※teachers learning code

Baking with Algorithms

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60+ minutes

Lesson Details

LEVEL
Grades 3+

COMPONENTS
‹/› **Programming**
🖥 **Computing and Networks**
🗗 **Design**

SUBJECTS
English, Mathematics

KEY CODING CONCEPTS

Algorithms
Sequences
Debugging

TOOLS & LANGUAGES
Unplugged

TERMINOLOGY

Algorithms
A step-by-step set of operations to be performed to help solve a problem.

Sequences
Identifying a series of steps necessary to complete a task.

Debugging
Finding problems in code and solving them.

Lesson Plan

Overview

Students learn about the concepts of algorithms and sequence by looking at and using recipes. In the first part of the lesson students take different parts of a recipe and put them in the correct order. In the second part of the lesson, students follow the correct sequence of the recipe to make cookies.

Prep Work

Materials

- Cookie ingredients, bowls, measuring cups, recipe handout, an oven

Before the lesson...

- Print out a recipe (see below) and cut out ingredients. Then, cut each instruction step out separately. (Have enough for your class to be placed in groups of four)
- Have ingredients set out with proper measuring cups
- Have cookie sheets prepared with parchment paper
- Gathering volunteers and putting students in small groups would be beneficial

Lesson

Introduction

Ask: When we are making cookies we have all these steps, can we do them in any order, or is the sequence of instructions important?

Activity

1. Divide students into groups of 4 and hand out cut up Chocolate Chip Cookie instructions.
2. Ask students to put steps in a logical sequence. Once correct, have them glue it on a paper.
3. Hand out ingredients sheet.
4. Have students in groups make their recipe following the recipe and algorithm they put in the proper sequence.
5. When the sequence is complete, have each group place their cookie dough on sheets you prepared.
6. Put cookies in the oven, talking to the class about the proper temperature and timing. Start a timer.
7. Enjoy cookies with the class!

Assessment

Assess students' ability to work collaboratively in a group and evaluate their cut and paste algorithm (e.g. is the sequence in the correct order?).

Extensions

Coding and English

While cookies are baking, have students think of a task they do every day and write out the "algorithm" for that task (e.g. brushing teeth). Have students cut out each step, trade with a partner and see if they can put each other's algorithms in the correct sequence.

English

Have each student share a favourite family recipe and create a class cookbook.

Math

Explore other recipes with a focus on measurement. Challenge students to rewrite the recipe if they half or double the measurements.

Design and Computing & Networks (Hardware and Software)

- View 'The Robotic Chef' (bit.ly/baking-with-algorithms-video) and/or 'A good egg: robot chef trained to make omelettes' (cam.ac.uk/research/news/a-good-egg-robot-chef-trained-to-make-omelettes)
- Challenge students to create their own robot chef prototypes using recycled materials or just sketching their design.

Provincial Curricular Crossover

Teach lessons that are tied to your existing curriculum! bit.ly/CLClessons

References

Robotic Chef does all the cooking for you (Tech Insider, 2017)
https://youtu.be/SQjXaTlGHIY

A good egg: robot chef trained to make omelettes (University of Cambridge, 2020)
https://www.cam.ac.uk/research/news/a-good-egg-robot-chef-trained-to-make-omelettes

Chocolate Chip Cookie Recipe

Makes 8

Ingredients

1/2 cup + 1 tablespoon all-purpose flour
1/4 teaspoon baking soda
1/4 teaspoon salt
1/4 cup unsalted butter, softened
1/4 cup light brown sugar lightly packed
2 tablespoon granulated sugar
1 egg
1/2 teaspoon vanilla
1/3 cup chocolate chips

Instructions

Preheat the oven to 350 degrees. Line a baking sheet with parchment paper and set aside.

In a small bowl using a handheld mixer, mix together the butter, brown sugar, and granulated sugar until smooth. Crack the egg and remove the shell. Add in the egg and vanilla and mix until fully combined.

In a separate bowl, whisk together the flour, baking soda, and salt.

Add the dry ingredients to the wet ingredients and mix until fully combined, then fold in the chocolate chips.

Scoop out rounded balls of dough (about two tablespoons each) onto the baking sheet. Bake for 10-12 minutes. Cookies will be slightly underdone, allow to cool for at least ten minutes on a baking sheet, then transfer to a wire rack to finish cooling.