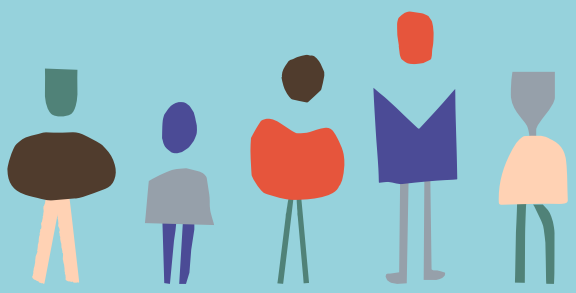
a guide to

The Science of SUMmit

JULY 2018

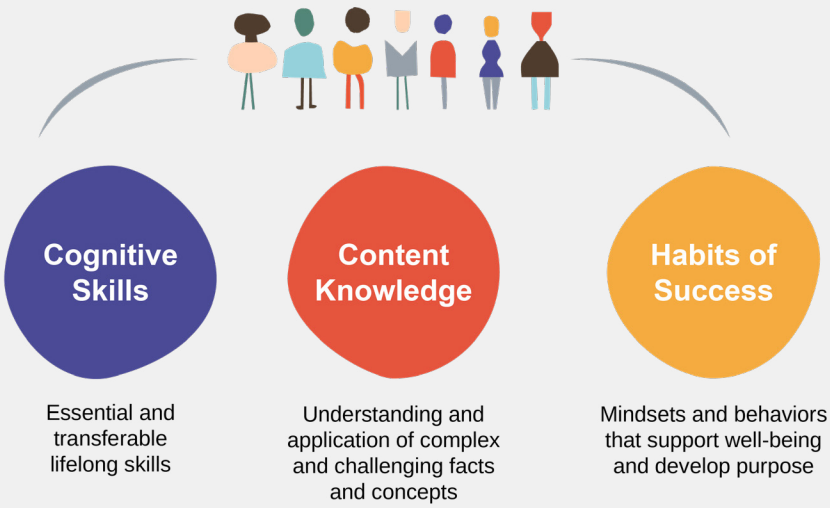


A Vision Grounded in Science

Since founding Summit Public Schools in 2003, we have held ourselves accountable to a vision that every student should be equipped to lead a fulfilled life — one that looks different for each individual but that includes financial security, meaning and purpose in their work, fulfilling personal relationships, and engagement in their community. We've worked in partnership with nationally-acclaimed learning scientists, researchers, and academics to develop a model that supports this vision.

We outline our school model and the science behind it in ***The Science of Summit***, a groundbreaking white paper 15 years in the making. This publication, *A Guide to The Science of Summit*, is an introduction to the full report. Both reflect our effort to share what we believe about young people, the promise of public education, and principles for school design rooted in the science of learning. We will continue to update both publications over time, in line with our commitment to improving the Summit Learning approach according to what learning science dictates is best for students.

Summit Learning Student Outcomes



Driving Student Success with Measurable Outcomes

Summit Learning combines core values with learnings from leading scientists and experts in education to create a school experience that is tailored to every community's needs. We translate the science of learning into the intentional design of our schools to achieve student success in three outcomes: **Cognitive Skills**, **Content Knowledge**, and **Habits of Success**.

We know that students who accomplish all three commencement-level outcomes are more prepared to find fulfillment in college, careers, and life. Summit uses this knowledge to design a school experience that develops these outcomes through three components: **Mentoring**, **Projects**, and **Self-Direction**.

Within each component, students are constantly setting and achieving goals — both short- and long-term. To achieve these goals, students work through a Self-Directed Learning Cycle with the support of their teachers and develop a set of strategies they can use in any context in school and life.

The following pages explore each student outcome in depth and illustrate what each looks like in the classroom.

COGNITIVE SKILLS

Essential and transferable lifelong skills

What are Cognitive Skills?

How do we design schools that empower students with transferable lifelong skills? Cognitive Skills are the essential and transferable lifelong skills that all students need for success in college, career, and life. At Summit, we've identified 36 such skills.

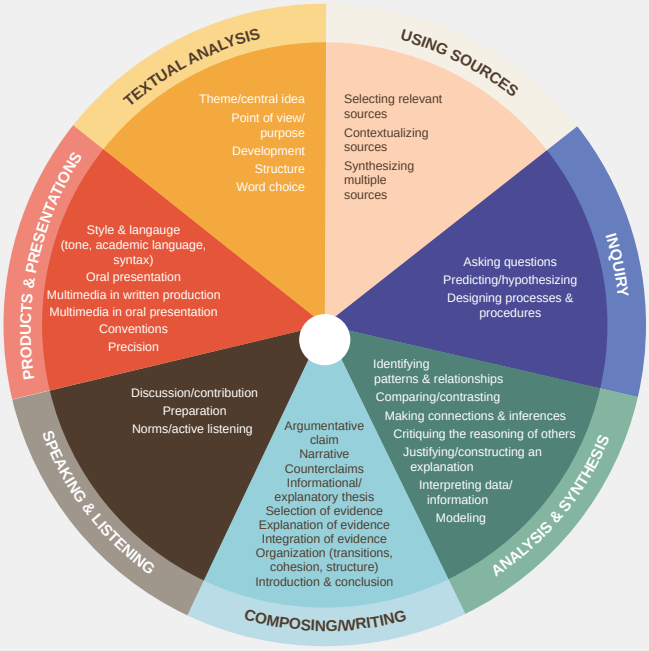
Students apply their acquired skills, along with Content Knowledge and Habits of Success, to projects that prepare them for real-world scenarios they'll encounter in life after graduation. Projects, which are the foundation of the academic experience, culminate in authentic final products — oral presentations, written reports, structured discussions, etc. — that allow students to apply the skills they are learning. At present, there are approximately 200 projects spanning all grades and subjects in the Summit Learning Base Curriculum.

COGNITIVE SKILLS FOR COLLEGE AND CAREER READINESS

The **Summit Learning Cognitive Skills Rubric** *is an assessment and instruction tool that outlines the continuum of 36 interdisciplinary, higher-order thinking skills (pictured here) that are necessary for college and career readiness.*

Developed in collaboration with the Stanford Center for Assessment, Learning & Equity, May, 2017.

SCALE
Stanford Center for Assessment, Learning, & Equity



Cognitive Skills in Action

Students spend class time immersed in **hands-on projects** that mimic and allow students to solve tangible problems. Throughout a project, students develop multiple Cognitive Skills, such as the ability to express ideas with precision and to use relevant, credible sources to support those ideas.

Projects culminate in authentic final products — oral presentations, written reports, and Socratic Seminars are just a few examples — that allow students to demonstrate fluency in skills. In the example on the following page, students apply their understanding of gravity and friction in science class to develop Cognitive Skills such as designing processes and procedures, modeling, integrating evidence, and others.

Every project assesses multiple Cognitive Skills. Our **Cognitive Skills Rubric** outlines 36 skills necessary for college and career readiness. Students hone these skills in every subject and grade level across multiple contexts, progressing along a continuum appropriate for their level of development. As assessed by their teachers, 70% of a student's grade is based on Cognitive Skill development.

Teachers are experts not only in their subject areas but also in the skills students apply in their projects. Teachers ensure that students have the right support and scaffolds to meet or exceed grade-level expectations. Students access and complete checkpoints, activities, and resources that are the "stepping stones" to helping them master the skills needed to complete a final product. Teachers provide students with actionable, formative feedback on each checkpoint throughout a project.

Students also meet 1:1 regularly with a **dedicated mentor** who is a teacher or administrator in the school. Students meet weekly with mentors to align daily actions with long-term goals and explore ways to further develop Cognitive Skills. Mentor guidance relates to students' exploration of passions and their development of lifelong skills.

To see how Summit classrooms support Cognitive Skills, please see the Cognitive Skills in Action graphic on the next page.

COGNITIVE SKILLS IN ACTION

COGNITIVE SKILLS RUBRIC

THE SELF-DIRECTED LEARNING CYCLE

DEDICATED MENTOR

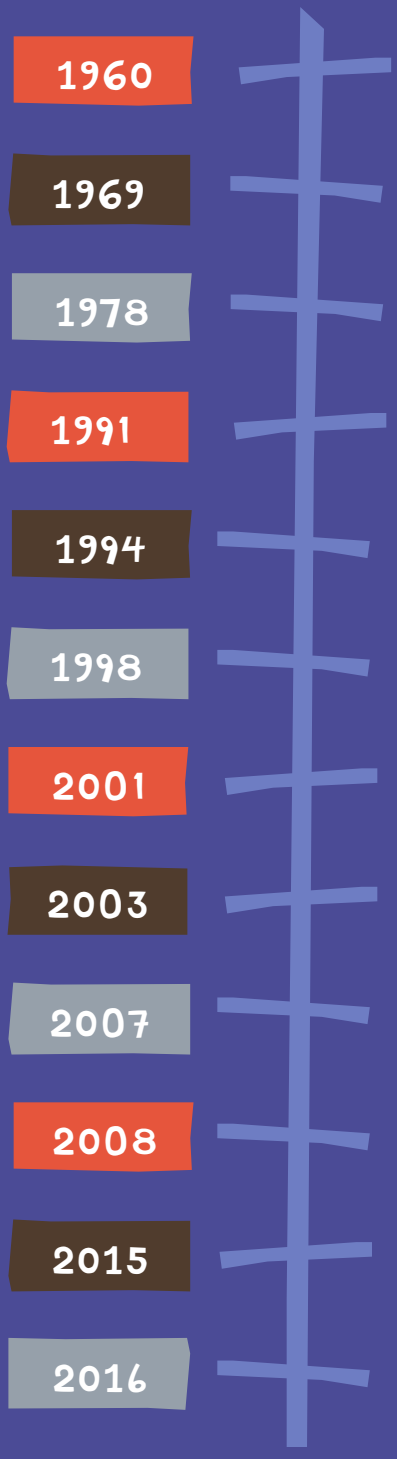
TEACHERS ARE EXPERTS

PROJECTS

The Science of Cognitive Skills

The importance of students developing Cognitive Skills for success in school and life is rooted in research spanning almost 50 years (Piaget, 1969; Vygotsky, 1978).

Learning science indicates the importance of students taking an active role in their learning and having frequent opportunities to learn with and through others in order to build higher-order thinking skills (Cohen & Lotan, 1994; De Corte, 2003). Furthermore, early research in the cognitive science and human development fields supports designing curricula that provide multiple opportunities for practice and transfer of Cognitive Skills, across subject matter and grade levels, to promote long-term learning (Bruner, 1960).



1960 — Jerome Bruner makes the case for a **spiral curriculum** that starts in early childhood

1969 — Jean Piaget details the intricate relationship between **mental and physical growth development**, from birth through adolescence

1978 — Lev Vygotsky emphasizes the essential role of social relationships in **cognitive development**

1991 — Martin Haberman challenges urban educators to focus on creating a learning environment that fits the needs and nature of **urban youth**

1994 — Elizabeth Cohen and Rachel Lotan blend theory with effective teaching strategies for group work, emphasizing multiple ability and **bilingual classrooms**

1998 — Grant Wiggins advocates for and details **performance-based assessment**, focused on helping students improve

2001 — Carol Ann Tomlinson collates field-tested and best practices for differentiated instruction in **multiple ability classrooms**

2003 — Erik De Corte emphasizes the need for **active learning** experiences and the importance of metacognition and communication skills in transfer of knowledge

2007 — John Hattie and Helen Timperley suggest best ways to deliver **individualized feedback** in the classroom

2008 — David Conley sets forth the **Cognitive Skills**, Content Knowledge, and “habits of mind” necessary for high school students to be college ready

2015 — Jo Boaler provides roadmap of research-based strategies for helping all children be successful in **mathematics**

2016 — Daniel Schwartz et al. categorize and describe 26 “scientifically proven” **approaches to learning**

Content Knowledge

Understanding and application of complex and challenging facts and concepts

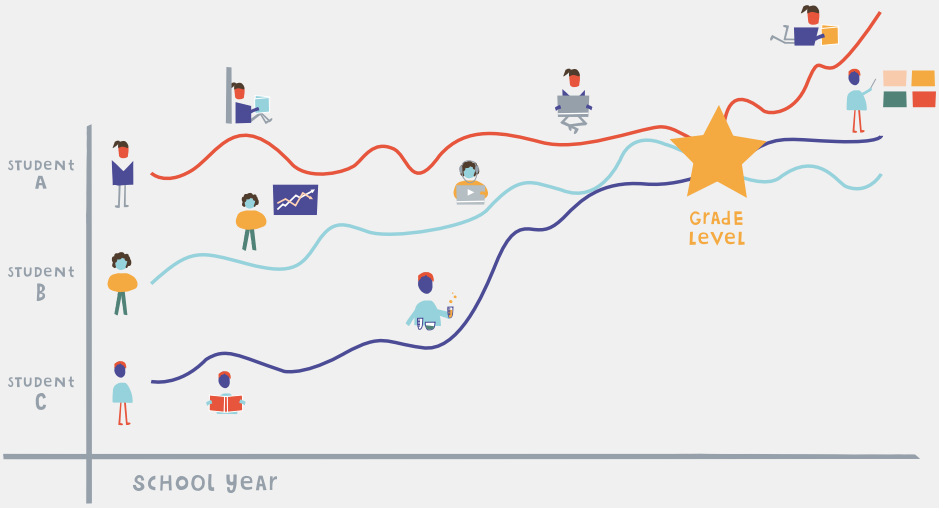
What is Content Knowledge?

How do we design our schools to prepare students for life, not just assessments? Content Knowledge is the understanding and application of complex, challenging facts and concepts. Students need a broad Content Knowledge base in order to put Cognitive Skills to work.

Summit Learning puts students at the center of their learning journeys, empowering them to set goals and work through standards-aligned content. Students not only deepen their knowledge of a particular content topic in each course, but also build their understanding of how they learn best and explore their own academic interests further — laying the foundations for a lifelong love of learning.

Individual Pathways of Learning

In the Summit Learning curriculum, students can choose from an array of resources suited to their style of learning. Supported by their teachers, students move through these resources, demonstrating competency at different stages.



Content Knowledge in Action

Through interdisciplinary projects, students apply the content learned in each course and deepen their understanding of a specific topic. In the example scenario that follows, the student is learning science content that she will apply in the “Forces At Work: Roller Coaster Design” project, which asks students to apply their knowledge of gravity and friction and design a safe and fun roller coaster.

Students learn Content Knowledge through whole-group lessons, small-group workshops, 1:1 supports, and **self-directed learning** as they progress through content playlists — a diverse set of learning resources (primary sources, videos, presentations, texts, etc.) that also include formative and summative assessments. **Content Assessments** are aligned with both state and rigorous college- and career-ready standards and account for 30% of a student’s grade.

Each topic is organized into Focus Areas. After demonstrating mastery of a required Focus Area by passing a Content Assessment, students can deepen their understanding with Additional and Challenge Focus Areas. This structure enables students to master the most important concepts, while holding no student back from deepening their understanding. The Summit Learning experience is designed to encourage students to also participate in **peer tutoring** and explore other topics that are of particular interest and relevance to them.

Teachers facilitate self-directed learning by offering targeted support through small-group workshops and 1:1 interventions, as well as by providing extra scaffolding for students who need it. Personalized, easy-to-understand assessment data available via the Platform help teachers identify where each student is, whether they’re behind grade-level, on track, or ahead. Teachers **personalize scaffolds** based on real-time data and individual learning needs.

Part of a student’s weekly mentoring session may be dedicated to setting goals around their progress in learning new content. Students work with their mentor to build learning strategies that will not only help them stay at or ahead of grade-level expectations, but that can also be applied to any new situations throughout their lives.

To see how Summit classrooms support Content Knowledge, please see the Content Knowledge in Action graphic on the next page.

CONTENT KNOWLEDGE IN ACTION

The Science of Content Knowledge

Three decades of research reveal the key finding that students must acquire and retain Content Knowledge to support the development of Cognitive Skills (Willingham, 2009; Schwartz, Tsang & Blair, 2016).

Contemporary research also supports the following practices that help meet the needs of all learners: students should advance through material at their own pace, be provided with the appropriate supports, and move on only when they demonstrate proficiency in a given subject (AIR, 2016; Rose, 2016).

1988 Robert Glaser and Michelene Chi draw attention to the cognitive and psychological conditions that enhance and limit the **development of expertise**

1988 Donna R. Recht and Lauren Leslie find **prior knowledge** has significant effect on learners' retention and summarizing of information after reading

2000 John D. Bransford et al. combine theories of **how we learn** with best practices for effective learning in the classroom

2001 Carol Ann Tomlinson collates field-tested and best practices for **differentiated instruction** in multiple ability classrooms

2008 David Conley sets forth the **Cognitive Skills**, Content Knowledge, and "habits of mind" necessary for high school students to be college ready

2009 Daniel Willingham emphasizes the importance of **background knowledge** in the critical thinking process

2014 Peter C. Brown et al. present concrete practices for **mastery learning**, like building background knowledge, based on recent research in cognitive psychology and related fields

2015 Jo Boaler provides a roadmap of research-based strategies for helping all children be successful in **mathematics**

2016 Todd Rose proposes an individualized, versus standardized, approach to **performance assessment** in education and in the workforce

2016 Kristina Zeiser et al. (AIR) make the case for a positive relationship between **competency-based education** and greater autonomy over and motivation for learning

2016 Daniel Schwartz et al. categorize and describe 26 "scientifically proven" **approaches to learning**

Habits of Success

Mindsets and behaviors that support well-being and develop purpose

What are Habits of Success?

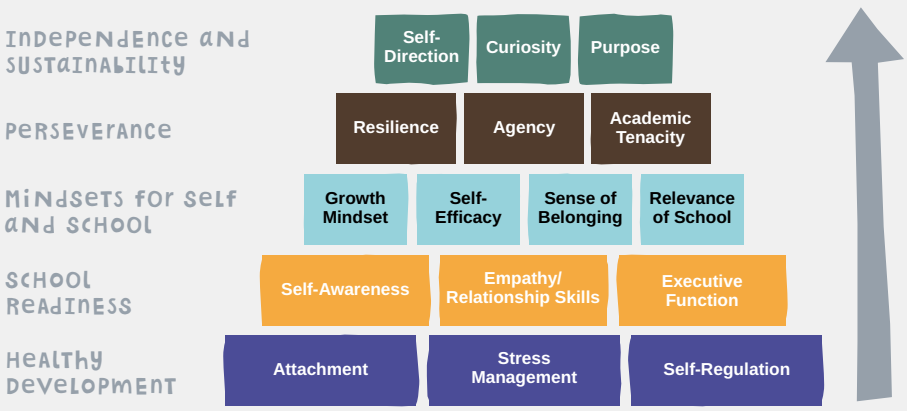
How do we empower our educators to teach the whole child? Educators know that learning isn't confined to the four walls of a classroom. To achieve a fulfilled life, students need to develop "Habits of Success" — mindsets and behaviors that support academic achievement and well-being. These include habits that support healthy development, school readiness, mindsets for self and school, perseverance, and independence and sustainability. Summit Learning incorporates Turnaround for Children's *Building Blocks for Learning* as its framework for defining Habits of Success, with 16 key social-emotional learning skills outlined for comprehensive student development.

The development of Habits of Success is embedded throughout the Summit Learning experience, including all three components: Mentoring, Projects, and Self-Direction. Teachers teach students in all subjects through lessons and projects as they develop Habits of Success such as self-awareness, tenacity, and agency.

Building Blocks for Learning

A Framework for Comprehensive Student Development

Summit Learning adopted prominent educational psychologist K. Brooke Stafford-Brizard's 2016 Building Blocks for Learning as our framework. It outlines 16 key social-emotional learning skills for comprehensive student development.



Habits of Success in Action

Habits of Success are the mindsets and behaviors that support academic achievement and well-being. These **16 Habits are modeled** throughout the school environment: in adult interactions; within school routines, celebrations, and policies; and as part of ongoing professional development for teachers.

Teachers create opportunities in lessons and projects that ensure students are learning to collaborate and build interpersonal habits. Students are also supported both inside and outside the classroom as they set goals and work toward development of specific habits through the Self-Directed Learning Cycle. The goal is to help students develop and show habits independently, along with the ability to transfer them to a variety of life situations.

One way these mindsets and behaviors take shape is in three commencement-level ready habits — self-direction, curiosity, and purpose — that set up a student for a life of well-being:

- Self-Direction: A student is driving forward the actions needed to achieve their goals, with or without help.
- Curiosity: A student is interested in lots of things and wants to understand more, even if that is challenging.
- Purpose: A student is charting a course for their life that is meaningful and will have an impact on the world.

During weekly **1:1 mentoring** sessions, students and their mentors use a rigorous and customized set of tools to set goals, determine strategies, and reflect on successes and setbacks. The content of these mentoring conversations is individualized so that students can see how habits are supporting and hindering their academic, extracurricular, and personal success, as well as any areas where support is needed.

Families can also see what is being discussed during the mentor check-in and the underlying student results that motivated a conversation. Students participate in **family meetings** to set goals for growth and so that educators can better understand how to better tailor habits to students' cultures and contexts. At Summit, community-wide **celebrations of learning** allow students to share their projects and cultivate a sense of belonging, as well as share successes with their families and friends.

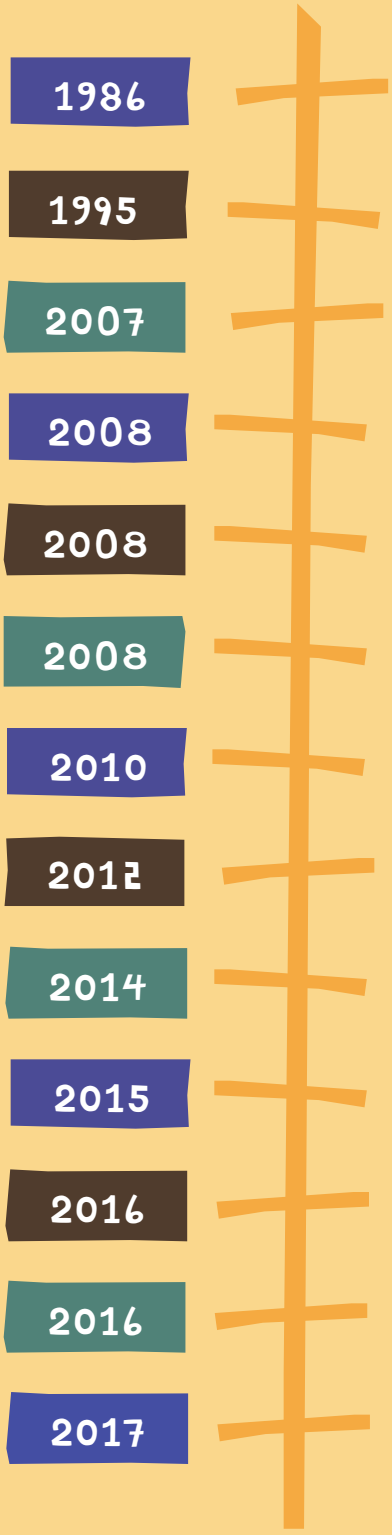
To see how Summit classrooms support Habits of Success, please see the Habits of Success in Action graphic on the next page.

HABITS OF SUCCESS IN ACTION

The Science of Habits of Success

A growing body of research around the development of Habits of Success shows that social-emotional learning is inextricably linked to academic learning.

Researchers find that students need Habits of Success — a set of mindsets and behaviors — to succeed in college and life. Development of habits, which occurs on a continuum over time, is most effective when integrated into the social learning environment of a school and classroom (Farrington, 2012; Stafford-Brizard, 2016; AIR, 2017).



Albert Bandura reveals his robust theory on the cognitive and social factors that affect **human motivation**

Daniel Goleman introduces model for **emotional intelligence** encompassing five skills, which include self-regulation and empathy

Carol Dweck explains how to leverage **mindset** to better fulfill individual potential

David Conley sets forth the **Cognitive Skills**, Content Knowledge, and "habits of mind" necessary for high school students to be college ready

Arthur Costa and Bena Kallick present a guide for **shaping schools** around 16 habits of mind

William Damon identifies key factors that help young adults identify their **Sense of Purpose**

Tom Rath and Jim Harter explore how five universal and interconnected factors influence overall **well-being**

Camille Farrington et al. (University of Chicago Consortium in Chicago School Research) link non-cognitive skills with higher **student achievement**

Ron Berger et al. advocate for **self-directed learning** and student-engaged assessments

Angela Duckworth and David Yeager discourage use of evaluative assessments for **social-emotional skills**

K. Brooke Stafford-Brizard's **Building Blocks for Learning** framework integrates social and cognitive pathways for optimal development

Trevor Fronius et al. (WestEd) answer questions about **restorative justice** as a favorable approach to school and student discipline

David Osher et al. (AIR) present a comprehensive case for student-centered, **individualized classrooms** and schools

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