QuarkNet

Data Activities Portfolio

Data Activities Portfolio

In the Beginning

In the Beginning	Now
14 Activities	38 Activities
Variety of structures	Specific structure
No Protocol	Protocol Aligned with PD Criteria
Level 1-3	Level 0 - 4
No Teacher Answer Key	Teacher Answer Key Provided
No Coding Activities	2 Coding Activities
No Spanish Language Versions	Spanish Language Posted for 5 Activities

Roudebush, NSF Review, May, 2023

Data Activities Portfolio

Guiding Principles

Improvements

- **Accessibility for all teachers**

- **Activities tied to curriculum topics**

- **Linked activities of increasing challenge**

- **Ultimate goal: Student Research**

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Improvements

Data Strand

Level

Curriculum Topics

NGSS Practices

Data Strand
- ✓ – Any –
- Cosmic Ray
- LHC
- Neutrino

Level
- ✓ – Any –
- Level 0
- Level 1
- Level 2
- Level 3
- Level 4

NGSS Practices
- ✓ – Any –
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Curriculum Topics
- ✓ – Any –
- Conservation Laws
- Diversity & Inclusion
- Electricity & Magnetism
- Half-Life/Mean Lifetime
- Instrumentation
- Waves & Interference
- Kinematics
- Nature of Matter
- Quantum Mechanics
- Special Relativity
- Standard Model
- Skill: Coding
- Skill: Developing Models
- Skill: Graphing
- Skill: Histograms
- Skill: Uncertainty
- Spanish Language

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NGSS Best Practices

QuarkNet Data Activites Portfolio (N= 35):
Alignment with NGSS Practices

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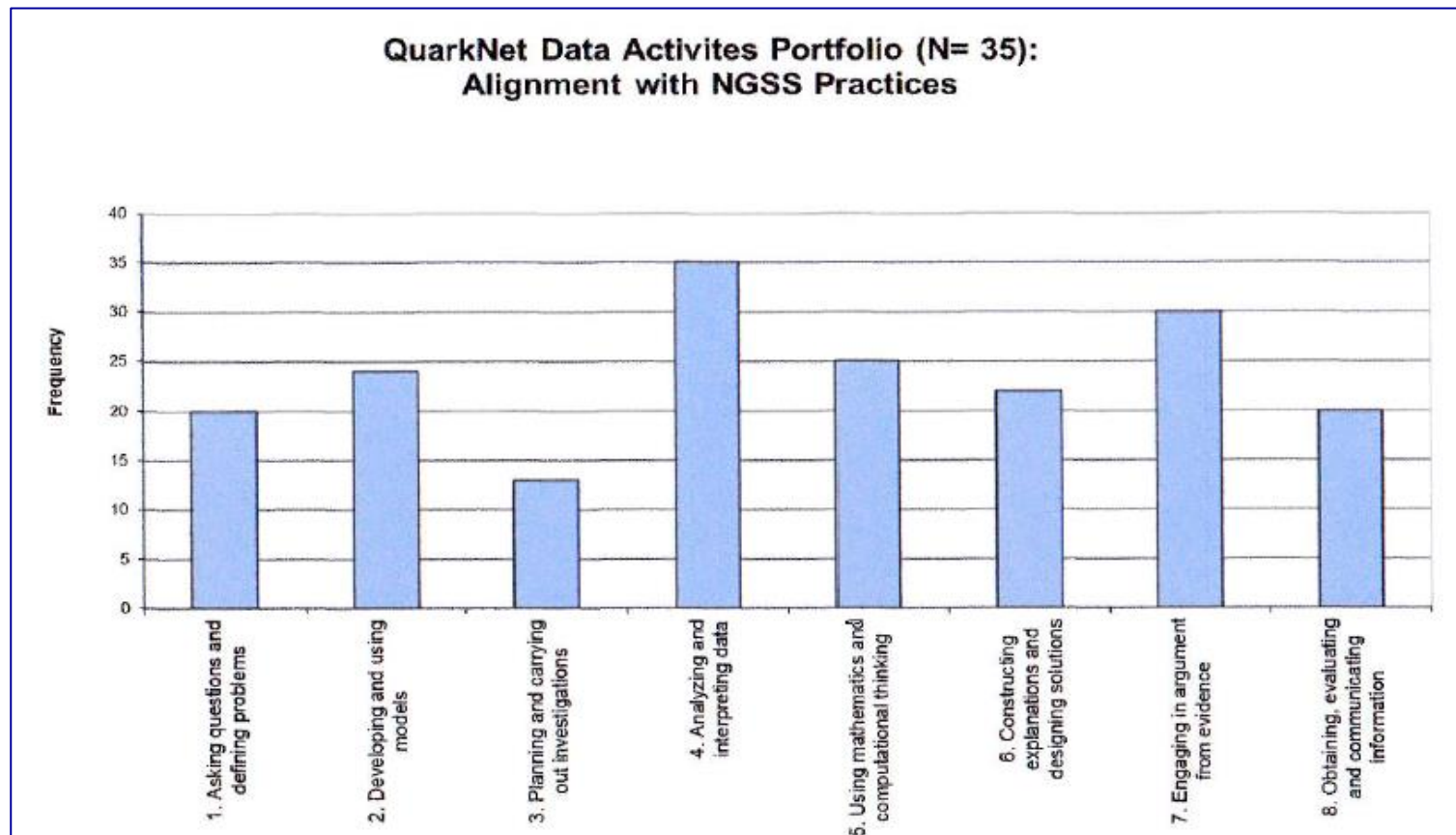
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Most Used Activities

2019	2020
Rolling with Rutherford	Rolling with Rutherford
Quark Workbench	Dice, Histogram and Probability
Mass of U. S. Penny	Calculate the Z Mass

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Connections

Data Activities Portfolio Supports:

- **Workshops**

- **Camps**

- **Masterclasses**

- **Broadening Participation**

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Initiatives

- **Infuse Data Science into existing activities.**

- **Implement using coding notebooks.**

- **Add Spanish language versions to existing activities.**
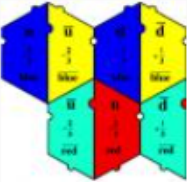
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The Future

Goals:

- **Infuse Data Science where appropriate.**

- **Implement coding activities accessible to all teachers.**

- **Add Spanish language versions to all activities.**

- **Continue to develop accessible activities explaining new discoveries.**

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Data Strand	Level	Curriculum Topics	NGSS Practices	
- Any - ⌄	- Any - ⌄	- Any - ⌄	- Any - ⌄	**Apply**

1 2 3 4 NEXT› LAST»

ACTIVITY NAME	DATA STRAND	LEVEL	CURRICULUM TOPICS	NGSS PRACTICES
Mass of U.S. Pennies Students create and interpret a histogram of penny masses.	Cosmic Ray, LHC	Level 0	Skill: Developing Models, Skill: Histograms, Skill: Uncertainty	1, 2, 3, 4, 5, 6, 7, 8
Quark Workbench 2D/3D Students use Standard Model rules to build hadrons and mesons from quarks.	Cosmic Ray, LHC	Level 0	Conservation Laws, Nature of Matter, Standard Model, Skill: Developing Models	1, 2, 4, 5, 6, 7

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