

Research Guide

College and Career Competency: *Curiosity*

Definition:

Researchers have defined curiosity as a multidimensional trait that encompasses seeking out new experiences and includes a readiness to accept novel and unpredictable situations (Day, 1968; Henderson et al., 1982; Jovanović & Brdaric, 2012). Curiosity is connected to a host of positive attributes and behaviors, such as openness, **creativity**, **initiative**, and subjective well-being as well as **self-efficacy** and resilience (Clark et al., 2019; Jovanović & Brdaric, 2012; Kashdan & Steger, 2007).

Essential Components for Students:

1. Actively seek out information and make efforts to fill knowledge gaps when something new or different is encountered.
2. Welcome novel or unpredictable situations.

Research:

- Curiosity inspires learners to pursue novel pathways and drives them towards discoveries that contribute to their intellectual and social-emotional growth (Kashdan & Steger, 2007; Kashdan, et al., 2004). People with greater curiosity challenge their views of self, others, and the world with an inevitable stretching of information, knowledge, and skills (Kashdan & Steger, 2007).
- A study by von Stumm et al. (2011) examined how intellectual curiosity, defined as seeking out opportunities for intellectual engagement and acquiring facts and knowledge, predicts academic performance. Their research showed that curiosity was a core determinant of academic performance, noting that “curiosity may start as a hungry and exploratory mind but ultimately transforms into intellectual maturity” (p. 582).
- Highly curious students are characterized by interest in high levels of novelty and complexity, which are linked to high **creativity** and flexibility (Day, 1968). When older students encounter “unexpected or mysterious descriptions” (p. 36) in reading material, they are more likely to remember the content and have a deeper understanding of what they read (Garner et al., 1992; as cited in Engel, 2013). These unexpected descriptions could include vivid anecdotes or interesting details that are only peripherally related to the main topic of the reading, such as the fact that Stephen Hawking has ALS mentioned in a chapter on black holes (Garner et al., 1992, as cited in Engel, 2013).
- Research in a number of domains, including early childhood education and mental health, indicates that the feeling of curiosity and the process of discovery that comes with it can have a positive influence on children’ well-being (Engel, 2011; Kashdan et al., 2004; Kashdan et al., 2013).
- A host of professions, ranging from law to advertising, view a well-developed sense of curiosity as essential to personal effectiveness (Guthrie, 2009; Koranda & Sheehan, 2014). Some professional endeavors, especially if they involve **creativity** and innovation, cannot be realized without a strong and persistent sense of curiosity. Entrepreneurial endeavors also require a curious and nimble mind to succeed. Along with motivating entrepreneurs to learn, research by

Jeraj and Marič (2013) shows that curiosity has a particularly beneficial impact on **self-efficacy**—a key factor in entrepreneurial achievement.

- While curiosity is often used synonymously with interest, it has characteristics that distinguish it from interest (Grossnickle, 2016). For example, curiosity is associated with a desire to reduce uncertainty and to take steps to fill knowledge gaps. Interest, on the other hand, is characterized more by increased attention and a willingness to re-engage with content without necessarily taking action (Grossnickle, 2016).
- Students learn better when looking for information themselves rather than when just receiving knowledge (Abdelghani et al., 2022). In their study, Clark et al. (2019) significantly increased teenagers' disposition toward curiosity by using the Questions Formulation Technique: A teacher or student presents a prompt for the class to focus on. Students produce as many questions as possible regarding the prompt, following four rules:
 1. Ask as many questions as possible.
 2. Ask without judging, answering, or discussing the questions.
 3. Write everything down as stated.
 4. Convert statements to questions.

Afterward, students change any closed-ended questions to open-ended questions and vice versa. Then students select three priority questions and, finally, decide how they are going to answer them.

- Teachers ask many more questions than students, sometimes twice as many (Clark et al., 2021). Because teachers almost always know the answers already, teacher-led questioning gives students the impression that the learning is already finished. For example, in science classes, students might be convinced that science is carried out by a prearranged procedure rather than from curiosity.
- Uncertainty can make learners justify their assertions, treat learning as a problem to solve, and motivate discussion among themselves (Lamnina & Chase, 2021). In Lamnina and Chase's (2021) experiment, groups of physics students invented their own equations. The control group was told all the required information ahead of time. The experimental group was told irrelevant information. Both groups did equally well, but the latter showed greater curiosity and performed better on transferring knowledge. In both groups, when students understood more, curiosity decreased.
- Singh & Manjaly (2022) found that the more teachers encouraged their students to be autonomous, the more intrinsically motivated the students rated themselves.
- While curiosity is positively correlated to well-being, it has also been positively correlated to various types of risky behaviors (Jovanović & Gavrilo-Jerković, 2014). This suggests that supporting and developing curiosity in adolescents must be done thoughtfully, taking into account the fact that adolescence is a time when experimentation and risk-taking behaviors emerge (Galambos & Tilton-Weaver, 1998; as cited in Jovanović & Brdaric, 2012).

Assessments:

Please note that the assessments listed here reflect what is currently being used in multiple disciplines to measure curiosity. Not all of these measures will be easily used in classroom settings or by classroom teachers. However, the general knowledge that these measurements exist and the ability to review particular items from these assessments is valuable.

- [The Curiosity and Exploration Inventory II](#) (CEI-II; Kashdan, 2009) is a 10-item self-report tool that uses a 7-point Likert scale to capture undergraduates' responses to statements involving

novelty and ambiguity. The CEI-II employs a two-factor model capable of assessing an individual's disposition towards curiosity and exploration. The CEI-II is appropriate for adolescents and adults. Sample questions include "I actively seek as much information as I can in new situations" and "Everywhere I go, I am out looking for new things or experiences." For details on the CEI-II, see [Kashdan et al. \(2009\)](#).

- Chamorro-Premuzic's (2015) Curiosity Profile employs a yes/no scale across 24 questions to evaluate individuals in three domains: mental flexibility (are you an unconventional, flexible, or traditional thinker?), interest in learning (are you intellectually hungry, interested in learning, or pragmatic?), and adaptability (do you seek new experiences and relationships, adapt to new situations, or play it safe?). As a self-assessment tool, the Curiosity Profile is most relevant for individuals in late adolescence through middle adulthood. Individuals are asked to agree or disagree with statements like "I get bored easily" and "I don't care how it works as long as it works." The Curiosity Profile is available through [the Harvard Business Review](#).
- [The Social Curiosity Scale](#) (SCS; Renner, 2006) employs a 4-point Likert scale to gauge participants' general and covert social curiosity. The SCS consists of 10 items, including statements such as "I like to learn about the habits of others" and "Other people's life stories interest me." Researchers have found the SCS suitable for adolescent and adult populations.
- The Epistemic Curiosity Scale (Litman & Spielberger, 2003; Powell et al., 2016; Renner, 2006) has been administered to adolescents and undergraduates. It consists of 10 items that measure interest in exploring new things and figuring out how things work using a 4-point Likert scale (1 = *Almost Never*; 4 = *Almost Always*). Item statements include "Enjoy learning about subjects which are unfamiliar" and "See a complicated piece of machinery / ask someone how it works." More information on the questionnaire can be obtained by [contacting Dr. Litman](#).
- [Herwin & Nurhayati \(2021\)](#) provide a scale for measuring the curiosity of elementary students. It consists of 16 items across four indicators: pay attention ("Students pay attention to other students who express opinions in group discussions"), take notes ("Students record any new information they get from friends"), asking ("The student asks other students if they hear something they have not known before"), and comparing ("Students compare the new information obtained with previously known information"). Teachers rate their students on a scale of *Always*, *Often*, *Rarely*, and *Never*.

Instructional Practices:

- Certain pedagogical models, such as inquiry-based and problem-based learning, are designed to promote and foster the curiosity students need to become deeply engaged with learning (Pluck & Johnson, 2011). With inquiry-based learning, the teacher poses questions, problems, or scenarios that students respond to. Problem-based learning involves students working together to solve open-ended problems.
- To gauge curiosity in the classroom, teachers can record lessons or conversations and then count the questions that students ask. The number and type of questions will help teachers understand what the students are most curious about, and can also help teachers develop cues to encourage more questions (Engel, 2013).
- Price-Mitchell's (2015) article, "[Curiosity: The Force Within a Hungry Mind](#)," discusses curiosity in the context of lifelong learning and offers 10 tips on how to promote and foster students' curiosity. Among the practices she outlines, Price-Mitchell advocates for teaching students how to ask questions and providing them with opportunities to tinker or experiment.

- A strategy that can be used to foster curiosity in the classroom is to incorporate curiosity-inducing elements into a lesson—for example, incongruity, contradiction, uncertainty, novelty, or surprise. Teachers can also model curiosity by asking questions or engaging in exploration to resolve a question (Arnone, n.d.). Revisiting old questions that were posed but not fully answered can make students curious (Heick, n.d.). This can be prompted through journaling, Socratic discussion, or [the Question Formulation Technique](#) (Rothstein & Santana, 2011).
- Isaacs (n.d.) has created [a lesson](#) that encourages students in grades 6–8 to use their curiosity in order to understand life during the Great Depression. The lesson, which uses the novel *Jacob Have I Loved* and historical images from the Library of Congress’s archives, provides an opportunity for students to respond to history by developing visual images to accompany their engagement with the source materials.
- The National Aeronautics and Space Administration (n.d.) offers a series of lesson plans, “[NASA’s Journey to Mars](#),” that prompts students to use their curiosity in the service of science and engineering. The lessons in the series contain student guides, videos, and other resources appropriate for both elementary and middle school students.
- Helm (n.d.), writing for the National Council of Teachers of English (NCTE) provides K–2 teachers with [an interactive writing lesson](#) that taps into students’ curiosity and **creativity**.
- Hughes (2014) has developed a cognitive hierarchy of curiosity. According to Hughes, first-level curiosity is fact based, second-level curiosity is comprehensive in nature, third-level curiosity is procedural, fourth-level curiosity is creative, and fifth-level curiosity is existential in nature. In his model, Hughes sees questions involving curiosity ranging from simple “who, what, where, and why” inquiries to far more complex “what if” and “deep why” questions. Hughes asserts that educators should actively nurture curiosity and lead students towards the latter types of questions, for such questions give learning its true value and help build student character. Using the topic of the law as an example, students might ask the following types of questions at each level:
 - First level, Factual—What are laws?
 - Second level, Comprehensive—Why do we have laws?
 - Third level, Procedural—How do laws work?
 - Fourth level, Creative—What would happen if we had no laws?
 - Fifth level, Existential—Do we have a moral responsibility to break unjust laws?
- Students tend to end learning early because they overestimate how much they know and can do (Abdelghani et al., 2022). Having them stop and ask themselves questions is a way to help them acknowledge their uncertainties. Students need to see the connections between the gaps in their knowledge, knowledge-seeking behaviors, and progress in learning.

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