Global STEM Classroom™ - 21st Century Skills, Technology and beyond11

ISTE 2015

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The 21st Century Global Workforce

*"..The 21st-century workforce is global, highly connected, technology-savvy, and demanding. Its employees are youthful, ambitious, and filled with passion and purpose, awakening to a new world after the great global recession

- The world is much more global and interdependent
- Mobile, social, and cloud computing continue to explode
- Demographic shifts are creating a diverse, multigenerational workforce
- Global social, political, and regulatory shifts are changing the focus of business

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The 21st Century Global Workforce

- **Technology has transformed the workplace. Technology is changing how we work and the skills we need**
- **Technology has changed the nature of collaboration, expertise sharing, and the skills one needs to succeed. Collaborative technologies continue to make it possible for teams to work in remote locations across the world, easily accessing experts within and outside the organization**
- **The skills we need today and in the future are dramatically different than what they were only five years ago**
- **Corporate learning redefined - prepare for a revolution**
- **These changes in the workforce and workplace are significant, disruptive, and here today..″**

The 21st-century workforce is GLOBAL

****″Global Human Capital Trends 2014 engaging the 21st-century workforce″***
A report by Deloitte Consulting LLP and Bersin by Deloitte

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US National Academies Grand Challenges* and why all educators need to know about it

- Make Solar Energy Economical
- Provide Energy from Fusion
- Develop Carbon Sequestration Methods
- Manage the Nitrogen Cycle
- Provide Access to Clean Water
- Restore and Improve Urban Infrastructure
- Advance Health Informatics
- Engineer Better Medicines
- Reverse-Engineer the Brain
- Prevent Nuclear Terror
- Secure Cyberspace
- Enhance Virtual Reality
- Advance Personalized Learning
- Engineer the Tools of Scientific Discovery

ALL OF THESE ARE GLOBAL PROBLEMS… WE CAN ONLY SOLVED THEM TOGETHER

** NAE Grand Challenges http://www.engineeringchallenges.org/*

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*Global STEM Classroom™

The unique features and components:

- **Students engage in STEM project/-problem-based (both research and action-oriented) learning with students from a partner school in countries around the world in the collaborative learning and teaching environment that simulates the actual global STEM working environment. Students work together in multicultural globally dispersed teams on multidisciplinary problem-based, project-based, research and hands-on authentic, industry-responsive STEM projects.**

- **Teams use online innovative cutting edge collaborative tools/platforms, communication technologies as well as project-related STEM technology. Each technology encourages and enhances student engagement.**

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*Global STEM Classroom™

The unique features and components (continued)

- **Teachers engage in unique professional development (on the topics detailed below*) that enables them to become successful global educators who have mastered collaborative teaching and learning for 21st century**

- **Teachers engage in a COLLABORATIVE project planning and TEACHING with teachers from partner schools in different countries and student teams in all schools complete and present Global STEM projects via international virtual conferences and Global STEM Classrooms**

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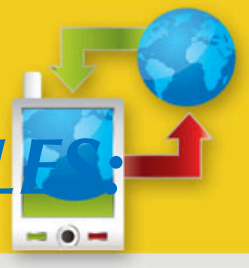
Global STEM Classroom™ Project EXAMPLES:



- NASA Space Exploration projects (NASA GRACE Mission, NASA MARS Mission, NASA Astronomy & Virtual Observatory
- NASA International Space Station (Electrical Wiring, Hydrology and Food Science)
- My Blue Planet & Global Citizenship (Clean Water Projects, Sustainability Projects, Global Citizenship Project)
- Data visualization (based on IBM Data Visualization and based on NASA GRACE)
- Global Collaboration & Global Communication technology (comparative analysis)

- Global STEM Classroom™ Larisa Schelkin 2009-2015 © All rights reserved

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Global STEM Classroom™ Project EXAMPLES

- **Wind turbine design and 3D printing**
- **Nanotechnology applications**
- **Minecraft (computer gaming) in studying science (Minecraft and Space Exploration; Minecraft and Arctic Research)**
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- **Automotive Engineering projects**
- **Material Science projects**

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Global STEM Classroom™ - Technology

…..Communication technology

…..Collaboration technology

….STEM professional technology

Remember - technology is an excellent tool, but it's just a tool..don't start planning your program from technology, start from what you would like to teach and then find the right tools (technology) that would help you accomplish your goals!

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Global STEM Classroom™: Teacher Professional Development

- **Global education and an innovation-driven global workforce of 21st century – what has changed; how it's affecting K-20 education and how these new challenges can be addressed**
- **Global education in the environment simulating a real innovation-driven global workforce**
- **Global achievement gap and skills needed for global workforce of 21st century**
- **Global educational systems and collaborative curriculum development**
- **"How-to guide" for K-12 educators developing projects and working collaboratively with STEM professionals**
- **Foundations of "science diplomacy" and how to develop and maintain successful international relations with global partners**

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Global STEM Classroom™: Teacher Professional Development

- **Global STEM Classroom™ Model (all components) and the implementation approaches bring all the "pieces of the puzzle" together and the next steps for a developing and implementing a (discipline specific/country specific) global education program in your school/college/university**
- **Intercultural Computer-supported collaborative learning**
- **Intercultural Communication and Global Competency (including the assessment - IDI, IDP)**
- **Global STEM Team-building (based on NASA 4D) (including the assessment - IDA, TDA)**
- **Innovative collaboration and communication technologies**

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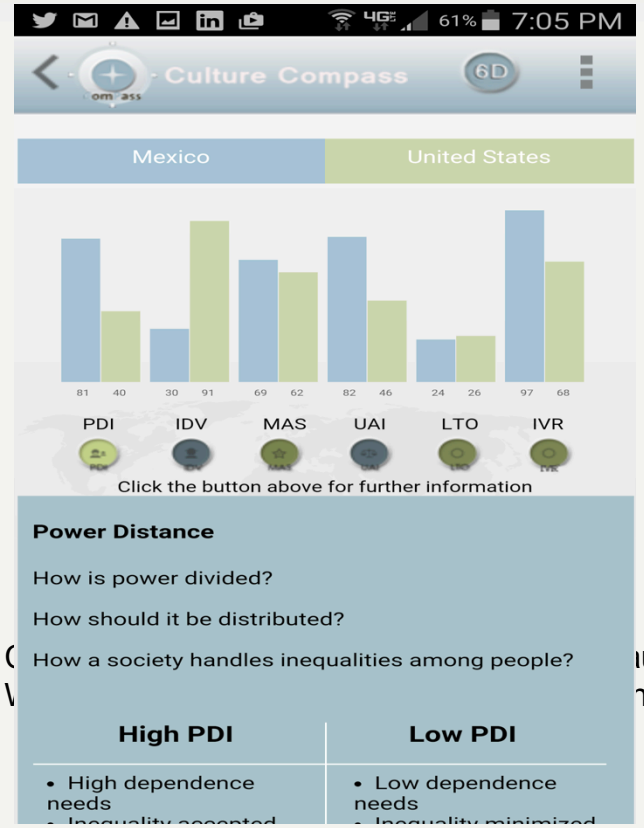
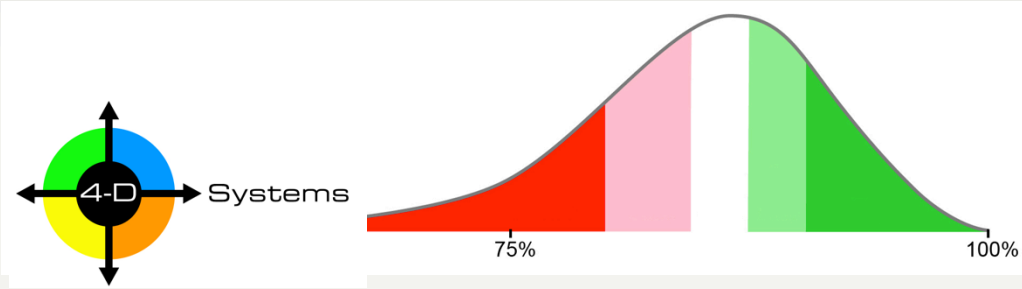
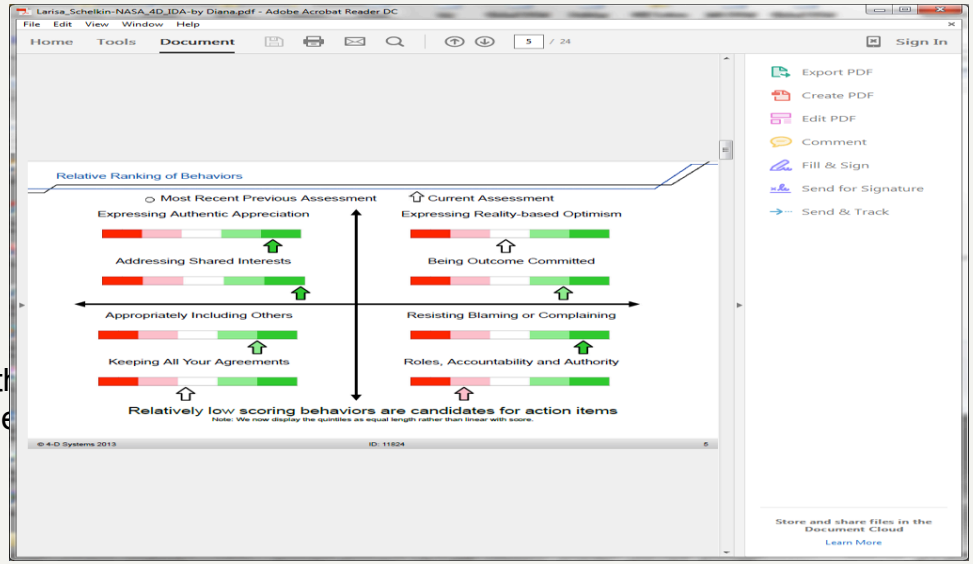
Evaluating intercultural communication, global competencies & global team-work

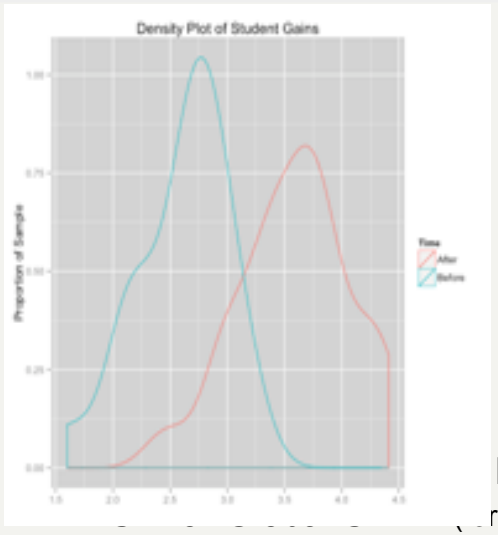


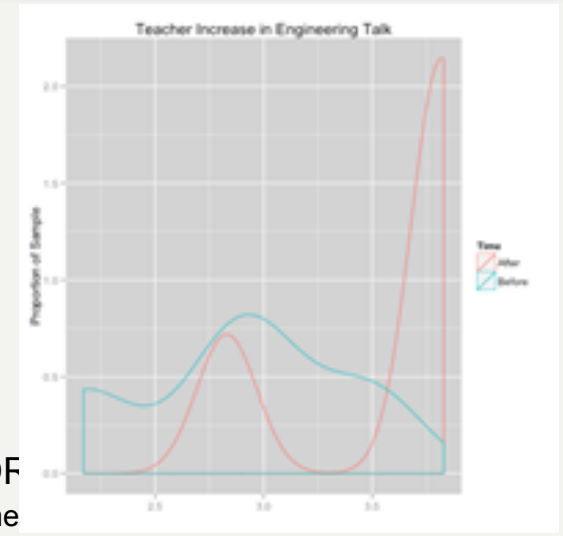


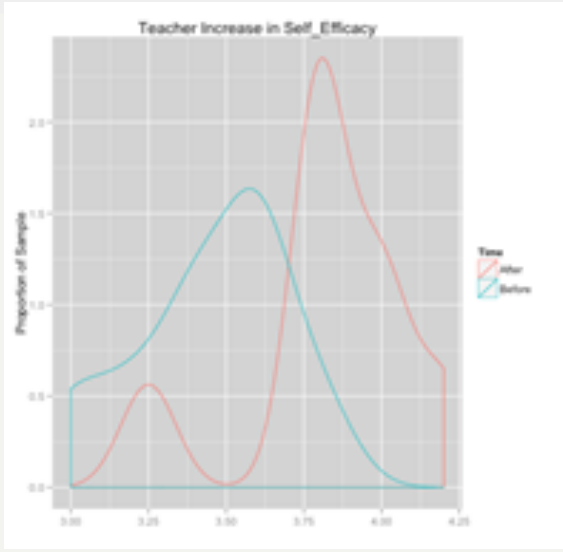


Dr. C… …uth…
Dr. V… …nde…

Some interesting findings (quotes for presentation) from a preliminary research by Dr. Russell Faux, DSRA







Global STEM Classroom™: skills

Bringing it all together:

- **"Problem identification...;**
- **Critical thinking and problem solving;**
- **Communication and collaboration across networks and leading by influence**
- **Agility and adaptability**
- **Initiative and entrepreneurship**
- **Accessing and analyzing information**
- **Curiosity and imagination.." (Tony Wagner)**

- **Content Knowledge and 21st Century Themes**
- **Global awareness**
- **Financial, economic, business and entrepreneurial literacy**
- **Civic, Health and Environmental literacies**
- **Learning and Innovation Skills**
- **Information, Media and Technology Skills**
- **Life and Career Skills (Framework for 21st Century Learning)**

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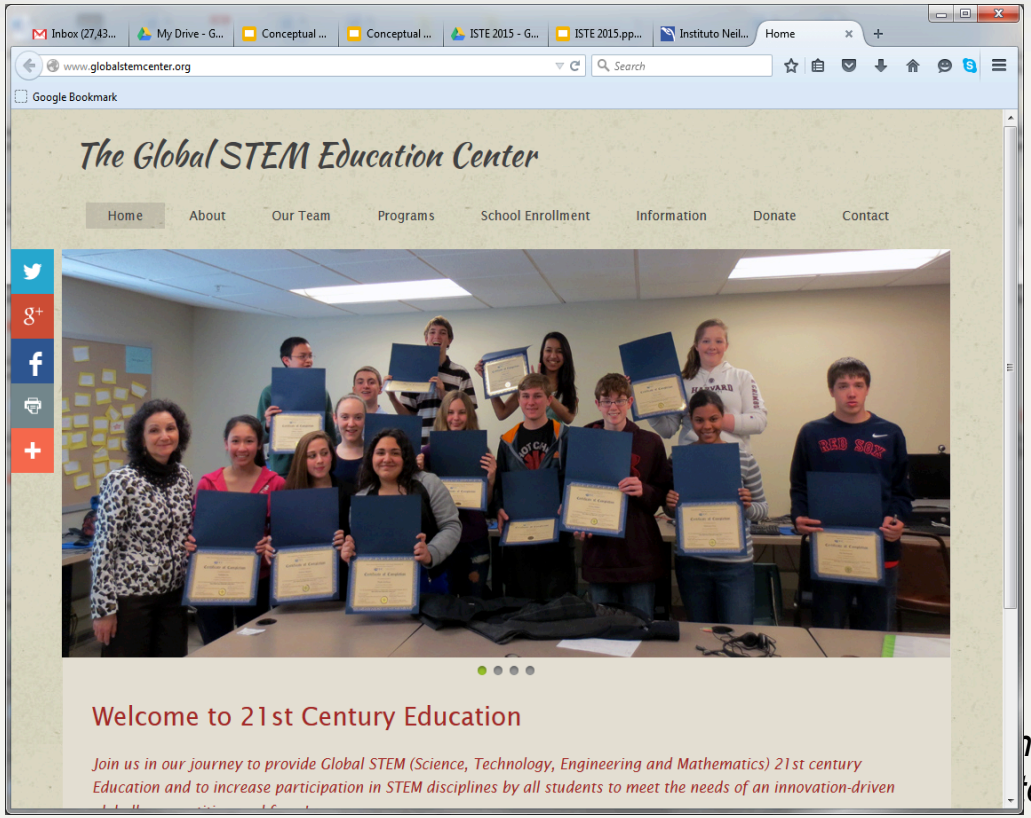

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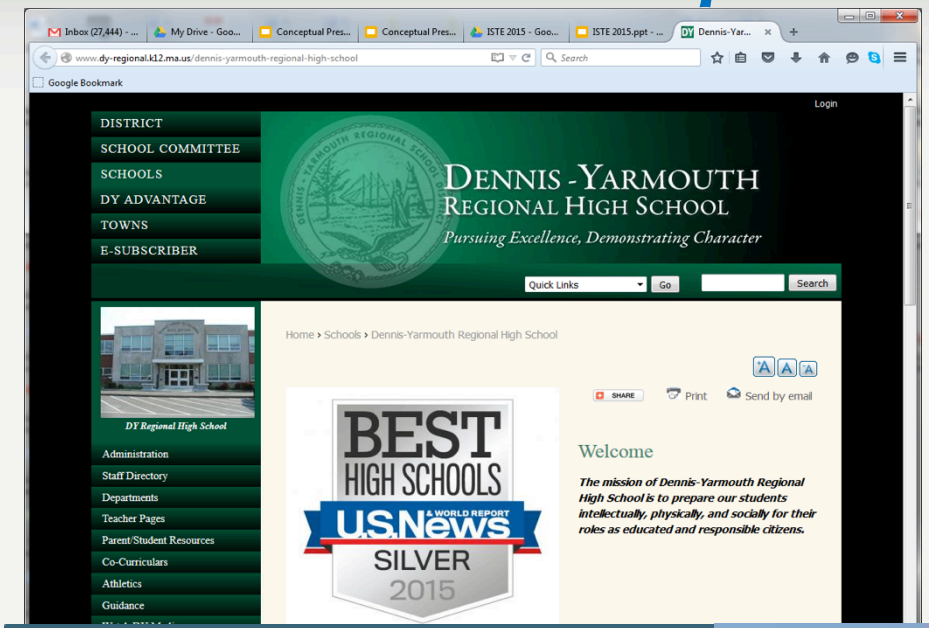
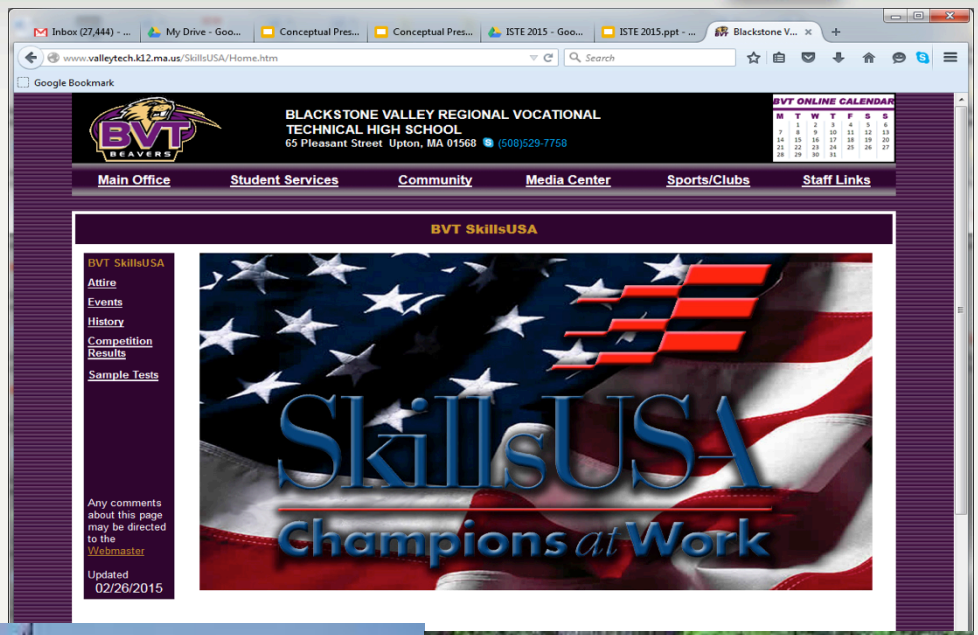
Global STEM Classroom™ in Massachusetts public schools





USA- UK Global STEM Classroom™

USA-France Global STEM Classroom™

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☆ FrontPage

last edited by Mrs Descroix 4 months ago Page history

Global Technology and Engineering Consortium (GTEC) Program

USA - France Collaborative School Program

Dennis Yarmouth Regional High School, Cape Cod, Massachussetts

Collège René Cassin, Ballan-Miré France

Click on your team's link to go to the page for your communication and collaboration.

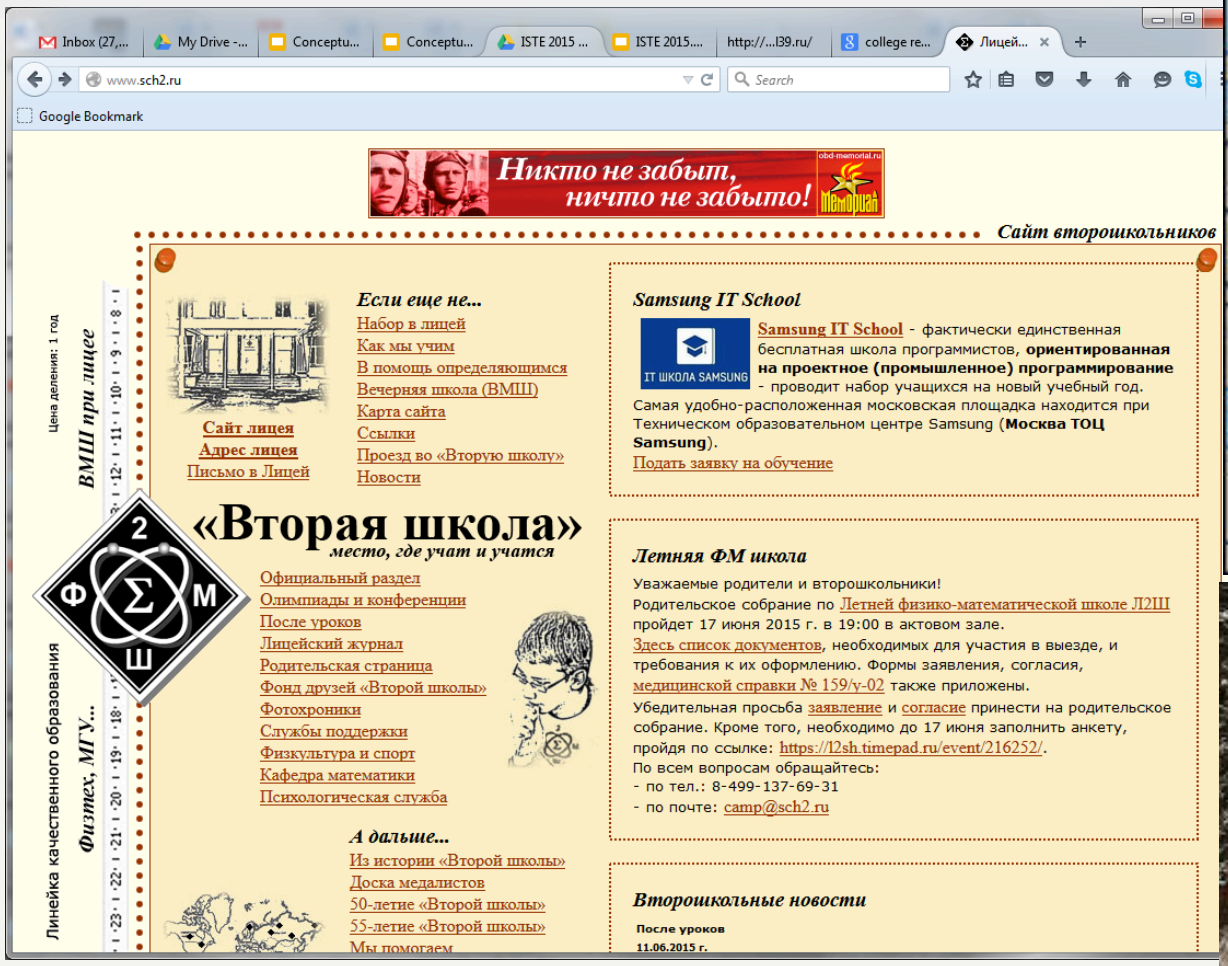
Team 1 : Ian, Joshua, Pierre-Louis, Quentin Si., Dylan	Team 2 : Emma, Juliana, Quentin Sz, Nattan, Elisio	Team 3 : John, Makenzie, Nicolas, Dmitri, Matthieu	Team 4 : Virginia, Paula, Marion, Pauline, Céline
Team 5 : Maxime, Shane, Ilona, Maëva	Team 6 : Lauren, Molly, Marie, Solenn	Team 7 : Philson, Olivia, Théo, Hugo	

Pictures of our video-cor

We were in the local new

France

USA-Moscow, Russia Global STEM Classroom™



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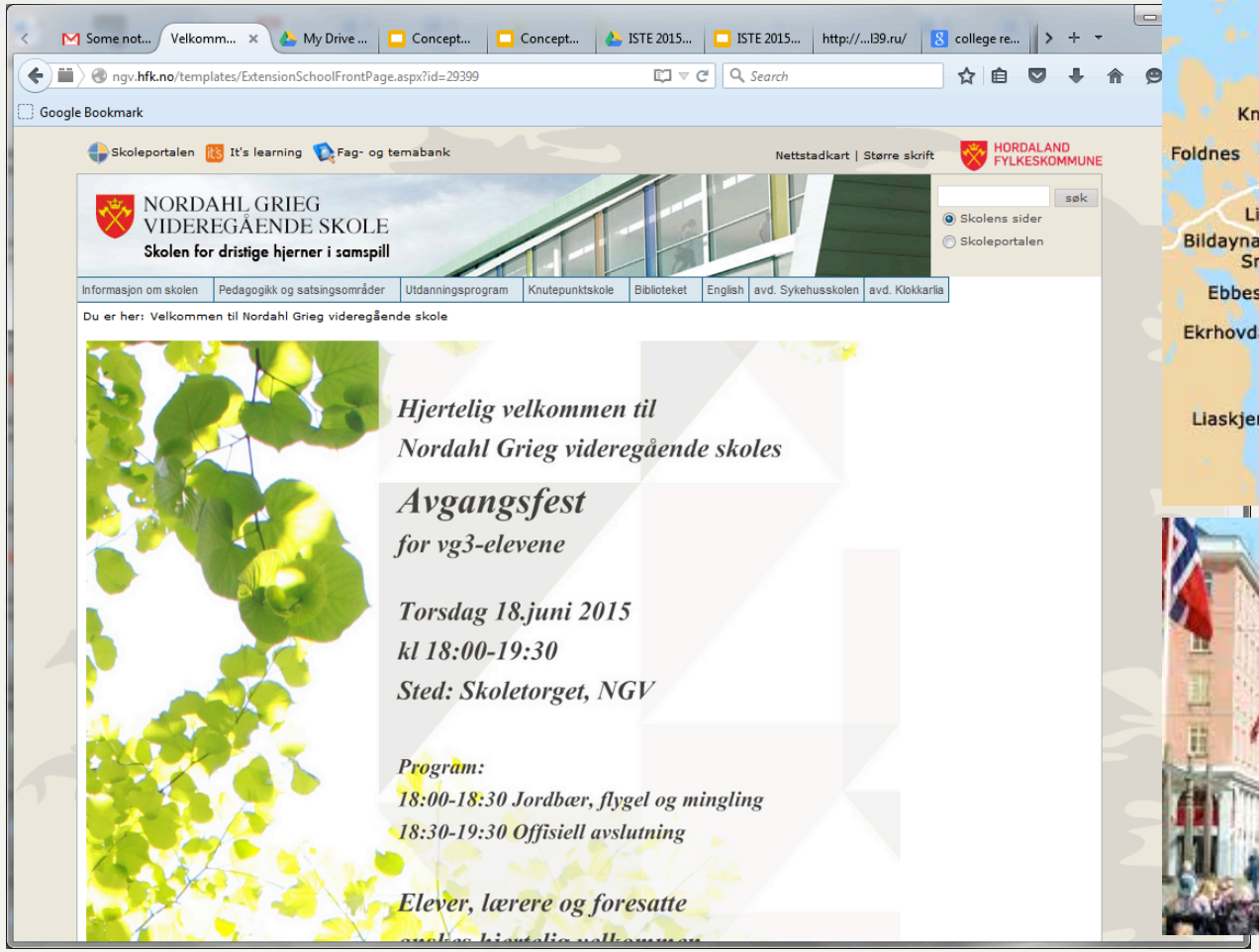
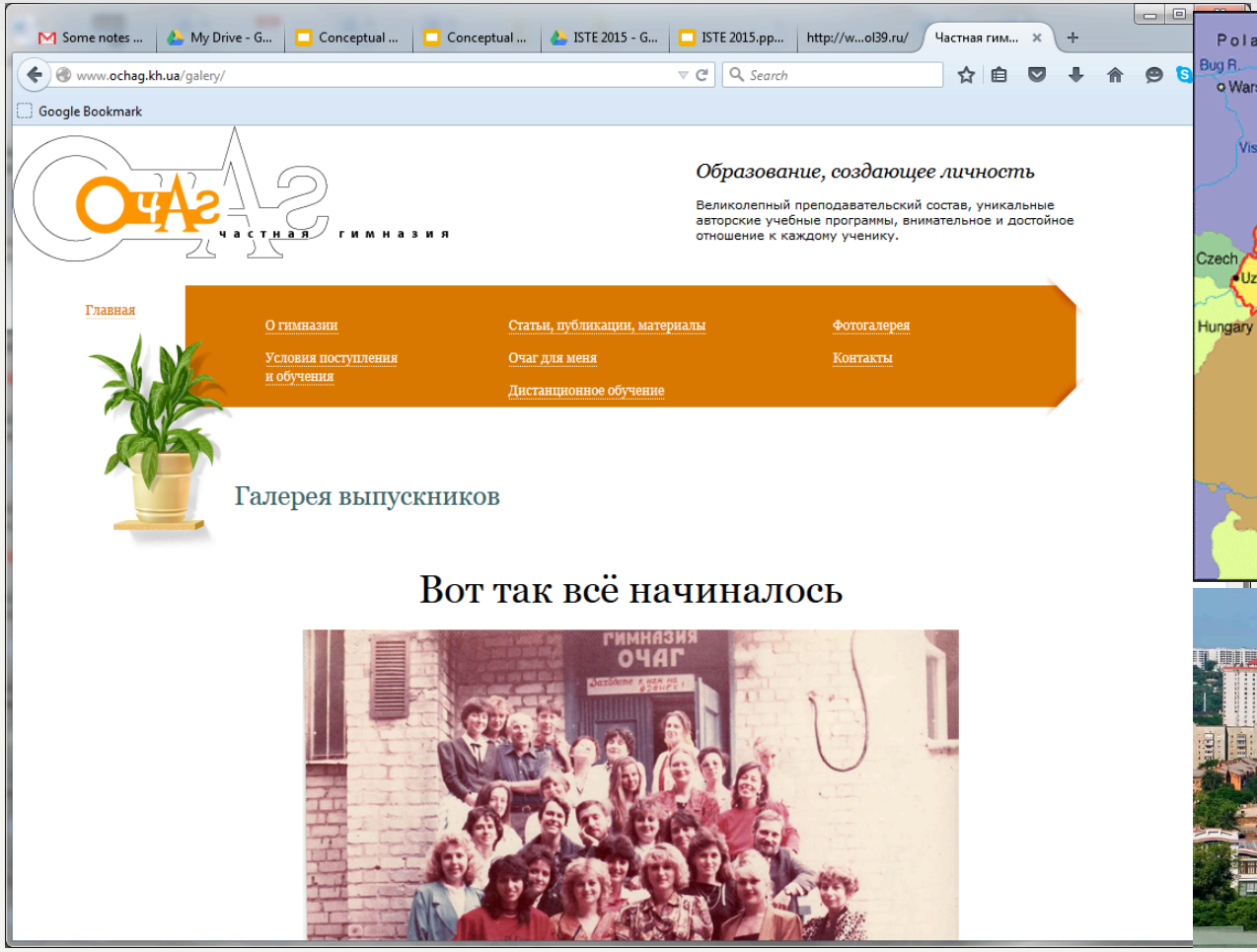
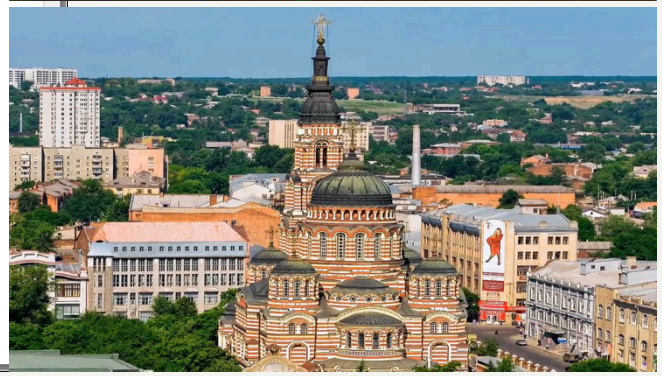
USA-Norway Global STEM Classroom™



USA - Ukraine Global STEM Classroom™





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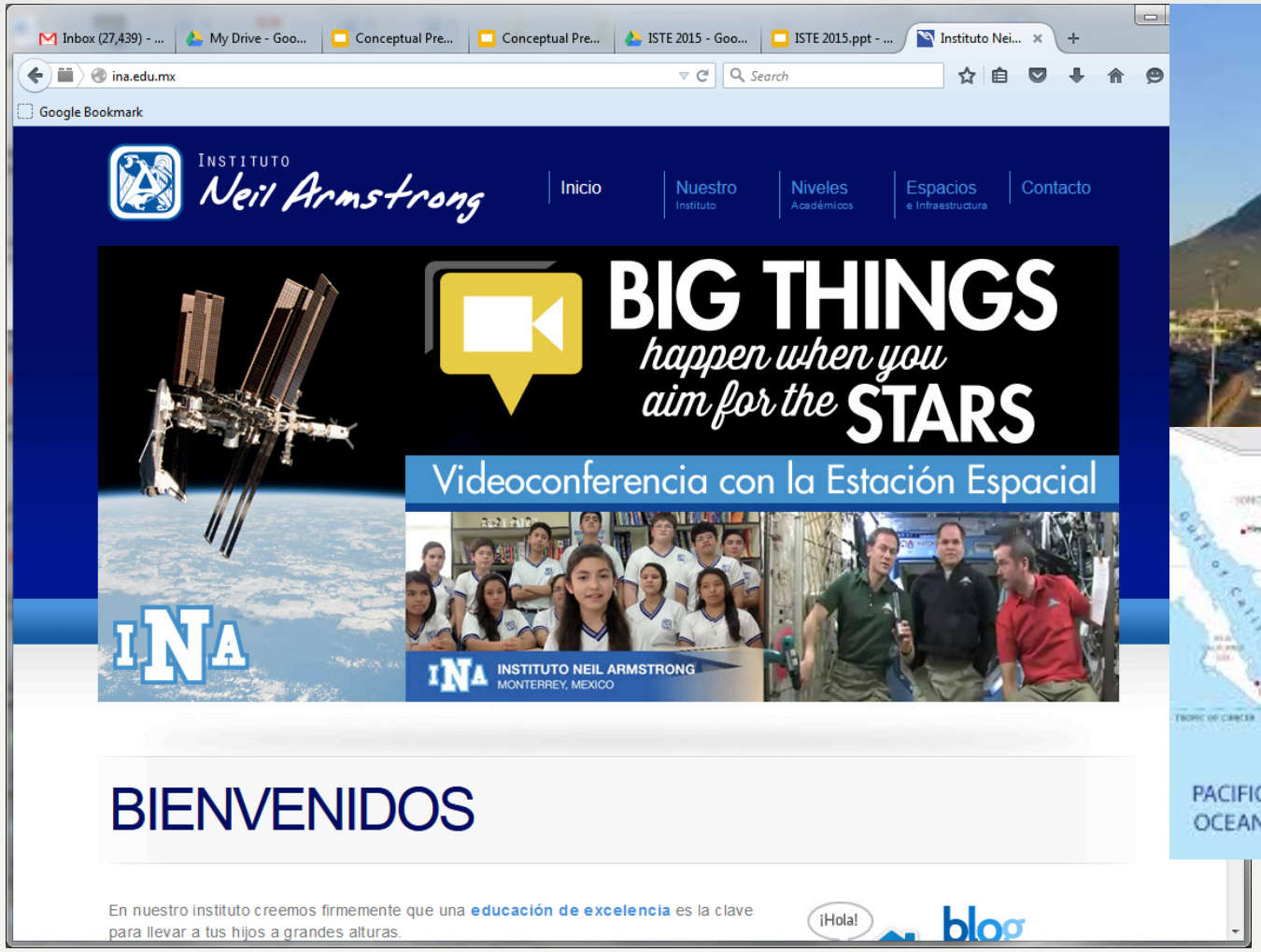
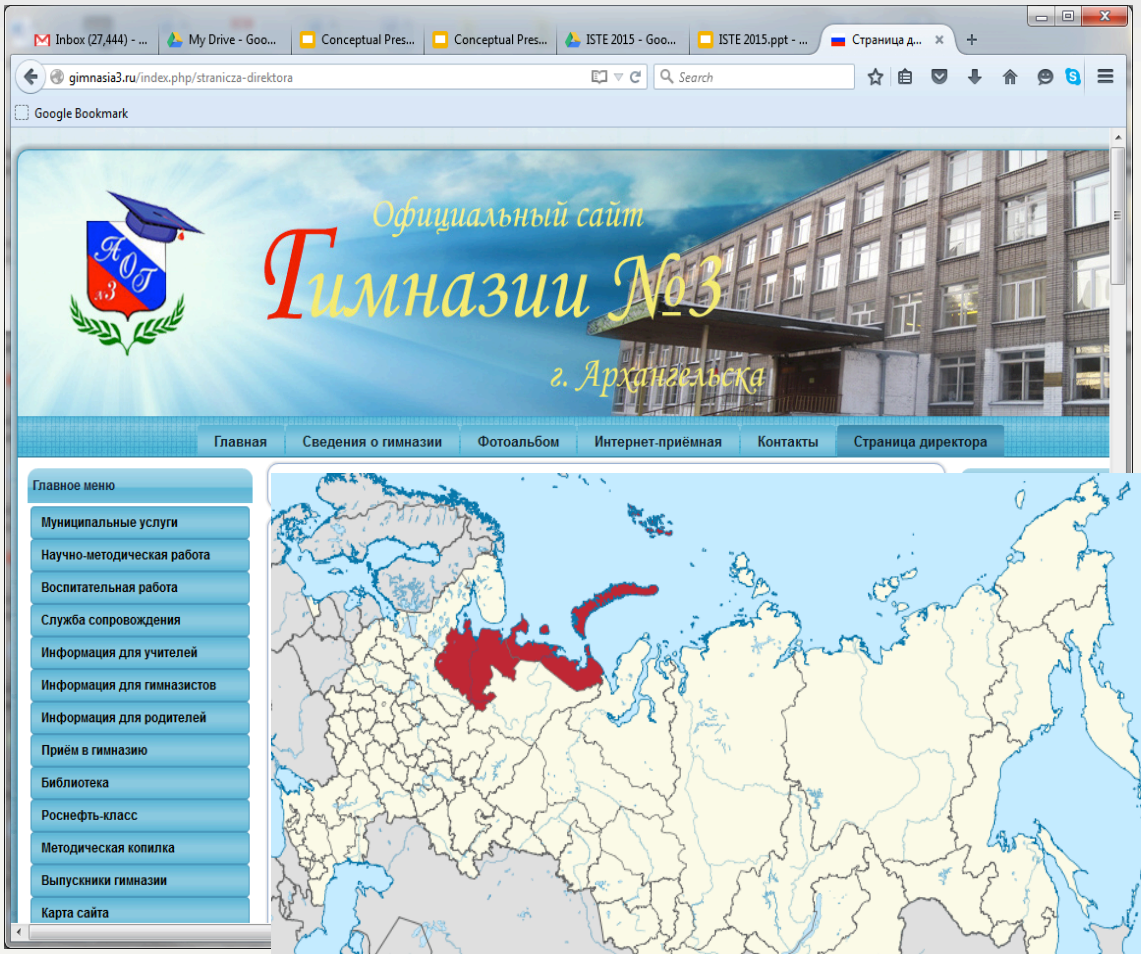
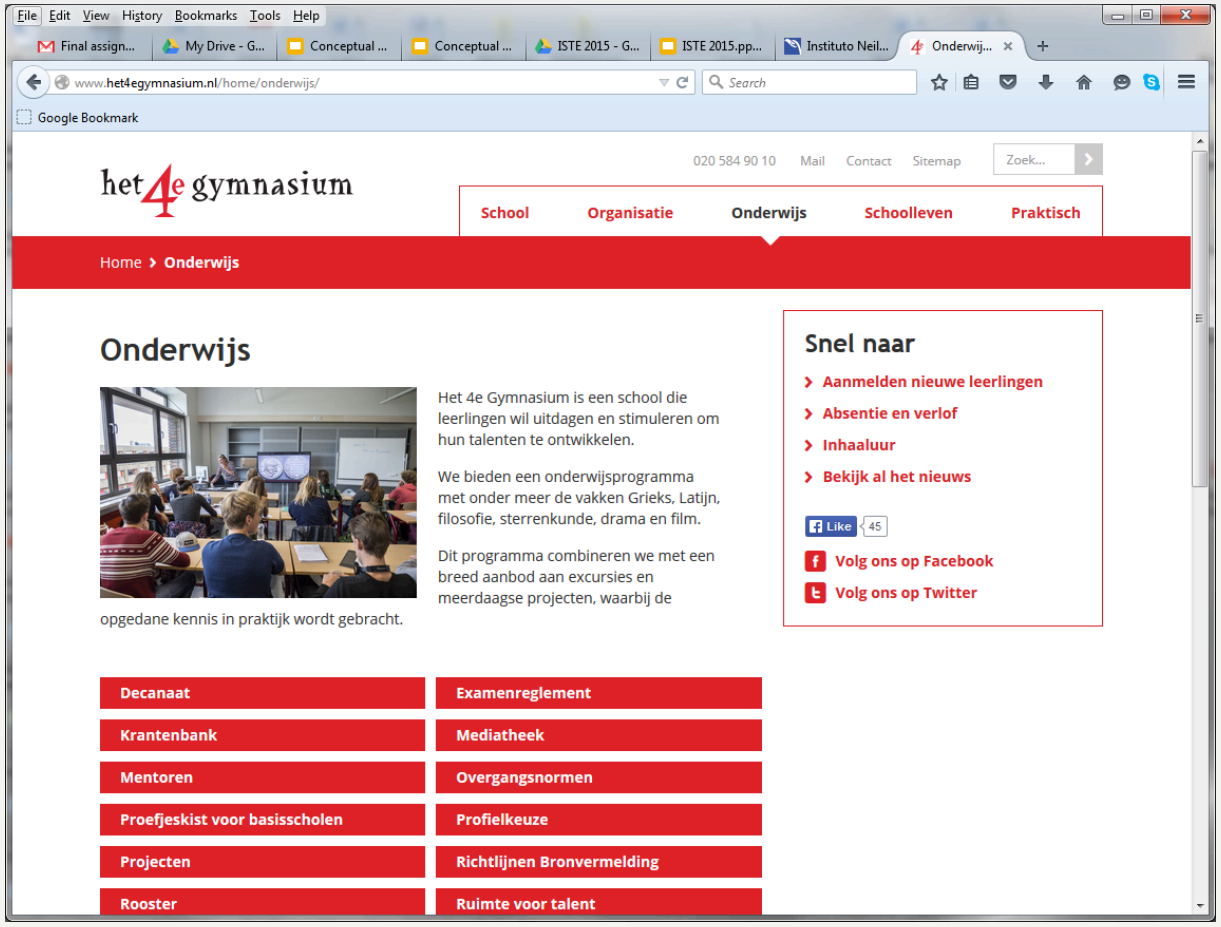
USA-Mexico Global STEM Classroom™



USA- Arkhangelsk, Northern Russia
Global STEM Classroom™



USA-Netherlands *Global STEM Classroom™*



Global STEM Classroom™
Classroom Pairs to Date (2010 – 2015)

1,000 students, 100 educators, 45 technical collaborators
25 projects
8 countries

Many great "lessons learned"!

- Relationship building takes time and efforts - it's greatly REWARDING and EXCITING!
- Finding PASSIONATE TEACHERS and COMMITTED SCHOOL LEADERSHIP is a "MUST"
- Great results require a lot of hard work and preparation (Surprise/ smile!!)
- Don't underestimate the importance of teacher PD (prior, during and after)
- It's difficult (if not impossible!) to do it alone - running global programs/projects is a team-effort - BUILD YOUR TEAM (with your IT Directors, Technology Integration Specialists, Curriculum Developers, IT technicians, Foreign Language and all STEM Teachers, parents and, of course - with your students!)
- A special word about wonderful parents - their enthusiastic support is absolutely priceless!
- Be prepared for a great "flipping classroom" effect - your STUDENTS will OWN the LEARNING!

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…and more about "Lessons learned"

- Studying cultural differences is a "must"- there are no "surprises" here - it really makes a difference in how educators from different countries work together
- Language "barrier" is not a real barrier - it's manageable
- Students are much more "adaptable" and often "lead" the process
- School leaders/administrators around the world are ready/supportive of global collaboration moving from "WHY?" to "WHAT?" and "HOW"
- A special word (again!) about the importance of teacher PD - intercultural communication, global competence, global team-work, global education systems, collaborative curriculum and instructional design, collaboration technology and...diplomacy - all are "must"
- Logistics - challenging, time consuming - but manageable
- and it's all VERY REWARDING!!

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Global STEM Ed Center
Getting the word out

- Regional Round tables (Regis, Blackstone Valley)
- Meeting with higher education institutions and superintendent groups
- Annual Symposium at the Harvard Graduate School of Education
- Website
- Email announcements

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Global STEM Education Work To Be Done

- Organizing support campaigns
- Public Policy development
- Legislation
- Publication

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What's next and how you can join?

Sign up for our contact list and we will send you the updates and the exciting news!

Looking for a school-partner and would like to participate in our programs? Let us know!

Not sure yet if you are ready to participate, but have questions and may be need a consultation?

We would like to hear from you!

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