Thermal temperature the object undergoes; ergo, proving that

Thermal energy is the total energy that an object or system possesses due to the vibrations of particles within the object or system. Thermal energy depends on three different factors: the temperature of an object or system, the number of particles contained, and the arrangement of the aforementioned particles. These three factors will affect the total amount of thermal energy that an object or system has. For instance, the more particles an object or system has, at a certain temperature, the more thermal energy it contains; however, the higher the temperature of an object, the more its particles vibrate, the more thermal energy the object or system has. Thermal energy is one of the various types of energy, where ' energy' is defined as ' the ability to do work.' Work is the movement of an object due to an applied force; ergo, thermal energy can be described as the ability of something to do work due to the vibrations of its particles. Since thermal energy is due to the movement of particles, it is accounted as a type of kinetic energy — energy due to motion.

This term in science class, students were instructed to create and conduct an experiment that investigates factors related to thermal energy. This includes the transfer of heat — due to conduction, convection, or radiation — and the relationship between heat and its factors: mass, specific heat capacity, or temperature difference. For this task, I have decided to create and conduct an experiment that will investigate how different masses of water affect the time needed for it to reach a certain temperature. Although many people might say that an object contains heat, strictly speaking, it does not.

Instead, as previously mentioned, an object or system contains thermal energy. According to the book Interactive Science: Forces and Energy, Heat is the transfer of thermal energy from warmer regions (i. e. objects) to cooler regions. As warmer objects will cool down, cooler objects will warm up — given that both objects are the same temperature.

When this occurs, the heat stops transferring. Heat is measured in the units of energy: joules. Heat depends on factors such as mass, specific heat capacity, and temperature difference. This is evident in the formula of heat itself: Q = mc? t. In this formula, ‘ Q’ represents heat (in joules), ‘ m’ represents the mass of an object, ‘ c’ represents the specific heat capacity of an object, and ‘? t’ represents the difference in temperature the object undergoes; ergo, proving that mass (the topic of my experiment) correlates with heat. This means that more mass will equal to more amount of heat; however, the formula does not specify the time needed to reach a certain temperature difference.

What the formula does not mention is that the more amount of heat needed, the time needed to concurrently increases. The experiment I will conduct is relevant because many factors affect heat; however, the formula aforementioned does not clarify time. In theory, to investigate the amount of heat needed for different masses can be tested by inserting factors into the formula, without the use of experimentation.

However, experimentation is needed to record the time needed to heat the various masses because it is not accounted for in the formula. The experiment I will conduct relates to the theme — the investigation of factors related to heat — because mass is a direct factor in heat, scientifically proven in the formula of heat itself. The experiment I will conduct will be recording the time needed for different masses to reach a certain temperature. I will do this by placing different amounts of water into a saucepan and heat them on a stove on low heat. Then, I will place a thermometer into the saucepan and measure the time needed to reach a certain temperature — preferably 20°C as this is cool enough to record safely and warm enough to require a time to pass. will have five different masses of water ranging from 50 mL, 100 mL, 150 mL, 200 mL, to 250 mL.

Each mass of water will be tested three times — which I will then average the amount of time needed (in seconds) to heat the aforementioned masses to 20°C.