Education and Outreach

# Green CREST Award

## Green CREST AwardScience Investigation: How does the Moon’s appearance change? – Student Guidance

Have you ever looked up at the Moon and wondered why it does not always appear the same? What are some of the differences you notice at different times and on different days? Have you considered what might be happening to cause these changes?

### Aim

In this investigation, you will work collaboratively with your peers to collect observations of the Moon for at least one month, identify patterns in those observations, and draw conclusions about their cause.

### Inquiry question

How does the Moon’s appearance change over time?

### Fair testing

Answer these questions in your science journal or notebook.

What is changing in this investigation?

What are you measuring in this investigation?

What other factors are important to consider in this investigation?

### Prediction and Hypothesis

How do you think the Moon’s appearance changes over time? Think about its appearance and when and where we see the Moon. Why do these changes occur? Record your ideas in your science journal or notebook.

### Equipment

To make and record observations:

* Astrolabe
* Pen
* Science journal or notebook
* Observation chart

To make your astrolabe:

* Astrolabe template printed or glued on thick card
* Straw
* 30 cm length of string
* Small weight, such as a washer
* Sticky tape

### Procedure

Discuss this procedure with your team. Make sure everyone in the team understands the procedure before you begin your investigation.

#### Make an astrolabe

An astrolabe is a device that helps an observer to determine the angle of an object above the horizon. Once it is made, you can use it to determine the angle of the Moon in the sky.

1. Carefully cut out the astrolabe template on the card.
2. Attach the washer to the end of the length of string.
3. Attach the other end of the length of string to the astrolabe by poking a hole through the X.
4. Sticky tape the straw to the long flat edge of the astrolabe. The straw should pass over the centre of the protractor.
5. Practise using the astrolabe to measure the angle of objects above you.

#### Make observations of the Moon

Record your observations of the Moon on the next page. Try to make at least one observation every day and make observations over at least 30 days. You can photocopy the page if you need to.

For each observation, record the date, time, angle and direction (north, east, south, west, etc) of the Moon. Next, colour in the part of the Moon you can’t see in the circle, leaving white the part of the Moon you can see.

### Results

#### Observations of the Moon

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: |
| Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: | Date:  Time:  Angle:  Direction: |
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#### Analysis

After you have finished collecting observations, carefully cut out each observation. Combine your observations with those of your team members. Place them in chronological order.

Our observations of the time, angle and direction of the Moon inform us about the position of the Moon in the sky. What patterns do you and your team notice? Look for patterns in appearance and position (time, angle and direction). Record some notes about the patterns you have found in your science journal or notebook.

* What patterns did you identify by observing changes in the appearance and position of the Moon?
* How does the appearance of the Moon change?
* How does the position of the Moon change?
* Where and when does the Moon rise and set?
* How frequently does the cycle of phases of the Moon repeat?

### Discussion

Record your responses to these questions in your science journal or notebook. Some key words that will help you respond include: orbit, spin, moonrise, moonset, light, reflect, angle, phase, waxing, waning, crescent, gibbous, Full Moon, New Moon, half, angle, horizon, direction…

* How are the appearance and position of the Moon related?
* How do changes in the Moon’s appearance and position relate to the phases of the Moon?
* What evidence is there to support your claim about the relationship between the appearance and position of the Moon?
* What reasoning can you provide to support your claim about the relationship between the phase and position of the moon?

### Conclusion

Record your response to this question in your science journal or notebook.

* How does the Moon’s appearance change over time?

### Evaluating your investigation

Record your responses to these questions in your science journal or notebook.

* What challenged you in this investigation?
* How well did your team work together?
* What did you learn from this investigation about how the Moon’s appearance changes over time?
* How will you apply what you have learned about the Moon’s appearance to your own life?