



LEARNING MODULES

GK-12 DISSECT at New Mexico State University

Title: Metric Measuring and Computational Thinking Introduction 2

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Discipline or Area: Metric Measurement

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School: Vista Middle School

Subject of class: Science

Grade: 6th

COVERAGE OF COMPUTATIONAL TOPICS

The concept of metric measurement was the main topic. All major computational thinking vocabulary was also covered. Algorithms and sequencing of steps were utilized to help them understand how following them can solve a problem.

OBJECTIVES

Students will learn how to follow and write an algorithm, follow and write a sequence of steps, and measure in centimeters and millimeters.

EQUIPMENT AND MATERIALS

Colored Butcher Paper
Metric Ruler
Scissors
Algorithm Handout

Meter Stick
Glue or Tape
Composition Notebook
Vocabulary Handout

BACKGROUND AND REFERENCES

The purpose of this module is to get students comfortable with metric measurement. This module is also meant to introduce the students to the world of computational thinking through vocabulary introduction and use of algorithms.

PROCEDURE

Provide detailed instructions on how this module is taught.

Previous to module deployment, students should be taught how to measure in centimeters and millimeters. Students are given the handout with the algorithm of how to cover the composition notebooks. They should be instructed to try to follow the algorithm by themselves and only ask for help if they can't figure it out by themselves. The teacher will have to cut the paper at the spine of the notebooks for the students when they get to that step. Once they finish covering their notebooks, they should write down if they followed the algorithm, didn't follow the algorithm, or had to ask for help. Next they should be given the vocabulary words sheet and told to cut and glue them onto their notebooks.

What were the “learning goals?”

The learning goals were to understand how to measure in centimeters. Another goal was to introduce computational thinking vocabulary words. The main computational goal was to learn to follow an algorithm.

How did you introduce CT?

CT was introduced when they were taught about the multiple vocabulary words. The concept of following an algorithm, or a series of steps, to solve a problem was also heavily focused on.

How could you assess the understanding of CT in this module?

We can easily assess the understanding of the CT by looking at their notebooks. We can also utilize the CT rubrics made at the beginning of the semester, specifically the sequencing and algorithms rubrics, to assess their learning

NOTES AND OBSERVATIONS

What were challenges you encountered in the overall development of the module?

Some are very slow executing directions. A lot of the kids had to ask for help, but most of them could figure it out just by reading it together out loud. Almost all of the kids had difficulty measuring. Sometimes they would try and use inches and some kids didn't measure at all. They were not confident in their own problem solving skills; most kids were doing the right thing, but still asked for help with, and/or confirmation of what they were doing.

What was successful?

This module helped the kids develop their measuring skills. By the end of the module most of them improved in measurement. They seemed to understand that an algorithm was a sequence of steps used to solve a problem and most of them tried to follow it.

How was the students' reception to the content of the module?

The students were engaged and excited to cover their notebooks. They were very excited to be given a notebook of their own and they were excited to decorate them. They were very excited to measure and cut and glue things, but many of them became frustrated when they couldn't ask for help without trying it on their own first.

Computational Thinking Notebook Algorithm

1. Pick a color of paper, and bring it to your seat
2. Place your paper on your table horizontally
3. Measure 35 cm down from the top left edge of the paper and make a small mark
4. Measure 35 cm down from the top right edge of the paper and make a small mark
5. Connect the two small marks so that you have a line drawn all the way across your paper
6. Cut along the line
7. Place your paper on your table horizontally
8. Measure 52 cm over from the top left edge of the paper and make a small mark
9. Measure 52 cm over from the bottom left edge of the paper and make a small mark
10. Connect the two small marks so that you have a line drawn all the way across your paper
11. Cut along the line
12. Open the cover of your composition notebook and place it in the center of your paper
13. Fold the left side of your paper over the cover of your notebook
14. Fold the top and bottom of your paper over your entire notebook
15. Raise your hand for help with the next step
16. Open your composition notebook to the back cover
17. Fold the right side of your paper over the cover of your notebook
18. Fold the top and bottom of your paper over your entire notebook
19. Place a piece of tape on the folded paper at each of the corners to keep the flaps of paper folded down
20. Close your notebook
21. Write your name at the top right corner of your notebook

Algorithm

Variables

Branching

Linear

Nonlinear

COMPUTATIONAL
THINKING

SEQUENCE OF STEPS

Glutamine Synthetase

*Sucrose Phosphate
Synthase*

Data

ITERATION

Efficiency

CORRECTNESS