Lesson # 1- Intro to Class and Objects

Overview

Provide students with an introduction to the concept of Classes and Objects through a series of unplugged examples.

Lesson Objectives

Students will be able to

- Identify similarities and differences between real world examples which share certain commonalities.
- Understand the relationship between Class and object
- Provide examples of possible attributes and methods of a given class.

Suggested Duration

1 period (45 minutes)

NYS Computer Science and Digital Fluency Learning Standards

7-8.CT.4 Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task.

Vocabulary

Class - a template for creating objects which contains specific attributes and methods which will be held by each object.
Object - A specific instance of a class. An object will have specifically defined attributes which will make it a unique instance of the class it is from.
Attributes - characteristics which are declared in a class and defined when the object is made. You could think attributes like adjectives of the object.
Methods - A behavior, procedure or action which can be performed by an object that is specific to the class to which it belongs. You could think of methods like verbs that the object can do.

Planning Notes

This lesson is an introduction to the concept of Classes and Objects. Students will be presented with several different real world examples and analogies to help understand this concept.

For this lesson, you will need an assortment of different types of balls of all shapes, color, sizes, material etc. The more variety, the better. Ideally, you would want a different type of ball for each group, but if some groups have the same type of ball, the lesson will still work. You could inquire with your school's gym teacher ahead of time to acquire these materials.

Students will engage in an unplugged group activity where they examine an object (Specifically a ball) and describe the physical characteristics of the ball and what we can do with a ball. These observations will then be connected to the concept of classes and objects in programming. Students will then be asked to demonstrate their understanding of this concept through a short assessment using Baseball players as an example.

Students will not be expected to write any code in this lesson.

Assessments

- Assess ____. Check for the ability to:
  - **identify accurate attributes and methods for a possible class.**
  - **Differentiate between between attributes and methods**

Do Now

- Provide students with copies of the following pages from this children's book:
  We're Different, We're the Same.

Do Now Task: Have students answer the following questions:

1. **What are some differences you see about the noses pictured on page 1?**
2. **What are some things that make all noses the same? Can you think of something else that wasn't mentioned in the book?**
3. **What do you think the main message of this book is?**

Take a few minutes at the beginning of class for students to share out responses. Emphasize that the main idea is that each nose has individual characteristics which makes it unique from other noses, but all noses share certain characteristics which makes them all able to be classified as noses. (The book covers other parts of the body as well as people in

general)

Lesson

Part 1 - Unplugged Activity

1. Divide the class into groups of 3-4.

2. Explain that you will provide each group with a ball. Your group will first take 5 minutes to make observations about the ball's physical characteristics which we will refer to as attributes. You will record these observations on the group organizer.

3. Allow groups time to make and record their observations. Circulate room to see how groups are progressing. Help prompt groups who may be stuck in trying to describe their ball. Let them know they should not overlook things that may seem obvious (shape, color, size, material etc).

4. Regain classes attention. Inform them now to consider what they could do with this ball. Think physical actions. If you feel the class is capable, you can allow them to experiment with what could be done with the ball as long as it is done within reason.

5. Allow an additional 5 minutes for students to consider and record part 2 of their organizers.

6. Have class reconvene. Go around and have each group share out what they wrote for part one. Keep track of each ball on the board. Have a header of the type of ball (tennis, baseball, basketball etc) and underneath write the

7. Once each group has gone, ask students to consider what are some attributes that multiple groups included. For example, if several groups had words like big/small, you can say that size was an attribute.

8. Once class has established multiple attributes that each ball has in common, get group responses for what can be done with the ball. Get response from group and ask if other groups had the same (examples :throw, roll, bounce, hit, catch).

Part 2 - Intro to classes and objects

1. Establish that we have seen several different types of balls. While each ball is different, they all have certain attributes in common which help define them as a ball. (Connect this idea to the nose example from the do now)

2. In computer programming, the concept this is related to is class and object. A class is like a template or blueprint to make an object. An object is a specific instance of a class. The class includes the attributes that will be held by all objects which are created using this class template.

3. For the exercise we did, each ball was an ***object***, a specific ball that had its own specific attributes which made it unique from other balls.

   However, we could say that all these balls came from the same ***class***, the Ball class. They all have certain attributes which each ball has: color, size, shape, surface material, firmness (refer to specific examples of attributes which were provided during class discussion)/ They also all have certain actions which they can do which we would refer to as methods in our class.

4. Recap vocabulary and concepts (see vocabulary section of this lesson)

Part 3 - Assignment Roll Out

1. Present students with this photo:

2. Imagine we are going to program a Baseball game. We need to create a class that will be a template for each character in the game (try to avoid referring to them as “players”)

3. Have students consider the following:
    - What could we call this class?
    - What would be some attributes for this class?
    - What could be some methods for this class?

Wrap Up/Assessment

- Students should individually complete using the assignment sheet document: Baseball Game Character class

Extensions

- In this lesson we looked at noses, balls and Baseball players to fit the idea of a Class/Object relationship.
  Ask students to consider other real life examples where this sort of structure could fit. Consider things that all have some general similarities that make them fit together in a class but also have some differences which would be set when we define them as an object.