Henry Ford Community College

Technology Investment Fund
Project Funding Request

Executive Summary

DATE OF APPLICATION	PROJECT TYPE
09 September 2010	New
NAME OF PROJECT DIRECTOR OR PRESENTER	**DEPARTMENT/DIVISION**
Steven R. Murrell	Science Division
COST OF PROPOSED PROJECT	**NUMBER OF STUDENTS SERVED ANNUALLY**
$158,775	3,000

SUMMARY

We want to improve our students understanding of earth, space and environmental sciences, and enhance our curricula in those areas by integrating into them a large format, 3-D, digital globe that can display dynamic images of the earth, both simulated and taken from space, and of the sun, planets, and their moons.

The digital globe, called the 'Magic Planet' and made by a company called Global Imagination, is a 4-foot diameter sphere with internal, HD projectors. The projected images and videos are true to scale representations planetary surfaces, weather patterns, geological activity and any other type of display utilizing a spherical geometry. Rather than having the students passively view slides or animations on a 2-D screen, students will be actively engaged as they view objects of interest from all angles. This additional information and improved format for presenting will enhance the learning process for our science students.

In addition to serving HFCC students directly, the digital globe will fill several other roles in the science division. It will be used, along with the planetarium, for field trips on the themes of earth and space science, and, in conjunction with the rain garden and green roof of the new building, of environmental science. It will also form a major part of our Science on Display initiative in the science facility, for casual education of students walking through the facility, and as a focal point of special events.

RECEIVED
SEP 09 2010
HFCC
VICE PRESIDENT/CONTROLLER

Henry Ford Community College
Technology Investment Fund
Project Funding Request

This application form with original signatures must be received by the Vice President/Controller's office by 4:00 p.m. on either **the first Friday after Labor Day** (Fall semester) **or the third Friday in January** (Winter semester) in order to be eligible for funding. Applications will only be accepted on this form. Applications must include an Executive Summary which will be shared with the Campus Community. ***(Attach additional sheets for any section needed.)***

Date of Application: 09-September-2010	**Project Type: [X] New [ ] Upgrade/Expansion**	
Project Director: Steven R. Murrell **Department/Division:** Science Division	**How many students will *directly* benefit from the project?** More than 1000 each semester	**Total TIF Funds Requested:** $158,775

Problem Statement

Define the problem/idea. *(What do you want to do? Why?)*	We want to improve our students understanding of earth, space and environmental sciences, and enhance our curricula in those areas by integrating into them a digital globe that can display dynamic images of the earth taken from space, and of the sun, planets, and their moons. We currently offer a number of courses that deal with either the earth as a dynamic system, or the solar system[1]. These courses deal with topics (weather patterns, geological and geographical features, melting of arctic ice, plate tectonics, the sun, planets, moons, *etc.*) that are difficult for people to envision[2]. These classes are among our most rapidly growing ones, and more and more students are faced with the challenges of understanding difficult topics. We are looking for a way to present information on these topics in an engaging and substantial way that will increase the students' understanding of the topics. In 2000, scientists at the National Oceanographic and Atmospheric Administration (NOAA), faced with precisely this problem in understanding the data they deal with daily, developed a new technology that they used to view weather and climatological data provided by satellite and other devices. This technology was a spherical projection screen that allowed images of the earth and celestial objects to be viewed in 3 dimensions. The technology was highly successful and is now available to schools and science education facilities. We want to use this technology to facilitate curricular change in our basic science classes. The digital globe will also fill several other roles in the science division. It will be used, along with the planetarium, for field trips on the themes of earth and space science, and, in conjunction with the rain garden and green roof of the new building, of environmental science. It will also form a major part of our Science on Display[3] initiative in the science facility, for casual education of students walking through the facility, and as a focal point of special events. [1] ASTR 131 and 133; ATMS 131; BIO 130, 131, 138, 139, and 150; GEOL 131; PSCI 131; SCI 210 and 213.

	[2]Adiniyi, E. O. 1985. Misconceptions of selected ecological concepts held by some Nigerian students. J. Biol. Educ. 19:311-316. Bailey, J.M. and T.F. Slater. 2004. A review of astronomy education research. Astr. Ed. Rev. 2:20-45. Barab, S.A., M. Barnett, L. Yamagata-Lynch, K. Squire, T. Keating. 2002. Using activity theory to understand the systemic tensions characterizing a technology-rich introductory astronomy course. Mind, culture, and activity 9:76-107. Dodick, J, and N. Orion. 2003. Cognitive factors affecting student understanding of geologic time. J. Res. Sci. Teaching 40:415-442. Grace, M. M. and M. Ratcliffe. 2002. The science and values that young people draw upon to make decisions about biological conservation issues. Int. J. Sci. 24:1157-1169. Libarkin, J.C. and S.W. Anderson. Assessment of learning in entry-level geosciences courses; results from the geosciences concept inventory. 2005 J. Geoscience Educ. 53: 394-401. Liskowski, M. and J.F. Disinger. 1991. The effect of field-based instruction on student understandings of ecological concepts. J. Environ. Ed. 23:19-23. Petcovic, H. L. and R. J. Ruhf. Geoscience conceptual knowledgeof preservice elementary teachers: results from the geoscience concept inventory. 2008. J. Geoscience Educ. 56:251-260 Smyth, J. C. 2006. Environment and education: a view of a changing scene. Environ. Educ. On Research 12: 247-264. Trumper, R. 2001. A cross-age study of junior high school students' conceptions of basic astronomy concepts. Int. J. Science 23:1111-1123. Trumper, R. 2000. University students' conceptions of basic astronomy concepts. Phys. Educ. 35:9-14 Trumper, R. 2003. The need for change in elementary school teacher training – a cross-college age study of future teachers' conceptions of basic astronomy concepts. Teaching and Teacher Education 19:309-323. [3] Volume IV: What works, what matters, what lasts.Project Kaliedoscope 2003 Roundtable: Facilities of the Future: The Ideal Facility for 21st Century Learning Communities. Accessed at: http://www.pkal.org/documents/IdealFacilityFor21stCenturyLearning.cfm

Evidence for Project Validity *(What is the current situation?)*	
What resources do you have/use now?	We currently have classrooms equipped with standard presentation hardware, and the planetarium. The planetarium has a completely different function than the digital globe, and the two should not be confused.
Why can't you use your existing resources to do this project?	The classrooms are fine for showing static, two-dimensional images, but they can't begin to do what a digital globe can do. It would be like asking a squid to fly.

What evidence do you have that this project will be successful? *(Cite specific information.)* • **Current research** • **Examples from other schools or teachers** • **Letters of support from experts in the field** • **Your own past experience.**	Within the past few years, a number of evaluations have been published on the educational advantages of digital globes[1]. (All of the evaluations were of globes at museums and other public facilities, but many were conducted with school classes.) Although the evaluations used different techniques and survey instruments, and were conducted by different entities[2], all came to the same basic conclusions. Digital globes uniformly are viewed as an effective way to teach concepts of earth and space science, environmental science, and geography. For example, The McWane Science Center developed, for their digital globe, earth and space science modules based on the Alabama science curriculum. They found that in pre- and post test score comparisons of 27 classes of elementary and middle school students, the average test scores increased from 53 to 70 (a 17-point difference) after attending lessons that used the digital globe. Seventy percent of low-income classes and 94% of all other classes had average score increases of 10% or more in the pre- and post test comparisons. The Bishop Museum tested their science modules for K-8 students (based on the Hawai'i science curriculum) and found a 16 point difference in pre- and post-test scores. The results of both studies are statistically significant. Digital globes are particularly engaging. Classroom groups at the Maryland Science Center were "enthralled throughout the 40-minute presentation". Teachers report that even active children are engaged through presentations lasting 30-40 minutes. The Science Museum at Minnesota found that almost every visitor to their display was highly engaged. Visitors to the digital globe at the North Carolina Aquarium were deeply engaged with displays with which they had a personal connection (e.g., representations of human activity: air traffic, the *Earth at Night*) or natural phenomena that they remember happening (the Indian Ocean tsunami, the 2005 hurricanes, earthquakes). A common theme among all of the evaluations is the effectiveness of the digital globes for science education. Visitors to the displays uniformly express that programs using digital globes enhanced their understanding of science, made complex topics more understandable, and taught them new knowledge. In response to specific questions designed to probe their actual understanding of topics, McWane Science Center visitors answered correctly 100% of the time. Visitors uniformly find the displays aesthetically pleasing, an innovative use of technology, and interactive. A he digital globe is very effective at helping people see the "big picture", and to give them a perspective on the interconnectedness of the world. Most visitors say the globes help them to learn information that relates to their everyday life. For example, visitors were polled after a presentation on global warming at the Bishop Museum, and called one week later for a followup interview. Ninety percent of the respondents said that the digital globe presentation "influenced their intention to make changes in their lives" in response to global warming. One reason for the high levels of engagement is that digital globes are aesthetically pleasing. The Maryland Science Center reports that adults describe the globe as "beautiful" and "riveting"; children are more likely to describe it as "cool". Over half of the visitors at the Science Museum of Minnesota said they would return just to see the digital globe. Visitors

	describe the images as being "realistic", "authentic" and "alive", because the image isn't distorted as it would be on a flat map. Visitors at the Boonshoft Museum of Discovery called the digital globe "beautiful" and "engaging", and that the globe made "Earth come to life". They also appreciate the global view, saying that it provides a new perspective, and allow them to visualize concepts that are difficult to conceive. One 8th grade teacher in Maryland said that although her students had studied the formation of the earth and plate tectonics, most didn't really understand it until they saw it on the digital globe. Teachers, in particular, respond that they can conceive of many ways to use the digital globe in teaching classroom lessons. [1]2009: North Carolina Aquarium on Roanoke Island; 2006: Science Museum of Minnesota (Minneapolis); 2004: Maryland Science Center (Baltimore); 2007: The Bishop Museum (Honolulu); 2010: Boonshoft Museum of Discovery (Dayton); 2006: Nauticus – The National Maritime Center (Norfolk); 2007: McWane Science Center (Birmingham, AL). All of the evaluations can be accessed through http://www.oesd.noaa.gov/network/SOS_evals/index.html. [2]Randi Korn and Associates; Pacific Institute for Education and Learning; RMC Research Corporation; and Department of Evaluation and Research in Learning, Science Museum of Minnesota.

Relevance to Technology Investment Committee Guidelines *(Address only those that apply.)*	
INNOVATION:	
Is the proposal innovative to the field of Instructional Technology?	There are only two digital globes in Michigan. The Great Lakes Maritime Institute in Alpena has a 6-foot globe, and the AirZoo in Kalamazoo has an 18-inch globe.
Is the proposal innovative to HFCC?	This will represent a new and dynamic way to teach at HFCC.
Is the proposal innovative to the specific discipline?	

Relevance to Technology Investment Committee Guidelines (Continued) *(Address only those that apply.)*	
NEED:	
Is the proposal essential for the instructional design?	Essential to instructional design: See discussion in 'Problem Statement' above.
Does it create new programs or courses with the potential for increased student enrollment?	Should attract students and generate need for new sections. The science building carries a considerable amount of student traffic into and out of both the Health Careers Building and the Liberal Arts Building. The Magic Planet Display would be a very potent example of 'Science on Display', the very concept of which includes the opportunity to attract new students to the world of science and science education.
Is it necessary to remain competitive with post-secondary institutions?	This will place HFCC far ahead of the curve in technology, which will be another factor making HFCC competitive among post-secondary institutions in southeast Michigan.
Does it provide skills that are transferable to the workplace?	
Does it prepare students for transfer to upper-level curriculum?	This will enhance the learning process in the basic science curricula at HFCC. The deeper understanding of many of the concepts taught using the device will be better prepare our students as they transfer to four-year institutions.
Does it keep the course or program current in the related technology?	It will keep our courses ahead of the curve in technology.

Relevance to Technology Investment Committee Guidelines (Continued) *(Address only those that apply.)*	
NATURE OF PROPOSAL:	
Is the proposal a component of curricular revision?	Yes. In fact, it is requested because it will be the focus of curricular change.
Is it the next logical step in the evolution of the course/curriculum?	We have moved from overhead transparencies to slide projectors to computer-driven flat displays. It is the next logical step in teaching students about the earth and the solar system.
Will it help attract students to HFCC?	Yes. Our already existing public outreach programs in the Science Division are already attracting many potential students in the area. The Magic Planet Display will represent a significant feature to attract repeat visitors and new visitors alike.
Will it support HFCC community outreach/public relations activities?	See above.
Will it support student retention activities at HFCC?	Students participating in courses that utilize the Magic Planet will understand that HFCC is devoted to providing the most modern and effective means of educating its student body in the sciences.
Will it become an integral part of the course, program or curriculum?	Yes.

Resources		
Where will the project hardware be installed?	The Magic Planet system will be installed in lower lobby of old science bldg.	
Who will do the job? • **List the personnel** • **List their duties**	Steve Murrell will take the lead in organizing this project. Brian Kirchner will develop curriculum for earth sciences, Judy Kelly will organize a group to develop curriculum for environmental science, and Steve and Mike LoPresto will develop the curriculum for astronomy. Mike LoPresto will take the lead in developing assessment tools.	
Who will use the hardware?	Hardware used by students via touch screen. Presenters will be trained from faculty and volunteers like we do with planetarium.	
Who will conduct any necessary project-hardware training?	Training is included in installation costs. Further training will be done by the core of faculty members who are trained as part of the installation.	
Who will handle any spring and summer semester duties related to hardware installation?	Installation will be part of the overall Science Building Renovation Project and, as such, will be coordinated with project manager (Turner, Inc) and vendor representatives. Project Shepherd and AD will be liaisons with PM.	
Do you have commitment from your administration for personnel support? *(Be specific, include documentation.)*	The Associate Dean agrees that the faculty involved have the time take on this project can be taken on as part of their normal curriculum development duties. It will become one of their divisional committee assignments.	
Is release time required to complete this project? **If yes, has it been approved at this time by your Associate Dean?**	**[ ] Yes [X] No** **[ ] Yes [ ] No**	*TIF does not fund release time. If you are requesting release time, it must be approved by the appropriate administrators prior to proposal submission.*

Evaluation *(How will you know if it worked?)*	
How will you demonstrate to the college that this was an effective use of funds? *(How will you evaluate the goals listed as Expected Outcomes?)*	Mike LoPresto will lead the development of pre and posttest assessment tools, which will then be administered over the course of the next couple of years. He has significant experience in this area as his current doctorate research involves very closely related work in the assessment of Astronomy education tools and techniques.
How will you determine the success or shortcomings of the project?	See above.

Budget **(You must also include an itemized budget statement.)**	
What do you need to complete this project? *(Be specific about equipment, software, and training.)*	We have already included the required infrastructure in the renovation plans for the existing Science Building, so there will be no need for additional coordination with HFCC Building and Grounds personnel. The only additional costs, for which we are seeking TIF funds, are for the actual display system itself. All installation, software and training costs will be included in the cost shown below.
What is the TOTAL COST? *(You must attach an itemized cost analysis with this proposal.)*	As mentioned above, infrastructure costs are already being incorporated into the budget for the renovation of the existing science building. All other costs involved consist of the system itself, installation, training and software subscriptions per the attached quote. The total anticipated cost for the Magic Planet System will be $158,775
How recent is your quote?	Current (May 2010)
Are changes to the college infrastructure necessary to support this project?	**[X] Yes [ ] No** However, these modifications are part of the existing Construction/Renovation plans for the Science Building Project.
What other monetary commitments exist? *(Department/Division/ External) Please be specific; include documentation wherever possible.*	Infrastructure costs will be handled out of the Science Building Project construction budget. Continued operating costs will be drawn from the Science Division budget.

If other sources of funding are not available, why? • **Doesn't have the support?** • **Not viewed as feasible?** • **Not a priority?** • **Other?**	Not applicable.

Strategic Plan

Include with your application a document that indicates the ways in which your project addresses the goals and objectives of the Henry Ford Community College Strategic Plan. Also, indicate how your project addresses your Division or Department plan. Be as specific as possible.

This project will implement a major revision of curriculum in a number of courses (Goal 2a), training to use it will provide professional development opportunities (2c), and we will use the results of our assessments to improve the curriculum (2e). The entire project will help fulfill goal 3 by promoting international awareness by integrating global awareness into the curriculum (3e) and giving students the knowledge to live and work in a global economy (3a). The globe will allow us to increase our collaboration with K-12 schools and 4-year colleges (5e) by giving us yet another focal point for educating students at all levels in several fields. Finally, it will further our commitment to integrating multimedia technology (6d) and enhance our current technology (6e).

If your proposal is Non-Instructional (Library Services, Learning Lab, Counseling, Placement Services), please skip this section and complete the information in the Non-Instructional section.

Instructional Proposals

Complete this section if this is an Instructional Proposal, directly impacting student teaching and learning.

Expected Outcomes *(Project Objectives)*	
What is your current teaching method? How will this project fit into your current plan?	Our current teaching methods include lectures, problem-based learning, directed inquiry, and structured laboratories. This project will enhance our students' learning by providing a dynamic, 3-Dimensional representation of whatever the instructor wishes to show. Those students who lack the ability to visualize complex concepts in 3-D will find this display method particularly useful.
How will this improve student learning? *(List specific goals.)*	*As a result of this project students will:* 1. Be able to describe the planets and moons of the solar system 2. Explain how plate tectonics change the face of the earth 3. Explain how climate change will affect local weather patterns 4. Explain ocean current patterns and how they may be influenced by global climate change.

State how the project addresses the Seven Principles of Good Practice in Undergraduate Education. *(Address only the relevant criteria.)*	
Supports student-faculty contact	When students and faculty use the globe together, it will promote questions and answers (based on the evaluations of other similar projects).
Supports cooperation among students	The curriculum can be designed to stimulate group work.
Supports active learning	The globe can be used to pose questions for the students to answer, then be used to give them feedback.
Supports prompt feedback	The globe provides immediate feedback to questions raised by the presentations.
Supports time on task	
Supports high expectations	

Supports diverse talents and ways of learning	This installation will help visual learners particularly, but the evaluations of other installations indicate that the 3-dimensional nature of the presentation helps people with many different learning styles.

SIGNATURES:

9/8/10		9/8/10		9/10/10	
**Project Director	Date	*Associate Dean/Department Head	Date	*Vice President	Date
NO ADD'L INFRASTRUCTURE COSTS 9/8/10		9-8-2010			
**Director of Building & Grounds	Date	**Director of Data & Voice	Date		

* For notification purposes only
* * For project feasibility

(N/A) Non-Instructional Proposals (N/A)

Complete this section if this is a Non-Instructional Proposal, related to college areas that serve and support student instructional progress. ***(Non-Instructional areas include Library Services, the Learning Lab, Counseling, and Placement Services.)***

Expected Outcomes *(Project Objectives)*	
What will this project accomplish that you can't accomplish now?	
How does the project enrich or support the learning, teaching, or communication technology needs of students? *(List specific examples.)*	*As a result of this project, service to students will be improved through:*

SIGNATURES:

9/8/10					
**Project Director	Date	*Associate Dean/Department Head	Date	*Vice President	Date
9/8/10					
**Director of Building & Grounds	Date	**Director of Data & Voice	Date		

* For notification purposes only
* * For project feasibility

Global Imagination

Quotation

700 Gale Drive
Suite 260
Campbell, CA 95008
Ph: 408-866-6800
Fx: 408-866-6801

DATE May 7, 2010
Quotation # 05-07-HFCC-HD

To: Charles Jacobs
Henry Ford Community College
5101 Evergreen Road
Dearborn, MI 48128
313-845-9734

Quotation valid until: 9/30/2010
Prepared by: Linda Boysel

Description	QTY	AMOUNT
Magic Planet, with 4' (1.2 m) sphere 4' sphere Large aperture lens Large chassis Software runtime Remote control Documentation Community membership	1	$ 113,000.00
Qty: (2) F32-1080P, 6000 lumen HD Projectors	2	$ 41,000.00
On site product installation and training	1	$ 10,000.00
Support: 1 year hardware and software runtime (per designated contact)	1	$ 2,500.00
	TOTAL	$ 125,500.00

System enclosure (floor, wall or ceiling mount)	1	$ 10,000.00

Software and content development tools (per developer seat) StoryTeller OnStage Other tools for exhibit and content development	1	$ 4,300.00
1 year software support, maintenance and update	1	$ 1,000.00
	TOTAL	$ 5,300.00

Full Globe: After Effects plug-in for spherical movie making	1	$ 2,000.00

Dynamic Earth: Real Time Weather (1 year subscription)	1	$ 500.00

Desktop Computer Includes wireless keyboard and mouse	1	$ 9,000.00
Monitor 1920 X 1200 (for use with desktop computer)	1	$ 425.00
Touchscreen Kiosk including 19" monitor with speakers	1	$ 4,550.00
Qty: (2) F32-1080P, 6000 Lumen Replacement Bulb	2	$ 1,500.00

GRAND TOTAL $ 158,775.00

Terms:
1) Prices exclude shipping, tax, duties, brokerage fees, etc. Estimates will be provided to customer upon request
2) Software subject to standard GI license
3) Terms: 70% payment upon order, 30% due upon receipt or 100% payment upon order; late payments are billed at a 3% monthly interest charge
4) 1 year warranty on parts and labor
5) Standard delivery is approximately 120 days for a 4' (1.2 m) Dual HD system
6) FOB Origin

For questions regarding this quotation, please contact:
Linda Boysel
(408) 866-6800 x309
linda@globalimagination.com