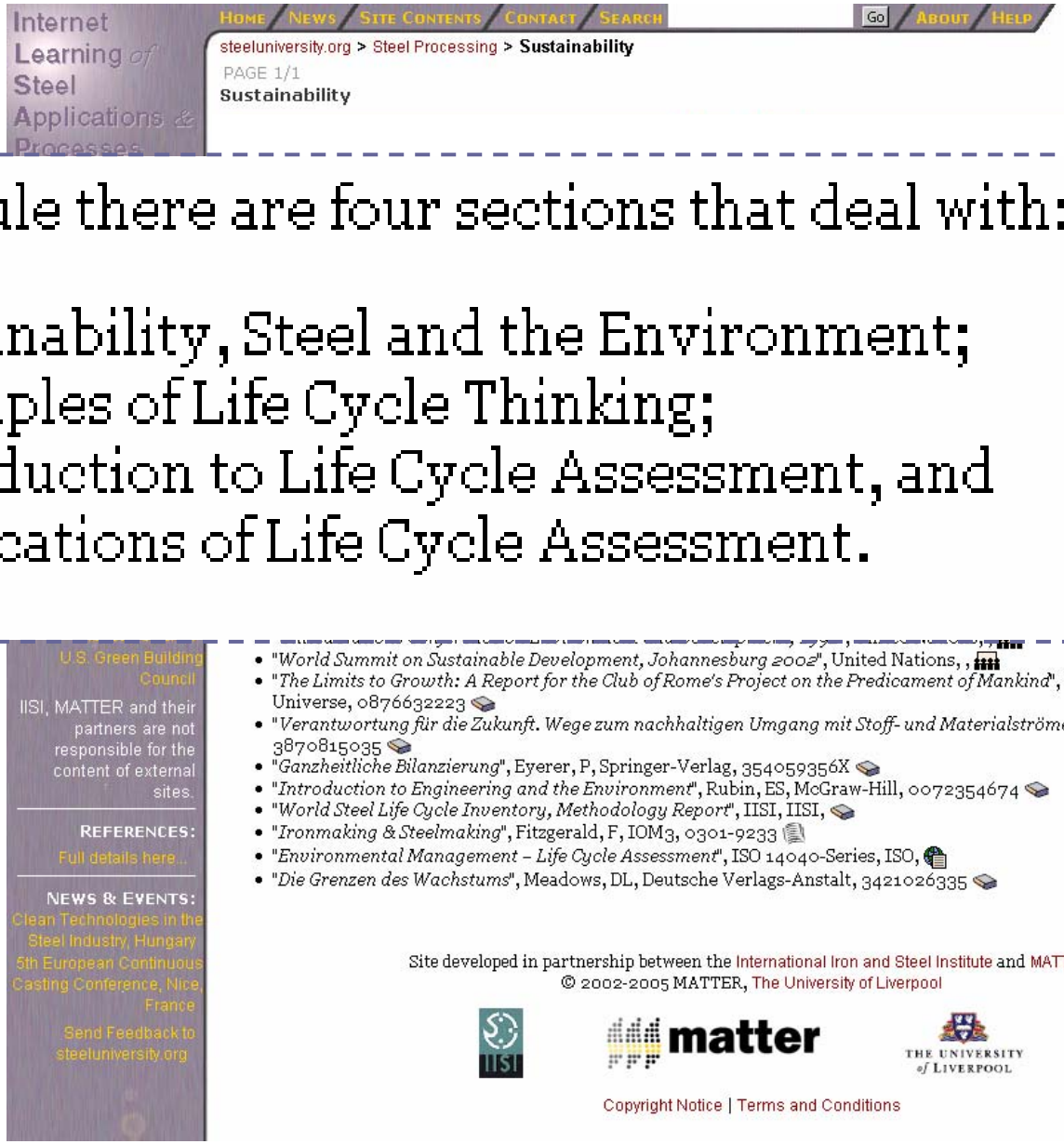
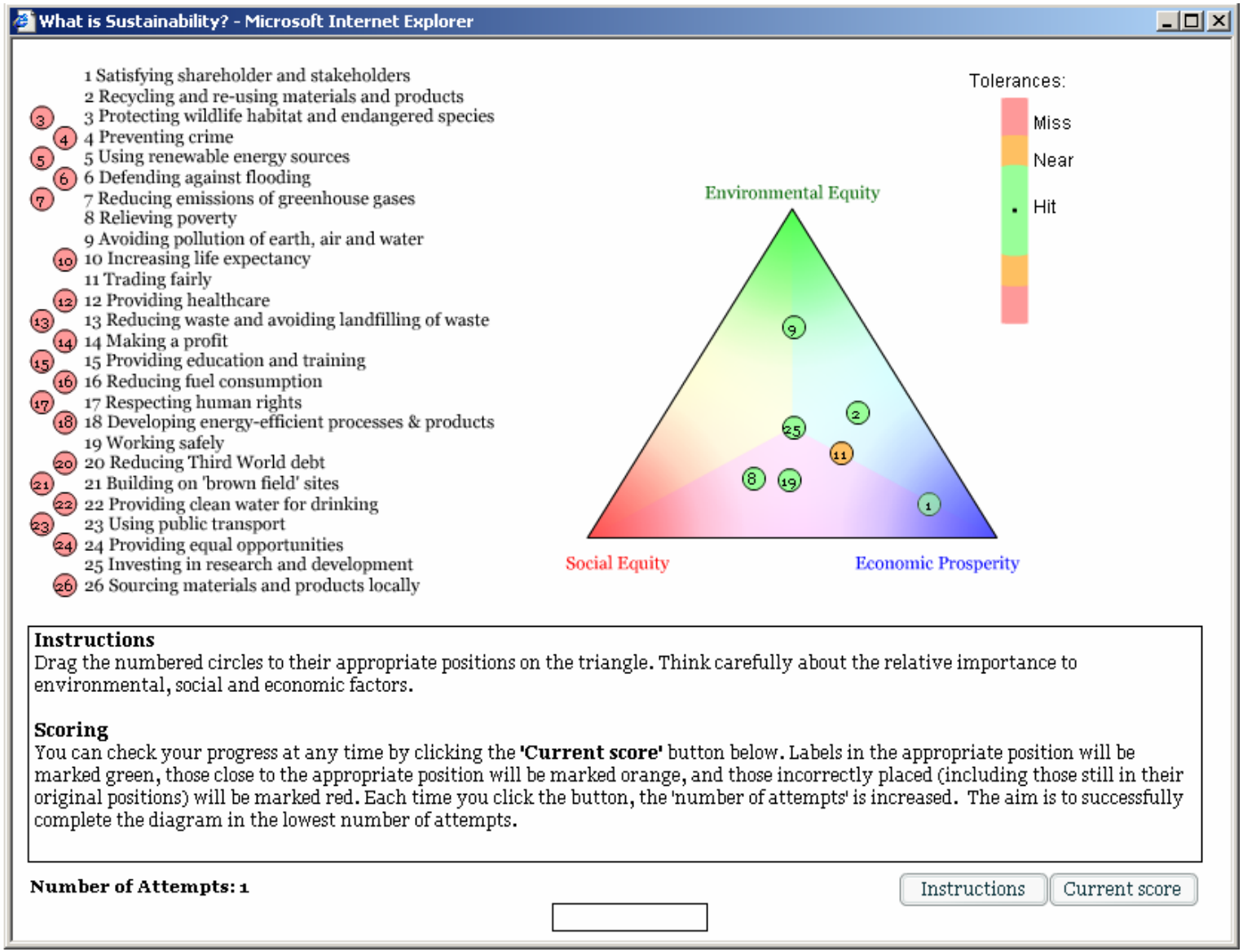
The module “Sustainability”



steeluniversity.org: The module “Sustainability”

Sustainability, Steel and the Environment

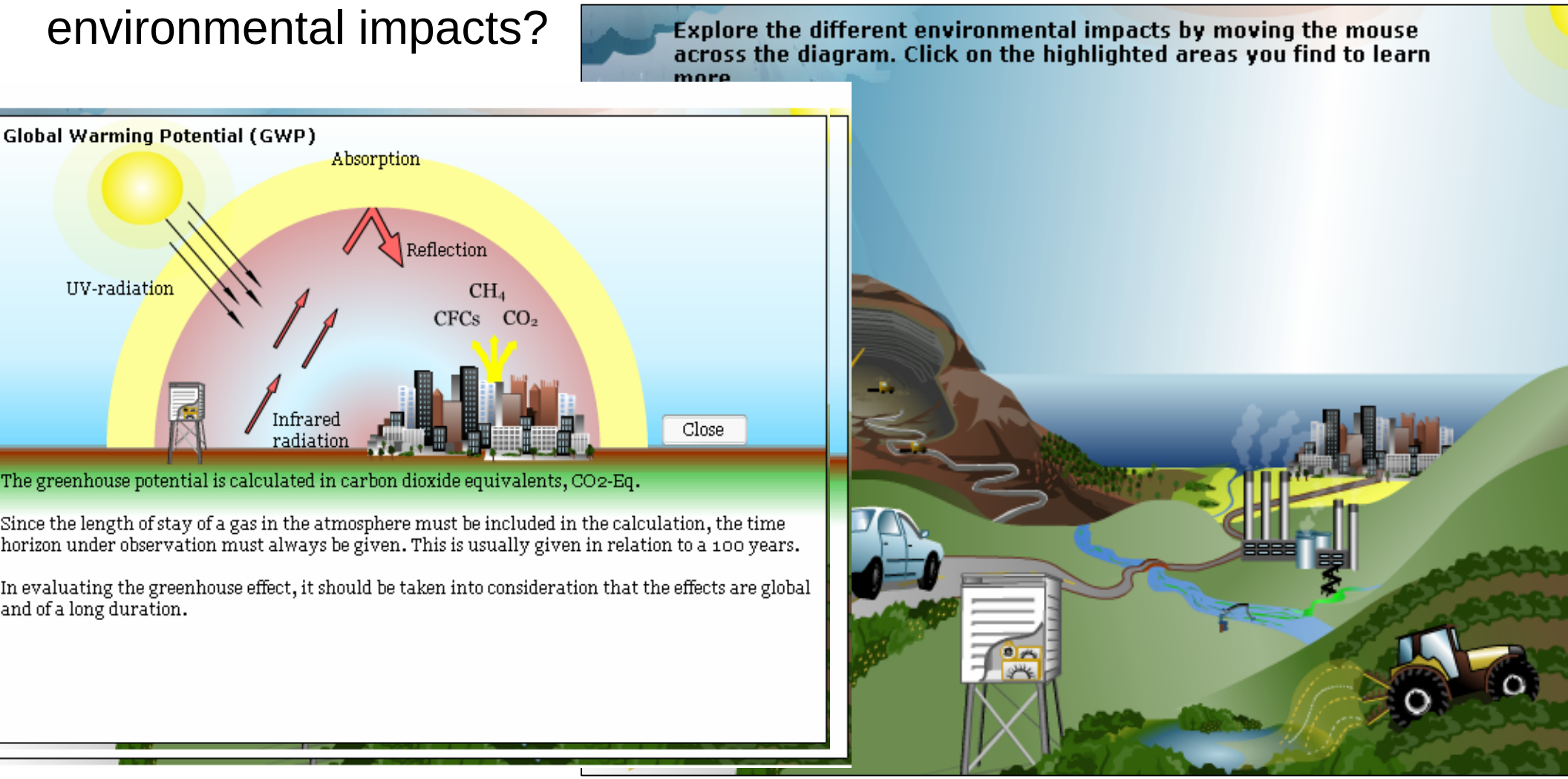
What is Sustainability?



steeluniversity.org: The module “Sustainability”

Sustainability, Steel and the Environment

What are the main environmental impacts?



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Sustainability, Steel and the Environment

IISI Sustainability Indicators

steeluniversity.org > Steel Processing > Sustainability > **Sustainability, Steel and the Environment**

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Section Contents...

Indicators of Sustainability

The International Iron and Steel Institute (IISI) has identified 11 indicators of sustainability and is using these to measure the contribution of the steel industry to sustainable development. These are:

- Investment in new processes and products (% turnover)
- Operating income (% turnover)
- Return on Capital Employed (% capital employed)
- Value Added (% total revenue)
- Greenhouse Gas emissions (tonnes CO_2 / tonne of crude steel produced)
- Material Efficiency (%)
- Energy Intensity (GJ / tonne crude steel)
- Steel Recycling(% crude steel produced)
- Environmental Management Systems (% total employees / contractors working in Registered Production Facilities)
- Employee Training (Training Days / employee)
- Lost Time Injury Frequency Rate (Frequency / 1,000,000 hours worked)

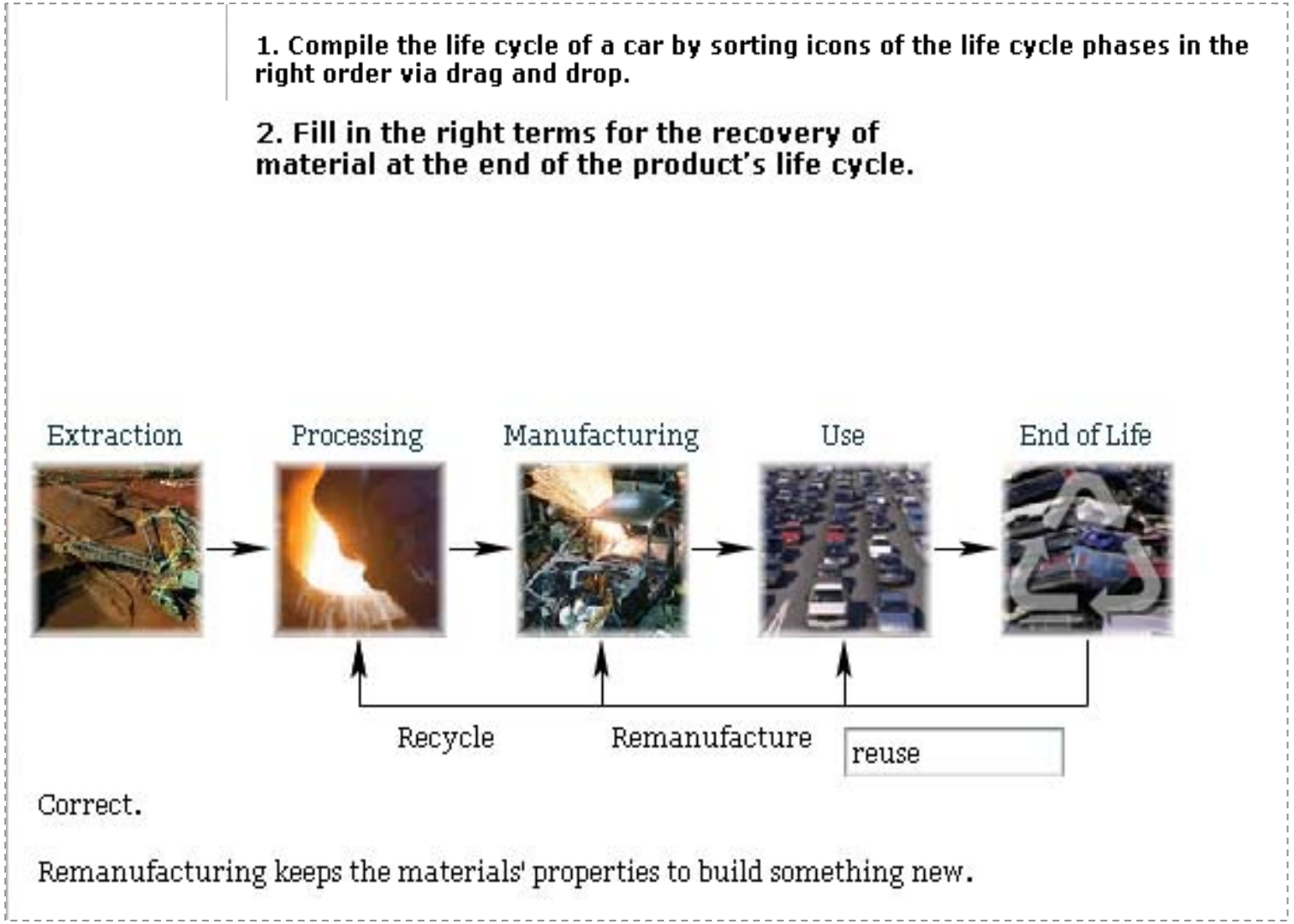
The latest report from IISI on "The Measure of Our Sustainability - Report of the World Steel Industry 2004" can be found at http://www.worldsteel.org/sustainability.php?page=report

steeluniversity.org: The module “Sustainability”

Principles of Life Cycle Thinking

he module
bout the life cycle
f steel products
ontains:

- ✓ Interactive exercises
- ✓ Lessons
- ✓ Queries
- ✓ Tests



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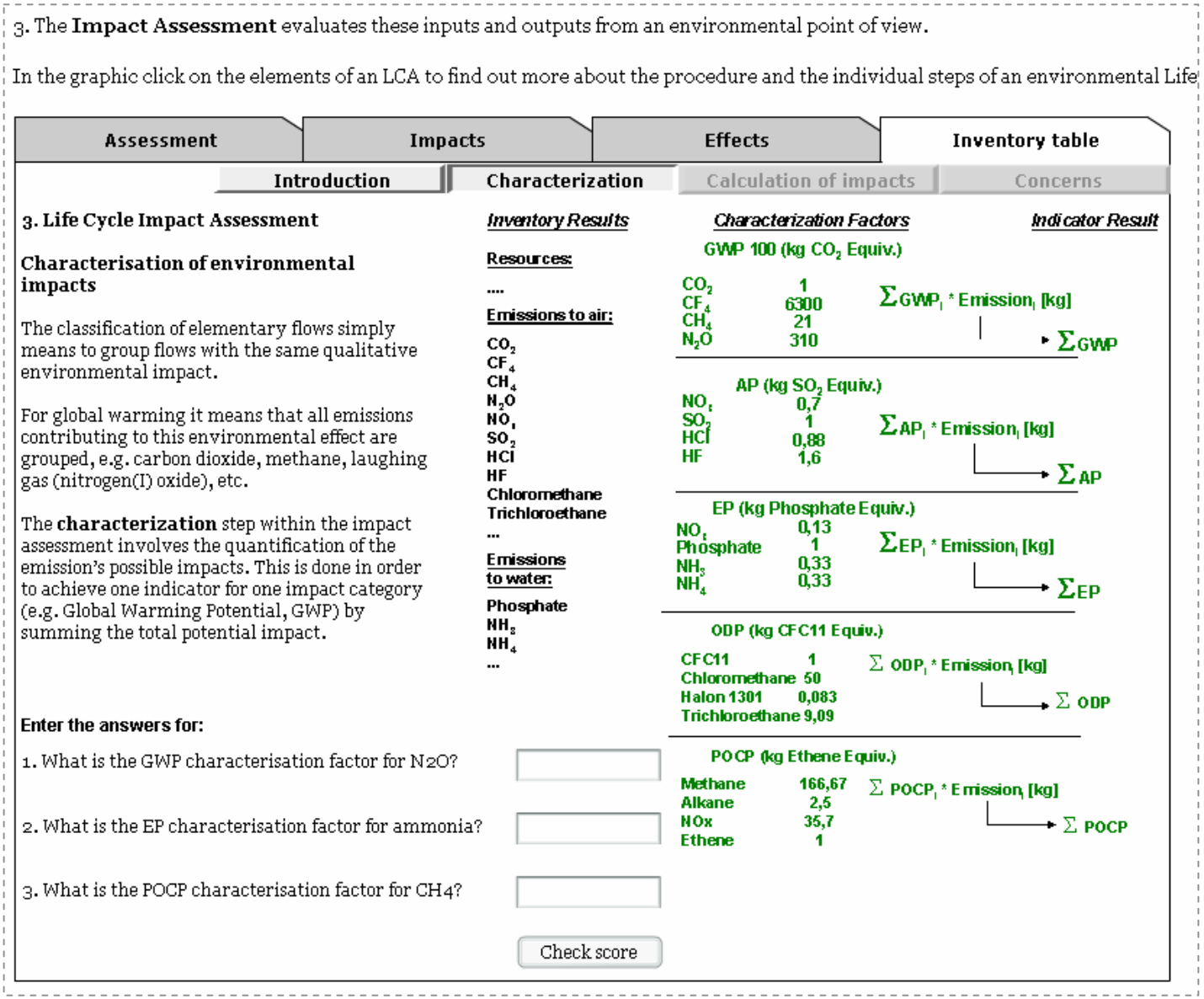
Introduction to Life Cycle Assessment

Lessons on methodology of Life Cycle Assessment:

- ✓ Goal & Scope
- ✓ Functional Unit
- ✓ System Boundaries
- ✓ Life Cycle Inventory Analysis
- ✓ Impact Assessment
- ✓ Interpretation of results



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Applications of Life Cycle Assessment

Examples from and exercises on steel, automotive and construction

of a Car: Consequences of Material Selection Decisions

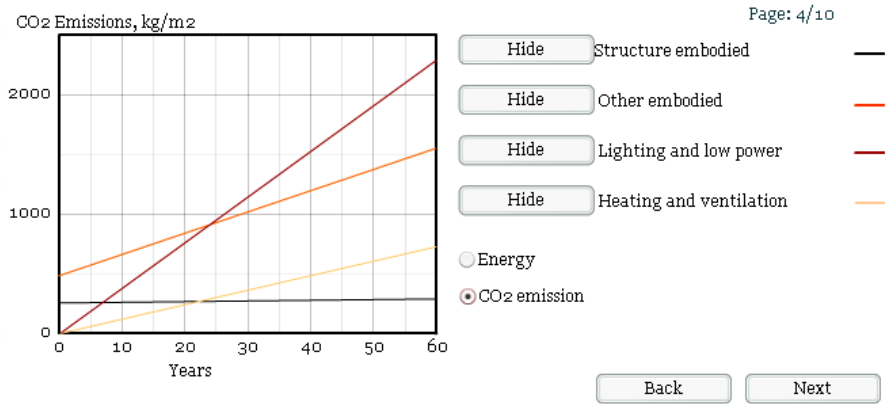
od example of how effective changing the material can be in reducing the onmental impact of a car is the use of higher strength steel to reduce the weight of a hereby reduce fuel consumption and hence emission of green house gases and the tion of the resources of oil.

as conducted an in-depth study (ULSAB AVC - Ultra Light Steel AutoBody nced Vehicle Concept) to show that the use of high strength steels and advanced notive manufacturing techniques, including hydroforming and laser welding, in a intensive vehicle is capable of providing significant weight reduction, improved conomy, a high level of safety and passenger comfort, at low cost – see worldautosteel.org

naterials used and the performance characteristics of each car are:

erials /kg	Conventional	ULSAB AVC
	91.34	40.75
	840.00	594.33
ron	154.13	47.83
Ferrous Metals	127.52	64.77
cs	150.02	126.55
Materials	180.68	123.37
Weight	1553.69	997.60
Vehicle, km	193,000	193,000
	Petrol	Petrol
Consumption		
/100 km	10.3	4.5
US)	22.8	52.4
Doors	4	4
Passengers	6	5
eration time to 100km/h /sec	10.7	13.9

LCA of a Building - Phase 2: Life Cycle Inventory



	Energy, GJ m⁻²							CO_2 Emissions, kg m⁻²						
Years	0	10	20	30	40	50	60	0	10	20	30	40	50	60
Slim-floor														
Structure Embodied	2.6	2.6	2.7	2.7	2.8	2.8	2.8	251	255	260	264	268	272	276
Other Embodied	6.2	8.6	11	13.4	15.8	18.1	20.5	474	652	830	1007	1185	1262	1540
Lighting and low power	0	5.6	11.2	16.8	22.4	28	33.6	0	383	765	1148	1530	1913	2295
Heating and Ventilation	0	2.2	4.3	6.5	8.6	10.8	13	0	123	246	369	492	615	738
Total	8.8	19	29.2	39.4	49.6	59.7	69.9	725	1413	2101	2788	3475	4062	4849

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International Iron and Steel Institute

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Conclusions

steeluniversity.org is intended to…

- ✓ Inform and inspire students, teachers and steel industry employees to better understand the issues around sustainability
- ✓ Encourage them to conduct Life Cycle Assessments
- ✓ Provide information on relevant environmental effects and impacts causing these impacts in general
- ✓ Provide valuable in-service training and life-long learning for employees in the steel industry supply chain at reduced cost
- ✓ Facilitate research partnerships between academic and steel industry experts
- ✓ Demonstrate the commitment and contribution of the steel industry to a sustainable world and to the knowledge economy

Awards

Switzerland,
September 25-27th 2004

"Innovative and Excellent Graphical Simulations, Open-Ended Problems and Integrated Educational Approach"

Visit steeluniversity.org and learn about sustainability…

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http://www.lbpgabi.uni-stuttgart.de