

## NEED's Virtual Energy Escape Room – Cheat Sheet

There are 10 objects to click on which opens a google form where the person reads some text and answers the question. One letter is given for each correct answer. The letter clues are not in order (e.g., clue #1 doesn't mean that letter is the first letter of the word), so once have all 10 letters – you are to unscramble and try to guess the energy word.

### CODE WORD ANSWER: efficiency

#### Clue #1 (Click on the Windows)

Windows are an important part of the building envelope. They allow occupants easy access between the inside and outside world, but these are also areas that should be checked carefully to ensure that they are working efficiently.

The best windows shut tightly and are constructed of two or more pieces of glass. Any cracks around the window frames should be caulked and the windows checked often to make sure they seal tightly. Any cracked glass should be replaced. In some doublepaned window systems, a heavy gas is used to fill the space between the panes. This gas slows down heat transfer by convection. Some windows also have coatings that allow sunlight in, but are effective at reflecting thermal energy radiating from within the building back inside.

Older windows in a home can be treated to make them more energy efficient. Weatherstripping can be used to create a tighter seal between the window and the frame. There are many types of weatherstripping. For windows, use a spring-type weatherstripping, which is a strip installed along the window frame on the track on which the window moves up and down. The most durable type is made of brass. It is a strip folded in half so as to spring against both the window and the frame creating a tight seal. Foam weatherstripping, while not as effective, is easy to find and install.

Clue #1 Question: The best windows shut tightly and are constructed of how many pieces of glass?

Answer Options:

- Single Pane
- two or more pieces of glass (correct answer, clue letter is f)
- it doesn't matter how many

#### Clue #2 (Click on Power Strip)

Many electrical devices use electricity even when they are turned off. This type of electricity consumption is known as a phantom load, because it can easily go unnoticed. Phantom loads are also known as standby power or leaking electricity.

Phantom loads exist in many electronic or electrical devices found at home. Equipment with electronic clocks, timers, or remote controls, portable equipment, and office equipment with wall cubes (small box-shaped plugs that plug into AC outlets to power appliances) all have phantom loads.

These devices can consume anywhere from 1-40 watts even when turned off. You can use a watt meter to see if devices are using power when they are turned off. These devices can be plugged into a smart power strip, which can turn off multiple devices when the strip is not in use.

Clue #2 Question: What is the name given to a device that still consumes electricity while plugged in, even though it has been turned "off"?

Answer Options:

- electricity leech
- phantom load (correct answer, clue letter is f)
- peak load

### Clue #3 (Click on the Door)

#### Building Envelope

The transfer of heat, air, and moisture into and out of the home is largely governed by the building envelope, which is made up of all the components that separate the inside of the home from outdoors. Siding, windows, doors, and roofs have an important role to play, as does how tightly the various parts of the building are sealed to one another.

Doors to the outside should seal tightly and have door sweeps at the bottom, as well as weatherstripping around the frame to prevent air leaks. Use rubber "stop-type" weatherstripping for doors. This is installed in the frame as a strip and has a thick "bulb" that squeezes tightly into the crack when the door is closed. Door sweeps are flexible, rubber strips that are installed at the bottom of a door to prevent air movement under the door. If the door has windows in it, they should be sealed tightly.

Try to limit opening and closing doors to the outside too frequently. When this happens, air from outside is exchanged with air inside. Some fresh air is okay every so often, but if the temperature outside is much different than that of the inside, it can cause your thermostat and HVAC system to work harder than necessary.

Clue #3 Question: What is a building envelope?

Answer Options:

- the equipment that provides heating, cooling, hot water, and fresh air to the home
- everything that is plugged into electrical outlets
- includes everything that creates barriers between indoors and outdoors - walls, floors, roofs, windows, and doors (correct answer, clue letter is i)

### Clue #4 (Click on the Fan)

When opening windows on cool evenings, put a fan in the window to pull cool air through the house. Use a ceiling fan to circulate air in a room. Also, if you point a fan directly at you, it will keep you cooler and allow you to be more comfortable at higher temperatures.

A temperature setting of 68°F (20°C) during the day and 58-60°F (14-15°C) at night during heating seasons is comfortable if people dress warmly and use warm blankets. During cooling seasons, a temperature setting of 78°F (25°C) is comfortable if people dress appropriately and use fans.

Turn off ceiling fans when you leave a room; fans cool people, not rooms, by creating a wind chill effect.

Clue #4 Question: True or False? Even if you aren't in a room, it's best to leave the fan on to keep the room cool.

Answer Options:

- True
- False (correct answer, clue letter is e)

### Clue #5 (Click on the Light)

Some homes are still lit with traditional incandescent light bulbs. Only 10 percent of the energy consumed by an incandescent bulb produces light; the rest is given off as heat! This is because light is produced by sending electricity through a filament that resists the current. This causes the filament to heat up and then glow.

Compact fluorescent light bulbs (CFL) work on a much different principle and have become more common. A fluorescent light is a glass tube with a powdered phosphor coating on the inner surface. The tube is filled with a gas and contains a small amount of mercury. They save money in the long run because they use only one-fourth the energy of incandescent bulbs and last 7-10 times longer.

Light emitting diode (LED) light bulbs, which have been commonly found in traffic lights, exit signs, car taillights, and other applications, are also widely available as affordable options for home lighting. They contain no mercury and offer even more energy savings than CFLs. They last even longer than CFLs, they turn on instantly (some older CFLs take a moment to come on

and some can take a few moments to warm up), and many of them can be used with a dimmer or even app-based programs. LED bulbs often cost less than CFL bulbs, while providing even more energy savings.

Ways to save with lighting:

- Turn off lights when not in use
- Use day lighting whenever possible
- Use task lighting—instead of lighting the whole room provide light where it is needed
- Use CFLs or LED lighting instead of incandescent

Q #5: Which light bulb lasts the longest and is most energy efficient?

Answer Options:

- Incandescent light bulbs
- CFL
- LED (correct answer, clue letter is c)

### Clue #6 (Click on the Thermostat)

Heating and cooling systems use more energy than any other systems in our homes. About 43 percent of the average family's energy cost is for keeping homes at comfortable temperatures.

Thermostats are used to control the heating and cooling systems in a home. Most consumers set the temperature higher than recommended during heating seasons and lower than recommended during cooling seasons, wasting energy.

Programmable thermostats automatically control the temperature of buildings for time of day and can save energy and money, when programmed correctly, by automatically adjusting the temperature for times of the day when no one is home or when people are sleeping. Adjusting the thermostat by just two degrees can decrease bills significantly and prevent hundreds of pounds of carbon dioxide from entering the atmosphere each year.

Staying comfortable is an important part of why we use energy. However, in our quest for comfort, we can end up using more energy than is necessary. It's always a balance between energy savings and individual comfort when setting the thermostat. The U.S. Department of Energy has determined that 68°F is a good winter-time setting that keeps most people comfortable while keeping energy use low. The recommended summertime setting is 78°F.

Q #6: The U.S. Department of Energy recommends what temperature for a winter-time setting?

Answer Options:

- 78°F
- 68°F (correct answer, clue letter is i)

### Clue #7 (Click on the Sink)

Water heating is the second largest energy expense in most homes, accounting for 16 percent of energy use on average. Usually water is heated in a tank-type water heater that is fueled by natural gas or electricity. Heated water is used for showers, hand washing, dishwashing, and cleaning.

The five main ways to reduce water heating bills are:

- Use less hot water
- Make sure there are no water leaks or drips
- Turn down the thermostat on the water heater
- Insulate water heaters and water pipes
- Choose an energy efficient water heater when yours needs replacing

The easiest way to cut the cost of heating water is to reduce the amount of hot water consumed. This can be done with little cost and minor changes in lifestyle. Water-saving faucet aerators (which diffuse the flow of water) can be installed in bathrooms and kitchens. Water-saving showerheads are also available. They limit the flow of water while providing adequate flow for washing.

Most water heater thermostats are set much higher than necessary. A setting of 120 degrees Fahrenheit provides hot water suitable for most uses. Decreasing the temperature by 10 degrees Fahrenheit can result in energy savings of \$12 to \$30 per

year. Buying a high efficiency or tankless water heater can save \$40-\$140 per year. Instead of heating a large amount of water and keeping it hot in a tank, these appliances only heat the water as it is being used.

Q #7: Water heating is the largest energy expense in most homes, accounting for 16 percent of energy use on average.

Answer Options:

- True
- False (correct answer, clue letter is n)

### Clue #8 (Click on the Bookshelf)

Q #8: Who is responsible for reducing energy use at school?

Answer Options:

- Everyone (correct answer, clue letter is c)
- Administrators and Faculty
- Building Engineers

### Clue #9 (Click on the Energy Sources Poster)

Graphic of the U.S. primary energy consumption by energy source, 2019

Q #9: Nonrenewable sources of energy make up what percentage of U.S. energy consumption?

Answer Options:

- 80 – 90% (correct answer, clue letter is y)
- 50 – 75%
- Less than 50%

### Clue #10 (Click on the Vent)

If there is a furnace or central air conditioning in your home, you have probably noticed how air flows out of the vents or registers. There are also registers that pull air from the room and return it to the air handler. The air handler is a large fan in your furnace or central AC system that is connected to the ducts that carry the air to and from the rooms in your home. These systems are strong enough to create areas of higher or lower pressure in certain rooms. When these systems are not balanced correctly, the pressure differences can greatly increase the rate at which air leaks into or out of the house.

Many homeowners believe closing air vents in rooms not in use saves energy. It's a common misconception that closing vents in one area of your home redirects airflow to other areas. Closing vents causes your heating and cooling system to overwork (a costly repair to correct) and can actually increase energy consumption.

Q #10: You can save energy in your home by closing vents to rooms not in use because it will help redirect the air to rooms that actually need the heating/cooling.

Answer Options:

- True
- False (correct answer, clue letter is e)