

# Kesler Science Station Lab

## Online Answer Sheet Instructions

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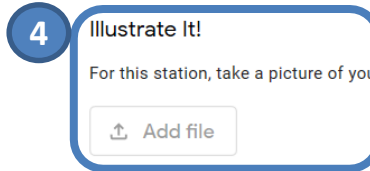
**Use the link to the form your teacher provided for this station lab.**

A screenshot of the form's input fields. It shows three rows of text input boxes. The first row is labeled 'Email address \*' and contains the text 'chriskesler@keslerscience.com'. The second row is labeled 'First Name' and contains the text 'Chris'. The third row is labeled 'Last Name' and contains the text 'Kesler'.

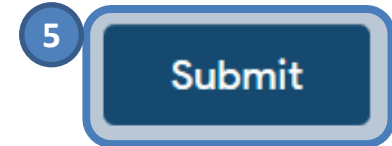
**Enter your email address and name. Choose your class.**



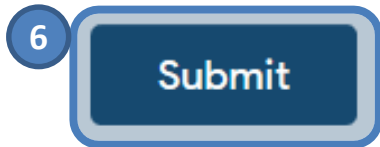
**Look at this file for questions and answer them in the form. Make sure you are answering each station in the correct answer section of your form.**



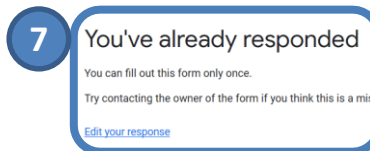
**Sometimes you may need to upload a photo. You can take a picture with a phone, webcam, or scanner. Click Add File and browse to the picture you saved.**



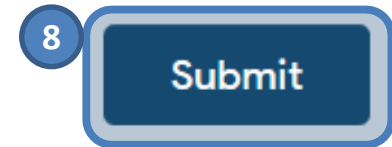
**The Submit button is at the bottom of the form. You can submit without completing the form.**



**Make sure you hit submit anytime you stop working on the form so you do not lose your answers.**



**You can edit your answers or return later to complete the stations. Go back to the link your teacher gave you for the form, click it, then click Edit your response.**



**When you have completed all the stations, carefully check your answers and submit your form for the final time.**



Watch It!

## Watch It! Station Directions

Each member of the group will go to the website listed on task card #1

Complete the task cards in order.

Every student will answer the questions from the task cards on the lab sheet in the Watch It! section of the lab sheet.

Watch It!  
#1

Study Jams:  
<http://goo.gl/A4xmrY>  
**URL is case-sensitive**

1. Click Play on the video.
2. Answer questions from cards #2-4 on your lab sheet.



Study Jams

Watch It!  
#2

What is heat?

Watch It!  
#3

After watching the examples in the video of radiation, list 2 other examples that you come up with on your own.

Watch It!  
#4

Explain what convection is and provide an example.

A starburst-shaped logo with a green and yellow border containing the text "Research It!".

Research  
It!

## Research It! Station Directions

Each member of the group will go to the website listed on task card #1

Complete the task cards in order.

Every student will answer the questions from the task cards on the lab sheet in the Research It! section.

Research It!  
#1

1. Go to <https://bit.ly/2BGd0a8>
2. On your lab sheet describe how heat transfers from one object to another.

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Research It!  
#2

1. Click on the **Radiation** tab.
2. Read the radiation text and summarize the information on your lab sheet.
3. Play the animation
4. Click on examples and list 2 of them on your lab sheet.

Research It!  
#3

1. Click on the **Conduction** tab.
2. Read the conduction text and summarize the information on your lab sheet.
3. Play the animation
4. Click on examples and list 2 of them on your lab sheet.

Research It!  
#4

1. Click on the **Convection** tab.
2. Read the convection text and summarize the information on your lab sheet.
3. Play the animation
4. Click on examples and list 2 of them on your lab sheet.

A white starburst shape with a green and yellow border, containing the text "Explore It!" in blue.

Explore  
It!

## Explore It! Station Directions

One member of the group will read the task cards in order. The group will be responsible for completing each of the tasks that are being read.

Each member of the group will then write their conclusions down on the lab sheet in the Explore It! section.

Explore It!  
#1

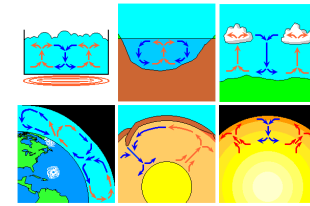
Heat always transfers from hotter objects to cooler objects.

When two objects are in direct contact with each other (touching) heat is able to transfer. This is called **conduction**.

1. Come up with two other examples of conduction on your lab sheet.

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Explore It!  
#2



1. Use the large diagram at the station to make some observations about how heat is transferring in each of these situations. Are there any similarities? What are they?

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Explore It!  
#3

When heat flows through a liquid or a gas it is called **convection**.

Earth's mantle, Earth's oceans, and Earth's atmosphere contain **convection currents**.

1. Come up with two other specific examples of convection on your lab sheet.

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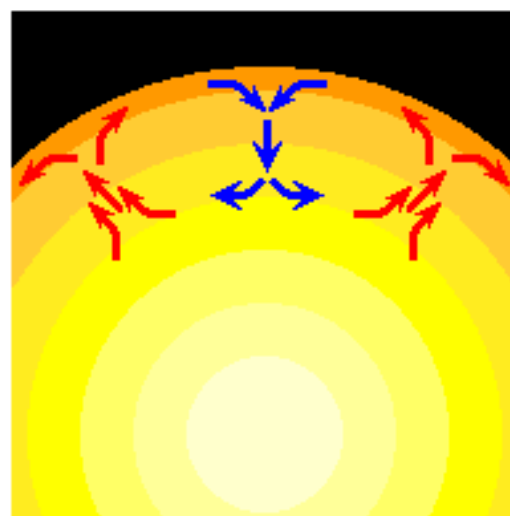
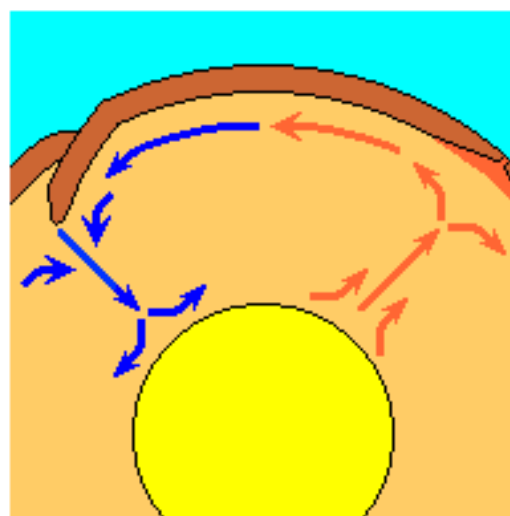
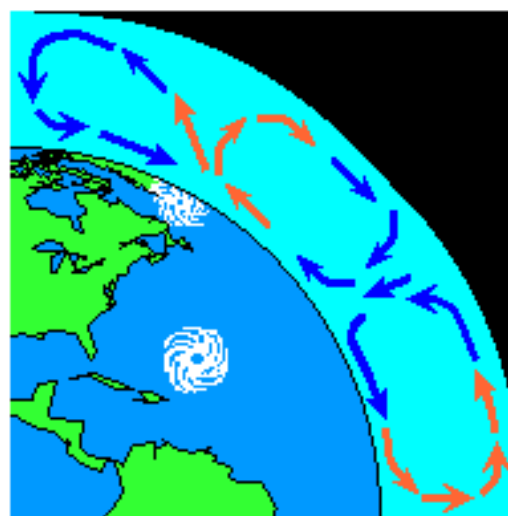
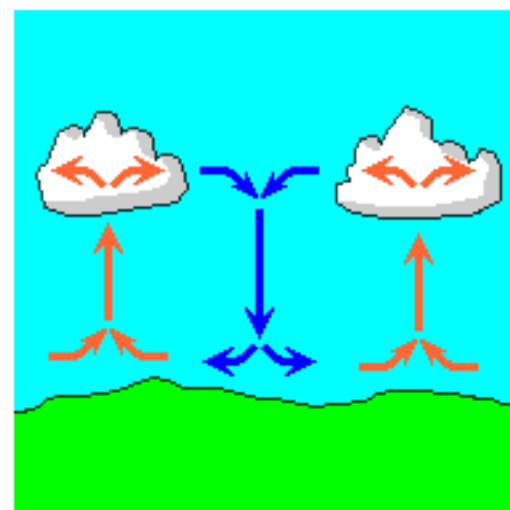
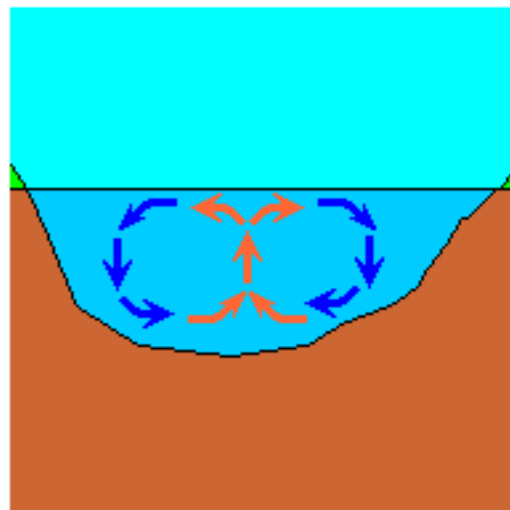
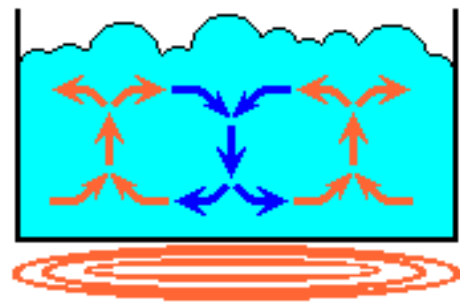
Explore It!  
#4

When heat is transferred through electromagnetic or radio waves it's called **radiation**.

The objects are not touching each other in the example of radiation.

1. Come up with two other examples of radiation on your lab sheet.

# Explore It!





A white, starburst-shaped callout bubble with a green and yellow border, containing the text "Read It!".

Read It!

## Read It! Station Directions

Each member of the group will read the passage and answer the questions from the task cards on the lab sheet in the Read It! section.

It is important to remember that the answers will come directly from the reading passage.

Read It!  
(M)

## Sunscreen and Radiation

Whether you're relaxing on the beach, jetting down a ski slope, or hiking up a mountain, you're hit by unseen rays that can cause your skin to darken and burn. This radiation or ultraviolet (UV) light can also damage DNA in your skin cells. It causes changes in your genes that can lead to skin cancer.

Fortunately, you can protect against many of the harmful rays with sunscreen. Sunscreens, which can be sprays, lotions, gels, or waxes, are usually made up of a mix of substances. Sunscreen reflects the light away from the skin.

The SPF on sunscreen bottles stands for Sun Protection Factor. It means how well the sunscreen guards against one type of UV radiation, called UVB (it may be helpful to think B for burning). UVB rays cause sunburn and several types of skin cancer.

Another type of radiation, called UVA radiation, enters deeper into the skin. It can cause early wrinkling, age spots, and can also increase the risk for some skin cancers. Sunscreen lotions marked broad-spectrum block against both UVA and UVB. Currently, there is no standard for listing UVA blocking power.

Most groups mention using sunscreen with an SPF between 15 and 50 (SPF ratings higher than 50 have not been proven to be more effective than SPF 50). A sunscreen with an SPF of 15 protects against about 93 percent of UVB rays. One with an SPF of 30 protects against 97 percent of rays, according to the Mayo Clinic. No SPF can block 100% of UV rays.

Some UV radiation still gets through the sunscreen and into your skin. The SPF number refers to how long it will take for a person's skin to turn red. Sunscreen with an SPF of 15 will prevent your skin from getting red for about 15 times longer than usual.

Sunscreen is not an end-all solution. Health groups strongly mention also using a hat, sunglasses, clothing, and shade to protect your skin.

Read It!  
#1

Which statement is true about radiation?

- A. Radiation is the transfer of heat through electromagnetic waves
- B. Radiation is the transfer of heat through direct contact.
- C. Radiation is more dangerous than conduction.
- D. Radiation is the transfer of heat through liquids and gases.

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Read It!  
#2

Which is true about UVA and UVB rays?

- A. Both rays can be blocked 100% by sunscreen
- B. UVA protects the surface, UVB protects beneath the surface
- C. UVB rays cause burning, UVA rays cause premature aging
- D. UVA rays cause burning, UVB rays cause premature aging

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Read It!  
#3

Which is true about SPF ratings.

- A. The highest rating is 100% effective
- B. The rating number means it will protect you that many times longer than without sunscreen
- C. SPF ratings are only good in the summer
- D. SPF doesn't matter after 1 pm.

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## Illustrate It! Station Directions

Each member of the group will draw a quick sketch on the lab sheet that shows they understand the concept being taught.

Use the colored pencils and markers that are provided.

The directions for the sketch are provided on the task card at the table.



Illustrate It!

## Illustrate It! Station Directions

Use the colored pencils to draw 3 different pictures that illustrate the concept of **convection, conduction, and radiation**.

Be sure to include labels for each of your images and a brief summary of what each term means.



Write It!

## Write It! Station Directions

It is recommended that you have completed at least **two** of the following stations before working at this station.

- Read It!
- Explore It!
- Watch It!
- Research It!

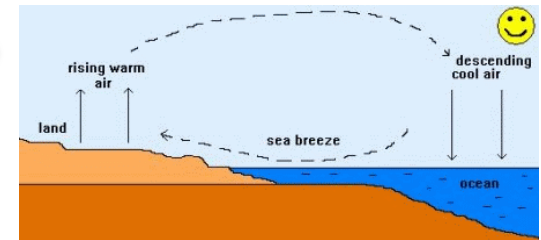
Answer each of the task card questions on the lab sheet in **complete sentences**.

Write It!  
#1

Explain the difference between conduction, convection, and radiation.

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Write It!  
#2



Explain what is happening in this diagram. Also describe what heat transfer process is taking place.

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Write It!  
#3

Explain why it's much colder at the bottom of a pool than at the top. Also describe what heat transfer process(es) are taking place.

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Assess  
It!

## Assess It! Station Directions

It is recommended that you have completed at least **two** of the following stations before working at this station.

- Read It!
- Explore It!
- Watch It!
- Research It!

Each member will answer the questions from the task cards on the lab sheet in the Assess It! section.



Assess  
It! #1

Which statement is true about heat transfer?

- A. Heat can only transfer when touching another object
- B. Heat always travels up
- C. Heat transfers from cooler to warmer objects
- D. Heat transfers from hotter to cooler objects

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Assess  
It! #2

Which situation best represents conduction?

- A. Heat from a campfire
- B. A hot air balloon taking off
- C. Touching a hot piece of metal
- D. Getting sunburned

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Assess  
It! #3

Which situation best represents convection?

- A. Heat from a campfire
- B. A hot air balloon taking off
- C. Touching a hot piece of metal
- D. Getting sunburned

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Assess  
It! #4

What heat transfer principle is happening in the image below?

- A. Radiation
- B. Convection
- C. Conduction
- D. Reaction



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A white starburst graphic with a green and yellow border, containing the text "Organize It!".

Organize  
It!

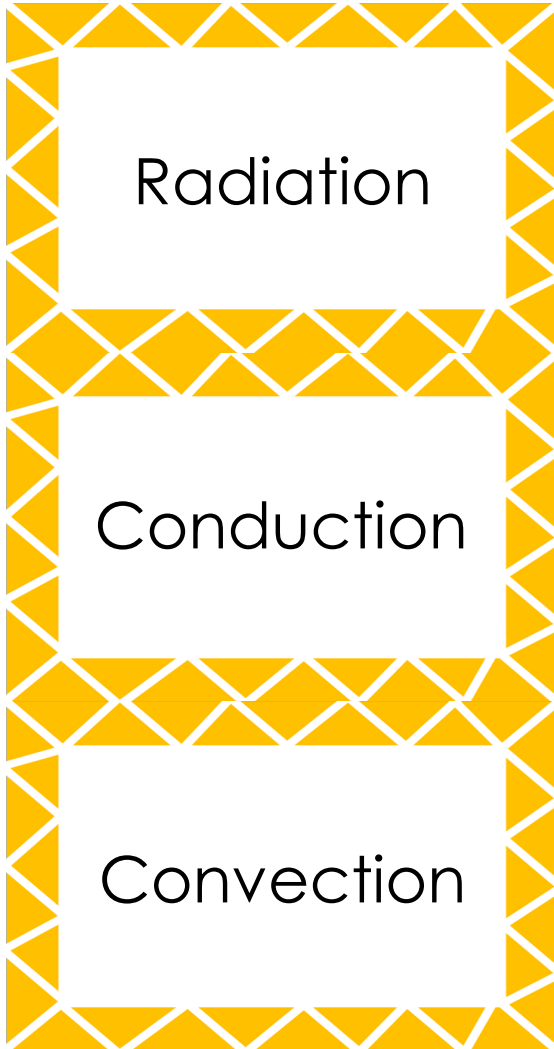
## Organize It! Station Directions

It is recommended that you have completed at least **two** of the following stations before working at this station.

- Read It!
- Explore It!
- Watch It!
- Research It!

Each group will organize the cards. Each of the cards will be used.

Please mix up the cards again before the next group arrives at this station.



An ocean breeze
Burning yourself with a curling iron
Touching a hot car seat in the summer
Water in a boiling pot of macaroni
Microwave cooking food
Siding down a hot metal slide in August
Getting sunburned on a beach
Currents deep within the Earth that cause tectonic plates to move