LEARNING IN PLACE

LESSON PLAN

Subject: Grade 6 Science **Lesson:** True Colors

Standard Addressed: Understand characteristics of energy transfer and interactions of matter and energy (NC.6.P.3)

Objectives:

- Explain the transfer of heat energy from warmer objects to cooler ones.
- Explain the suitability of materials for use in technological design based on a response to heat.

Materials Needed:

- Device for showing *True Colors* video
- "True Colors" Activity

Outline:

- Prior to lesson, students will understand that energy can be transferred from one system to another. Students will also understand the concepts of heat transfer involving conduction, convection, and radiation.
- Show the 10 minute video, *True Colors*, https://youtu.be/LcwJ_AkBhNE
- Discuss the Activity prompt and kiln diagram.
- Students complete the Activity independently or with a partner.

Take It Further: Follow the link below to investigate the movement of thermal energy in water.

https://www.youtube.com/watch?v=86ChgK38EIA

Cross-Curriculum Connection: The Moravians used decorative motifs such as ferns, birds, fish, tulips, and pomegranates to illustrate themes important to them. Use the images of historic pottery included in the video for inspiration to create your own glazing designs that are important to you. With colored pencils or markers of the same color as the glazes shown in the video, decorate a paper plate with your themes. Share and compare your drawings with your classmates.

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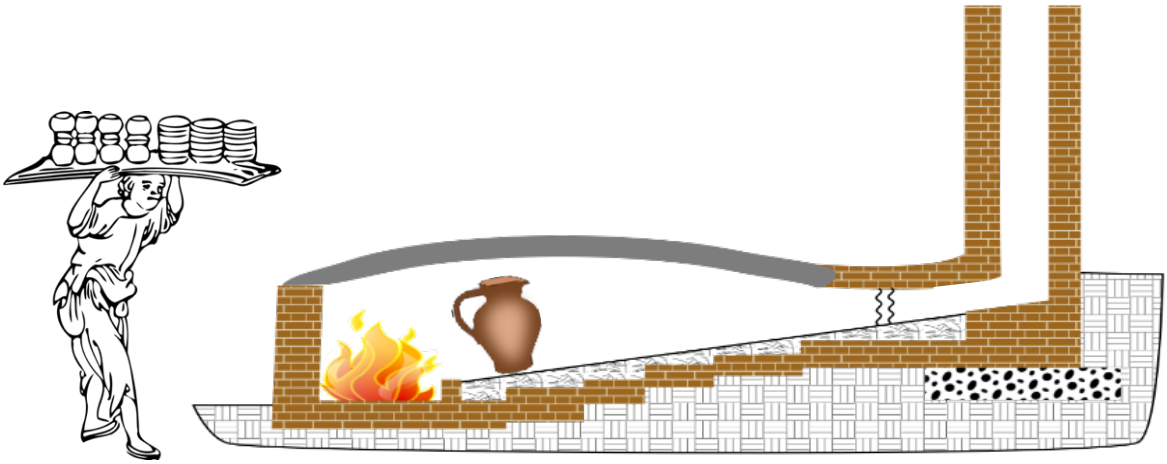
Student Name: _____ Date: _____

Use the diagram of a kiln to help you complete the following activities:



1. Circle the source of thermal energy in the diagram above.

2. Describe how convection works in the kiln:

_____

_____

_____

3. How is the clay pot in the kiln being heated by radiation*?*

_____

_____

_____

4. The bricks used to build the kiln are made with a special material that keeps the thermal energy from being absorbed by the brick.

Are these bricks conductors or insulators? _____

5. Explain what happens to the molecules in clay when the pot was placed in the kiln?

_____

_____

_____

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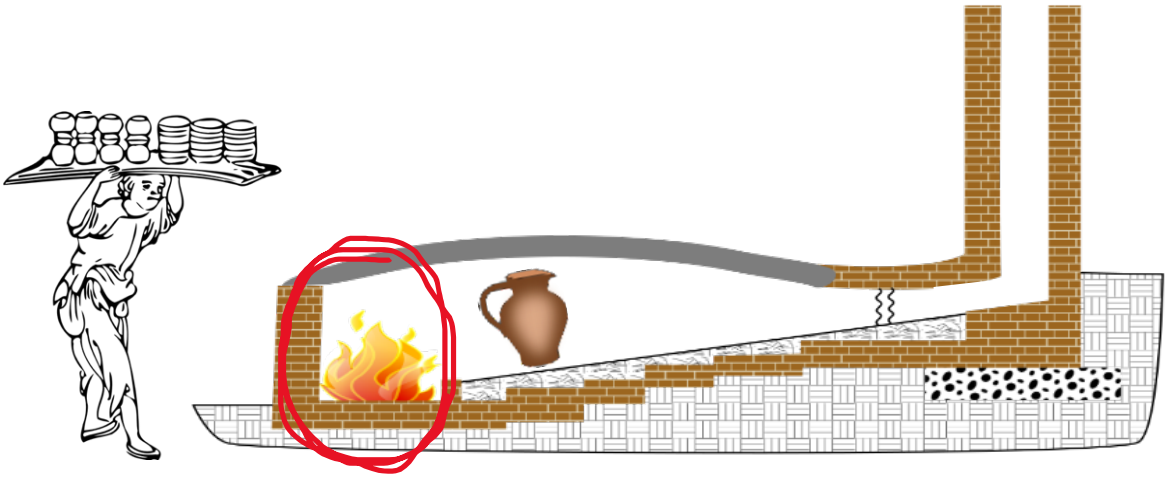
ANSWER KEY

Use the diagram of a kiln to help you complete the following activities:



1. Circle the source of thermal energy in the diagram above.

2. Describe how convection works in the kiln: _____The fire heats up the air, causing the atoms to expand and move. As they move, they displace and heat up the atoms around them, thus circulating a current of warm air towards the cooler parts of the kiln. _____

3. How is the clay pot in the kiln being heated by radiation? _____The fire radiates waves of electro-magnetic energy which travel to the pot and energize the atoms to create heat.

_____

4. The bricks used to build the kiln are made with a special material that keeps the thermal energy from being absorbed by the brick.

Are these bricks conductors or insulators? _____Insulators_____

5. Explain what happens to the molecules in clay when the pot was placed in the kiln?

_____The molecules of the clay are energized by the radiation energy from the fire, which causes them to expand and move, creating heat. Some of the particles will vibrate enough to change states of matter and liquify, fusing the other particles together as the pot cools. _____