

Lesson 5 - Brightness and Distance Flashlight Experiment

1) In the space below, draw how you think it might look if the two flashlights are in the room with you, pointing right at your face. How would the two flashlights look different?

2) What would the two friends look like if they were in a window across the street?

3) How can you tell which lights you see outside your window are super bright, and which are super dim?

Flash Light Experiment

What you need:

- Two good friends!
- A dark night in a large open space
- One large, very bright flashlight
- One small, very dim flashlight
- A paper and a notebook, and a light to write notes by

In order to complete this experiment, you're going to need to take careful notes about how bright each light *appears* to an observer as it gets further away from you on a large, open field at night. You might try to do this in a park, or if you live on a long street that doesn't get any traffic, or anything like that. Just make sure the open space you're in is safe to stand in!

With your two flashlight holding friends, you're going to take some careful notes about how bright things appear to you to be based on how far away they get. For this experiment, we're going to call the friend with the small, dim flashlight **Friend 1**, and the friend with the large, bright flashlight **Friend 2**.

We're going to test the brightness of our two friends' flash lights in a couple different **conditions** in order to see what happens. Between each condition, you should have your friends turn off their lights so your eyes have a chance to adjust.

Ready? Let's go!

TUMBLE

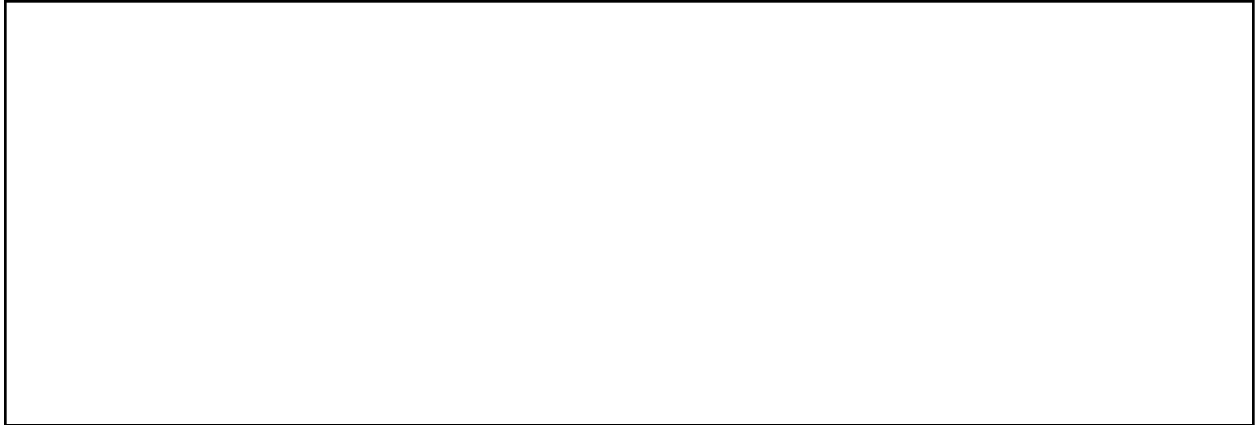
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Trial 1:

Friend 1 - stands **3** paces away from observer

Friend 2 - stands **3** paces away from observer

Draw what the two lights look like from your point of view.



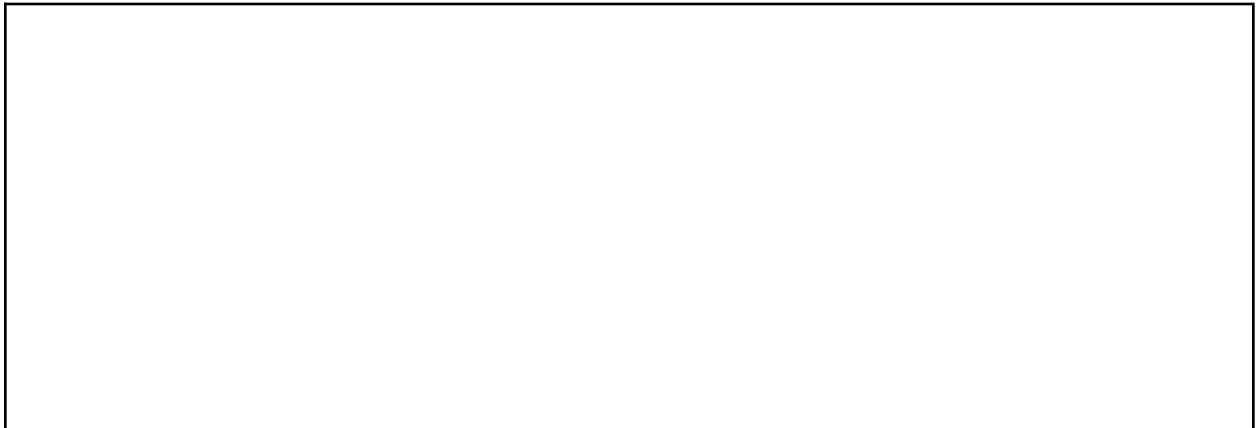
Which light looks brighter?

Trial 2:

Friend 1 - stands **200** paces away from observer

Friend 2 - stands **200** paces away from observer

Draw what the two lights look like from your point of view.



Which light looks brighter?

TUMBLE

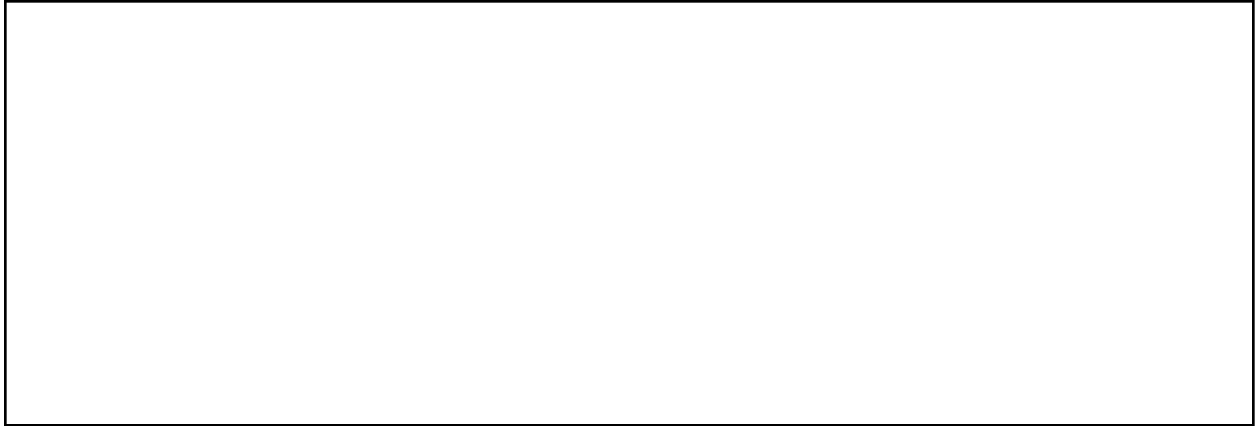
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Trial 3:

Friend 1 - stands **3** paces away from observer

Friend 2 - stands **200** paces away from observer

Draw what the two lights look like from your point of view.



Which light looks brighter?

Trial 4:

Friend 1 - stands **200** paces away from observer

Friend 2 - stands **3** paces away from observer

Draw what the two lights look like from your point of view.



TUMBLE

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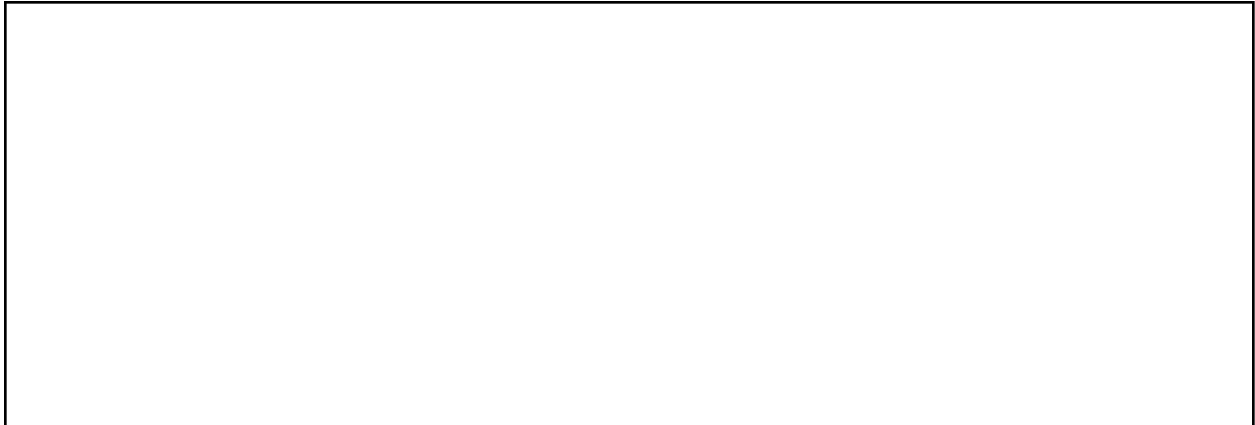
Which light looks brighter?

Trial 5:

Friend 1 - stands _____ paces away from observer

Friend 2 - stands _____ paces away from observer

Draw what the two lights look like from your point of view.



Which light looks brighter?

Additional trials:

Try experimenting with different distances. Make sure to carefully record what you observe!

TUMBLE

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Questions:

- 1) Did Friend 2's flashlight *always* look to you to be brighter than Friend 1's? Why or why not?

- 2) Could you find a distance where Friend 1 and Friend 2's flashlights appeared to be exactly the same brightness? What distance was that?

- 3) Was there a distance where Friend 2's flashlight appeared to be dimmer than Friend 1's? What was it, and why?

- 4) If you didn't know which flashlight was the brighter one, would you be able to tell just by looking when they're standing very far away?

- 5) What happens to a light's appearance as it gets further away from you?

- 6) How do you think any of this might be relevant to the stars we see in the sky?