In the Sky

Moon
Stars
Clouds
Sun
Rain
Birds

Mark each object:

D = only in the Day
N = only at Night
B = Both day and night
In the Sky

Purpose
The purpose of this instrument is to elicit students’ ideas about when various objects can be seen in the sky. Student’s explanations reveal their thinking about the role of light, behavior of various objects, and the patterns of these behaviors.

Explanation
The best responses are:

- B for the Moon – because the Moon is relatively close to the Earth, it reflects enough light to be visible most days. It gets harder to see as it gets closer to aa “new Moon” because it is so thin, and closer to the Sun.
- N for Stars – Stars (other than our Sun) are so far away that their light is over powered by sunlight during the day.
- B for Clouds – Clouds are visible at any time of day.
- D for Sun – the Sun is only visible in the day. It is the Sun’s apparent motion that defines “day” (when the Sun is “Up”) and “night” (When the Sun is “down”)
- B for Rain – Rain, and any precipitation, can occur both day or night.
- B for Birds (While many birds are not active at night, many are. Consider Owls as an example.)

What to Listen For
Listen carefully to the students’ ideas. You may want to probe further to ask students where they think the Moon and stars go during the daytime and where the Sun goes at night.

The main core ideas (summarized from the points above) are:

The Sun and Moon can be observed moving across the sky; we see them at different locations in the sky, depending on the time of day or night. The Sun appears to rise in the east, move across the sky during the day, and set in the west.

We want to hear students talking about patterns – using words like “daily” or “monthly” to describe how things occur.

We want to hear (encourage) students to explain their statements. While this is an instrument to elicit their ideas, we can encourage the practice/habit of using information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena, using evidence to support their ideas, and distinguishing between opinions and evidence in explanations.
Common alternative Conceptions:
Although the term “alternative conception” (or “misconception”) simply means an idea or explanation that differs from the accepted scientific concept, students’ alternative conceptions are anything but simple. Some alternative conceptions arise as students try to make sense of the world around them and naturally occurring phenomena. These alternative conceptions are developmental in nature, often change as students develop their ability to think abstractly, and do not change as a result of instruction. Other alternative conceptions form when students construct explanations with insufficient information. Finally, alternative conceptions can also result from incorrect or partially correct explanations given by teachers, parents, or the media.

We are not trying to “correct” their ideas, but rather determine what they are. They have these ideas because they are sufficient to explain the world from what they know. Our goal is to provide experiences that help them create new understanding – experiences that challenge these alternative explanations and force them to re-think (or even think about the phenomenon for the first time.)

Alternative conceptions can be tenacious – persisting even in the face of discrepant events or careful instruction. Research has documented that students may be able to provide the “correct” answer in science class yet still not abandon their previously formed idea.

Even though targeting student alternative conceptions is difficult, teachers should be cognizant of their students’ beliefs before, during, and after instruction. Formative assessment can provide insight and guidance for planning lessons and meeting student needs.

The Sun goes behind hills. Clouds cover the Sun. The Moon covers the Sun. The Earth goes around the Sun once a day. The Sun goes around the Earth once a day.