About OMICS Group

OMICS Group International is an amalgamation of Open Access publications and worldwide international science conferences and events. Established in the year 2007 with the sole aim of making the information on Sciences and technology 'Open Access', OMICS Group publishes 400 online open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS Group also organizes 300 International conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.

About OMICS Group Conferences

OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Phrama scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

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Green Chemistry and Sustainability in Education

Lothar Brecker

International Summit on Past and Present
Research Systems of Green Chemistry

Philadelphia (Pennsylvania, USA), August 25th – 27th 2014

From Invention to Education

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Inventions





Year	
0	Invention / Discovery
0-2	Presentation on meetings
1-5	Publications / Citations
3-6	Own teaching
5-15	Specialized textbooks
15-30	General textbooks
20-40	Curricula
35-50	General teaching concept (University)
40-60	General teaching concept (Secondary school)

From Invention to Education

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Green Chemistry





Decade	
~1970	Development of Concept
1970s	Presentation on meetings
	Publications / Citations
1980s	First teaching
1990s	Specialized textbooks
2000s	General textbooks
2010s	Curricula
?	General teaching concept (University)
?	General teaching concept (Secondary school)

Green Chemistry - General Teaching Concept

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General educational concept for Universities

- *Bachelor program* →

- *Master program* →

- *PhD program* →

- *Teacher education* →

Green Chemistry - General Teaching Concept

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General educational concept for Universities

- *Bachelor program* → twelve principles of green chemistry
  - mandatory lecture courses
  - mandatory lab courses
- *Master program* →
- *PhD program* →
- *Teacher education* →

Green Chemistry - General Teaching Concept

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General educational concept for Universities

- *Bachelor program* → twelve principles of green chemistry
  - mandatory lecture courses
  - mandatory lab courses
- *Master program* → application in specialization
  - election duty lecture courses
- *PhD program* →
- *Teacher education* →

Green Chemistry - General Teaching Concept

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General educational concept for Universities

- *Bachelor program* → twelve principles of green chemistry
  - mandatory lecture courses
  - mandatory lab courses
- *Master program* → application in specialization
  - election duty lecture courses
- *PhD program* → application in own research
  - assessment criterion for thesis
- *Teacher education* →

Green Chemistry - General Teaching Concept

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General educational concept for Universities

- *Teacher education* → <u>twelve principles of green chemistry</u>
  - mandatory lecture courses
  - mandatory lab courses

  - educational concepts
  - experiments for pupils

Green Chemistry - General Teaching Concept

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General educational concept for Secondary Schools



All pupils

sustainability in every days life
economical use of commonplace chemicals



Green Chemistry - General Teaching Concept

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General educational concept for Secondary Schools



All pupils

sustainability in every days life
economical use of commonplace chemicals





Pupils with interest in natural sciences

basic principles of Green Chemistry

internalize the meaning and application of sustainability

Green Chemistry - General Teaching Concept

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General educational concept for Secondary Schools



All pupils

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Pupils with interest in natural sciences

basic principles of Green Chemistry

internalize the meaning and application of sustainability

Pupils with other interests



internalize the benefits of sustainability and of Green Chemistry

Green Chemistry - General Teaching Concept

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General educational **Schools**



eco als







Pupils with interest in natural sciences

basic principles of Green Chemistry

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internalize the benefits of sustainability and of Green Chemistry

Green Chemistry - General Teaching Concept

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General educational **Schools**







eco als



Pupils with interest in natural sciences

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internalize the benefits of sustainability and of Green Chemistry

Green Chemistry - Regional Peculiarities

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Green Chemistry - Regional Peculiarities

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One global concept for Green Chemistry will fail!

Plan **education** with respect to

national, political, cultural and **environmental** frames!

Hot, humid climate &
Strong agriculture



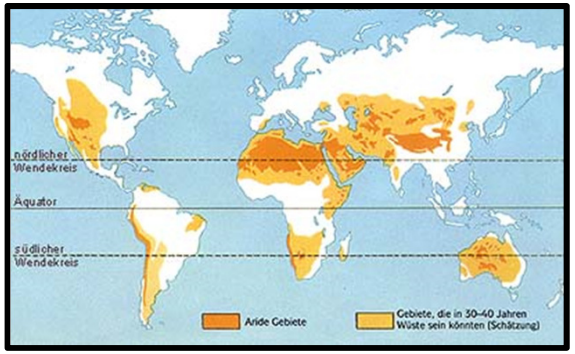
Use all natural recourses

Industrialized countries &
Densely populated area



Twelve principles of Green Chemistry

Arid areas



Green Chemistry as chance for development

Green Chemistry in Education

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Take home the conclusions from the conference.

Discuss it with respect to your environmental frame.

Introduce the concepts to your curricular.

Green Chemistry in Education

Take home the conclusions from the conference.

Discuss it with respect to your environmental frame.

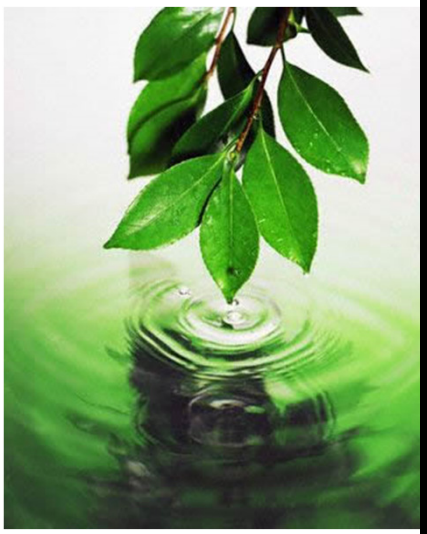
Introduce the concepts to your curricular.



…

2010s	Curricula
2020s/2030s	General (worldwide) teaching concept (University)
2030s/2040s	General (worldwide) teaching concept (Secondary school)

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Thank you

for your kind attention !

Let Us Meet Again

We welcome you all to our future conferences of OMICS Group International

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