

# The Black Box Innovation Group



## A Prospectus

David V. Black

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# Overview

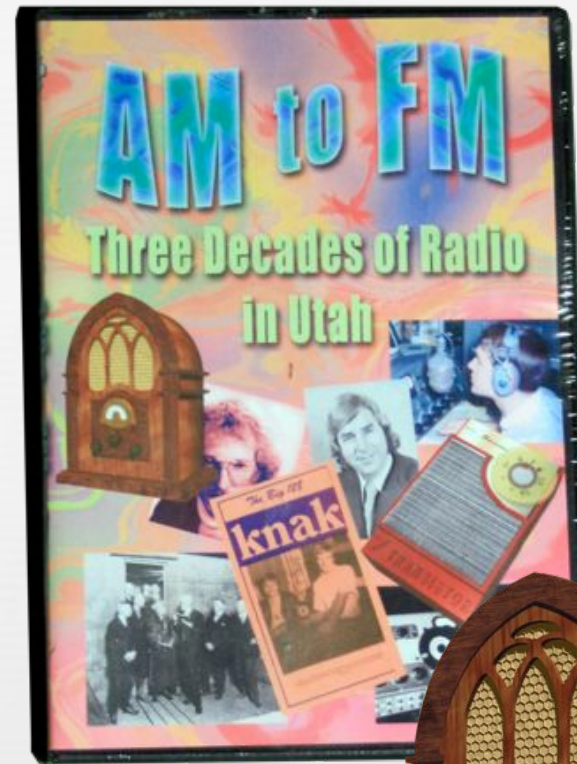


- ✎ **Mission:** Black Box Innovation Group (BBIG) is dedicated to fulfilling needs and solving problems through completing projects of societal significance that educate students to become innovators and change agents.
- ✎ This organization will bridge the gap between business and education as student teams work with BBIG Master Educators to produce meaningful projects in the areas of educational content; community improvement; scientific study; and cultural, historic, or artistic preservation.

# Background

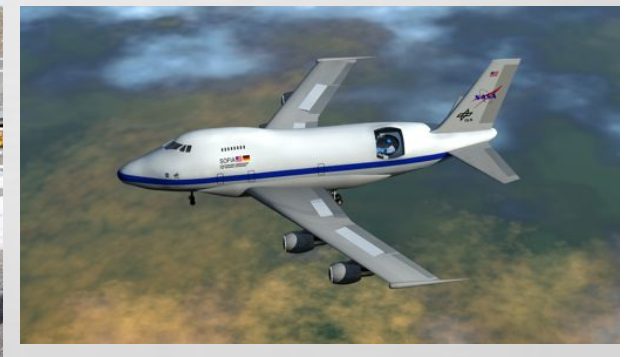
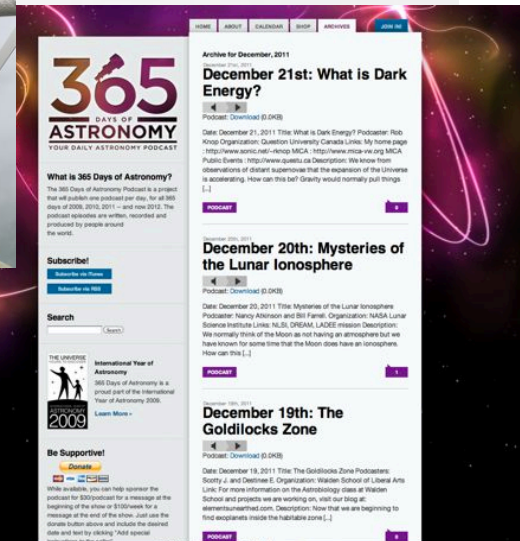


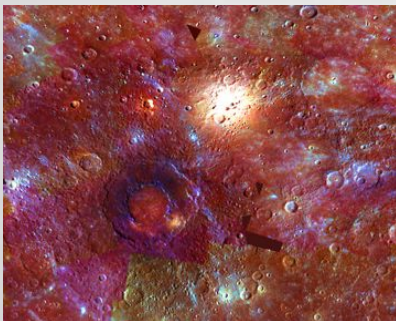
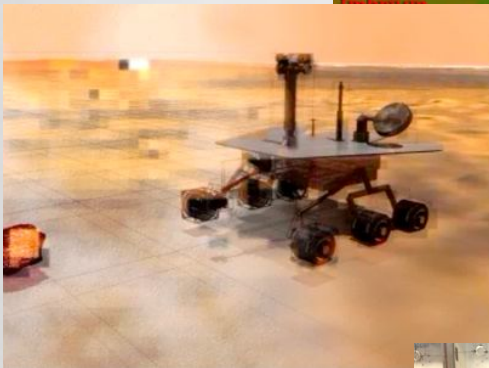
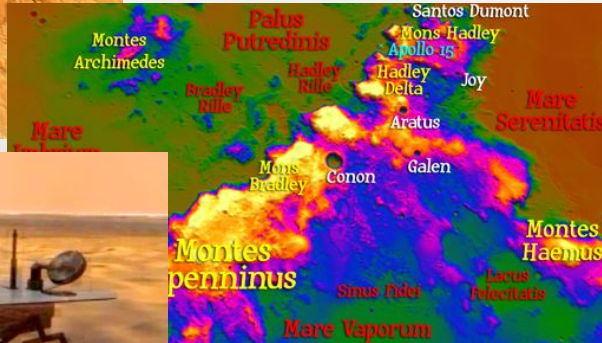
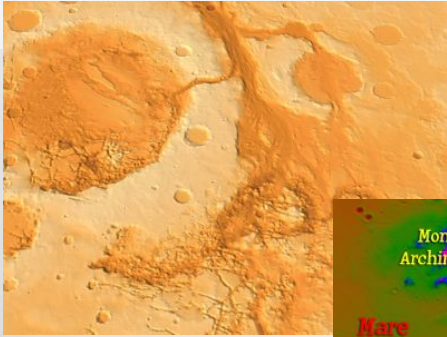
- David Black has successfully implemented project-based learning in schools for 25 years.
- Example: The AM to FM Project**
  - High School media design students interviewed 25 disc jockeys; created animations and images; and digitized photos, Top 40 music surveys, jingles, and air checks.
  - They edited this into a two-hour documentary called “AM to FM: Three Decades of Radio in Utah” which aired on KUED in 2007 to excellent reviews.
  - They designed and programmed an interactive DVD and companion CD-ROM and sold enough copies to cover expenses.



# Other Projects

- Organic Chemicals Hypercard Stacks, 1993.
- Elementary Science Tutorial Program, 1994-96.
- Astrobiology Podcasts, 2011.
- Soil contamination field research study of the Tintic Mining District, 2011-12.
- SOFIA 3D Animations, 2013.
- MIT BLOSSOMS video on the parallax method of finding stellar distances, 2012-2013.
- Chocumentary on the history and process of chocolate making, 2015.





# Other Projects

- ☞ Probotica interactive programs on space exploration, 2000-01.
- ☞ Mars Exploration Student Data Team project, 2003-04.
- ☞ Elements Unearthed videos, 2007-09.
- ☞ 3D animations for the NASA Lunar Science Institute, 2011-12.
- ☞ NASA/IPAC Teacher Archive Research Program research and posters at AAS, 2014-15.
- ☞ MESSENGER Student Planetary Investigator program, 2014-15.
- ☞ Mars Exploration school-wide PBL program, 2017.

# BBIG

## Organizational Structure

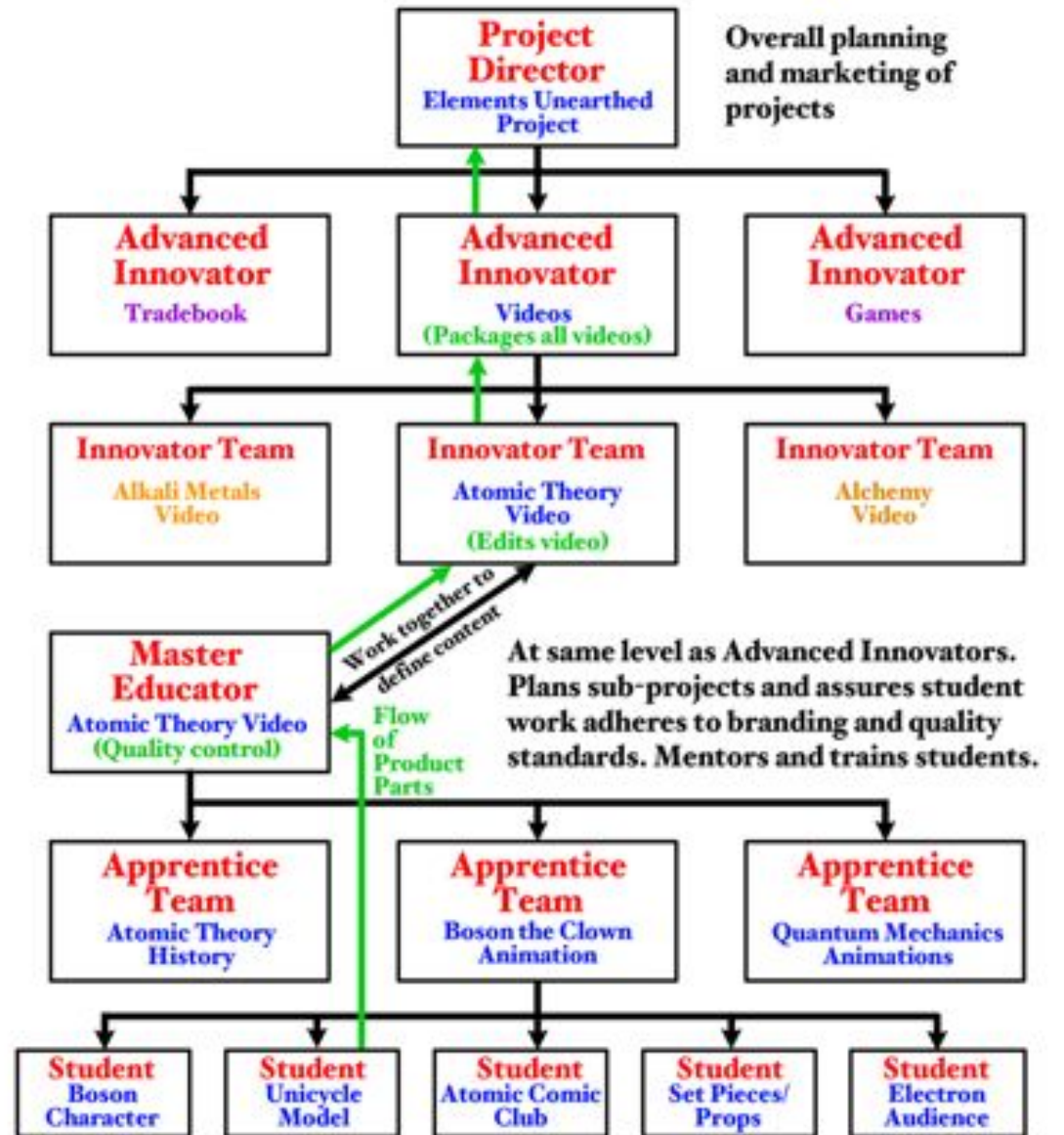


- ☞ Middle school student Associates learn media design, scientific inquiry, critical thinking, communication, collaboration, creative problem solving, and professionalism skills with classroom teachers and Master Educators.
- ☞ High school student Apprentices work on the individual pieces of large-scale projects, which are assembled and edited by BBIG Innovators with quality assurance by Master Educators.
- ☞ Apprentices complete individual Journeyman projects to graduate the program. With college training, they can become Innovators to assemble project parts.
- ☞ Major projects are managed by Project Directors, with sub-projects managed by Advanced Innovators.
- ☞ Innovators work with Master Educators to develop branding and content for each major project.

# BBIG Project Flowchart

- ☞ **Example:** Elements Unearthed project led by Project Director.
- ☞ Divided into major components (videos, tradebook, games, etc.) managed by Advanced Innovators.
- ☞ Innovator Teams work with Master Educators to design individual parts.
- ☞ Parts are assigned to student Apprentice Teams (such as creating a 3D animation).
- ☞ Master Educators ensure that student work adheres to defined standards of quality.

## Flowchart for a BBIG Project



Student Apprentices work in teams to create the parts needed for each component of a project. In the example shown here, students build the parts and scenery for an animation of Boson the Clown, part of a larger video on Atomic Theory that is one of a series for the Elements Unearthed.

# Yearly Project Timeline



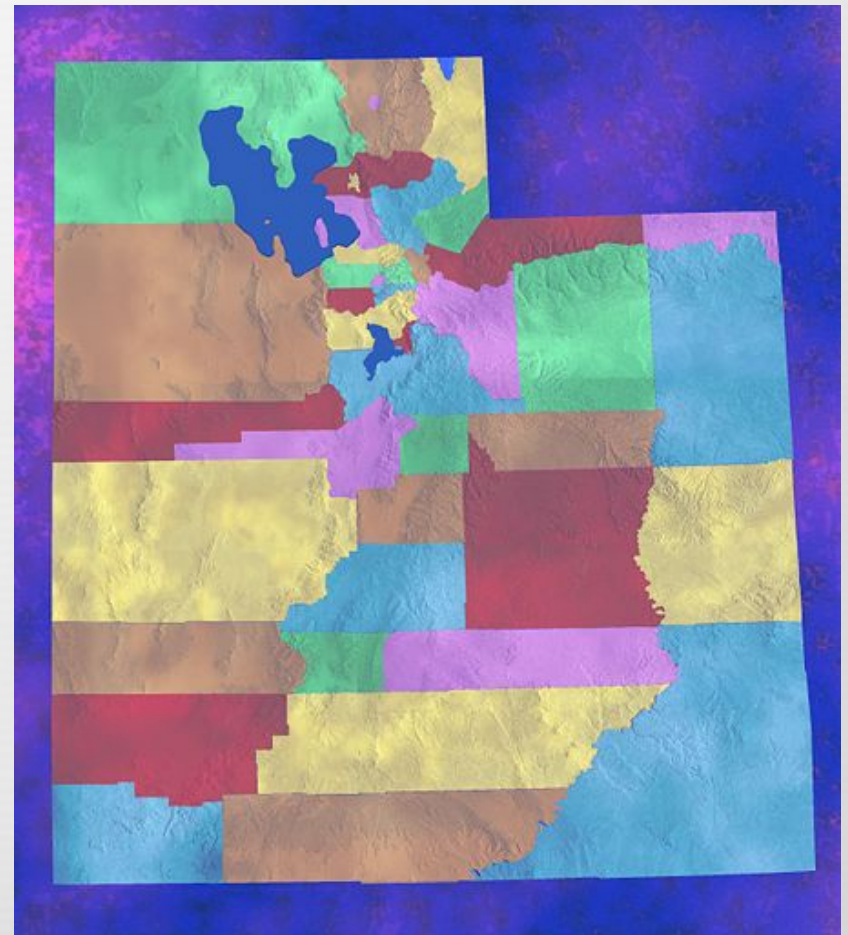
- ☞ **By end of May:** Student and Innovator teams pitch ideas for next year's project at the annual Convention; a final idea is selected by all members. Last year's project is beta tested. Attendees train each other through workshops and project presentations.
- ☞ **By end of June:** Project Directors, Master Educators, and Advanced Innovators meet to work out the components of the project, with assessment standards/rubrics defined.
- ☞ **By end of July:** Innovator Teams work with Master Educators to decide the individual parts of the project and the quality standards/rubrics for assessment.
- ☞ **First two weeks of school:** Apprentice Teams assembled and assignments made.
- ☞ **Fall semester:** Teams receive training by Master Educators and begin creating parts. Formative assessments ensure continuing improvement toward standards.
- ☞ **By end of February:** Individual student parts are evaluated and suggestions made.
- ☞ **By end of March:** The parts are completed and given to Innovator Teams for editing/assembly into the final sub-project. These are displayed at the Convention in May.
- ☞ **By end of June:** Products are complete and made available to all educators.



# Phase I: Proof of Concept



- David Black will work with the media design and/or science teachers of up to ten schools.
- These will be geographically diverse, representing some of Utah's less populated counties.
- Teams will work with county tourism bureaus to create a series of videos, brochures, and other county promotional materials.
- Videos will include an overview, scenery, geography/geology, ecology, events, and lodging/meals.
- Each video will be student filmed and edited and about 5-8 minutes long.



# Phase I Timeline



- ☞ From January to May of Year 1, David Black will develop promotional materials, gather sponsors, and advertise/solicit help from up to ten media design or science teachers in Utah.
- ☞ He will travel to the selected schools by the end of May to meet teachers and students and conduct pre-assessments. Student teams will be formed. He will line up local business sponsors.
- ☞ From June through December, students will develop skills and travel throughout the counties to film and document them.
- ☞ From December through March of Year 2, the footage and photos will be edited into draft videos and assessed by the classroom teacher, improved, then the final videos presented to county officials by the end of May.
- ☞ Another ten schools will be added to the project in Year 2 from new counties.

# Funding BBIG Phase I



- ☞ Phase I will require ~ \$5000 per month over 30 months. This will cover living expenses for my family (as this will be a full-time job to do right) as well as cover travel, lodging, and meals needed to visit the school sites.
- ☞ I will solicit funds from county and state tourism organizations, foundations, chambers of commerce, and STEM related grants.
- ☞ I will also need an improved computer, printer, and software at about \$4000 total.
- ☞ Team equipment such as cameras and hard drives will be funded by local sponsors (hotels and restaurants).
- ☞ Complete personal costs for Phase I will be \$154,000.

# Phase II: Building a Team



- ☞ Once the concept is proven and 10-20 teams have joined, we will increase the complexity of projects.
- ☞ We will bring in additional people, including game programmers, videographers, layout artists, and instructional designers as needed.
- ☞ We will begin a comprehensive professional development program to cross train employees on all relevant project skills.
- ☞ We will track student team members as they matriculate into college, collecting statistics on performance and career goals.
- ☞ These students will return to BBIG as the first group of Innovators.
- ☞ We will start the annual Convention in May to pitch ideas.

# Phase III: Education Program



- ❧ Innovators will develop competence and experience in project management and will become Advanced Innovators or Master Educators.
- ❧ Master Educators will be trained as mentors to work with classroom teachers and student teams to provide Four Cs, inquiry, and quality assurance instruction.
- ❧ Credentialed classroom teachers will attend an 8-week summer training program to be Master Educators and receive a \$5000/year stipend.
- ❧ The middle school Associates program will be added.
- ❧ The annual Convention will become a premier source of project management, creative problem solving, and innovation training.

# Phase IV: Full Scale BBIG

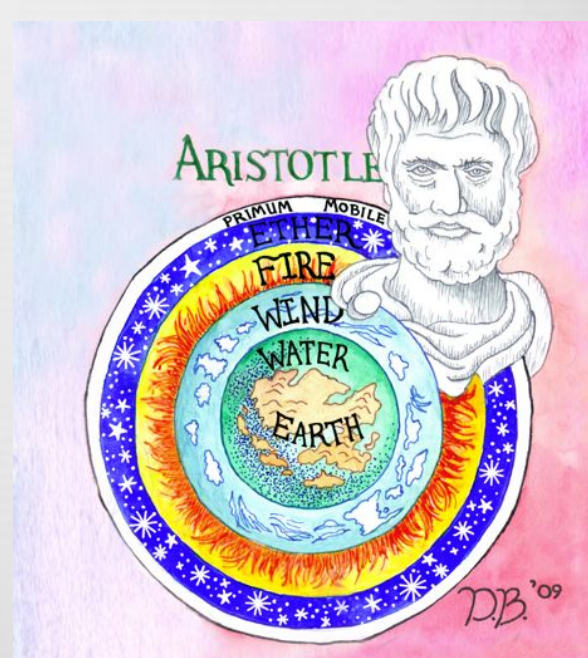


- ☞ All parts of the BBIG organization will be in place.
- ☞ Teachers and employees of other companies will receive training from BBIG Innovators, with frequent (20% of time) in-house professional development and 20% individual project time (the Innovation Initiative).
- ☞ Ground up projects will be national and global in scope.
- ☞ We will expand to include over 50 student teams in several states, with data showing the effectiveness of our program.
- ☞ Innovators will be drawn directly from high school Apprentices who complete BBIG internships or college scholarships, or from art schools or other training programs if they show exceptional competencies through a competitive process.

# Possible Educational Projects for Phases II-IV



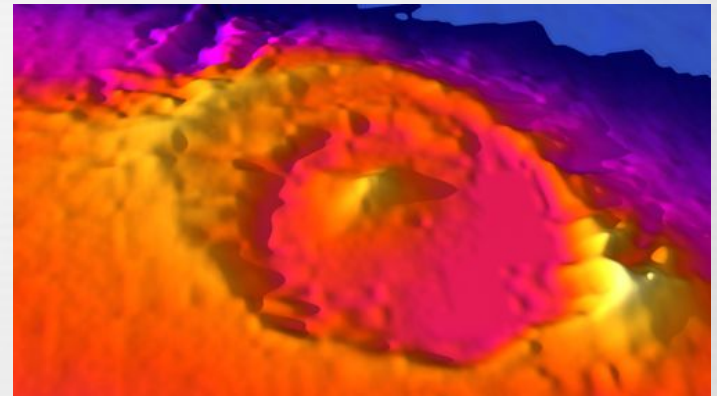
- ☞ **The Elements Unearthed:** a mini-series of 13 videos for PBS on the discovery, history, uses, mining, refining, and hazards of the chemical elements and industrial materials, with ancillary materials.
- ☞ **Mendeleev's Maze of Madness:** an online game shaped like the periodic table, with puzzles and challenges to move between the element rooms.
- ☞ **The Elusive Atom:** Posters, timelines, videos, and mini-posters of the scientists, theories, and events leading up to our understanding of atomic theory and the Standard Model.
- ☞ **Astronomy Educational Materials:** A completion of the SOFIA video, a nearby stars trade book, space probe posters, and lesson plans.



# Community, Cultural, and Scientific Projects



☞ **Global Awareness/Science Lesson Plan Book:** Includes lessons that incorporate real global science data such as USGS DEMs, Earth Explorer, etc. Student teams would field test the lessons.



☞ **Field Research Handbook:** Includes lessons that teach field research skills, such as using GIS data to chart soil and water contamination, ImageJ to 3D, etc.

☞ **History Preservation Videos:** Teaching students how to do video interviews to gather primary historic data to preserve cultural traditions and art forms or time periods, such as a video on the Tintic Mining District.

