Angular size

Novice
- Objects that are farther appear smaller

Intermediate
- Angular resolution is affected by properties of the eye or telescope, such as the diameter of the aperture.

Expert
- Determine the angular size of an object based on its distance.
- Convert units of angular size between radians, degrees, arcminutes, and arcseconds.

Related NGSS

Grade Level	Student Performance Expectations
3-5	5-ESS1-1 **Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.**
MS	MS-ESS1-3 **Analyze and interpret data to determine scale properties of objects in the solar system.**
HS	HS-ESS1-5 **Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.**

Related CCSSM

Grade Level	Student Performance Expectations
3-5	**CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent

	representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. **CCSS.MATH.PRACTICE.MP4 Model with mathematics.** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose. **CCSS.MATH.CONTENT.5.NBT.A.2 Understand the place value system.** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
MS	**CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. **CCSS.MATH.CONTENT.6.RP.A.1 Ratios and Proportional Relationships**

	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. **CCSS.MATH.CONTENT.7.RP.A.2 Ratios and Proportional Relationships** Recognize and represent proportional relationships between quantities.
HS	**CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. **CCSS.MATH.CONTENT.HSN.Q.A.1 Quantities** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **CCSS.MATH.CONTENT.HSN.Q.A.2 Quantities** Define appropriate quantities for the purpose of descriptive modeling. **CCSS.MATH.CONTENT.HSN.Q.A.3 Quantities** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.