Traumatic Brain Injury
Correlation with Standards

National Science Education Content Standards Correlation Grades 9-12

Learning Objectives	Science Content Standard
Players will recognize important characteristics of the drug design process.	Standard A: Students should develop understandings about scientific inquiry. Standard G: Students should develop understandings of science as a human endeavor. Standard G: Students should develop understandings of nature of scientific knowledge.
Players will identify ethical guidelines and associated procedures observed by researchers working with animal models.	Standard A: Students should develop understandings about scientific inquiry. Standard G: Students should develop understandings of science as a human endeavor. Standard G: Students should develop understandings of nature of scientific knowledge.
Players will recognize the basic structure and function of the brain as it relates to cognition and traumatic brain injury.	Standard C: Students should develop understandings of the cell. Standard C: Students should develop understandings of the behavior of organisms.
Players will be able to design, based on their understanding of control and experimental groups, a valid experiment.	Standard A: Students should develop the abilities to do scientific inquiry.
Players will describe in the correct order the steps involved in the biomedical research process.	Standard A: Students should develop understandings about scientific inquiry.
Players will describe how a traumatic brain injury can affect dopamine signaling and cognition.	Standard C: Students should develop understandings of the cell. Standard C: Students should develop understandings of the behavior of organisms.

Players will describe how dopamine agonists may work to increase dopamine signaling.	Standard C: Students should develop understandings of the cell. Standard C: Students should develop understandings of the behavior of organisms.
Players will explain how the Morris water maze procedure is used to assess cognition in rats.	Standard A: Students should develop the abilities to do scientific inquiry. Standard A: Students should develop understandings about scientific inquiry. Standard C: Students should develop understandings of the behavior of organisms.
Players will use data to explain results from an experiment.	Standard A: Students should develop the abilities to do scientific inquiry. Standard A: Students should develop understandings about scientific inquiry.

National Health Education Content Standards Correlation Grades 9-12

Learning Objectives	Health Content Standard
Players will recognize important characteristics of the drug design process.	Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.
Players will identify ethical guidelines and associated procedures observed by researchers working with animal models.	N/A
Players will recognize the basic structure and function of the brain as it relates to cognition and traumatic brain injury.	N/A
Players will be able to design, based on their understanding of control and experimental groups, a valid experiment.	N/A
Players will describe in the correct order the steps involved in the biomedical research process.	Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.
Players will describe how a traumatic brain injury can affect dopamine signaling and cognition.	Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.
Players will describe how dopamine agonists may work to increase dopamine signaling.	Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.
Players will explain how the Morris water maze procedure is used to assess cognition in rats.	N/A
Players will use data to explain results from an experiment.	N/A

TEKS Content Standards Correlation for Biology

Learning Objectives	Science Process and Content Standards
Players will recognize important characteristics of the drug design process.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will identify ethical guidelines and associated procedures observed by researchers working with animal models.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will recognize the basic structure and function of the brain as it relates to cognition and traumatic brain injury.	**(4)**: The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to (B) investigate and explain cellular processes. Including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules.
Players will be able to design, based on their understanding of control and experimental groups, a valid experiment.	**(2)**: The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to (E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology. **(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.

Players will describe in the correct order the steps involved in the biomedical research process.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will describe how a traumatic brain injury can affect dopamine signaling and cognition.	**(4)**: The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to (B) investigate and explain cellular processes. Including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules.
Players will describe how dopamine agonists may work to increase dopamine signaling.	**(4)**: The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to (B) investigate and explain cellular processes. Including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules.
Players will explain how the Morris water maze procedure is used to assess cognition in rats.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will use data to explain results from an experiment.	**(2)**: The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to (G) analyze, evaluate, make inferences, and predict trends from data.

TEKS Content Standards Correlation for Anatomy and Physiology

Learning Objectives	Science Process and Content Standards
Players will recognize important characteristics of the drug design process.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will identify ethical guidelines and associated procedures observed by researchers working with animal models.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will recognize the basic structure and function of the brain as it relates to cognition and traumatic brain injury.	(7): The student examines the electrical conduction processes and interactions. The student is expected to: (A) illustrate conduction systems such as nerve transmission or muscle stimulation. (10): The student investigates structure and function of the human body. The student is expected to: (A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems.

Players will be able to design, based on their understanding of control and experimental groups, a valid experiment.	**(2)**: The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to (E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology. **(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will describe in the correct order the steps involved in the biomedical research process.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will describe how a traumatic brain injury can affect dopamine signaling and cognition.	(7): The student examines the electrical conduction processes and interactions. The student is expected to: (A) illustrate conduction systems such as nerve transmission or muscle stimulation. (10): The student investigates structure and function of the human body. The student is expected to: (A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems.

Players will describe how dopamine agonists may work to increase dopamine signaling.	(7): The student examines the electrical conduction processes and interactions. The student is expected to: (A) illustrate conduction systems such as nerve transmission or muscle stimulation. (10): The student investigates structure and function of the human body. The student is expected to: (A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine, and reproductive; (B) evaluate the cause and effect of disease, trauma, and congenital defects on the structure and function of cells, tissues, organs, and systems.
Players will explain how the Morris water maze procedure is used to assess cognition in rats.	**(3)**: The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student.
Players will use data to explain results from an experiment.	**(2)**: The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to (G) analyze, evaluate, make inferences, and predict trends from data.

Common Core English Language Arts Standards, Science and Technical Subjects Grades 11-12

Learning Objectives	Standard
Players will recognize important characteristics of the drug design process.	CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Players will identify ethical guidelines and associated procedures observed by researchers working with animal models.	CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Players will recognize the basic structure and function of the brain as it relates to cognition and traumatic brain injury.	CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Players will be able to design, based on their understanding of control and experimental groups, a valid experiment.	CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Players will describe in the correct order the steps involved in the biomedical research process.	CCSS.ELA-Literacy.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. CCSS.ELA-Literacy.WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Players will describe how a traumatic brain injury can affect dopamine signaling and cognition.	CCSS.ELA-Literacy.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. CCSS.ELA-Literacy.WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
Players will describe how dopamine agonists may work to increase dopamine signaling.	CCSS.ELA-Literacy.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. CCSS.ELA-Literacy.WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Players will explain how the Morris water maze procedure is used to assess cognition in rats.	CCSS.ELA-Literacy.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. CCSS.ELA-Literacy.WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Players will use data to explain results from an experiment.	CCSS.ELA-Literacy.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. CCSS.ELA-Literacy.RST.11-12.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. CCSS.ELA-Literacy.RST.11-12.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. CCSS.ELA-Literacy.WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.