Title: *Real-life Algorithms* – Paper Airplanes

Subject Area: Computer Science

Grade Level: 2 (suitable for 6 and older)

Related Standards of Learning:

CSTA K-12 Computer Science Standards

CPP - Computing Practice & Programming
CT - Computational Thinking

ISTE Standards for Students

1 - Creativity and Innovation
2 - Communication and Collaboration
4 - Critical Thinking, Problem Solving, and Decision Making
6 - Technology Operations and Concepts

Common Core English Language Arts Standards

L – Language
SL - Speaking & Listening

Common Core Math Standards

G – Geometry
MP - Math Practices

Classroom Set-up:

1. Unplugged (taught without the students needing a computer),
2. Projector for Powerpoint slides and videos

Objective:

In this lesson, students will relate the concept of algorithms back to everyday activities. After discussing algorithms, students will make paper airplanes using an algorithm. The goal here is to start building the skills to translate real world situations to online scenarios and vice versa.

Students will be able to:

- Decompose large activities into a series of smaller events.
- Arrange sequential events into their logical order.

Summary:

In this lesson, students will learn that algorithms are everywhere in our daily lives. For example, to make a paper airplane they would have to follow a specific set of instructions. Instead of giving vague or over-generalized instructions, students will break down a large activity into smaller and more specific instructions. From these instructions, students must determine a proper order for the sequence of instructions to be in.

Please refer to https://curriculum.code.org/csf/coursec/4/ **Lesson 4: Real-Life Algorithms: Paper Airplanes** for a complete description of this activity.

Vocabulary: Algorithm - Say it with me: Al-go-ri-thm

A list of steps to finish a task.

Materials:

Print Real-Life Algorithms: Paper Airplanes - Worksheet from Code.org

Description: A5- regular paper size, STICKERS to decorate planes after it is made (optional). Note: There wasn't enough time left to do this so left them with the teacher.
Quantity: 12 (as many as students you have in class)

Procedure:

Warm Up (15 min)

Vocabulary

This lesson has one vocabulary word that is important to review:

Algorithm - Say it with me: Al-go-ri-thm

A list of steps to finish a task.

What We Do Daily

- Ask your students what they did to get ready for school this morning.
    - Write their answers on the board.
    - If possible, put numbers next to their responses to indicate the order that they happen.
        - If students give responses out of order, have them help you put them in some kind of logical order.
        - Point out places where order matters and places where it doesn't.
- Introduce students to the idea that it is possible to create algorithms for the things that we do everyday.

    - Give them a couple of examples, such as making breakfast, brushing teeth, and planting a flower.
- Let's try doing this with a new and fun activity, like making paper airplanes!

- At this point show them the Code.org video at https://www.youtube.com/watch?v=AWqo8Gxtrjs&feature=youtu.be. This video introduces the lesson to the students.

Main Activity (20 min)

Real-Life Algorithms: Paper Airplanes - Worksheet

You can use algorithms to help describe things that people do every day. In this activity, we will create an algorithm to help each other fold a paper airplane.

You know your classroom best. As the teacher, decide if students should do this individually, in pairs, or in small groups. I grouped the students in pairs and had them swap instructions and then follow them to make the paper airplane.

Lesson Tip

If deciding on the correct steps seems too difficult for your students, do that piece together as a class before you break up into teams.

Lesson Tip

If you are concerned about injury when your students begin flying their paper airplanes, we recommend having them blunt the tip of the plane by either folding it inward or ripping it off and covering the ripped edges with tape.

Directions:

1. Cut out the steps for making a paper airplane from the worksheet provided in the resources.
2. Work together to choose the six correct steps from the nine total options.
3. Glue the six correct steps, in order, onto a separate piece of paper.
4. Trade the finished algorithm with another person or group and let them use it to make their plane!

U

Unplugged

Name: _____ Date: _____

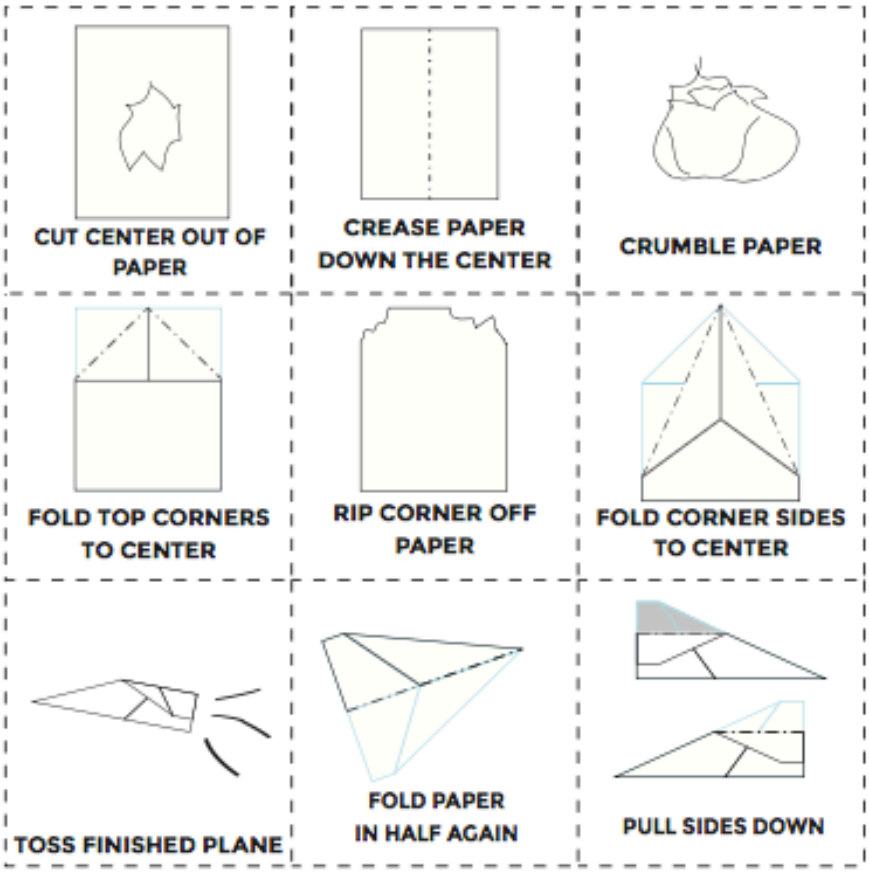
Real-Life Algorithms

Paper Airplane Worksheet

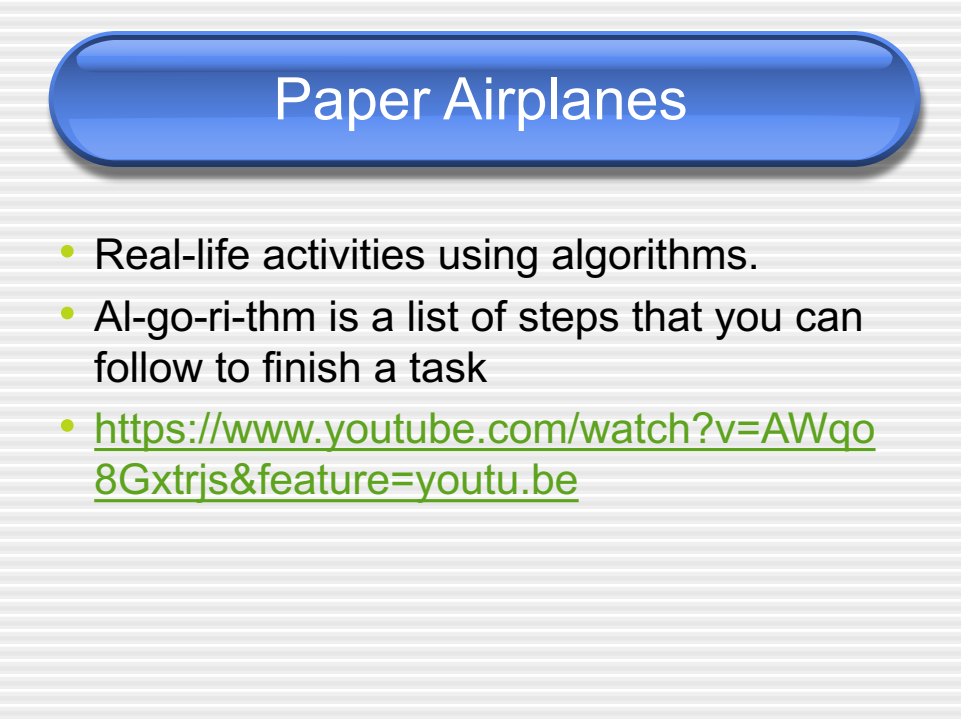
C O
D E

You can use algorithms to help describe things that people do every day. In this activity, we will create an algorithm to help each other make paper airplanes.

Cut out the steps of making an airplane below. Glue the six the correct steps, in order, onto a separate piece of paper. Trade your finished algorithm with another person or group and let them use it to make an actual flying model paper plane!



Slide to go along with lesson.



Discussion:

Wrap Up (15 min)

Flash Chat: What did we learn?

- How many of you were able to follow your classmates' algorithms to make your airplanes?
- Did we leave anything out when making the plane?
    - What would you have added to make the algorithm even better?
    - What if the algorithm had been only one step: "Fold a Paper Airplane"?
        - Would it have been easier or harder?
    - What if it were forty steps?
- What was your favorite part about this activity?

Be sure to practice making the paper airplane ahead of time by yourself so you can lend hands-on assistance to the students who find it challenging.

References/Sources:

Activity was adapted from Code.org at
https://curriculum.code.org/csf/coursec/4/