SCIENCE

The Parkway Science Program has been designed to achieve two goals. The first goal is to assist students to think critically about both physical and biological concepts. These concepts are relevant to living in today's society and may influence career choices. It is expected that the majority of students will wish to exceed the minimum. It is strongly recommended that students take the full complement of Biology, Chemistry, and Physics to be adequately prepared for life beyond high school. The complete content of each discipline is taught only through each three semester sequence.

The second goal of the Parkway program is to sequence the courses such that students have the appropriate mathematical background to understand and to apply abstract science principles. The sequences listed, suggest when to enroll in each course. Additionally, students must adhere closely to the math/science prerequisites listed with each course. Any exception to course prerequisites must be approved on an individual basis. In order to attain the best possible experience in science, it will be necessary to enroll in two science courses in at least one semester of high school. Students wishing to take advanced science courses will develop a four-year plan, which includes multiple semesters of enrollment.

Suggested Course Sequence

Science teachers and/or counselors will assist students in choosing honors, regular or foundations level courses. Due to state requirements and Parkway Science Curriculum revisions, please note the appropriate science course flow section for **each** graduating class in the course guide. We have structured each sequence of classes to meet the individual needs of students at each instructional level.

For Students with Freshman Standing 2010-2011

For the Class of 2014 students are required to complete 3 units of science. Those must include Biology-Cells and Systems, Matter and Change, Biology-Evolution and Ecology, Force and Motion in One Dimension, and one additional unit of science.

	College Prep Science Class Sequence	**Honors Student with Advanced course work emphasized**	**Foundations/Concepts Science Class Sequence**
9th Grade	Biology 1, Matter and Change & possibly Forces and Motion in One Dimension	Biology 1 Matter and Change Forces and Motion in One Dimension	Reading 180 & Pre-Algebra
10th Grade	Forces and Motion in One Dimension if not taken in 9th grade) Biology 2 & possibly Biology 3	Forces and Motion in One Dimension (if not taken in 9th grade) & Biology 2 & possibly Biology 3 **or** Chemistry	Foundations of Biology 1 Foundations of Biology 2
11th Grade	Chemistry & possibly Biology 3	Chemistry Physics & possibly AP Chemistry &/or AP Biology	Foundations of Matter and Change & Foundations of Force and Motion in One Dimension
12th Grade	Physics	AP Biology, &/or AP Chemistry, &/or AP Physics B	One unit of science Electives
* In addition, electives may be inserted during the Junior and Seniors years, along with possible advanced course work.			

Electives include:

Biochemistry	Medical Science	Environmental Science
Animal Behavior	Forensic Science	Astronomy & Meteorology
Concepts of Chemistry	Concepts of Physics	Science Laboratory Assistant

SCIENCE

For Students with Sophomore Standing 2010-2011

*For the Class of 2013, students are required to complete three units of science. Those must include Biology-Cells and Systems, Biology-Evolution and Ecology, Matter and Change, Force and Motion in One Dimension and one additional unit of science.

	College Prep Science Class Sequence	**Honors Student with Advanced course work emphasized**	**Foundations/Concepts Science Class Sequence**
10th Grade	Forces and Motion in One Dimension (if Physics 1 not taken in 9th grade) Biology 2 & possibly Biology 3	Forces and Motion in One Dimension (if not taken in 9th grade) & Biology 2 & possibly Biology 3 **or** Chemistry	Foundations of Biology 1 Foundations of Biology 2
11th Grade	Chemistry Biology 3	Physics & possibly AP Biology &/or AP Chemistry	Foundations of Matter and Change & Foundations of Forces and Motion in One Dimension
12th Grade	Physics	AP Biology &/or AP Chemistry, &/or AP Physics B	One unit science electives
* In addition, electives may be inserted during the Junior and Seniors years, along with possible advanced course work.			

For Students with Junior Standing 2010-2011

For the classes graduating in 2012, three units of science are required. Those must include Biology 1 or Biology-Cells and Systems, Biology 2 or Biology-Evolution and Ecology, Matter and Change, Force and Motion in one Dimension and one unit of science electives.

	College Prep Science Class Sequence (Completes requirements for most 4 year Universities)	**Honors Student with Advanced course work emphasized**	**Foundations/Concepts Science Class Sequence**
11th Grade	Chemistry	Physics AP Biology AP Chemistry	Foundations of Matter and Change Foundations of Force and Motion in One Dimension
12th Grade	Physics	AP Biology AP Chemistry AP Physics B	One unit of science electives
* In addition, electives may be inserted during the Junior and Seniors years, along with possible advanced course work.			

For Students with Senior Standing 2010-2011

For the classes graduating in 2011, two units of science are required. Those must include Biology 1, Biology 2, Matter and Change, or Forces in Motion in One Dimension.

	College Prep Science Class Sequence (Completes requirements for most 4 year Universities)	**Honors Student with Advanced course work emphasized**	**Foundations/Concepts Science Class Sequence**
12th Grade	Physics Chemistry Science Electives	AP Biology, &/or AP Chemistry, &/or AP Physics B	Foundations of Matter and Change & Foundations of Force and Motion in One Dimension
Electives may be inserted during the Senior year, along with the Concepts Courses in Chemistry and Physics or possible advanced course work.			

Electives include:

Biochemistry
Animal Behavior
Concepts of Chemistry
Medical Science
Forensic Science
Concepts of Physics
Environmental Science
Astronomy & Meteorology
Science Laboratory Assistant

SCIENCE

FOUNDATIONS OF BIOLOGY 1 : CELLS AND VARIATION 136140
Grades 9-12
FND BIO 1
1/2 Science Credit
Prerequisite: Pre-Algebra (or concurrent enrollment) and/or department approval.

This introductory semester course is designed for the students who have had difficulty with prior courses in science. This course has the theme: What is the basis of life and how does it vary? Students will conduct controlled experiments using the experimental design process. They will study biochemistry, prokaryotic and eukaryotic cells, cell environment, aspects of cell division, Mendelian genetics, meiosis, and the unity and diversity of life. The topics will be presented through numerous laboratory activities, lectures, and discussions; and will emphasize process and thinking skills.

FOUNDATIONS OF BIOLOGY 2: EVOLUTION AND ECOLOGY 136150
Grades: 9-12
FND BIO 2
1/2 Science Credit
Prerequisite: Foundations Biology 1: Cells and Variation

This semester course is designed for students who have had difficulty with prior courses in science. This course has a theme of "How is Life Interrelated?" Students will explore the unity and diversity of life through the study of evolution by natural selection. The structure of DNA and protein synthesis will be introduced. The interdependence of all living things will be explored with emphasis on ecological processes and human impact on the biosphere. The processes of photosynthesis and respiration will be introduced. These topics will be presented through numerous laboratory activities, lectures and discussions and will emphasize process and thinking skills. The Missouri Biology End of Course assessment is given at the conclusion of this course.

FOUNDATIONS OF MATTER AND CHANGE
Grades: 9-12 **136210**
FND CHEM:MAT
1/2 Science Credit
Prerequisite: Pre-Algebra (or concurrent enrollment) and/or department approval

Laboratory safety, experimental design, problem solving skills, and graphical analysis will be utilized in the study of a variety of relationships in the chemical world. The study of matter and how matter can change is the primary focus of this course, with additional topics possibly including phase changes and gases, the history of the atom, and how atoms bond.

FOUNDATIONS OF FORCES AND MOTION IN ONE-DIMENSION 136310
Grades: 9-12
FND PHY:FORC
1/2 Science Credit
Prerequisite: Pre-Algebra (or concurrent enrollment) and/or department approval

This class will cover topics including laboratory safety, measurement, scientific inquiry, graphical analysis, and forces and motion in one dimension. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent.

BIOLOGY 1: CELLS AND VARIATION 137140
Grades: 9-10
BIO 1 CELLS
1/2 Science Credit
Prerequisite: None

This is the initial course in a sequence of biology courses that together will provide a college preparatory experience in the life sciences. This course has the theme: What is the basis of life and how does it vary? Students will conduct controlled experiments using the experimental design process. They will study biochemistry, prokaryotic and eukaryotic cells and cell environment, aspects of cell division, Mendelian genetics, meiosis, and the unity and diversity of life. The topics will be presented through numerous laboratory activities, lectures, and discussions; and will emphasize process and thinking skills. Students may take this course concurrently with Matter and Change and/or Forces and Motion in One Dimension.

MATTER AND CHANGE 137210
Grades: 9-10
CHEM:MATTER
1/2 Science Credit
Prerequisite: None department approval

This semester course will include a study of physical and chemical changes, classification of matter, phase changes, atomic structure, the periodic table, laws of conservation of matter as well as the history of chemistry. Safety in the laboratory, the experimental process, graphing and metric measurement will be an integral part of this laboratory intensive course. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended laboratory experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent.

SCIENCE

BIOLOGY 2: EVOLUTION AND ECOLOGY
Grades 10-12 **137150**
BIO 2 EVOL
1/2 Science Credit
Prerequisite: Biology 1: Cells and Variation

This second course in the biology sequence has a theme of "How is Life Interrelated?" Students will explore the unity and diversity of life through the study of evolution by natural selection. The structure and replication of DNA along with protein synthesis will be examined. The interdependence of all living things will be explored with emphasis on ecological processes and human impact on the biosphere. The processes of photosynthesis and respiration will be introduced. These topics will be presented through numerous laboratory activities, lectures and discussions and will emphasize process and thinking skills. The Missouri Biology End of Course assessment is given at the conclusion of this course.

BIOLOGY 3: BIOTECHNOLOGY AND SYSTEMS
Grades 10-12 **137160**
BIO 3
1/2 Science Credit
Prerequisite: Biology 2: Evolution and Ecology, Matter and Change or department approval

This course completes the initial college preparatory sequence and has the themes: "How does biotechnology impact life?" and "How is life organized for success?" The students will investigate a variety of concepts such as DNA fingerprinting and genetic engineering. Students will explore and compare plants, and animals (including humans) at the system and molecular levels. Other topics will include photosynthesis and cellular respiration. These topics will be presented through numerous laboratory activities and will emphasize process and thinking skills.

CHEMISTRY **137201/137202**
Grades: 10-12
CHEMISTRY
1 Science Credit
Prerequisite: Matter & Change and Algebra 1 with a recommended C or above or department approval

This course can fulfill the third required year of science credit and completes the recommended core curriculum in chemistry. Topics include atomic structure, periodicity, bonding, nomenclature, chemical reactions, stoichiometry, gas laws and physical states, thermochemistry, and solutions. Additional topics may include kinetics and equilibrium, acids and bases, nuclear science and energy, and an introduction to organic chemistry. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent.

FORCES AND MOTION IN ONE-DIMENSION
Grades: 9-10 **137310**
PHYSICS:FORC
1/2 Science Credit
Prerequisite: None

This semester course is the first in a recommended series of physics courses. This class will cover topics including laboratory safety, measurement, scientific inquiry, graphical analysis and the study of forces and motion in one dimension. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences requiring student collaboration and multiple-step problem solving execution will be frequent.

PHYSICS **137301/137302**
Grades: 11-12
PHYSICS
1 Science Credit
Prerequisite: Forces and Motion in One-Dimension, recommended grade of C or better, Algebra II / Trig, or department approval

Physics is essential for a well-rounded science background. This course prepares students for a collegiate education. Students will investigate the following units: forces, motion in two-dimensions, energy and momentum, mechanical waves, light and optics, and electricity. Additional topics may include rotational motion, GPS, fluid mechanics, thermodynamics, nuclear physics, material science, and magnetism.

HONORS BIOLOGY 1: CELLS AND VARIATION
Grades 9-10 **138140**
+BIO 1 CELLS
1/2 Science Credit
Prerequisite: Recommended B in 8th grade science, Recommended B in Algebra I or departmental approval.

This is the initial course in a sequence of biology courses that together will provide a college preparatory experience in the life sciences. This course has the theme: What is the basis of life and how does it vary? Students will conduct controlled experiments using the experimental design process. They will study biochemistry, prokaryotic and eukaryotic cells and cell environment, aspects of cell division, Mendelian genetics, meiosis, and the unity and diversity of life. The topics will be presented through numerous laboratory activities, lectures, and discussions; and will emphasize process and thinking skills. Students may take this course concurrently with

Honors Matter and Change and/or Honors Forces and Motion in One Dimension. This course is designed to challenge the top ten percent of students. It is more intensive and requires increased levels of critical thinking and mathematical reasoning. It is designed for the student who anticipates a science-based career, desires an accelerated science program, and intends to take advanced courses in science. A weighted grade is given.

HONORS MATTER AND CHANGE 138210
Grades: 9-10
+CHEM:MATTER
1/2 Science Credit
Prerequisite): Recommended B in 8th grade science, recommended B in Algebra 1 or department approval

This semester course will include a study of physical and chemical changes, classification of matter, phase changes, atomic structure, the periodic table, laws of conservation of matter as well as the history of chemistry. Safety in the laboratory, the experimental process, graphing and metric measurement will be an integral part of this laboratory intensive course. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended laboratory experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent. This course is designed to challenge the top 10% of students and is more intensive and requires more critical thinking than Matter and Change. It is designed for the student who has an exceptional interest in science and desires an accelerated science program. Class lectures will often feature advanced, cognitive material delivered at a great pace and depth. A weighted grade is given.

HONORS BIOLOGY 2: EVOLUTION AND ECOLOGY
Grades 9-12 **138150**
+BIO 2 EVOL
1/2 Science Credit
Prerequisite: Honors Biology 1: Cells and Variation

This second course in the biology sequence has a theme of How is Life Interrelated? Students will explore the unity and diversity of life through the study of evolution by natural selection. The structure and replication of DNA along with protein synthesis will be examined. The interdependence of all living things will be explored with emphasis on ecological processes and human impact on the biosphere. The processes of photosynthesis and respiration will be introduced. These topics will be presented through numerous laboratory activities, lectures and discussions and will emphasize process and thinking skills. This course is designed to challenge the top ten percent of students. It is more intensive and requires increased levels of critical thinking and mathematical reasoning. It is designed for the student who anticipates a science-based career, desires an accelerated science program, and intends to take advanced courses in science. A weighted grade is given. The Missouri Biology End of Course Assessment is given at the conclusion of this course.

HONORS BIOLOGY 3: BIOTECHNOLOGY AND SYSTEMS 138160
Grades: 10-12
+BIO 3 TECH
1 Science Credit
Prerequisite: Honors Biology 2: Evolution and Ecology, Honors Matter and Change and department approval

This course completes the initial college preparatory sequence and has the themes: How does biotechnology impact life? and How is life organized for success? The students will investigate a variety of concepts such as DNA fingerprinting and genetic engineering. Students will explore and compare microbes, plants, and animals (including humans) at the system and molecular levels. Other topics will include metabolism and disease. These topics will be presented through numerous laboratory activities and will emphasize process and thinking skills. This course is designed to challenge the top ten percent of students. It is more intensive and requires increased levels of critical thinking and mathematical reasoning. It is designed for the student who anticipates a science-based career, desires an accelerated science program, and intends to take advanced courses in science. A weighted grade is given.

HONORS CHEMISTRY 138201/138202
Grades: 10-12
+CHEM
1 Science Credit
Prerequisite: Honors Matter & Change or department approval

This course can fulfill the third required year of science credit and completes the recommended core curriculum in chemistry. Topics include atomic structure, periodicity, bonding, nomenclature, chemical reactions, stoichiometry, gas laws and physical states, thermochemistry, solutions, kinetics and equilibrium, acids and bases, nuclear science and energy, and an introduction to organic chemistry. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent. This course is designed to challenge the top 10% of students. It is more intensive and requires more critical thinking than Chemistry. It is designed for the student who has an exceptional interest in science and desires an accelerated science program. Class lectures will often feature

advanced, cognitive material delivered at a great pace and depth. A weighted grade is given.

HONORS FORCES AND MOTION IN ONE-DIMENSION 138310
Grades: 9-10
+PHYSICS:FOR
1/2 Science Credit
Prerequisite: Recommended B in 8th grade science, recommended B in Algebra 1 or department approval

Laboratory safety, experimental design, problem-solving skills, and graphical analysis will be utilized in the study of forces and motion in one dimension. This course is designed to challenge the top ten percent of students. It is more intensive and requires more critical thinking than Forces and Motion in One-Dimension. It is designed for the student who anticipates a science-based career, desires an accelerated science program, and intends to take advanced courses in science. A weighted grade is given.

HONORS PHYSICS 138301/138302
Grades: 11-12
+PHYSICS
1 Science Credit
Prerequisite: Honors Forces and Motion in One-Dimension, recommended grade of C or better, Honors Algebra II / Trig

Physics is essential for a well-rounded science background. This course prepares students for a collegiate education, especially for those interested in a career in science. This course is designed to challenge the top ten percent of students. It is more intensive and requires more critical thinking than Physics. A more proficient level of math is followed to fit the accelerated nature and the greater depth of this course. Students will investigate the following units: forces, motion in two-dimensions, energy and momentum, mechanical waves, light and optics, and electricity. Additional topics will be covered and may include rotational motion, GPS, fluid mechanics, thermodynamics, nuclear physics, material science, and magnetism. A weighted grade is given.

HONORS AP BIOLOGY 139151/139152
Grades: 11-12
+AP BIOLOGY
1 Science Credit
Prerequisite: Biology 3 or Biology 3 (Honors), Chemistry 3 or Chemistry 3 (Honors), or permission of instructor

This course is designed for those students who are considering science as a profession or wish to earn college credit during high school. The content is equivalent to that of a freshman college course. The research techniques of the biologist and major biological concepts will be covered. Some topics include: the cell, biochemistry, photosynthesis, respiration, molecular genetics, transmission genetics, population genetics, evolution, phylogeny, plant and animal development and function. The course will assist in preparation of the Advanced Placement Test. A weighted grade is given.

AP CHEMISTRY 139251/139252
Grades: 11-12
+AP CHEM
1 Science Credit
Prerequisite: Chemistry 3 or Honors Chemistry 3 or permission of instructor

This course is designed to include concepts normally encountered in a first year college chemistry course. The theoretical aspects of chemistry will be emphasized with specific attention to such topics as structure of matter, kinetic theory of gases, chemical equilibria, chemical kinetics, basic concepts of thermo-dynamics, reaction kinetics, acids bases and salts, oxidation reduction reactions, and other selected topics. Wherever possible, the study of these topics is supported by laboratory investigation. This course will assist in preparation for the Advanced Placement Test. A weighted grade is given.

AP PHYSICS B 139311/139312
Grades 11-12
+AP PHYS B
1 Science Credit
Prerequisite: Physics 3, Precalculus, or permission of the instructor

This course culminates the study of trigonometry-based physics, and is a college level equivalent to General Physics with an emphasis to complete the College Board AP exam. Instructional methods include: lecture, discussion, demonstration, literature research, and laboratories. This course will provide maximum preparation for college physics. A weighted grade is given.

SEMESTER ELECTIVES IN SCIENCE

CONCEPTS OF CHEMISTRY 136201/136202
Grades: 10-12
CON CHEM
1 Science Credit
Prerequisite: Matter & Change and Algebra 1

SCIENCE

This course is designed for those students who wish to obtain an understanding of the science of chemistry and its application in everyday life. The major concepts of chemistry are introduced with a minor emphasis on mathematical applications. The course will cover atomic structure, periodic trends, physical and chemical properties, chemical formulas, chemical equations, chemical bonding, properties of gases, acid/base chemistry, solutions and nuclear chemistry. Additional topics may include organic chemistry, energy resources, mineral resources and chemistry in

medicine. Wherever possible, the study of these topics will be complemented by activities and laboratory investigations.

CONCEPTS OF PHYSICS **136300**
Grades: 10-12
CON PHYS
1 Science Credit
Prerequisite: Forces & Motion in One-Dimension or Foundations of Forces and Motion in One-Dimension

This course is designed for students who wish to learn more about science but have not developed the mathematical skills necessary for physics. Mathematics will be kept at an algebraic level. This course is a practical approach to physics that looks at the concepts of motion, electricity, magnetism, light, sound and the atom. These concepts are studied through descriptions, examples, laboratory activities and lectures. The course will involve both individual and group work and will provide the student with the practical physics necessary to deal with our technological society.

ANIMAL BEHAVIOR **137400**
Grades: 11-12
ANIMAL BEHVR
1/2 Science Credit
Prerequisite: Biology 3 or Foundations of Biology: Evolution and Ecology or permission of the instructor.

This course is designed for students to gain an understanding of behavioral research. Students will learn the basics of experimental design and statistical analysis of results. Students will investigate animal response, mating strategies, habitat usage, and social behaviors. Students interested in human behaviors and psychology will find this course a valuable tool in understanding research based psychology and sociology.

BIOCHEMISTRY **137440**
Grades: 11-12
BIOCHEMISTRY
1/2 Science Credit
Prerequisite: Chemistry 3 and Biology 3

Biochemistry highlights the introductory global terminology for structures, buffer systems, medicinal chemistry, and its applications in living systems.

MEDICAL SCIENCE **137470**
Grades: 11-12
MEDICAL SCI
1/2 Science Credit
Prerequisite: Biology: Cells & Systems and Biology 2

The nature of human health and disease is stressed with an emphasis on normal functioning of tissues, organs and systems versus pathologic conditions. Major units will include cardiovascular, respiratory, endocrine, and immune systems. A medical vocabulary will be taught along with each unit. Information will be taught through lecture, dissection, group work, and discussion. An optional opportunity to view a human cadaver will be provided in conjunction with Washington University Medical School. A medical career open house at Washington University Medical School will also be an option.

FORENSIC SCIENCE **137480**
Grades: 11-12
FORENSIC SCI
1/2 Science Credit
Prerequisite: Biology 1, Chemistry 1, Physics 1 or Matter & Change, Forces & Motion in One-Dimension, Biology: Cells & Systems

This course is intended to introduce the student to the field of forensic science, science as applied to the law. Forensic science includes all areas of scientific endeavor, such as medicine, anthropology, entomology, physics, chemistry and biology. The student will also be introduced to criminalistics, and services normally provided by crime laboratories, through various laboratory experiments. By stepping into the role of crime scene investigator, the student will learn various scientific strategies and skills.

ENVIRONMENTAL SCIENCE **137500**
Grades: 11-12
ENVIRON SCI
1/2 Science Credit
Prerequisite: Biology 3

Environmental Science centers on the principles of ecology. The student will investigate the way nature operates when left undisturbed and when influenced by man. Major concepts include: studies of soil, air and water, environmental variables, population dynamics, indicator organisms, succession, pathology of the environment, and energy. The student will use laboratory experiences, field trips, audio-visuals, current literature, guest speakers, and textbook studies in an investigation of nature's way.

ASTRONOMY AND METEOROLOGY 137550
Grades: 11-12
ASTRO/METEOR
1/2 Science Credit
Prerequisite: Successful completion of four semesters of science

This course is designed for students interested in the evolution of our solar system and factors that influence our weather. Topics in astronomy include evolution of our solar system, star birth, star death, galaxies, supernovas, quasars, black holes, satellites, space exploration, and our own planet. Computer and video programs will be utilized. Topics in meteorology include structure of the atmosphere, cloud formation, causes and patterns of precipitation, winds, humidity, atmospheric pressure, severe weather, and environmental problems such as global warming and acid rain. Methods of instruction include class discussion, videos, computer programs, group/individual research and projects.

SCIENCE LABORATORY ASSISTANT 137930
Grades: 11-12
LAB ASST
1/2 Elective Credit
Prerequisite: "B" average in Science, Junior or Senior standing, departmental approval

This is a special course for students to have the opportunity to learn laboratory skills needed for any scientific career. The student will develop skills in making chemical solutions, raising laboratory animals, microbiology techniques, maintaining equipment and supplies used in science classes, and assisting teachers in preparing for laboratory activities. They may also work on a scientific project under teacher supervision. Students must be reliable and enjoy working with science materials. Permission from the science department is required. The number of students accepted per class period is very limited.