

# **COURSE OF STUDY GUIDE**

## **LOWER CAPE MAY REGIONAL SCHOOL DISTRICT**

**TITLE OF COURSE: ANATOMY AND PHYSIOLOGY**

**DEPARTMENT: SCIENCE**

**DATE REVISED: STARTED 7-8-14**

**GRADE: 11<sup>TH</sup> AND 12<sup>TH</sup>**

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### **I. COURSE ORGANIZATION**

Length: ONE YEAR

Credits: 5

Periods Per Week: 4 WEEKS

Weighted: 5%

Prerequisite: PHYSICAL SCIENCE AND BIOLOGY

### **II. COURSE DESCRIPTION**

STUDENTS WILL LEARN THE 12 SYSTEMS OF THE HUMAN BODY. STUDENTS WILL LEARN DIRECTIONAL TERMS, REGIONS, CAVITIES, AND BASIC ORIENTATION OF THE HUMAN BODY. STUDENTS WILL BE REQUIRED TO PERFORM A VARIETY OF DISSECTIONS (REFER TO MATERIALS.)

STUDENTS WILL BE GUIDED TOWARDS COOPERATING HEALTHCARE FACILITIES THROUGHOUT THE COMMUNITY: CAPE REGIONAL (MEDICAL EXPLORERS CONTACT: KEITH BABORE), CARE ALTERNATIVES AKA ASCEND (HOSPICE CONTACT DENISE MADDEN: VICTORIAN MANOR AND EMERITUS), AND LIBERTY SCIENCE CENTER (MORRISTOWN MEMORIAL HOSPITAL TELECONFERENCE LIVE SURGERY: CONTACT MELISSA ALICEA)

STUDENTS WILL ALSO EXPERIENCE GUEST SPEAKERS FROM DIFFERENT MEDICAL FIELDS EXAMPLES FROM PAST YEARS: BACHARACH PHYSICAL THERAPY, CAPE REGIONAL GENERAL SURGEON DR. ANTINORI.

### **III. COURSE MISSION**

ANATOMY WILL PROVIDE THE STUDENTS OF LCMR WITH THE VOCABULARY, EXPERIENCES, AND SKILLS TO MAKE AN INFORMED DECISION ABOUT BRANCHES OF HEALTHCARE THAT MAY INTEREST THEM.

#### **IV. DEPARTMENT MISSION**

The primary goal of the Science Department of Lower Cape May Regional High School is to support the school's mission statement of preparing students to lead successful lives by helping them to: communicate effectively, think critically and creatively, solve problems resourcefully, use technology effectively, work cooperatively, and develop as self-directed learners.

#### **VI. COURSE LEVEL ASSESSMENTS & BENCH MARKS**

##### **BENCHMARK 1: Students will analyze anatomical structures in relationship to their physiological functions.**

- a. Apply correct terminology when explaining the orientation of body parts and regions.
- b. Investigate the interdependence of the various body systems to each other and to the body as a whole.
- c. Explain the role of homeostasis and its mechanisms as these relate to the body as a whole and predict the consequences of the failure to maintain homeostasis.
- d. Relate cellular metabolism and transport to homeostasis and cellular reproduction.
- e. Describe how structure and function are related in terms of cell and tissue types.

##### **BENCHMARK 2: Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.**

- a. Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.
- b. Explain how the skeletal structures provide support and protection for tissues, and function together with the muscular system to make movements possible.

##### **BENCHMARK 3: Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.**

- a. Interpret interactions among hormones, senses, and nerves which make possible the coordination of functions of the body.
- b. Investigate the physiology of electrochemical impulses and neural integration and trace the pathway of an impulse, relating biochemical changes involved in the conduction of the impulse.
- c. Describe how the body perceives internal and external stimuli and responds to maintain a stable internal environment, as it relates to biofeedback.

##### **BENCHMARK 4: Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.**

- a. Describe the chemical and physical mechanisms of digestion, elimination, transportation, and absorption within the body to change food and derive energy.
- b. Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.
- c. Relate the role of the urinary system to regulation of body wastes (i.e. water/electrolyte balance, volume of body fluids).
- d. Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.
- e. Describe the effects of aging on body systems.

**BENCHMARK 5: Students will analyze the role of the reproductive system as it pertains to the growth and development of humans.**

- a. Explain how the functions of the reproductive organs are regulated by hormonal interactions.
- b. Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders (e.g. ectopic pregnancy, miscarriage, cleft palate, hydrocephaly, fetal alcohol syndrome).
- c. Describe the stages of development from birth to adulthood (i.e. neonatal period, infancy, childhood, adolescence and puberty, and maturity).

**VII. POSSIBLE ASSESSMENT TASKS**

*Written*

- \* WEEKLY JOURNALS
- \* BIWEEKLY FORMAL LAB REPORTS
- \* PORTFOLIO OF HOSPICE OR MEDICAL EXPLORERS (IN LIEU OF FINAL EXAM)
- \* PRACTICALS

*Visual*

- \*JOINT ARTICULATION FITNESS ROUTINE
- \*VIDEO DIARY OF DISSECTIONS
- \*SCARE VIDEO: RESPONSE TO FIGHT OR FLIGHT
- \*PRACTICALS

**VIII. CONTENT/SUGGESTED INSTRUCTIONAL TIME (BASED ON 41 MINUTE PERIODS)**

**Content Pacing Guide & Standards (LAB DAYS COUNT AS DOUBLE PERIOD)**

<b>Unit Title: STANDARD SCIENTIFIC INQUIRY AND ORIENTATION OF THE HUMAN BODY</b>		
Content COMMUNICATING EFFICIENTLY (SCIENCE PRACTICES) ESSENTIALS TO MAINTAINING HOMEOSTASIS USING DIRECTIONAL TERMS USING REGIONAL TERMS EVOLUTION OF CAVITIES (COELOM)	SCIENCE Standards 5.1.12.A.3 5.1.12.B.1 5.1.12.B.12.3 5.1.12.C.2 5.1.12.C.3 (SCIENCE PRACTICES AND INQUIRY)	Time Frame 20 CLASSES

<b>Unit Title: SKELETAL, MUSCULAR, AND INTEGUMENTARY SYSTEMS</b>		
Content ASSEMBLY OF CAT SKELETON CATEGORIES OF JOINTS AND THEIR ARTICULATIONS 206 BONES OF THE HUMAN SKELETON PROJECTIONS AND DEPRESSIONS OF BONES CATEGORIES OF BONES HEMATOPOIESIS  CAT DISSECTIONS STARTS THE INTEGUMENTARY SYSTEM VIDEO DIARY OF THE DISSECTION FOR EXTRA CREDIT PROTECTIVE PROPERTIES OF THE SKIN DERMAL LAYERS AND CONNECTIVE/ELASTIC TISSUES	SCIENCE Standards 5.2.12.A.5-6 B.1-3 C.1-2 D.1-4 E.4 (REACTIVITY, KINETICS, ENERGY, FORCES)	Time Frame 20 DAYS GETS CLASS TO HALLOWEEN  3 DAYS

<p>CAT DISSECTION CONTINUES INTO THE MUSCULAR SYSTEM  MICROSCOPIC AND GROSS STRUCTURE OF MUSCLE TISSUE  IDENTIFICATION OF VOLUNTARY MUSCLES  BODY MOVEMENTS CAUSED BY ORIGINS AND INSERTIONS: CLASSES OF LEVERS 1-3  PHYSIOLOGY OF CONTRACTING AND RELAXING MUSCLES.</p> <p><b>NOTE</b> THAT DURING THE DISSECTION ALL SYSTEMS ARE EXPLORED PHYSICALLY. DEPTH COMES LATER</p>	<p>SCIENCE Standards  5.3.12.A.1-6  B.1-6  D.1-3  E.1-4  (LEVELS OF ORGANIZATION, ENERGY IN SYSTEMS, REPRODUCTION, COMPARITIVE ANATOMY AND EVOLUTION)</p> <p>5.4.12.B.1-3  (EVOLUTION OF COELOM)</p>	<p>26 DAYS  GETS CLASS TO CHRISTMAS BREAK  <b>CATS ARE DISPOSED OF BEFORE LONG CHRISTMAS BREAK</b></p>
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<p><b>Unit Title: CARDIOVASCULAR SYSTEM, RESPIRATORY SYSTEM</b></p>		
<p>Content  LOCATION OF HEART AND BLOOD VESSELS  DIFFERENCE BETWEEN AN ARTERY, VEIN, CAPILLARY  BLOOD TYPES, CONTENTS OF BLOOD, AGGLUTINATION  CARDIAC CYCLE, ECG, REGULATION OF BLOOD PRESSURE  TAKING A BLOOD PRESSURE SYSTOLIC/DIASTOLIC  DISSECTION OF PIG OR SHEEP HEART  GUEST SPEAKER (HEART SURGEON)  FIELD TRIP TO SEE LIVE HEART SURGERY</p> <p>LOCATION OF THE LUNGS, BRONCHI, ESOPHAGUS  USE OF PULSE OXIMETER  REACTION BETWEEN EXHALED CO2 AND BROMOTHYMOLOSYL BLUE  BOYLES LAW AND THE DIAPHRAGM</p>	<p>21<sup>st</sup> Century Standards  9.4.12.H.5-19  30-48  J.(3).6-9</p> <p>(THE 21<sup>ST</sup> CENTURY STANDARDS RELATE TO THE MEDICAL EXPLORERS AND HOSPICE COMMUNITY SERVICE THAT IS BEING OFFERED. OUR JOURNALS ALSO HIT ON A LOT OF ETHICAL QUESTIONS.)</p>	<p>Time Frame  20 CLASSES</p> <p>14 DAYS  GETS CLASS TO PRESIDENTS WEEKEND</p>

<p><b>Unit Title: DIGESTIVE SYSTEM AND ENDOCRINE SYSTEM (HOW THE PANCREAS PLAYS TWO ROLES)</b></p>		
<p>Content  THE SECTIONS OF THE ALIMENTARY CANAL  ACCESSORY DIGESTIVE ORGANS  MECHANICAL AND ENZYMATIC BREAKDOWN  ABSORPTION OF NUTRIENTS  METABOLISM (CELLULAR RESPIRATION)  BIOCHEMISTRY AND NUTRITION (PROTEINS, CARBOHYDRATES, LIPIDS)</p>	<p>Standards</p>	<p>Time Frame  28 CLASSES  GETS CLASS TO APRIL</p>

<p>OBESITY AND THE HORMONE LIPASE AND SURGICAL REMEDIES (NOVA MOVIE: OBESITY)          VISCERAL VS. SUBCUTANEOUS FAT          CALORIMETRY: CALCULATING THE ENERGY IN FOOD</p> <p>GLANDS AND HORMONES OF THE ENDOCRINE SYSTEM          DR. JOHN GRAY'S CONTROVERSIAL BUT LOGICAL INTERPRETATIONS OF RELATIONSHIPS AND HORMONES          FIGHT OR FLIGHT RESPONSE (FRIGHT VIDEO)          HORMONAL IMBALANCE: <b>Cushings Disease, goiters, Acromalagy, tetany ETC.</b></p>		<p>12 CLASSES          GETS CLASS TO SPRING BREAK</p>
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<b>Unit Title: LYMPHATIC SYSTEM, URINARY SYSTEM, SPECIAL SENSES AND NERVOUS SYSTEM</b>		
<p>Content</p> <p>CONNECTION BETWEEN CARDIOVASCULAR SYSTEM AND LYMPHOID ORGANS          MAINTAINING BLOOD VOLUME          PATHOGEN DESTRUCTION BY PHAGOCYTOSIS          IMMUNE SYSTEM (LYMPHOCYTES: WBCs)          IMPORTANCE OF INTACT SURFACE MEMBRANES SUCH AS SKIN AND MUCOSAE</p> <p>LOCATION OF THE KIDNEYS, URETERS, BLADDER          PHYSIOLOGY OF THE KIDNEY AND IMPORTANCE IN BLOOD PRESSURE REGULATION          IMPORTANCE OF FLUSHING METABOLIC WASTES          HYGEINE AND UT INFECTIONS          CONCENTRATION GRADIENTS AND MOVEMENT OF FLUIDS          DISSECTION OF THE SHEEP KIDNEY</p> <p>ANATOMY OF THE EYE AND IT'S STABILIZING MUSCLES          DISSECTION OF THE SHEEP EYE          THE RETINA AND EXPERIENCING "THE BLIND SPOT"          THE OPTIC NERVE AND HOW A CONVEX LENS PROJECTS AN IMAGE THAT THE BRAIN MUST COMPREHEND</p> <p>ANATOMY OF PERIPHERAL NERVOUS SYSTEM AND CENTRAL NERVOUS SYSTEM          LOCATION OF THE BRAINS REGIONS AND THE PHYSIOLOGY OF THE BRAIN          COMMUNICATION PROVIDED FOR MUSCLES AND HORMONES          SOMATIC AND AUTONOMIC FUNCTIONS          DISSECTION OF THE SHEEP BRAIN</p>	<p>SCIENCE Standards          5.2.12.A.5-6          (CONCENTRATIONS)</p>	<p>Time Frame          5 CLASSES</p> <p>10 CLASSES</p> <p>5 CLASSES</p> <p>12 CLASSES</p>

## **IX. MODIFICATIONS: INCLUSION TECHNIQUES/ENRICHMENTS**

- WORD BANKS ARE SUPPLIED WITH QUIZZES AND TESTS
- MEMORY OF TERMINOLOGY IS ENHANCED WITH KINESTHETIC METHODS SUCH AS PALPATION OF PROJECTIONS AND DEPRESSIONS AND JOINT ARTICULATION.
- VISUALLY, STUDENTS ARE PRESENTED WITH COMPLETE SKELETONS THAT CAN BE DISASSEMBLED FOR QUIZZES AND TESTS. STUDENTS ARE ALSO GIVEN SAMPLINGS FROM EACH ORGAN SYSTEM, EITHER INDIVIDUAL ORGANS OR AN ENTIRE ORGANISM FOR A DISSECTION EXPERIENCE.
- SAFETY EQUIPMENT IS SENSITIVE TO POTENTIAL ALLERGENS, SUCH AS LATEX, GLOVES ARE VINYL AND POWDERFREE TYPICALLY.
- EXTRA CREDIT IS GIVEN THROUGHOUT THE YEAR FOR BLOOD DONATION, BONE MARROW DONATION, HOSPICE COMMUNITY SERVICE HOURS, MEDICAL EXPLORERS ATTENDANCE AND INTRINSICALLY MOTIVATED TOURS OF MUSEUMS OR EXHIBITS RELATED TO ANATOMY EXAMPLES WOULD BE MUTTER MUSEUM, BODY WORKS ETC.
- STUDENTS COMPLETING A FULL YEAR OF MEDICAL EXPLORERS OR HOSPICE (PER PROGRAM COORDINATOR) WILL COMPLETE A PORTFOLIO OF THE EXPERIENCE IN LIEU OF THE FINAL EXAM.

## **X. INTERDISCIPLINARY CONNECTIONS/MULTICULTURAL MATERIALS**

### *Videos:*

- NOVA VIDEOS: <http://video.pbs.org/video/1506746269#>
- VHS IN SCIENCE DEPT. STORAGE ROOM
  - \* HOW YOUR BODY WORKS; AIMS MEDIA
  - \* THE UNIVERSE WITHIN: AN INCREDIBLE VOYAGE INTO THE MICROWORLD OF THE HUMAN BODY; NOVA ADVENTURES IN SCIENCE
  - \* YOUR SKIN: THE INSIDE STORY; NEO SCIENCE
  - \* THE ANATOMY OF THE CAT; CAROLINA
- LIVE FROM AT LIBERTY SCIENCE CENTER IS OFFERING A VARIETY OF LIVE SURGERIES THAT TAKE PLACE IN A 100 SEAT INTERACTIVE THEATRE. STUDENTS WILL BE ALLOWED TO HAVE OPEN CONVERSATION WITH THE SURGICAL TEAM AS THE SURGICAL EQUIPMENT IS PASSED AROUND THE THEATRE FOR CLOSER INSPECTION. NEURAL SURGERY, ORTHOPEDICS, KIDNEY TRANSPLANT, ROBOTIC HISTERECTOMY, AND HEART SURGERY (TYPICALLY BYPASS OR VALVE REPLACEMENT) ARE WHAT IS OFFERED.  
THE EXPERIENCE COMES WITH ADMISSION TO ALL OF THE MUSEUMS EXHIBIT.

**XI. MATERIALS/TECHNOLOGY** (Study Guides are used in place of text books)

- ANATOMY AND PHYSIOLOGY COLORING WORKBOOK, A COMPLETE STUDY GUIDE, 9<sup>TH</sup> ED, ELAINE N. MARIEB; PEARSON EDUCATION 2009 (COPYING INDIVIDUAL MANUALS FOR EACH STUDENT PROVED TO BE MORE EFFICIENT, ECONOMICAL AND STIMULATING FOR STUDENT BODY)
- ESSENTIALS OF HUMAN ANATOMY & PHYSIOLOGY, 7<sup>TH</sup> ED, ELAINE N. MARIEB PEARSON EDUCATION 2003 (BOOK USED ONLY AS A REFERENCE FOR TEACHER)
- VIDEO PROJECTS (CAT DISSECTION AND ARTICULATIONS)
- USE OF BLOOD PRESSURE AND PULSE OXIMETER
- LIBERTY SCIENCE CENTER VIDEOCONFERENCE “LIVE FROM” SURGERIES.
- HAND HELD DEVICES FOR VIDEO DIARIES DURING DISSECTION.
- TYPED FORMAL LAB REPORTS ACCEPTED IN A VARIETY OF FORMATS
- HOSPICE AND MEDICAL EXPLORERS WILL HAVE ACCESS TO TECHNOLOGY WITHIN THE NURSING HOMES AND HOSPITALS, AND THEY WILL BE SHOWN HOW IT IS USED BY THE PROFESSIONALS.
- DISSECTION SPECIMENS AND PROVIDER PRICES AS OF JULY 2011

**Bio Corporation**

**3911 NEVADA STREET**

**Alexandria, MN 56308**

**18002229094 fax 8003329094**

CT1418P	MEDIUM 14-18 PLAIN CAT	24.00
P015P	PIG HEART	3.90
S025P	SHEEP EYE	0.45
S010P	BRAIN W/HYPO	5.40
S050P	SHEEP KIDNEY	1.50
TL0608P	TURTLE	5.90
SN1824P	SNAKE	6.00
SK2227P	DOGFISH	7.15
PG0002P	PIGEON	7.50
RT0911P	RAT	7.45
RTP09P	RAT PREGNANT	9.50

# **Anatomy and Physiology**

## **Lower Cape May Regional HS**

### **Common Core Standards for Literacy in History/Social Studies, Science, and Technical Subjects**

The following Common Core Standards are woven throughout the curriculum. Specific standards addressed will be noted in the individual teacher's lesson plans.

#### **Reading Standards for Literacy in Science and Technical Subjects (RST)**

##### **Grades 11-12**

##### **Key Ideas and Details**

**RST.11-12.1** – Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

**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.

**RST.11-12.3** – Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

##### **Craft and Structure**

**RST.11-12.4** – Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**RST.11-12.5** – Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

**RST.11-12.6** – Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

##### **Integration of Knowledge and Ideas**

**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.

**RST.11-12.8** – Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

**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.

##### **Range of Reading and Level of Text Complexity**

**RST.11-12.10** - By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

#### **Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects (WHST)**

##### **Grades 11-12**

##### **Text Types and Purpose**

**WHST.11-12.1** - Write arguments focused on *discipline-specific content*.

○ **WHST.11-12.1a** - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.



- **WHST.11-12.1** - Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases.
- **WHST.11-12.1c** - Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- **WHST.11-12.1d** - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- **WHST.11-12.1e** - Provide a concluding statement or section that follows from or supports the argument presented.

**WHST.11-12.2** - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

- **WHST.11-12.2a** - Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- **WHST.11-12.2b** - Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.
- **WHST.11-12.2c** - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts
- **WHST.11-12.2d** - Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
- **WHST.11-12.2e** - Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).

**WHST.11-12.3** (See note; not applicable as a separate requirement)

- NOTE: Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

### **Production and Distribution of Writing**

**WHST.11-12.4** - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

**WHST.11-12.5** - Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

**WHST.11-12.6** - Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.