|  |  |  |
| --- | --- | --- |
| **Name:James Prugh** | **Contact Info:** | **Date:7/15/16** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Lesson Title : Algorithms** | **Unit #:** | **Lesson #:1** | **Activity #:**  **2** |
| **Activity Title: Algorithms** |

|  |  |
| --- | --- |
| **Estimated Lesson Duration:** | **1 day** |
| **Estimated Activity Duration:** | **1 day** |

|  |  |
| --- | --- |
| **Setting:** | **High school classroom** |

|  |
| --- |
| **Activity Objectives:** |

1. **Use simple algorithms to solve math problems.**

|  |
| --- |
| **Activity Guiding Questions:** |

1. **What is an algorithm?**
2. **How does the long division algorithm work?**
3. **How are algorithms used in internet security?**

| **Next Generation Science Standards (NGSS)** | |
| --- | --- |
| **Science and Engineering Practices (Check all that apply)** | **Crosscutting Concepts (Check all that apply)** |
| Asking questions (for science) and defining problems (for engineering) | Patterns |
| Developing and using models | Cause and effect |
| Planning and carrying out investigations | Scale, proportion, and quantity |
| Analyzing and interpreting data | Systems and system models |
| Using mathematics and computational thinking | Energy and matter: Flows, cycles, and conservation |
| Constructing explanations (for science) and designing solutions (for engineering) | Structure and function. |
| Engaging in argument from evidence | Stability and change. |
| Obtaining, evaluating, and communicating information |  |

| **Ohio’s Learning Standards for Science (OLS)** |
| --- |
| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| Demonstrating Science Knowledge **(D)** |
| Interpreting and Communicating Science Concepts **(C)** |
| Recalling Accurate Science **(R)** |

| **Ohio’s Learning Standards for Math (OLS) and/or**  **Common Core State Standards -- Mathematics (CCSS)** | |
| --- | --- |
| **Standards for Mathematical Practice (Check all that apply)** | |
| Make sense of problems and persevere in solving them | Useappropriate tools strategically |
| Reason abstractly and quantitatively | Attendto precision |
| Construct viable arguments and critique the reasoning of others | Look for and make use of structure |
| Model with mathematics | Look for and express regularity in repeated reasoning |

|  |
| --- |
| **Unit Academic Standards (NGSS, OLS and/or CCSS):** |

[CCSS.MATH.CONTENT.HSF.IF.A.1](http://www.corestandards.org/Math/Content/HSF/IF/A/1/)

|  |
| --- |
| **Materials**: (Link Handouts, Power Points, Resources, Websites, Supplies) |

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxqYW1lc3BydWdoMjAxNnxneDo2ZjEzZDQ2MDRkNjY3Yzgz>

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxqYW1lc3BydWdoMjAxNnxneDo2Y2I0NTgwODQyNmRjY2E1>

|  |
| --- |
| **Teacher Advance Preparation:** |

Worksheet assigned the previous day:

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxqYW1lc3BydWdoMjAxNnxneDoxMjI2NWU4NjEzZWQwNzQ2>

|  |
| --- |
| **Activity Procedures:** |

1. Students are placed in groups of 4 and asked to work on questions provided.
2. Groups share solutions and methods
3. Students are given a different set of questions and asked to share out results.
4. Teacher provides a summary discussion of findings

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

The teacher will monitor the group work.

**Summative Assessments:** These are optional; there may be summative assessments at the end of a set of Activities or only at the end of the entire Unit.

The class will be given a problem involving finding a square root by hand.

|  |
| --- |
| **Differentiation:** Describe how you modified parts of the Lesson to support the needs of different learners.  Refer to Activity Template for details. |

Heterogeneous grouping will be used and roles will be defined: leader, recorder, time-keeper, presenter

|  |
| --- |
| **Reflection:** Reflect upon the successes and shortcomings of the lesson. |

Students found the algorithms interesting, and I was especially pleased with their interest in the historical context of the work. Prior to this lesson, most students thought that finding a square root was a calculator exercise with no mathematical basis. The algorithm for greatest common divisor helped reinforce long division skills that are needed when dividing polynomials.

I hope to introduce several other algorithms throughout the year.