Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Lesson 3: Why are growing cities hotter? |

**Do Now:** During our last class, we looked at different types of information about the why certain cities in Colorado are getting hotter.

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| What things did we decide are NOT causing temperatures to increase? | What things did we decide ARE causing temperatures to increase? |
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| What did we decide we still need to figure out about why temperatures are getting hotter? |
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**Then and Now Picture Comparisons:**

Look at the pictures shown on the board, and fill in the table below. You can write more than one statement for each pair of pictures.

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| **Location** | **Observations:** What looks different between the two pictures? | **Explanation:** What caused these changes? Why did these changes happen? | **Ideas:** How might these changes affect temperature? |
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**Infrared Images:**

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| **Warm areas** | **Cool areas** |
| **Types of surfaces** | **Types of surfaces** |
| **Why are they warmer?** | **Why are they cooler?** |

**Color and Temperature Investigation:**

**Question:** How does the color of a surface affect how much it warms up in the sun?

**Hypothesis:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part A:** Plan the steps of your group’s investigation to test which color of paper gets the warmest using the following materials:

* Various colors of construction paper (black, white plus green, yellow, red, orange, blue, etc.)
* 3 thermometers
* Stopwatch or timer
* Light source (indoors: desk lamp or sunny windowsill, outdoors: sunshine)
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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**Part A Observations:**

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| **Time** | **Temp of Dark Color** | **Temp of Light Color** | **Temp of Other Color** |
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**Part B** Plan the steps of your group’s investigation to test which color of paper melts an ice cube the fastest using the following materials:

* Various colors of construction paper (black, white plus green, yellow, red, orange, blue, etc.)
* 3 ice cubes
* Stopwatch or timer
* Light source (indoors: desk lamp or sunny windowsill, outdoors: sunshine)

**Part B Procedure:**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part B Observations:**

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| **Ice Cube** | **Time to melt** | **Observations** |
| Ice cube on dark colored paper |  |  |
| Ice cube on light colored paper |  |  |

**Conclusion**:

*The color that heats up the most*  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*The color that heats up the least*  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Ice cubes melt more quickly on* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Ice cubes melt more slowly on* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Reflection:**

1. What types of land surfaces does the dark color represent?

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1. What types of land surfaces does the light color represent?

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1. What does our data tell us about the color of a surface and its temperature?

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**Next Steps:** What have we learned from this lesson and what should we investigate next?

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| **What have we learned about growing cities and heat?** |
|  |
| **What do we need to figure out next about why temperatures are increasing?** |
|  |