<table>
<thead>
<tr>
<th>Number of Phases</th>
<th>Current Curriculum</th>
<th>Greener Pastures</th>
<th>Blue Skies</th>
<th>Golden Horizons (Student-led)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phases</td>
<td>Three</td>
<td>Three</td>
<td>Three</td>
<td>Five</td>
</tr>
<tr>
<td></td>
<td>- Preclinical</td>
<td>- Foundations</td>
<td>- Practice Initiation</td>
<td>- Warm-Up</td>
</tr>
<tr>
<td></td>
<td>- Clerkship</td>
<td>- Clerkship</td>
<td>- Practice Creation</td>
<td>- Core</td>
</tr>
<tr>
<td></td>
<td>- 4th Year</td>
<td>- Focus</td>
<td>- Practice Personalization</td>
<td>- Ministretch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Flex</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Stretch</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic Sciences Content</th>
<th>Current Curriculum</th>
<th>Greener Pastures</th>
<th>Blue Skies</th>
<th>Golden Horizons (Student-led)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preclinical: 72 weeks</td>
<td>Foundations: 46 weeks</td>
<td>Practice Initiation: 6 weeks</td>
<td>Warm Up: 32 weeks</td>
</tr>
<tr>
<td></td>
<td>- Organized by foundational concepts followed by organ systems</td>
<td>- Organized around organ systems that perform similar functions of the body</td>
<td>- Introduction to curriculum and foundational content needed to engage in modules</td>
<td>Anatomy, physiology, pathology, clinical skills</td>
</tr>
<tr>
<td></td>
<td>Clerkship: 3 days per block</td>
<td>Clerkship: 3 days per block</td>
<td>Practice Creation: 126 weeks (72 weeks foundational instruction and 54 weeks clinical instruction)</td>
<td>Core: 24 weeks (3 weeks preceding each clinical immersion and 1 week following each clinical immersion)</td>
</tr>
<tr>
<td></td>
<td>Focus: 5-week Keystone Integrated Science blocks</td>
<td></td>
<td>- Foundational material and clinical clerkship content are taught integrated modules that are repeated 2-3 times.</td>
<td>Flex: 18 weeks (2 weeks preceding each clinical rotation)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Clerkship Content</th>
<th>Current Curriculum</th>
<th>Greener Pastures</th>
<th>Blue Skies</th>
<th>Golden Horizons (Student-led)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clerkship: 52 weeks</td>
<td>Clerkship: 52 weeks</td>
<td>Practice Initiation: 6 weeks</td>
<td>Warm Up: 32 weeks</td>
</tr>
<tr>
<td></td>
<td>Medicine (12 weeks), surgery (12 weeks), neurology (4 weeks), psychiatry (4 weeks), pediatrics (6 weeks), Ob-Gyn (6 weeks)</td>
<td>Medicine (12 weeks), surgery (12 weeks), neurology (4 weeks), psychiatry (4 weeks), pediatrics (6 weeks), Ob-Gyn (6 weeks)</td>
<td>- Preparation- basic sciences, clinical skills, social sciences, community advocacy, health systems, and inquiry content (classroom)</td>
<td>Core: 24 weeks</td>
</tr>
<tr>
<td></td>
<td>5, 10-week blocks with 8 weeks required content, 1 week of assessment, reflection/coaching, return to scientific foundations, community time (ARC), and 1 week flexible: internal medicine, surgery, pediatrics, ob-gyn, and psychiatry/neurology</td>
<td>5, 10-week blocks with 8 weeks required content, 1 week of assessment, reflection/coaching, return to scientific foundations, community time (ARC), and 1 week flexible: internal medicine, surgery, pediatrics, ob-gyn, and psychiatry/neurology</td>
<td>- Clinical immersion</td>
<td>- 6, 4-week blocks of medicine, surgery, pediatrics, ob-gyn, psychiatry and neurology</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Consolidation- revisit the concepts of the module, answer questions that arose during their clinical immersion, and fill gaps (classroom)</td>
<td>Flex: 30 weeks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- In each iteration, the clinical portion increases in duration and the classroom portion decreases</td>
<td>- 6, 5-week blocks of medicine, surgery, pediatrics, ob-gyn, psychiatry and neurology at more advanced level</td>
</tr>
<tr>
<td>Category</td>
<td>Current Curriculum</td>
<td>Greener Pastures</td>
<td>Blue Skies</td>
<td>Golden Horizons (Student-led)</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------</td>
<td>------------------</td>
<td>------------</td>
<td>-------------------------------</td>
</tr>
</tbody>
</table>
| **Individualization** | Year 1: 40 hours  
- Selectives  
Year 4  
- Electives  
- Capstone | Focus Phase: 97 weeks  
- Advanced Clinical Rotations: 5-week blocks providing deeper clinical exposure and practice-based learning in a sub-specialty area  
- Sub-Internships  
- Keystone Integrated Science Courses: 5-week blocks to allow students to achieve a deeper understanding of the foundational sciences that underlie and impact a focused clinical topic  
- Capstone | Practice Personalization Phase: 54 weeks  
- Electives  
- Sub-Internships  
- Inquiry Project  
- Capstone Experience | Stretch: 48 weeks  
- Electives  
- Sub-Internships  
- Capstone Experience |
| **Threads** (Content that is integrated and assessed throughout the curriculum) | IDEA- Inclusion, Diversity, Equity, and Advocacy  
Geriatrics  
QUIPS- quality improvement, patient safety | Fully integrated foundational threads (physiology, histology, molecular foundations of medicine, pathology and mechanisms of disease, pharmacology, anatomy and embryology, comprehensive clinical skills) | Fully integrated content across all modules that aligns with clinical immersion experience (clinical participation, basic sciences, social sciences, health systems, community advocacy, inquiry) | Fully integrated, content not specified |
| **Adjuncts** (Content that occurs across years but may not be integrated) | Practice of Medicine  
Interprofessional Education | Healthcare systems and delivery  
Professional identity development through Academic Communities | Longitudinal Continuity Clinic | Not addressed due to time constraints |
| **Transitions** | WUMP (Wash U Medical Plunge) | Prelude Block at start of Foundations Phase  
Clerkship Prelude Block before Clerkships Phase  
Clerkship-focused WUMP prior to each clerkship  
Coaching time at end of each block | Practice Initiation prepares students for working in the curriculum  
Longitudinal coaching during transitions between modules | Mini-Stretch: 13 weeks after Core to explore passions, do a deep dive into an area, or transition to other degree programs |
<table>
<thead>
<tr>
<th>Assessment</th>
<th>Current Curriculum</th>
<th>Greener Pastures</th>
<th>Blue Skies</th>
<th>Golden Horizons (Student-led)</th>
</tr>
</thead>
</table>
| Assessment | Course-based MCQs in preclinical curriculum-pass/ fail  
Shelf Exam, post-rotation feedback and non-graded OSCE in clinical curriculum- H/ HP/ P/ fail  
Step 1, 2 and 2CS required to be taken but not passed | Frequent formative and summative assessment populating a dashboard of competency-attainment, supported by longitudinal coaching  
Each Foundations Block ends with an assessment, reflection, coaching, and communities (ARC) week- 2½ days of assessment, a day of giving back to their community with events organized within their Academic Communities, and a day for reflection  
Pass/ fail until Focus Phase with their Coach | Module performance assessed as an integrated unit with multiple forms of formative and summative assessment. Summative knowledge assessments may include cumulative content from preceding modules as appropriate. Clinical assessments will include direct observation by master assessors and OSCEs.  
All assessment components compiled longitudinally in portfolio; high stakes decisions made by committee. Supported by longitudinal coaches and trained master clinical assessors.  
Pass/fail at least through the Practice Creation Phase | Frequent formative assessments, supported by longitudinal coaching with narrative feedback  
Beginning in Core, weekly formative narrative feedback (rose, bud, thorn)  
SP and simulation utilized initially as formative assessments, then summative assessments  
Pass/fail in warm-up and core, graded in Flex and Stretch |
| Scholarship | • Optional | • Mandatory 2 blocks of time in Focus Phase | • Mandatory Inquiry Curriculum, 6-18 weeks during Practice Personalization for a dedicated project | • Optional |
| Community and Relationships | • Academic societies  
• Research  
• STL Community service  
• Interest groups | • Academic Communities  
• Online communities  
• Finding your passion (exploration and inquiry in an area of interest)  
• STL Community relationships | • Near-peer teaching and mentoring in clinical placements  
• Inquiry groups for scholarship blocks  
• Integrated STL community relationships during clinical immersions | • Academic Societies  
• Student co-teaching and mentoring during core and flex  
• Opportunities for self-directed STL service, exploration, and discovery |
GREENER PASTURES EXECUTIVE SUMMARY

CHARGE TO GREENER PASTURERS AND GUIDING PRINCIPLES
Greener Pastures was charged with developing a future-focused curriculum proposal using educational best practices, while preserving current strengths and the institution’s long history of training successful academic physicians. We developed our educational philosophy by broadly surveying the needs of our stakeholders (those that receive, provide, govern, and support medical education at WUSM), review of the educational literature, and identifying successful initiatives at peer institutions that embrace educational best practices. The following themes emerged that should be contained in the curriculum:

- Fully integrate basic and clinical sciences across the entirety of the four-year program;
- Preserve or augment the current level of rigor and scholarly involvement;
- Promote collaboration within the WUSM community and with the community served by WUSM;
- Continue to foster inquiry and innovation;
- Increase the use of active instructional methods; and
- Utilize competency-based outcomes to guide student promotion and future evolution of the curriculum.

CURRICULUM STRUCTURE AND DESCRIPTION
Our curricular structure (see figure 1) is divided into 3 phases – Foundations Phase, Clerkship Phase, and Focus Phase – with each phase providing three strands of curricular content (medical knowledge, healthcare systems and delivery, and professional identity development). When woven together, these strands contribute to the development of an academic physician. We specifically focused on eliminating redundant content early in training and appropriately sequencing the depth and presentation of content or concepts such that students were learning material at the appropriate phase of their training.

On-/off-ramps would be most easily achieved after the end of a Phase with MSTP students able to choose if they prefer to enter their PhD study after the Foundations (Year 1) or Clerkship Phase (Year 2). If MSTP students
chose to off-ramp after the Clerkship Phase, they would have the opportunity to continue clinical experiences, as deemed appropriate by their scholarship and clinical advisors. On/off ramps and flexibility would also be available between Clerkship and Focus blocks which are structured in 10- and 5-week segments, respectively, to allow for flexibility and some ability to interchange them.

The **Foundations Phase** of the curriculum includes the content *every general pre-clerkship medical student should know to be a good clerkship student* and content *every general medical student should know*. This phase begins with the **Prelude**, a series of self-assessments and condensed didactic time to bring all entering students to a common level of understanding in foundational basic sciences that have clinical significance. The Prelude allows a bridge for the admission of students with various undergraduate degrees while minimizing redundancy.

The remaining Foundations Phase blocks are divided into three curricular strands: medical knowledge, healthcare systems and delivery, and professional development. Instructional methods within the blocks include case-based-team-learning, cadaver dissections, laboratory, small and large group discussions, and didactics (<50% of instructional time devoted to didactics). Instructional weeks will be organized such that students receive at least two half days of independent time to prepare for the case-based learning sessions, study, participate in co-curricular activities, and/or engage in personal health maintenance activities. The final week of each block includes assessment of knowledge, skills, and attitudes; time for community engagement with events organized by the students’ Academic Communities; and reflection time with academic Coaches (see table). Finally, two major breaks – Winter Break and Spring Break – would also occur during this Phase. From a wellness perspective, we propose that **blocks should not cross these breaks** in order to allow students to fully divest themselves of academics during these periods. Brief descriptions of the curricular strands follow:

- **The medical knowledge** curricular component groups organ systems by *specific functions of the body* to allow for improved synthesis and integration of concepts in a clinically-oriented way that will facilitate the transition to the Clerkship Phase. Content in this strand would fully integrate concepts from the following areas: physiology, histology, molecular foundations of medicine, pathology and mechanisms of disease, pharmacology, anatomy, embryology using a developmental biology perspective, clinical skills, clinical reasoning, medical communication, social determinants of health (SDOH), Quality Improvement and Patient Safety (QuIPS), clinical epidemiology, and ethics. All aspects of the medical knowledge curriculum would be assessed in an integrated fashion.

- **Healthcare Systems and Delivery (HSD)** provides the additional instruction required to work in an academic healthcare setting and provide high-quality equitable care to all Americans by helping

<table>
<thead>
<tr>
<th>Final Week of the Block, Known as “ARC” Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
</tr>
<tr>
<td>Reflection &amp; Coaching</td>
</tr>
<tr>
<td>Communities</td>
</tr>
</tbody>
</table>
students recognize the key stakeholders and sectors involved in the US healthcare system and the main overarching goals of a sustainable and effective healthcare system and its delivery. Content may overlap with that of the medical knowledge strand but is not designed to directly integrate.

- **Academic Communities** guide professional development by delivering content in the areas of creating my professional persona and challenges experienced by physicians associated with providing academic healthcare. Again, this content may overlap with the other strands but is not designed to integrate or articulate directly.

The **Clerkship Phase** of the curriculum consists of five 10-week blocks of core clinical experiences (in any order): internal medicine, surgery, pediatrics, obstetrics and gynecology, and psychiatry/neurology. Each 10-week block would consist of 8 weeks of clinical experiences, one multipurpose week, and one week of flexible independent time in which students can participate in co-/extra-curricular activities or engage in personal health maintenance (see table). The **Clerkship Prelude** is a weeklong orientation to the clinical environment and includes an orientation to the instructional methods and assessment strategies along with broad reviews of clinical skills, documentation, SDOH, and HSD. Individual clerkships would begin with one day orientation in which students are provided block-specific expectations, socialized to the clerkship clinical culture, and oriented to the specific patient populations and communities using a virtual Washington University Medical Plunge similar to the Plunge experienced during the Foundations Prelude. During this virtual experience, students would be introduced to the patient populations and communities, SDOH, and HSD issues most often encountered during that clerkship. Students would also receive “cue cards” that provide general resources which can be offered to patients based on key clerkship-oriented SDOH problems. At the midpoint in each clerkship block, time would be dedicated for students to complete formative clinical assessments, meet with the Clerkship Block Director, meet with their Coaches for review of personal and professional goals or needs, and engage with their Academic Communities to discuss HSD and participate in community engagement projects aligned with their clerkship block. The 9th week of each block will consist of assessment (shelf exam and summative OSCE), reflection and coaching time, and dedicated time to return to Foundations Phase learning with their entire class.

<table>
<thead>
<tr>
<th>Individual Clerkship Block Organization</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation Day</td>
<td>Socialization to clerkship-specific clinical areas &amp; expectations plus clerkship-specific virtual WUMP</td>
</tr>
<tr>
<td>8 Weeks of Clerkship Experience</td>
<td>Mid-rotation formative OSCE and time to meet with Clerkship Block Director, Coach, &amp; Academic Communities</td>
</tr>
<tr>
<td>9th Week: Clerkship “ARC” Week</td>
<td>Assessment with ½ day shelf &amp; ½ day OSCE</td>
</tr>
<tr>
<td></td>
<td>Reflection &amp; Coaching similar to Foundations Phase</td>
</tr>
<tr>
<td></td>
<td>Return to Foundations with 3 days of case-based-team-learning of pertinent basic sciences</td>
</tr>
<tr>
<td></td>
<td>Communities with discussion in their Academic Communities of various HSD and professional development issues that might arise during clerkship training</td>
</tr>
<tr>
<td>10th Week: Flexible Time</td>
<td>Independent time in which students participate in co-/extra-curricular activities and/or personal health maintenance</td>
</tr>
</tbody>
</table>
The **Focus Phase** is a truly personalized curriculum based on an individual student’s academic and clinical career goals through which students use a combination of 5-week blocks with the following requirements (see figure 2):

- **1 sub-internship** in one of the 5 core clerkships
- **2 Advanced Clinical Rotations** (ACRs) designed to allow students to achieve deeper clinical exposure and practice-based learning in a sub-specialty area, will focus on teaching students to 1) ask patient-oriented clinical questions and demonstrate their ability to retrieve and interpret evidence to advance patient care in an assessable way, 2) discuss key HSD influences in this clinical area, and 3) deepen their understanding of a subset of SDOH influences in this clinical setting
- **4 Keystone Integrated Science Courses** designed to allow students to achieve a deeper understanding of the foundational sciences that underlie and impact a focused clinical topic. In order to enhance a student’s knowledge and conceptual understanding of integrated concepts in foundational and clinical science that underpin a focused clinical content area in the Keystones, an interdisciplinary team of educators will focus their instruction on the foundational science that describes relevant physiology and pathophysiology and informs conceptual models of human disease within that focused clinical topic. Students will explore evidence-based research, healthcare delivery and systems issues, and social and psychosocial determinants of health within that focused content area. Clinical skills in the focused content area will be developed through focused clinical experiences. Courses will demonstrate the continuum from biomedical sciences to clinical care, and will provide detailed discussions of healthcare delivery and impact on health outcomes within that focused clinical area.
- **2 scholarship** blocks
- **1 capstone**
- **2 blocks for USMLE preparation and completion**
- **7 blocks of flexible time** used for additional ACRs, Keystones, specially developed electives to support professional development, and/or residency interviews

Specific assessment strategies will be developed and implemented for each mandatory block.
ASSESSMENT STRUCTURE AND DESCRIPTION

We propose creating an assessment system involving frequent assessments for learning (formative) and of learning (summative) that strive to mitigate, and whenever possible, eliminate explicit and implicit bias. Assessments will be gathered from all domains of learning (knowledge, skills, and attitudes) and all members of the educational or healthcare team with which a student participates. Summative grading occurs during the Foundations and Clerkship Phase ARC weeks and will be criterion referenced with consistent, transparent, and high cut-points. We propose that grading be pass/fail in the Foundation and Clerkship Phases and honors/pass/fail in the Focus Phase.

**Dashboards** (see figure 3), used to track individual progress and benchmark outcomes, would be accessible by students and Coaches to identify areas of strengths and weakness allowing ample time for remediation. Faculty highly trained in specific areas of assessment and sources of bias for each assessment category, known as Master Assessors, will be responsible for developing the assessment tools. Master Assessors responsible for mapping student outcomes to the appropriate competency or milestone level will not be directly responsible for the student’s clinical assessment and will be blinded to the student’s identity to reduce bias. A subset of Master Assessors, Master Clinical Assessors, will conduct summative clinical skills assessments in the Clerkship Phase to separate the assessor from the frontline faculty to improve reliability and validity. Finally, a Promotions Committee, similar in concept to the Clinical Competency Committees of graduate medical education, will review students nearing the completion of a Phase to appropriate progression towards Phase goals and graduation. While we anticipate that most students will require minimal review for progression, the Promotions Committee – made up of the Dean of Students, Associate Dean of Medical Education, Assistant Deans of Foundational and Clinical Curriculum, Master Assessors, and other medical education leadership as determined by the Dean – will provide a formal structure for review and development of remediation plans for struggling learners.

NECESSARY SUPPORTING ELEMENTS AND ADDITIONAL IDEAS

Professional identity development will be facilitated through longitudinal coaching and active participation in the four communities of an academic physician (communities of learning, communities of practice, communities of scholarship, and communities of patients), and co-/extra-curricular opportunities. Coaches will work with a small subset of students in their Foundations and Clerkship Phases. Using each student’s formative assessment data and reflections, coaches will work with students to articulate goals, reflect on the student’s current state with regards to the goal(s), discuss and then elicit a specific plan from the student to achieve the goal(s). As students’ progress into the Focus Phase, coaching will be replaced by mentoring. In many cases, students will transition from their current coach to another dedicated career mentor that fits the students selected area of

![Figure 3: Exemplary Student Dashboard for Two Domains](image-url)
clinical and scholarly interest. Four Academic Communities will provide a community of learning for our students. Education in professional identity development and the challenges associated with modern healthcare (including physician wellness) will occur within the Academic Communities. The Academic Communities will also provide opportunities for peer and faculty mentoring relationships and group community service/engagement.

Formalizing our community relationships in our community of practice, St. Louis, begins with recognizing the work done in all community realms through an office specifically dedicated to community outreach and engagement so that we can better understand what the community needs from Washington University School of Medicine. The office could maintain a website dedicated to this topic from which students can identify outreach opportunities aligned with their passions. This will also provide an opportunity to create a Patients-as-Teachers program, ensuring that students and faculty hear directly from our patients about how to provide a curriculum that meets their needs, thereby explicitly demonstrating the role patients play in life-long learning. Finally, professional identity development requires students to identify their clinical and scholarly passions which will occur through the Finding Your Passion program and be supported by online forums. The Finding Your Passion program includes Lunch-and-Learn sessions that will be offered to provide informal sessions to discuss hot topics in medicine, areas of scholarly and clinical focus, and areas of community engagement. Online forums would provide additional opportunities for professional development within communities of scholarship and practice, facilitating connections among peers and faculty within the institution that share similar scholarly and clinical interests. The online forums would allow students to discuss questions, share resources, and receive advice/mentorship from other forum members (peers and faculty). Out of these programs, students will identify potential career mentors and create a personalized program for career development spanning their training.
BLUE SKIES EXECUTIVE SUMMARY

CHARGE AND GUIDING VISION: The Blue Skies Team was charged with completely re-imagining the medical school curriculum without the constraints of resources. With these limitations lifted, we were able to focus on how an ideal curriculum could be developed based on the science of learning. As we thought of the possibilities, we began to explore the following questions: What if our students were treated like doctors from day one? What if the divides between foundational science and clinical practice were removed and the learner were placed at the center of the curriculum? What if students began their lifelong journey of learning, patient care, and discovery from the first day of medical school? This is the vision that has guided our curriculum development.

ORGANIZING PRINCIPLES:

Learning principles: Learning is not simply the accumulation of facts. Knowledge is created through interactions and activity that occurs by actively participating in authentic work.\textsuperscript{1,2,3} Participation is the most powerful learning strategy in medical education.\textsuperscript{4} A central aspect of our curriculum proposal is that students actively participate in the clinical environment from the beginning. We envision students learning all aspects of practice through participation.

Acquisition of knowledge facilitates participation. Through integrated modules, students acquire factual knowledge in the preparation phase for immediate application during clinical immersion. This structure makes clear the rich connections between foundational material and clinical application and leads to more robust retention of information.\textsuperscript{5} Participation is optimized through meaningful and increasingly authentic work.\textsuperscript{2} Meaningful participation gives students developmentally appropriate jobs within real clinical environments from the beginning of the curriculum. Through repeated experiences in these environments, they grow in their responsibilities and roles, developing increasingly sophisticated clinical reasoning.

Design principles:

- **Integration**: Each component of a module is designed to interrelate and build on each other. Clinical participation is the unifying force in each module bringing all aspects of the curriculum together. This immediate application demonstrates the importance and relevance of the information learned in the preparation phase of the module.\textsuperscript{6} Modules are led by teams of faculty content experts that represent each aspect of the curriculum. These teams work together to design the student experience for each module to ensure that all components of the module are tightly integrated.

- **Iteration**: Repetition builds skill and knowledge.\textsuperscript{5} Within a module, the preparation, immersion, and consolidation phases provide repetition and review. Throughout the practice creation phase of the curriculum, students will have two to three passes through core modules that build upon previous modules and cover each aspect of the foundational and clinical materials. Through each iteration, students grow in their knowledge and clinical abilities as topics are covered in greater depth and complexity.

- **Individualization**: By focusing on student questions in each module from the start, providing opportunities to pursue inquiry projects, and flexibly timing electives towards the latter portion of the practice creation phase, students can personalize the curriculum to meet their needs as they shape their practice as academic physicians.

- **Interactions**: Relationships and community are crucial for learning.\textsuperscript{4} Students will have coaches that work with them across the four years of the curriculum. Students will work in longitudinal continuity clinics where they will develop long-term relationships with providers and patients. Students form close relationships with their peers as a larger group as well as in stable small
group in the practice initiation and the longitudinal components of the curriculum (social sciences, health systems, community advocacy, and inquiry). Because modules repeat, students of different experience levels will practice together in the same clinical spaces leading to peer-to-peer teaching and mentorship.

**CURRICULUM STRUCTURE:** By integrating immersive clinical experiences from the beginning of medical school, the curriculum focuses on learning through participation. The total number of weeks of foundational instruction and clinical instruction in this curriculum proposal is nearly identical to the current curriculum. The curriculum itself is divided into three phases: *practice initiation, practice creation,* and *practice personalization* (see Figure 1).

**Practice initiation:** This phase consists of a 6-week experience in which students are provided with the skills to navigate and engage in the curriculum. For example, they learn orienting principles of human biology such as broad anatomical, histological, molecular, and genetic principles. They learn foundational concepts of physiology and pathophysiology such as homeostasis and inflammation. Very basic skills in patient interviewing and examination are also introduced. Students will become familiar with fundamental ideas in health systems, social sciences, community advocacy, and inquiry. Students will be oriented to the structure of the curriculum and explore how learning in this curriculum will be different than any learning experience that they have had up to that point as they begin their professional academic practices.

**Practice creation:** This phase is built on a series of integrated modules each consisting of three components: *preparation, clinical immersion,* and *consolidation* (on the next page see Figure 2 for the general structure of an early module and Figure 3 for the general structure of a later module). Within each module, the preparation component provides students with the content necessary to begin working within a clinical environment such as basic sciences (e.g. anatomy, physiology, pharmacology, disease processes, treatment) and clinical skills practice. Social sciences, community advocacy, health systems, and inquiry are built into each module as elements critical to the students’ understanding and engagement with the clinical environment. Within the preparation component, students will have scheduled time to explore their own interests. The clinical immersion component allows students to
continue their learning through application in patient care by joining patient care teams. The consolidation component provides students with the opportunity to revisit concepts of the module, answer questions that arose during their clinical immersion, and ensure that gaps in knowledge are filled. Modules are experienced iteratively two to three times. Topics addressed in the preparation component builds upon material covered in previous modules. Each iteration will include all three components, with the clinical portion gradually expanding.

Figure 2. Early module structure during practice creation phase followed by a possible example of a schedule for an early cardiovascular/internal medicine module. Content in the peach color represents basic sciences, green represents social sciences, bright blue represents health systems, orange represents community advocacy, pink represents inquiry, and light blue represents clinical skills/work.
**Figure 3.** Later module structure during practice creation phase followed by a possible example of a schedule for a later cardiovascular/internal medicine module. Content in the peach color represents basic sciences, green represents social sciences, bright blue represents health systems, orange represents community advocacy, pink represents inquiry, and light blue represents clinical skills/work.

**Practice personalization:** This phase will consist of electives as currently structured in the curriculum. It will include the necessary sub-internships for residency applications, and students will have opportunities to pursue in-depth electives in the various areas of the curriculum including social sciences, community advocacy, and health systems. An important part of this phase will be a dedicated period of time to pursue a more in-depth inquiry project with an inquiry group focused on one of the areas in the curriculum (clinical sciences, basic sciences, social sciences including education training, health systems, or community advocacy). This dedicated time will range from 6-18 weeks depending on the interests of the student. This is a key component of identity formation as an academic physician. The practice personalization phase also includes a capstone experience to help students prepare for the transition to residency. The boundary between the practice creation phase and practice personalization phase will be fluid with students mixing elective blocks and required modules as they progressively transition to a more elective schedule. This arrangement provides greater flexibility for the curriculum to meet individual needs.

**CURRICULAR COMPONENTS:** Through an integrative and iterative structure, the modules of the practice phase of the curriculum bring together all of the aspects of practice outlined below.

- **Clinical Participation:** Early students will complete tasks such as taking basic histories of present illness, performing basic physical examinations, and helping the team in any available capacity. As students spend more time in the clinical environment, they will grow in their responsibilities and begin to formulate diagnoses and treatment plans. Repeated placement in clinical work environments will allow students to grow in these settings over time rather than depending on single exposures as in the current curriculum. During their clinical immersion time, students will complete assignments relating to the various other areas of the curriculum to experience how they are integrated into clinical practice, such as reviewing data on social determinants of health and developing an optimized care plan for an actual patient based upon those factors. Throughout the four years of the curriculum, students will participate in a longitudinal continuity clinic. These clinical placements will be with the same providers and environment over time.

- **Basic Sciences:** Students will continue to receive a robust and rigorous education in the basic sciences that underpin the practice of medicine. The basic science content of each module will be driven by what students need to know to participate in the clinical environment that they will be assigned to during the module. It is important to note that basic science content is not replaced
by the increasing clinical experience but is contextualized and reinforced by direct clinical application in authentic work. Our dedication to maintaining the rigor and depth of basic science education remains unchanged. Students would also have the option to take advanced basic science electives during the practice personalization phase.

- **Social Sciences:** The practice of medicine is based in social interactions that occur within social systems. Students will understand social determinants of health, structural biases within our healthcare system that create health inequities, power structures that exist within teams and between health professions, leadership skills, communication and conflict management, as well as the social construction of daily practice and our understanding of disease. This portion of the curriculum will be developed through partnership with colleagues in the departments of anthropology, psychology, sociology, business, and social work.

- **Community Advocacy:** We live and practice in a community of deep racial and economic divisions that have health implications. Our students must come to understand those divisions and become part of efforts to overcome those problems. Through partnership with the Brown School, we will develop these components in ways that students have opportunities to both engage in an embedded manner with the community through outreach as well as apply these principles in their clinical experiences. We envision this portion of the curriculum to be tightly interwoven with the social sciences, health systems, and inquiry elements.

- **Health Systems:** Academic physicians practice in interdisciplinary teams within complex systems. True understanding of patient care extends beyond the patient-physician relationship to the systems in which care is delivered. In order to practice medicine in the modern age, our students will gain both knowledge and practical experience in health policy analysis, health care financing, patient quality and safety, electronic medical records, and all aspects of the business side of medicine.

- **Inquiry:** Inquiry is central to the identity of an academic physician. Inquiry will be key to the transitions in each module. Each practice creation module begins with both students and instructors identifying the questions that will be answered over the course of the module. As students transition to the clinical immersion portion, they will again identify questions that they will seek to answer during their clinical time. As students finish their clinical immersion, they will identify new questions that have arisen during their clinical experiences to answer during the consolidation component. During the modules, students will receive formal training in quantitative and qualitative research methods that will apply to the various components of the curriculum. During the practice personalization phase, students will have 6-18 weeks of dedicated inquiry time to work in groups on an inquiry project in an area of basic science, clinical science, social science, community advocacy, or health systems.

**ASSESSMENT:** We view assessment as a tool for integration. Modules are assessed as integrated units using a variety of sources. Grading is pass/fail and is determined by reaching the standard of competency in all of the domains of the curriculum in a non-compensatory manner (good performance in one area cannot make up for deficiencies in another area). Assessments use tools such as open-ended questions, standardized patients, projects, and essays as appropriate for the given domain. These assessments are collected in the students’ longitudinal portfolios. Clinical assessments are performed both by the physicians working with the student and master clinical assessors who work with students to make specific assessments of clinical skills outside of routine clinical work.

**PEDAGOGY:** During the preparation and consolidation phases of the integrated modules, we envision content being delivered through small group active learning techniques such as team-based learning, flipped classrooms, or other case-based learning methods. Rather than prescribe one technique, we feel
that content should drive the decision as to which technique is appropriate. The teams of faculty charged with designing the individual modules would determine the selected techniques.

**CURRICULUM SUPPORTS:** Longitudinal coaches will work with small groups of students over the course of the entire curriculum. These coaches will meet with students during the transitions between modules to review performance and assist in setting goals for future modules. These coaches will ensure that students have the support necessary as they progress along the curriculum. Clinical assessment will be supported by master clinical assessors in each clinical rotation that have received special training in assessment and are able to provide detailed feedback on clinical skills on an individual basis. These trained assessors will also facilitate faculty development of the faculty in their respective disciplines to improve clinical assessment.

References:

GOLDEN HORIZONS PROPOSAL (Student-Led)

CHARGE TO THE STUDENTS
Concurrently with the formation of the two curriculum committees (Blue Skies and Greener Pastures), a diverse group of students spanning all years of the medical school class, degree programs, specialty interests, and backgrounds were charged with creating a third proposal. While hearing the ideas and proposals from the two curriculum committees during advisory meetings, the group was tasked with creating a curriculum that best reflected the students’ ideal. The proposed curriculum was derived from the gathered thoughts, ideas, and opinions of classmates, input from mentors, and literature reviews. The lived experiences of the current curriculum and the importance of student wellness were major influences on the proposal. It is important to note that the student-led team was charged several months after the Greener Pastures and Blue Skies teams and so has less detail to present as a result.

GUIDING PRINCIPLES
The proposal put forth puts emphasis on student autonomy, community development, and an iterative learning process - three components that align with the Self-Determination Theory, a leading motivational and wellness framework that holds that human beings are “inherently active, intrinsically motivated and oriented toward developing naturally through integrative processes.”¹ The end result is a curriculum that puts wellness first. In this proposed curriculum, students engage in integrated multidisciplinary educational and mentorship models, graduate to higher levels of responsibility for and autonomy over their education as they progress through medical school and develop as physician-leaders through meaningful work with the St. Louis community. The five key tenets that guide this model are: iterative educational experiences, basic sciences and clinical integration, autonomy and flexibility, personal growth, and civic engagement.

Iterative Educational Experiences: Currently, clinical learning occurs primarily in the third year in high stakes, graded clerkships. Students have limited opportunities for initial learning-focused, low-pressure clinical experiences that allow students to practice clinical skills, identify areas of weakness and improve on them via timely formative assessments before being graded.

We envision a curriculum that gives students the flexibility to learn the foundations of pathophysiology through experiential learning and to have the opportunity to revisit and dive deeper into clinical and basic science topics about which they are passionate. This allows for an initial pass through all of the core rotations that is purely formative, with more focused exploration in a student’s area of interest that is formally graded. Comprehensive coaching will be instrumental throughout. By allowing students some choice in which classes they receive grades for not only promotes student wellness, but also provides extra meaning to the choices they make while in medical school.

Class and Clinical Integration: The proposed curriculum integrates clinical and classroom work and the basic and clinical sciences. This will allow for earlier development of clinical skills, meaningful application of medical knowledge, and the ability to further develop relevant advanced knowledge later in the classroom. This can best be enacted with a roughly eight-month introductory, Warm Up period focused on classroom learning.

Following this Warm Up period, Core modules provide clinical experiences through weeks of initial classroom-based pedagogy followed by weeks of un-interrupted clinical training. Core modules would end with a short return to classroom-based education to reinforce advanced clinical concepts. Allowing space to iteratively return to these topics will promote progressive growth, development of advanced understanding, and greater responsibility in clinical roles.

Autonomy and Flexibility: WUSM’s current curriculum, in which specialty exploration is largely relegated to fourth year, is not sufficient for students to explore potential career paths or academic interests. We envision a model that empowers students to shape their medical education to best match their personal interests and professional aspirations. Every student would still be required to complete a minimum number of Core blocks, but in this model, students will be able to arrange blocks in a way that both meets the requirements of the school and promotes students’ autonomy.

After developing competencies and interests during the Core block, the Flex block will allow students to demonstrate their competency in broad areas of medicine that align with what will be most relevant to his or her future medical practice, graded in a scheme that is tailored for their future endeavors. For example, students prefer the flexibility of taking STEP1 any time after the core clinical clerkships due to the association with higher scores and ability to contextualize pathophysiology. In addition, this provides the opportunity for students to remediate weak areas with Flex modules and customize study time. Because these decisions are important and sometimes difficult to juggle, coaches will support the students and guide them in creating the optimal individualized schedule.

Personal Growth: In the classroom, more frequent formative evaluations using multiple assessment tools - including multiple choice, short answer, essays, concept maps, and student generated questions - will be used to ensure learning goals are being achieved. Clinical assessments with narrative feedback are woven throughout the curriculum to ensure regular, actionable feedback from clinicians. To this end, we suggest frequent clinical feedback in a “rose, bud, thorn” format: coupling items for future improvement with skills that have shown demonstrable improvement as well as noting skills that have been mastered. Detailed narrative feedback during ungraded Core clinical modules will support continuous student development.

To help navigate students through the milieu of quantitative and qualitative feedback and smoothly manage intra- and inter-block transitions, faculty coaches will be equipped to identify goals with students, share best practices to achieve goals, serve as a general academic point of contact and provide an extra level of wellness surveillance. To promote student autonomy, matchmaking events will be used to help connect students with coaches. We also believe that students are invaluable resources for each other, and we propose a formal peer mentorship program, perhaps in a society format that both engrains institutional memory and provides a structured teaching/mentorship certification for students who may hope to enter teaching-track residencies and academic careers in education.

**Civic engagement:** Since health policy, economic institutions, and social determinants of health affect all patients and providers, it is crucial that students learn about them through formalized, experiential projects. Curriculum reform presents a unique opportunity to officially integrate civic engagement into our educational mission. We propose a mandatory longitudinal community experience for students with specialized opportunities for those who desire further involvement. The program would include well-defined projects for students to participate in with community partners.

Indeed, it would require significant administrative investment with personnel specifically compensated to form community connections and coordinate logistics. This mandatory component could include student partnerships with low-SES families so that they can better understand social barriers to health. Students would engage in that longitudinal community experience over their four years (within the Warm Up, Core, Flex, and Stretch blocks) to discuss their experiences and research solutions to current struggles. Further engagement, especially for students strongly interested in health policy, advocacy, and public health would occur during the Flex or Stretch blocks in the form of continued work with the longitudinal community or separate extended projects with community programs.

**SCHEMATIC DESCRIPTION**
The Golden Horizons “Gateway to Health” curriculum incorporates the five tenets: iterative education experiences, classroom and clinical integration, autonomy and flexibility, personal growth, and civic engagement. The proposed curriculum includes five phases: Warmup, Core, Ministretch, Flex, and Stretch. As a student moves through each phase, their autonomy and flexibility will gradually increase from the required classes of core to the self-directed learning of stretch. Although this curriculum will give students a greater level of choice, the structure of the blocks and block requirements will ensure that iterative learning, classroom/clinical integration, personal growth, wellness, and civic engagement are consistently present throughout a student’s medical school education.

**Warm-up:** In this eight-month introductory period focused on classroom learning, students will receive intensive instruction covering the basic science principles needed to enter the clinical setting, such as foundational topics in anatomy, physiology, and pathology. In addition, students will have a course, like POM, to learn foundational clinical skills, such as taking a history and performing a physical exam. This phase will not only give students the knowledge they need to enter the hospital setting but also give them time to adjust to life in medical school.
**Core:** Twelve months composed of a series of eight-week blocks; each block begins with content delivery (3 weeks), followed by a clinical rotation (4 weeks), and capped off with a period of guided exploration (1 week). The content delivery portion will build on the knowledge students gained in Warmup and give students a deeper understanding of a content area relevant to their clinical rotation. The clinical rotation will provide them an opportunity to apply that knowledge and understand its relevance to treating patients. Finally, the guided exploration will occur after the clinical rotation to give students a chance to dive deeper or fill in gaps in understanding they identified while in the clinical rotation. The separation of weeks of classroom and clinical time will allow students to have even more uninterrupted experiences in the clinical rotation without having to leave for mid-rotation lectures. Although students’ block schedules will be arranged differently throughout Core, students will be required to complete several weeks in all core clerkships (medicine, surgery, OBGYN, pediatrics, neurology, and psychiatry). Core will be pass/fail, giving students a low-stakes introduction to the clinical setting.

**Ministretch:** This thirteen-week period in between Core and Flex will give students the opportunity to on/off ramp to pursue other degrees, to search for passion projects, such as research, education or community engagement, or to focus more on a topic of interest, such as HIV care, the opioid crisis, or personalized medicine.

**Flex:** This phase resembles Core because of its twelve-month duration and series of eight-week blocks. However, Flex blocks include more clinical time and more student choice. The Flex blocks begin with content delivery (2 weeks), followed by clinical rotation (5 weeks), and end with guided exploration (1 week). The three portions of the block serve the same purpose as in Core, but the Flex students will spend less time in the classroom and more in the clinical setting. In addition, the Flex blocks will be graded. Because Flex blocks are a student’s second exposure to a rotation, the student will be more adjusted to the clinical setting and can focus more on their performance. Core and Flex students have slightly offset weeks working in clinical settings to provide optimal coverage of students year-round; however, there will be two intentionally overlapping weeks where Flex students can help orient and teach Core students. Student-to-student teaching and mentorship will not be the primary method of student learning but will allow for more senior students to begin honing their education skills for when they become residents and teachers themselves.

The modular blocks of Flex will give students the opportunity to arrange their schedule in a way that best suits them and allows them to follow their passions. If a student’s mentor proposes a research project, they could schedule a research block in Flex. If a student is very interested in community healthcare, they could schedule a Flex block that combines public health content and a community clinic rotation. Moreover, the students will have already experienced most of the core rotations and can thus make an educated decision about which areas they would like to explore further. In addition, Step 1 study and exam will also be a Flex block, allowing students to take Step when they are most ready. If a student struggled in OBGYN concepts during Core, they could choose to revisit that rotation in Flex before taking Step 1.
**Stretch**: The most flexible of the five phases; students have the opportunity to customize almost the entirety of their academic year. Stretch consists of eight-week blocks similar to those in the Core and Flex blocks, but they are not standardized. Students can choose to schedule research, sub-internships, away rotations, work in the community, and other blocks that help them explore their interests. Stretch will end with a required capstone course, similar to the current course, that will ensure all fourth years are prepared for residency.

**ASSESSMENT AND FEEDBACK**
Throughout all five phases of the Golden Horizons Gateway to Health curriculum, assessments and feedback will be thoughtfully applied to measure each student’s progress and assess competency across a series of educational domains, including scholarship, inquiry, teaching skills, clinical skills, patient interaction, patient advocacy, and awareness of the social determinants of health. The results of each formative and summative assessment will be reported by domain, rather than as a single combined ‘grade’. The results of these assessments will be closely followed by each student’s academic coach, who will assist the student in developing an individualized education plan to best align each student’s academic preparation with their personal and professional goals.

- During the **Warm-up** phase, formative assessments will provide students with an opportunity to assess their strengths and identify areas for targeted improvement prior to beginning the Core phase of their education.
- During the **Core** phase, students will receive formative assessments. Multiple choice and free response assessments will ensure that each student attains the expected level of knowledge competency in all relevant subject areas. Weekly feedback (following the rose, bud, and thorn format) during each clinical experience will provide students with real-time guidance on clinical and professional skills. Comprehensive formative clinical evaluations and focused standardized patient experiences will be used to assess overall clinical competence across domains at the end of each module. Additionally, formative (cumulative) MCQ assessments will be available to all students to guide self-directed preparation for the USMLE Step examinations.
- During the **Flex** phase, students will receive both formative and summative evaluations. Weekly formative clinical feedback will continue to provide students with an opportunity to assess their progress and identify areas for targeted improvement. Formative knowledge assessments will continue to be available for students to help direct studying for the USMLE examinations. Summative evaluations will include advanced SP and simulation activities, comprehensive clinical evaluations, and shelf-style examinations. These multifaceted assessment tools will provide students with an opportunity to add depth to their resume by complementing USMLE Step 1 and Step 2 scores and providing residency programs with a more holistic view of each student’s potential as a future physician.
- During the **Ministretch** and **Stretch** phases, formative and/or summative assessment will be tailored to the nature of each specific module. For example, Sub-Internships will be accompanied by summative clinical evaluations, while research or teaching experiences may be accompanied by formative faculty evaluations.

We are aware that many students find the subjective nature of clinical evaluations stressful and are alarmed by the nationwide findings of racial bias in clinical evaluations. To address these issues, we
believe that any clinical faculty members responsible for student evaluations should receive formal introductory and ongoing training in student assessment and should be subject to continuous quality assurance monitoring, so issues related to bias or mistreatment can be identified and addressed in real time.

NECESSARY SUPPORTING ELEMENTS

Coaching and Mentoring: We propose a nested approach to coaching and mentoring in the new curriculum that is designed to expose students to a diverse array of perspectives. Coaching should be performed in both small group and one-on-one sessions throughout all curricular phases by trained faculty members who are aware of each student’s personal goals, career aspirations, and academic performance. Primarily, a student’s coach meets one-on-one with them and should be able to track their academic performance and professional development through a comprehensive electronic portfolio. This would allow the coach to identify areas for improvement and develop strategies to strengthen the student’s skills in those areas. In total, mentoring should be provided in both a group and individual setting by peers, near-peers, and faculty, and should be facilitated by the division of the student body into societies and advising groups that span all phases of training (M1-M4 + residency, fellowship, and faculty.)