A Year at Howard High School of Technology

John D. Shaw

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Our Team

Graduate Fellow + Teacher

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Goals

- Develop innovative methods to convey ideas and scientific method.
- Emphasize universal nature of physical laws.
- Emphasize data taking and analysis.
- Emphasize deductive reasoning to generate predictions.
- Stimulate independent thought and research.
Example Projects

• The Rotation of the Sun
  – A Project CLEA computer based lab adapted for use in NCCVoTech.
  – Students observe real images of the sun and follow sunspots over several days
Example Projects
Example Projects

• The Rotation of the Sun
  – Learn to take and analyze data.
  – Repeat observations for accuracy.
  – Compute synodic and sidereal rotation.
  – Importance of taking observing point into account.
  – Discover different rates of rotation depending on latitude.
Example Projects

• The Moons of Jupiter
  – A Project CLEA computer based lab.
  – Students observe *simulated* images of the four Galilean moons of Jupiter.
  – Measure the distances from Jupiter and periods of the moons to data.
Example Projects

• The Moons of Jupiter
  – Find mass of Jupiter by using Kepler’s Third law: Mass = (distance)^3/(period)^2.
  – Extend to Earth – moon system, and other bodies in the solar system.
Example Projects

• Scale Model of the Solar System
  – Students calculate distances and planet/moon sizes if the Earth were 1 cm, 1 inch or 1 foot in diameter.
  – Plot orbits on 40”x36” map of Wilmington.
  – Determine location of planets today and plot.
  – Compute and plot location of planets in one years time.
Example Projects

- Scale Model of the Solar System
Example Projects

• Scale Model of the Solar System

A Quantitative Prediction!
Where a planet will be observed in the future based only on knowing how far a planet is from the sun and where it is observed to be now.
Other Duties

- Assist with Chemistry lab experiments
- Observe student successes and problems with traditional studies and new projects.
Conclusions

• Use of “hands-on” materials were most effective in conveying ideas.
• Greatest problems are engaging students and students’ false preconceptions.
• Improved my ability to better communicate scientific knowledge and my own research to a broad audience.