Name: _____

Assessment
Color Coded

1) How does the Color sensor work?
   a) It emits sound waves and measures the echoes.
   b) It emits white light and measures the reflected red, green, and blue wavelengths.
   c) It uses a magnet to detect colors.
   d) It measures the shadows cast by objects.

2) What role do rods and cones play in the human eye in the way we see color, and how does this relate to the function of a Color sensor?
   a) Rods detect color, and cones detect brightness; similarly, the Color sensor uses a magnet to detect colors.
   b) Cones detect color, and rods detect brightness; similarly, the Color sensor uses white light to detect the reflected red, green, and blue wavelengths.
   c) Both rods and cones detect color, just like the Color sensor uses a laser to detect colors.
   d) Cones detect brightness, and rods detect color; similarly, the Color sensor uses sound waves to detect colors.

3) Which pin should be connected to GP20 on the breadboard?
   a) GND
   b) VCC
   c) SDA
   d) SCL

4) What should you do if your Color sensor has a switch?
   a) Make sure the switch is turned off.
   b) Make sure the switch is turned on.
   c) Make sure the switch is set to the middle position.
   d) The switch does not matter.

5) Why do we store the RGB value from the Color sensor into a variable?
   a) To use the value several times without re-reading the sensor each time.
   b) To change the color of the sensor.
   c) To make the sensor detect smells.
   d) To make the sensor waterproof.

6) Describe a real-world application where a Color sensor could be helpful. How would it improve the task or process?

7) Imagine you are designing a game that uses a Color sensor. Explain how you would integrate the sensor into the game and what the players need to do.

8) Look at the Python code below that you completed using Blockly. The program uses the Color sensor to detect different colors and prints words like "Hello," "How," "world!," "are," and "you?" based on the colors it senses. Can you analyze this code and change it to print a different sentence when the sensor detects these colors? For example, try making it print the sentence "Python coding is fun!" using the same colors. Share your new code below.

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Answer Key
Color Coded

1) B - It emits white light and measures the reflected red, green, and blue wavelengths.

2) B - Cones detect color, and rods detect brightness; similarly, the Color sensor uses white light to detect the reflected red, green, and blue wavelengths.

3) C - SDA

4) B - Make sure the switch is turned on.

5) A - To use the value several times without re-reading the sensor each time.

6) *Example:* A Color sensor could help sort materials in recycling facilities. By detecting and sorting plastics, papers, and metals based on color, the process becomes more efficient and reduces the chances of human error, improving the recycling rate and overall efficiency.

7) *Example:* In a color-matching game, players could use the Color sensor to scan different colored cards. The game could require players to find and scan cards in a specific sequence of colors to unlock levels or earn points. The sensor would detect the color of each card, and the game would give feedback based on whether the correct sequence was followed. This would add an interactive and educational element to the game, teaching players about colors and sequences.

8) *Example:*

```
## ---- Imports ---- ##
import time
import board
import busio
from piper_blockly import *

## ---- Definitions ---- ##
sensorColor = None
i2c_bus = busio.I2C(scl=board.GP21, sda=board.GP20)
color_sensor = piperColorSensor(i2c_bus)
color_sensor.sensorGain = 60

try:
  set_digital_view(True)
except:
  pass
```

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```
## ---- Code ---- ##
while True:
  sensorColor = color_sensor.readColorSensor()
  piperGraphColor(sensorColor)
  if (colorCompare((255, 0, 0), sensorColor)) > 70:
    print('Python')
  elif (colorCompare((255, 255, 0), sensorColor)) > 70:
    print('coding')
  elif (colorCompare((0, 0, 255), sensorColor)) > 70:
    print('is')
  elif (colorCompare((0, 204, 0), sensorColor)) > 70:
    print('fun!')
  elif (colorCompare((255, 102, 255), sensorColor)) > 70:
    print('!')

  time.sleep(1)
```