

Teacher Guide

College and Career Competency: *Curiosity*

Definition:

Researchers have defined curiosity as a multidimensional trait that encompasses seeking out new experiences and a readiness to accept novel and unpredictable situations (Day, 1968; Henderson, Gold, & McCord, 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 (Jovanović & Brdaric, 2012; Kashdan & Steger, 2007).

Essential Components for Students:

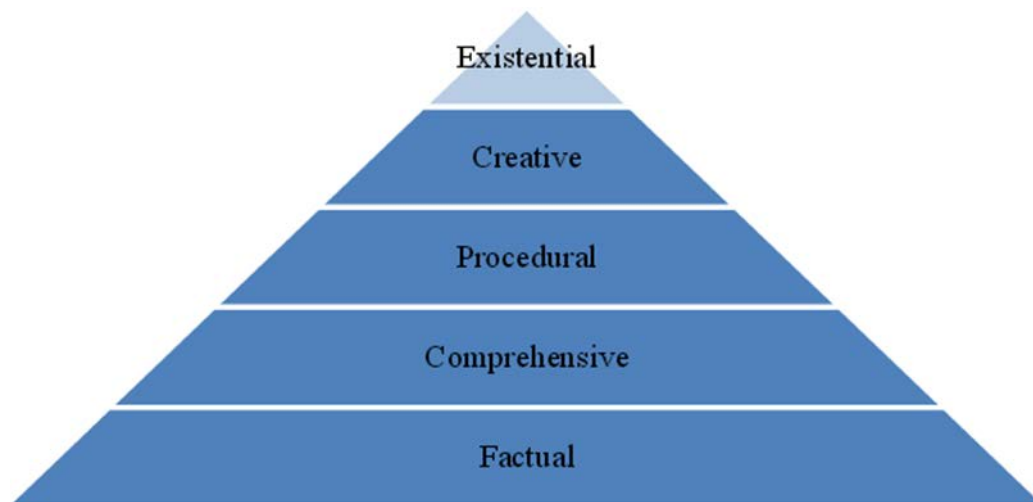
1. Actively seek out information and make efforts to fill knowledge gaps when something new or different is encountered.
2. Welcome novel or unpredictable situations.

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, Rose, & Fincham, 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, p. 171).
- A study by Von Stumm, Hell, and Chamorro-Premuzic (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, Brown, Sanders, & Menke, 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).
- 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 students’ well-being (Engel, 2011; Kashdan et al., 2004; Kashdan, Sherman, Yarbro, & Funder, 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 reengage with content without necessarily taking action (Grossnickle, 2016).
- 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—What are laws?
 - Second level—Why do we have laws?
 - Third level—How do laws work?
 - Fourth level—What would happen if we had no laws?
 - Fifth level—Do we have a moral responsibility to break unjust laws?



A cognitive hierarchy of curiosity (Hughes, 2014, p. 8)

- 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) 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 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2770180/> (Kashdan et al., 2009). A complete version of the CEI-II questionnaire is available at <http://psychfaculty.gmu.edu/kashdan/CEI-II.pdf> (Kashdan, 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* at <https://hbr.org/2015/12/assessment-whats-your-curiosity-profile> (Chamorro-Premuzic, 2015).
- The Social Curiosity Scale (SCS) 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. For a full explanation of the SCS and a list of its items, see Renner (2006) at <http://www.psychwiki.com/dms/other/labgroup/Measu235sdgse5234234resWeek2/Lindsay2/renner2006.pdf>.
- The Epistemic Curiosity Scale (Litman & Spielberger, 2003; Powell, Nettelbeck, & Burns, 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, <http://www.ihmc.us/groups/jlitman/>.

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. See her article at <http://www.edutopia.org/blog/8-pathways-curiosity-hungry-mind-marilyn-price-mitchell>.
- 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, 2013). This can be prompted through journaling, Socratic discussion, or the Question Formulation Technique. For a good discussion of the Question Formulation Technique, see http://hepg.org/hel-home/issues/27_5/helarticle/teaching-students-to-ask-their-own-questions_507 (Rothstein & Santana, 2011).
- The Library of Congress (LC) 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 LC’s archives, provides an opportunity for students to respond to history by developing visual images to accompany their engagement with the source materials. The lesson is available at <http://www.loc.gov/teachers/classroommaterials/lessons/jacob/index.html> (Isaacs, n.d.).
- The National Aeronautics and Space Administration (2012) offers a series of lesson plans, “NASA Imagine Mars-Mars Survival Kit,” 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. See the full series at <http://mars.jpl.nasa.gov/participate/marsforeducators/soi/>.
- The National Council of Teachers of English (NCTE) provides K-2 teachers with an interactive writing lesson that taps into students’ curiosity and **creativity**. The lesson contains information on planning, materials, standards, and other helpful details. To see the lesson, go to <http://www.readwritethink.org/classroom-resources/lesson-plans/using-children-natural-curiosity-52.html> (Helm, n.d.).
 - The lesson could be adapted for older students. This example is for a 7th grade Social Studies unit on Native Americans. Hand out a few buffalo chips and have the students pass them around the room. Tell the students to study the items, but don’t tell the students what they are. Just explain that this item was a very important part of Native American life. Once the students have interacted with the items, ask them to write a paragraph describing the item as they imagine it being used in a Native American village. Have the students share their paragraphs in small groups, and have each group vote on the best or most interesting usage of the item. Have those students read their paragraphs to the class, then explain that this item was used as fuel for fires because there were not many trees on the frontier. Ask if anyone has an idea of what the item is, and if no one figures it out, tell them they all handled buffalo chips. Enjoy the reaction, and then discuss how the Native Americans used every part of the buffalo.

References

- Arnone, M.P. (n.d.). Fostering curiosity in your students. Retrieved from <http://www.educationoasis.com/visitor-resources/articles/fostering-curiosity/>
- Chamorro-Premuzic, T. (2015). Assessment: What's your curiosity profile? *Harvard Business Review*. Retrieved from <https://hbr.org/2015/12/assessment-whats-your-curiosity-profile>
- Day, H.Y. (1968). Role of specific curiosity in school achievement. *Journal of Educational Psychology*, 59(1), 37-43. doi: 10.1037/h0025460
- Engel, S. (2011). Children's need to know: Curiosity in school. *Harvard Educational Review*, 81(4), 625-645. doi: 10.17763/haer.81.4.h054131316473115
- Engel, S. (2013). The case for curiosity. *Educational Leadership*, 70(5), 36-40. Retrieved from <http://www.ascd.org/publications/educational-leadership/feb13/vol70/num05/The-Case-for-Curiosity.aspx>
- Garner, R., Brown, R., Sanders, S., & Menke, D.J. (1992). "Seductive details" and learning from text. In K.A. Renniger, S. Hidi, & A. Krapp (Eds.), *The Role of Interest in Learning and Development* (pp. 239-254). Hillsdale, NJ: Lawrence Erlbaum Associates. Retrieved from <https://books.google.com/books?hl=en&lr=&id=LubJAgAAQBAJ&oi=fnd&pg=PA239&dq=garner+brown+sanders+menke+&ots=zen8kqFelg&sig=dk50KO4v2klRsPdjtBG1qlj4ovl#v=onepage&q=garner%20brown%20sanders%20menke&f=false>
- Grossnickle, E.M. (2016). Disentangling curiosity: Dimensionality, definitions, and distinctions from interest in educational contexts. *Educational Psychology Review*, 28(1), 23-60. doi: 10.1007/s106-014-9294-y
- Guthrie, C. (2009). Be curious. *Negotiation Journal*, 25(3), 401-406. doi: 10.1111/j.1571-9979.2009.00233.x
- Heick, T. (2013). 5 learning strategies that makes students curious. Retrieved from <http://www.teachthought.com/critical-thinking/inquiry/5-learning-strategies-that-make-students-curious/>
- Helm, L. (n.d.). Using children's natural curiosity to lead to descriptive writing. Retrieved from <http://www.readwritethink.org/classroom-resources/lesson-plans/using-children-natural-curiosity-52.html>
- Henderson, B.B., Gold, S.R., & McCord, M.T. (1982). Daydreaming and curiosity in gifted and average children and adolescents. *Developmental Psychology*, 18(4), 576-582. doi: 10.1037/0012-1649.18.4.576
- Hughes, C. (2014, October). *Awakening student curiosity*. Paper presented at Character Education for a Challenging Century Conference, Geneva, Switzerland.
- Isaacs, K. (n.d.). Photographs from the Great Depression: *Jacob Have I Loved*. Retrieved from <http://www.loc.gov/teachers/classroommaterials/lessons/jacob/index.html>
- Jeraj, M., & Marić, M. (2013). Relation between entrepreneurial curiosity and entrepreneurial self-efficacy: A multi-country empirical validation. *Organizacija*, 46(6), 264-273. doi: 10.2478/orga-2013-0027
- Jovanović, V. & Brdaric, D. (2012). Did curiosity kill the cat? Evidence from subjective well-being in adolescents. *Personality and Individual Differences*, 52(3), 380-384. doi: 10.1016/j.paid.2011.10.043
- Jovanović, V. & Gavrilov-Jerković, V. (2014). The good, the bad (and the ugly): The role of curiosity in subjective well-being and risky behaviors among adolescents. *Scandinavian Journal of Psychology*, 55(1), 38-44. doi: 10.1111/sjop.12084
- Kashdan, T. (2009). Curiosity and Exploration Inventory (CEI-II). Retrieved from <http://psychfaculty.gmu.edu/kashdan/CEI-II.pdf>

- Kashdan, T.B., Gallagher, M.W., Silvia, P.J., Winterstein, B.P., Breen, W.E., Terhar, D., & Steger, M.F. (2009). The Curiosity and Exploration inventory-II: Development, factor structure, and psychometrics. *Journal of Research in Personality*, 43(6), 987-998. doi: 10.1016/j.jrp.2009.04.011
- Kashdan, T.B., Rose, P., & Fincham, F.D. (2004). Curiosity and exploration: Facilitating positive subjective experiences and personal growth opportunities. *Journal of Personality Assessment*, 82(3), 291-305. doi: 10.1207/s15327752jpa8203_05
- Kashdan, T.B., Sherman, R.A., Yarbro, J., & Funder, D.C. (2013). How are curious people viewed and how do they behave in social situations? From the perspectives of self, friends, parents, and unacquainted observers. *Journal of Personality*, 81(2), 142-154. doi: 10.1111/j.1467-6494.2012.00796.x
- Kashdan, T.B., & Steger, M.F. (2007). Curiosity and pathways to well-being and meaning in life: Traits, states, and everyday behaviors. *Motivation and Emotion*, 31(3), 159-173. doi: 10.1007/s11031-007-9068-7
- Koranda, D., & Sheehan, K.B. (2014). Teaching curiosity: An essential advertising skill? *Journal of Advertising Education*, 18(1), 14-23.
- Litman, J.A., & Spielberger, C.D. (2003). Measuring epistemic curiosity and its diversive and specific components. *Journal of Personality Assessment*, 80(1), 75-86. doi: 10.1207/S15327752JPA8001_16
- National Aeronautics and Space Administration. (2012). NASA Imagine Mars – Mars survival kit. Retrieved from <http://mars.jpl.nasa.gov/participate/marsforeducators/soi/>
- Pluck, G., & Johnson, H.L. (2011). Stimulating curiosity to enhance learning. *GESJ: Education Sciences and Psychology*, 2(19), 24-31.
- Powell, C., Nettelbeck, T., & Burns, N.R. (2016). Deconstructing intellectual curiosity. *Personality and Individual Differences*, 95, 147-151. doi: 10.1016/j.paid.2016.02.037
- Price-Mitchell, M. (2015). *Curiosity: The force within a hungry mind*. Retrieved from <http://www.edutopia.org/blog/8-pathways-curiosity-hungry-mind-marilyn-price-mitchell>
- Renner, B. (2006). Curiosity about people: The development of a social curiosity measure in adults. *Journal of Personality Assessment*, 87(3), 305-316. doi: 10.1207/s15327752jpa8703_11
- Rothstein, D., & Santana, L. (2011). Teaching students to ask their own questions. *Harvard Education Letter*, 27(5), 1-2. Retrieved from http://hepg.org/hel-home/issues/27_5/helarticle/teaching-students-to-ask-their-own-questions_507
- Von Stumm, S., Hell, B., & Chamorro-Premuzic, T. (2011). The hungry mind: Intellectual curiosity is the third pillar of academic performance. *Perspectives on Psychological Science*, 6(6), 574-588. doi: 10.1177/1745691611421204