

Ciphers: Excel Applications to Engage Students

Saturday, April 20, 2013



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Terms

- Ciphers - Cryptographic algorithms used to encrypt and to decrypt information
- Encryption – Process to alter data so that is unrecognizable for the purpose of secrecy
- Decryption – Process to undo the procedure of encryption to recover data

Experiential Learning

John Dewey - 19th & 20th century psychologist and philosopher

functionalism, individual takes an active role in learning based on environment

Jean Piaget – 20th & 21st century psychologist

theory of cognitive development, how we learn, order and use knowledge; biological and environmental

Embedded Mathematics

- Discrete Mathematics
- Functions
- Matrices
- Modular Arithmetic
- Prime Numbers
- Random Numbers
- Tables

Excel Matrix Operations

- **Matrix Multiplication - *mmult***
- **Matrix Inverse – *minverse***

*** *Excel array operations require Control, Shift, Enter***

Excel Table Lookups

- **Vertical Table lookup – *vlookup***
- **Horizontal Table lookup – *hlookup***

Several Ciphers

- Caesar - substitution
- Viginère – block, multiple substitutions
- Affine – multiple substitution
- Linear Transformation – matrix multiplication
- One-time Pad - proven unbreakable
- RSA – public key

Benefits

- Cross-disciplinary, mathematics & technology
- Hands on applications
- Problem solving
- Work individually and or in groups
- Excel readily available

Observations & Follow-up

Observations

- Students discuss projects with classmates
- Students ask questions
- Students want to share how problem is solved

Follow Up

- Final oral presentation incorporated into project

Questions?

Demonstrations

Contact Information

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