

THE DARK SIDE



TEACHER GUIDE

ACCELERATE



PLANNING

Here's a suggested schedule for this kit! The activities should be completed in order, but you can choose when the lessons take place over time. Time required for each lesson may vary.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: LOCKED UP TIGHT Observe unusual traits the Moon has. Total time: 30 min	<input type="checkbox"/> It's Better Together	30 minutes	Day 1
ACTIVITY 2: SYSTEMS IN THE SKY Create a miniature Earth-Moon-Sun system. Total time: 2 h	<input type="checkbox"/> Some of the Solar System	45 minutes	Day 2
	<input type="checkbox"/> Relative Rotations	45 minutes	Day 3
	<input type="checkbox"/> Show What You Know	30 minutes	Day 4
ACTIVITY 3: PREDICTABLE PATTERNS Connect the patterns of the sky to Earth. Total time: 2 h 45 min	<input type="checkbox"/> Shadow Tracking	90 minutes	Day 5
	<input type="checkbox"/> Patterns in Nature	45 minutes	Day 6
	<input type="checkbox"/> Graphing		Day 7

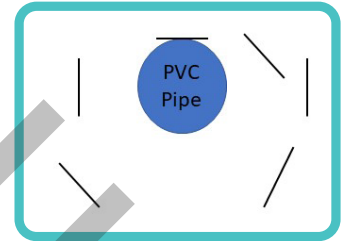
SAMPLE

Full schedule available with purchase

■ Students will be measuring the distance from the end of the shadow to the base of the PVC pipe once per hour. This will likely not take more than 5 minutes, but the experiment does require students to be timely with their data collection for accurate results.

■ One way to make sure that a data collection point (the hour mark) isn't missed is to set a timer. This can also help keep students more engaged in their experiment as they can check back to the timer to determine how much longer until they need to collect data again.

■ Your student's lines should look something like this:



MULTIPLE AGES AND ABILITIES:

If you are working with multiple students, encourage them to work together to collect data. This allows them to work on their cooperation skills, as well as gives each student the opportunity to test their data collection skills. One way students can collect data together is to have each student hold an end of the measuring tape when measuring the distance of the shadow. Alternatively, you could have one student take measurements, while the other records data.

REFLECT

❓ **Question 1:** On the y-axis labeled Distance, draw tick marks from 0 to the furthest distance you recorded in the table. Plot points for each time data was taken to show the distances of the shadow on the chart. Connect the dots with a line going from 8:00 AM to 9:00 AM, 9:00 AM to 10:00AM, etc.

Answer: Answers will vary.

How to Help:

• It is possible that this is one of the first times your student is working with graphing data. If this is the case, you can assist them by working through each sentence (step) outlined within the question.

• Your student's data should find no shadow or the shortest shadow at the 12 p.m. hour, with the shadow getting longer at the beginning and end of their data collection.

❓ **Question 2:** What pattern did you notice happened with the shadow distances?

Answer: The shadow was longest at the first and last observations, with the shortest distance at 12 p.m.

❓ **Question 3:** What did you notice about the shadow locations?

Answer: The shadow wasn't marked at the same side of the PVC pipe each time, but instead made a spiral or circle around the PVC pipe.

How to Help:

• You can connect the spiral or circle the shadow followed around the PVC pipe to the rotation and orbit of Earth.

• Your student may recognize that this spiral or circle of lines is similar to a clock. If so, encourage this curiosity and insight. Students will be learning about an ancient people who use shadows to tell time in the next section.

b. What patterns do you see in the graph?

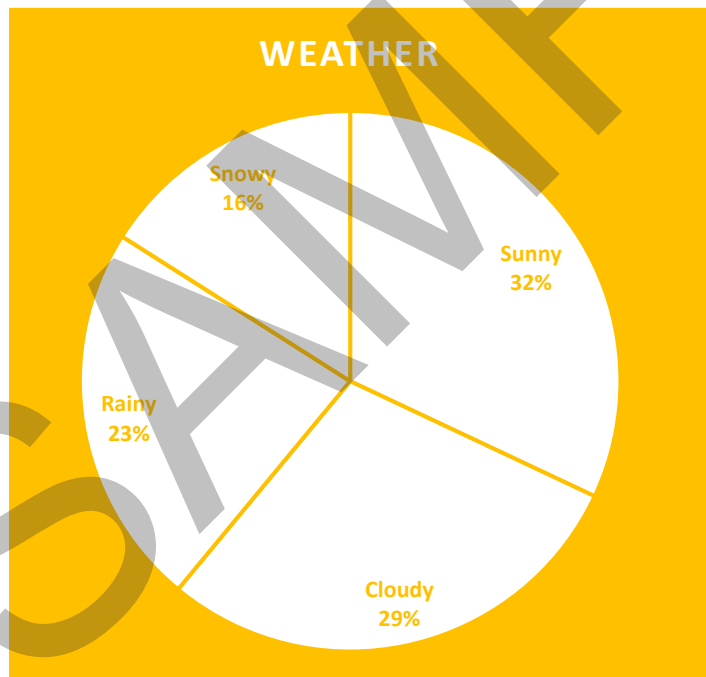
Answer:

- The days get longer and night shorter as you get to the months in the middle of the year. The days get shorter and the nights get longer as you get to the months at the beginning and end of the year.
- The winter months have the longest nights and the summer months have the longest days.

Question 2: The following is weather and temperature data for the month of October in Billings, Montana.

a. Use a pie chart to chart the percentage of days the weather was sunny, rainy, snowy, or cloudy. Step 1: add up the number of days the weather was sunny. Step 2: divide that number by the total number of days in October. (Hint: It's 31 days.) Step 3: multiply that number by 100 to get a percentage. Step 4: on the pie chart, draw a line from the line shown to make a piece that is the percentage you got for sunny days. Step 5: in that section, write the word "Sunny". Repeat these steps for rainy, snowy, and cloudy to fill in the rest of the chart.

Answer:



Day	Weather	Temperature (°F)
1	Sunny	65
2	Sunny	73
3	Sunny	74
4	Sunny	74
5	Sunny	74
6	Cloudy	58
7	Cloudy	53
8	Snowy	37
9	Snowy	28
10	Snowy	35
11	Snowy	29
12	Snowy	35
13	Rainy	45
14	Rainy	40
15	Cloudy	49
16	Rainy	45
17	Cloudy	54
18	Cloudy	59
19	Sunny	51
20	Sunny	46
21	Cloudy	48
22	Cloudy	47
23	Sunny	43
24	Sunny	45
25	Sunny	44
26	Rainy	42
27	Rainy	46
28	Cloudy	50
29	Rainy	46
30	Cloudy	53
31	Rainy	40



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Kit	SU-DARKSD
Instructions	IN-DARKSDT
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