Engineering a Play Design Challenge

STEM Content Standards:

Next Generation Science Standards

- (3-5) Engineering design
  - 3-5 ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
  - 3-5 ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Standards for Technological Literacy

- STL 2. Students will develop an understanding of the core concepts of technology.
  - (F) A subsystem is a system that operates as a part of another system.
  - (G) When parts of a system are missing, it may not work as planned.
  - (I) Tools are used to design, make, use, and assess technology.
  - (J) Materials have many different properties.
  - (K) Tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing.
  - (L) Requirements are the limits to designing or making a product or system.
- STL 9. Students will develop an understanding of engineering design.
  - (C) The engineering design process involves defining a problem, generating ideas, selecting a solution, testing the solution(s), making the item, evaluating it, and presenting the results.
  - (D) When designing an object, it is important to be creative and consider all ideas.
  - (E) Models are used to communicate and test design ideas and processes.

Common Core State Standards for Mathematics

1. Standards for mathematical practice
   - MP4 Model with mathematics
   - MP5 Use appropriate tools strategically
   - MP6 Attend to precision
2. Grade level standards
   - Measurement and data
   - Geometry

Common Core State Standards for English Language Arts

- Reading informational text
  - Key ideas and details
    - CCSS.ELA-Literacy.RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
    - CCSS.ELA-Literacy.RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
  - Integration of knowledge and ideas
    - CCSS.ELA-Literacy.RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
- Speaking and listening
  - Presentation of knowledge and ideas
    - CCSS.ELA-Literacy.SL.3.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.
    - CCSS.ELA-Literacy.SL.3.6 Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 3 Language standards 1 and 3 here for specific expectations.)

C3 Framework for Social Studies

- *D2.His.3.3-5.* - Generate questions about individuals and groups who have shaped significant historical changes and continuities.
- *D2.His.11.3-5.* - Infer the intended audience and purpose of a historical source from information within the source itself.

Big Ideas:
Using informational and fictional texts, historical events, scientific approaches, engineering design, puppetry, anthropometrics, stories, simple tools and processes, and presentation skills to tell a story through animation.

Essential Question:
How can a play be used to engage an audience and narrate a historical event?

Scenario:
Your class has just finished reading the story of ……. Your teacher has asked you to work as a member of a design team to bring a historical event in your community to life through the use of puppetry, a set design, and the development of a puppet drama or play.

Challenge:
Work as a member of a design team to develop a play, characters (mechanical stick puppets or marionettes), and a set that will illustrate a significant local historical event that everyone should know about. After preparation, present this play to an appropriate audience.

Tools, Materials, and Resources:
- *Marionettes: How to make and work them* by Helen Fling and Charles Forbell
- *One-person Puppet Plays* by Denise Wright
- https://www.instructables.com/id/Mechanical-Hand-4/
- http://thefantasticfive-hockmana.blogspot.com/2012/06/talking-stick-puppet-tutorial.html?m=1

Content information:
- A marionette is a puppet that is controlled using wires or strings.
- A marionette's (or other moving puppet such as a stick puppet) puppeteer is called a manipulator. Puppets are typically operated or manipulated with the puppeteer hidden or revealed to an audience by using a vertical or horizontal control bar in different forms of theatres or entertainment venues.
- Puppetry is an ancient form of performance. Some historians claim that they pre-date actors in theatre. There is evidence that they were used in Egypt as early as 2000 BC when string-operated figures of wood were manipulated to perform the action of kneading bread, and other string controlled objects.
- Puppetry was often used to display rituals, history, and ceremonies using string-operated figurines throughout history.
- Marionettes are sometimes referred to as "puppets", but the term "marionettes" is more precise, distinguishing them from other forms of puppetry, such as finger, glove, rod and shadow puppetry.
- With the rise in popularity of television and film, marionettes found a rise in popularity especially in children's programming. The story of Pinocchio and its Disney adaptation, which was released in 1940, is a story about a marionette. In 1947, Howdy Doody introduced marionettes to children's television, with Howdy Doody (the main character) being a marionette, as well as some other characters.
- Marionettes are controlled by a bar which is held in the hand in a horizontal plane, there can be numerous strings attached to it at right angles to the central bar to which the Hands, shoulders, back, etc. are all attached. This style of control is generally used in the USA for human figures and is also known as the American control.
    - What are the essential characteristics of a play?
    - In general, a play has a beginning, middle and end. It is fast moving, to the point, and only a few minutes long.

- A good play incorporates the 4 *"W's":* Who, What, Where and WRONG.
  - **WHO** is the main character?
  - **WHAT** is the play about?
  - **WHERE** is it happening?
  - **WRONG**. What's wrong? Something is making life difficult for the main character. And only through intelligence, cleverness and a few setbacks does our hero resolve the WRONG...just in time for the happy ending.
- Even if the puppet is only coming out to give a short lesson, the writer should incorporate the 4*"W's"* The Who, What and Where parts are easy. The WRONG is the fun part...for you and your audience.
- The series of events that the characters become involved in makes up the play. List them out. Your next job as puppet manipulator is to carry the characters through the events in the most interesting way possible. Remember these are puppets you are writing for....they demand to be outrageous.
  - In other words, characters need to be distinctive in some way: smart, dumb, superhuman, barely human, or crazy.
  - Each event encountered by the characters should be dealt with within their own distinctive framework. So "Sneezy" always sneezes the answers, "Bellowing Billy" always yells out replies, "Shy Sally" is very quiet and shy.
- Plays should not lecture, be boring, or long-winded (like adults). The characters are meant to fall down, snort, and stumble.

Deliverables:

Each design team will:

1. Conduct research to identify a significant historical event.
2. Use the *Puppet Pals App* to design a play that will bring the historical event to life and develop a written script for the main characters in the play.
3. Design a set for the play using files folders, cardboard boxes, or other recycled materials as well as paints, fabric scraps, glue, tape, and colored markers.
4. Design and illustrate marionettes or stick puppets to represent the main characters in the historical play.
5. After memorize the lines and practicing, present the play to an audience.

Parameters or constraints:

All teams participating in this engineering-a-play design challenge must:

1. Utilize a historical event for their play that has been identified by the team members.
2. Use the *Puppet Pals App* to design the first draft of their play.
3. Write a script for the play that can be presented in no more than 5 minutes.
4. Each person on the team must develop a stick puppet or marionette character to be used in the play.
5. Utilize recycled materials to design and construct their set and illustrate their characters.
6. Include all team members in the marionette play (all characters must have a speaking part).
7. Use the brainstorming guide below to conduct research and information gathering for the design challenge.

Ideation and Evaluation:

Team Members: _____

Design Team Brainstorming Guide

1. What is the problem that we have been asked to solve? State the problem in your own words.

   _____

   _____

   _____

   _____

2. What products will the team need to develop to solve this design challenge? List all items that will need to be developed/presented

   _____

   _____

   _____

   _____

3. What historical event will be the theme for our play?

   _____

   _____

   _____

   _____

4. Brainstormed solutions.

Sketch/describe a few possible scenes that might be included in the play.

5. Choose the scenes that would best illustrate the historical event. Briefly describe why you chose these scenes.

_____

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_____

_____

6. Brainstormed <u>character</u> solutions.

   Sketch and describe a few possible characters that might be included in the play.

7. Choose the characters that will work best. Briefly describe why you chose these characters.

   _____

   _____

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8. Write a script for the play using the information outlined in the “content information” section above. Remember, all team members need a role.

9. Use the *Puppet Pal App* to develop a rough draft of your play.

10. Develop/illustrate your set and your puppets using the materials available (paint, colored markers, cloth, paper, etc.)

11. Test and evaluate your solution. Practice the play? Did it work? Do you need to make changes? Describe below:

_____

_____

_____

_____

12. If you could start over, how could your team improve your set, your play, or your characters? Describe:

_____

_____

_____

_____

Assessment Rubric – Engineering a Play Project (100 points)

Name: **Date:**

Team Members:

	Up to 5 points	Up to 10 points	Up to 15 points	Up to 20 points
Research/Script Development	Project fails to include brainstorming guide. The project does not follow the historical events. Script fails to deliver outline for marionette project. Script lacks organization and flow. Script does not adequately portray the story. Script does not allow team to meet 5 minute time limit.	Project has incomplete brainstorming guide. The project has minimal connections to historical event. The script meets minimal requirements: Organization Flow of dialog Accuracy of story 5 minute time limit	Project has partially completed brainstorming guide. The project has connections to the historical event but is missing critical pieces. The script meets most of the requirements: Organization Flow of dialog Accuracy of story 5 minute time limit	Project has completed brainstorming guide. The project has solid connections to the historical event and depicts the story accurately. The script meets all requirements: Organization Flow of dialog Accuracy of story 5 minute time limit
***Puppet Pals* App**	Failed to include *Puppet Pals* presentation.	*Puppet Pals* presentation does not follow script. Scenes are characters do not portray or connect to topic. Does not follow time limit.	*Puppet Pals* presentation follows script but does not fully portray characters and scenes from topic. Does not follow time limit.	*Puppet Pals* presentation follows script and makes good use of characters and scenes from topic. Follows time limit.
Set Design	Set design was not appropriate for the play. Set design did not include recycled material.	Set designs included some recycled material. Set design included some details that accurately reflected the period, culture, or theme of the story.	Set designs included mostly recycled material and was neatly constructed. Set design included many details that accurately reflected the period, culture, or theme of the story.	Set designs were neatly constructed using recycled material The set was aesthetically pleasing and included many details that accurately reflected the period, culture, or theme of the story.
Marionettes/Stick Puppets	Construction of puppets lacked thought and planning. Did not meet required number of characters. Many details need refinement to connect to the historical event. Puppets did not operate correctly. Little to no use of creativity.	Construction of puppets included some thought and planning. Included required number of characters. Some of the puppets operated correctly. Some details need refinement to connect to the historical event. Little use of creativity.	Construction of puppets included thought and planning. Included required number of characters. Most of the puppets operated correctly. Several details need refinement to connect to the historical event. Some use of creativity.	Construction of puppets included creative thought and planning. Strong connection to history. Included required number of characters. All puppets were operational and functioned appropriately.
Performance	Presentation did not represent the historical event. Team did not work together to make an effective play.	Presentation had very few details that related to the historical event. Team did not work together to make an effective play.	Presentation needed more details that related to the historical event. Team worked together but needed more work to make an effective play.	Presentation related well to the historical event. Team worked well together.
Comments: **Total Points:**				

The elements for a television or movie script are:

Scene Heading.
A short description of the location and time of day of a scene, also known as a "slugline." For example: EXT. MOUNTAIN CABIN - DAY would denote that the action takes place outside a mountain cabin during daylight hours.

Action.
The moving pictures we see on screen. Also, the direction given by a director indicating that filming begins.

Character Name.
When any character speaks, his or her name appears on the line preceding the dialogue. In screenplays, the name is tabbed to a location that is roughly in the center of the line. In playwriting, typically the name is centered, but with the advent of screenwriting software that automatically positions the character name correctly, it has become acceptable to use a similar format for character names in stageplays.

Dialogue.
The speeches between characters in a film or a play.

Extensions.
A technical note placed directly to the right of the Character name that denotes HOW the character's voice is heard. For example, O.S. is an extension that stands for Off-Screen.

Transition.
A script notation denoting an editing transition within the telling of a story. For example, DISSOLVE TO: means the action seems to blur and refocus into another scene, and is generally used to denote a passage of time.

Shot.
What the camera sees. For example, TRACKING SHOT would mean that the camera is following a character or character as he walks in a scene. WIDE SHOT would mean that we see every character that appears in the scene, all at once.

The Standard Stage Play Format – Conduct research on the different types of scripts - https://ptfaculty.gordonstate.edu/lking/CPF_play_formatting2.pdf

The Hen and the Apple Tree

Arnold Lobel

It is always difficult to pose as something that one is not.

One October day, a Hen looked out her window. She saw an apple tree growing in her backyard.

“Now that is odd,” said the Hen. “I am certain that there was no tree standing in that spot yesterday.”

The tree said, “There are some of us that grow fast.”

The Hen looked at the bottom of the tree.

“I have never seen a tree,” she said, “that has ten furry toes.”

“There are some of us that do,” said the tree. “Hen, come outside and enjoy the cool shade of my leafy branches.”

The Hen looked at the top of the tree.

“I have never seen a tree,” she said, “that has two long, pointed ears.”

“There are some of us that have,” said the tree. “Hen, come outside and eat one of my delicious apples.”

“Come to think of it,” said the Hen, “I have never heard a tree speak from a mouth that is full of sharp teeth.”

“There are some of us that can,” said the tree. “Hen, come outside and rest your back against the bark of my trunk.”

“I have heard,” said the Hen, “that some of you trees lose all of your leaves at this time of the year.”

“Oh, yes,” said the tree, “there are some of us that will.” The tree began to quiver and shake. All of its leaves quickly dropped off.

The Hen was not surprised to see a large Wolf in the place where an apple tree had been standing just a moment before. She locked her shutters and slammed her window closed.

The Wolf knew that he had been outsmarted, and he stormed away in a hungry rage. ✾

The Hen and the Apple Tree

Readers: Narrator, Tree, Hen

Narrator 1: One October day, a hen looked out her window. She saw and apple tree growing in her back yard.

Hen: Now that is odd I am certain that there was no tree standing in that spot yesterday.

Tree: There are some of us that grow fast.

Narrator 2: The hen looked at the bottom of the tree.

Hen: I have never seen a tree that has ten furry toes.

Tree: there are some of us that do, hen come out side and enjoy the cool shade of my leafy branches.

Narrator 1: The hen looked at the top of the tree.

Hen: I have never seen a tree that has two long pointed ears.

Tree: There are some of us that have, Hen come outside and eat one of my delicious apples.

Hen: Come to think of it, I have never heard a tree speak from a mouth that is full of sharp teeth.

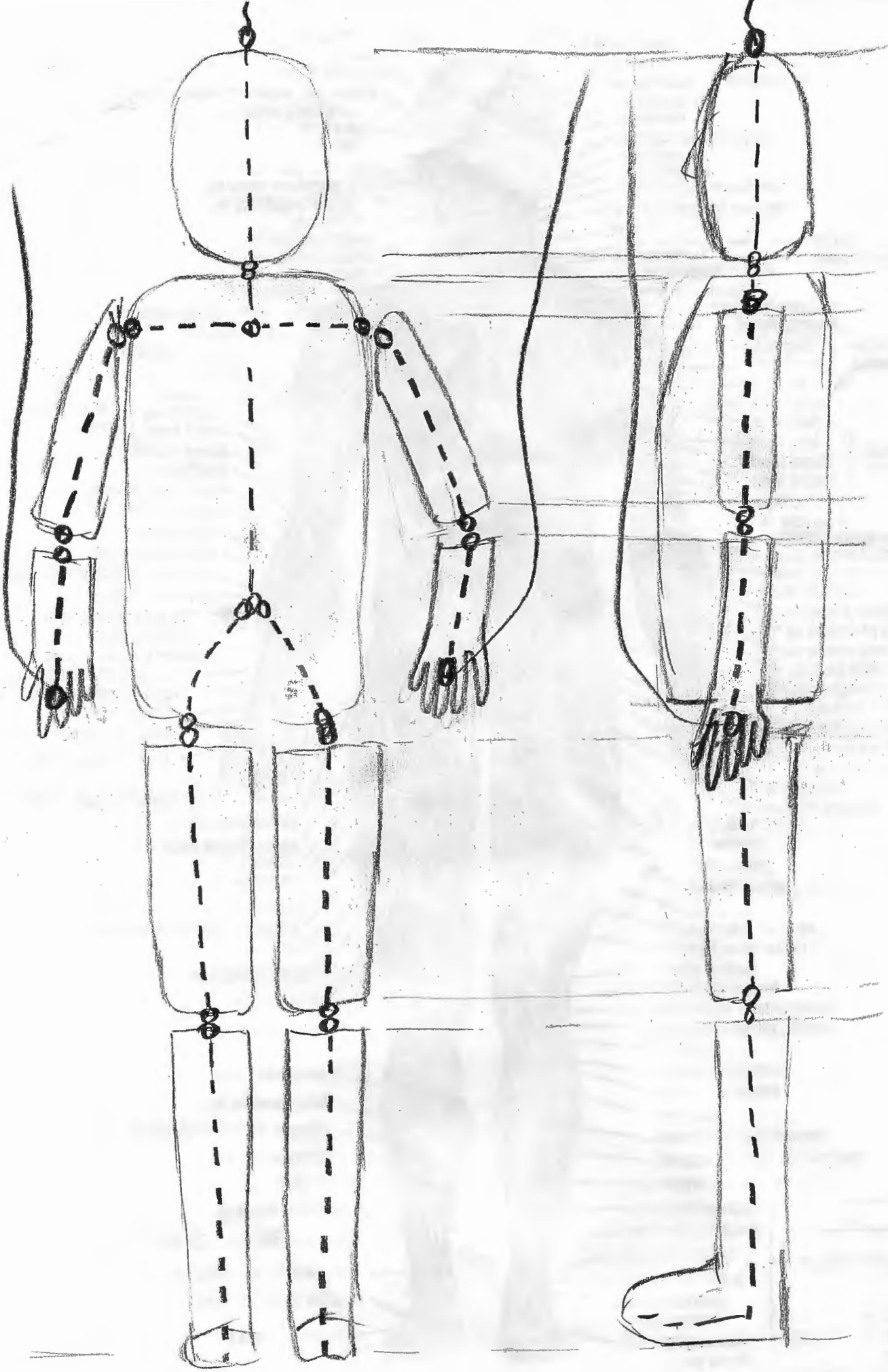
Tree: There are some of us that can Hen come outside and rest your back against the bark of my trunk.

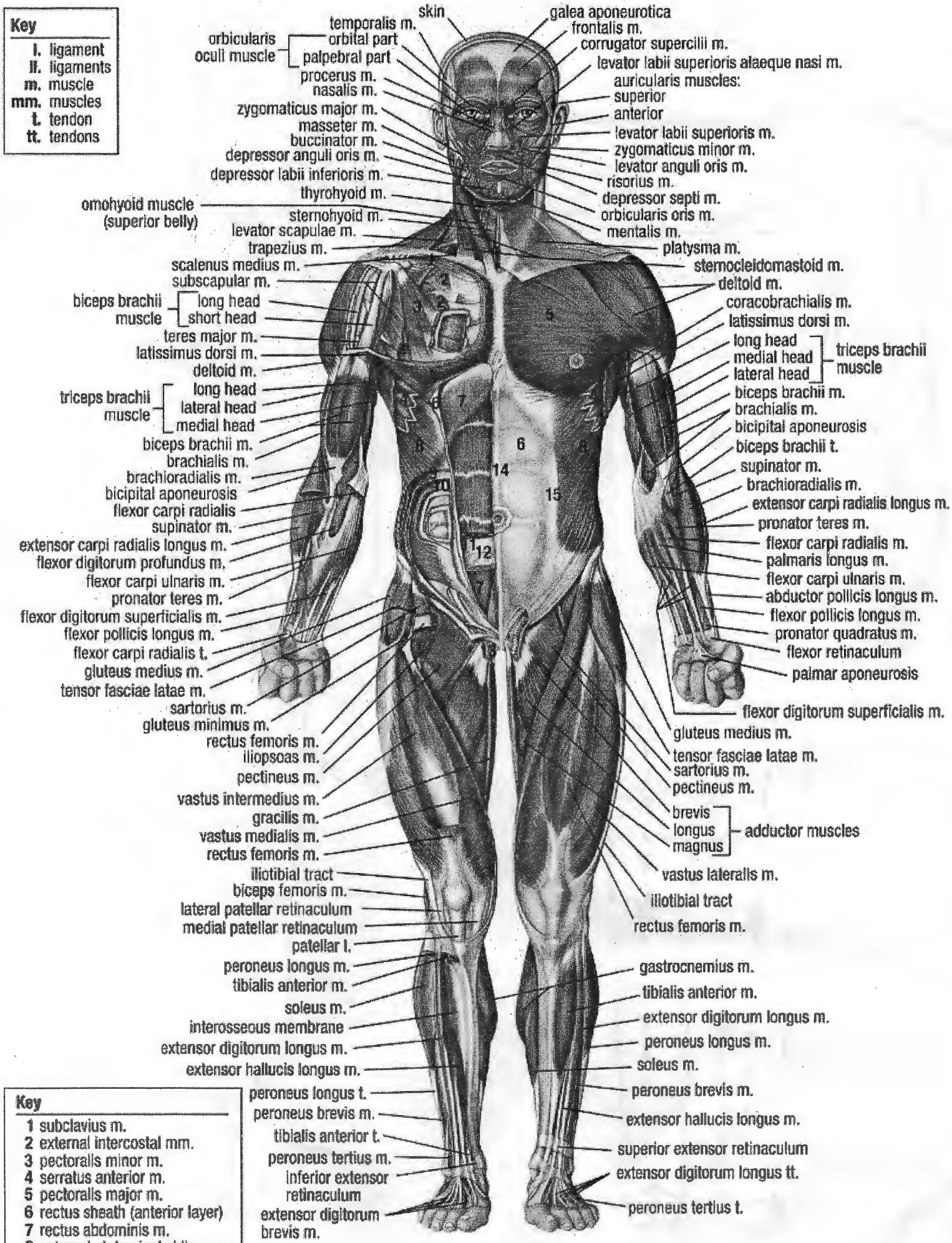
Hen: I have heard that some of you trees lose all of your leaves at this time of year.

Tree: Oh, yes there are some of us that will.

Narrator 2: The tree began to quiver and shake. All of its leaves quickly dropped off. The Hen was not surprised to see a large wolf in a place where an apple tree had just been standing just a moment before. She locked her shutters and slammed her window closed. The wolf knew that he had been out smarted. He stormed away in a hungry rage.

The moral of the story is: It is always difficult to pose as something that one is not.




Key
l. ligament
ll. ligaments
m. muscle
mm. muscles
t. tendon
tt. tendons
skin
temporalis m.
orbicularis oculi muscle
orbital part
palpebral part
procerus m.
nasalis m.
zygomaticus major m.
masseter m.
buccinator m.
depressor anguli oris m.
depressor labii inferioris m.
thyrohyoid m.
omohyoid muscle (superior belly)
sternohyoid m.
levator scapulae m.
trapezius m.
scalenus medius m.
subscapular m.
biceps brachii muscle
long head
short head
teres major m.
latissimus dorsi m.
deltoid m.
triceps brachii muscle
long head
lateral head
medial head
biceps brachii m.
brachialis m.
brachioradialis m.
bicipital aponeurosis
flexor carpi radialis
supinator m.
extensor carpi radialis longus m.
flexor digitorum profundus m.
flexor carpi ulnaris m.
pronator teres m.
flexor digitorum superficialis m.
flexor pollicis longus m.
flexor carpi radialis t.
gluteus medius m.
tensor fasciae latae m.
sartorius m.
gluteus minimus m.
rectus femoris m.
iliopsoas m.
pectineus m.
vastus intermedius m.
gracilis m.
vastus medialis m.
rectus femoris m.
iliotibial tract
biceps femoris m.
lateral patellar retinaculum
medial patellar retinaculum
patellar l.
peroneus longus m.
tibialis anterior m.
soleus m.
interosseous membrane
extensor digitorum longus m.
extensor hallucis longus m.
peroneus longus t.
peroneus brevis m.
tibialis anterior t.
peroneus tertius m.
inferior extensor retinaculum
extensor digitorum brevis m.
galea aponeurotica
frontalis m.
corrugator supercilii m.
levator labii superioris alaeque nasi m.
auricularis muscles:
superior
anterior
levator labii superioris m.
zygomaticus minor m.
levator anguli oris m.
risorius m.
depressor septi m.
orbicularis oris m.
mentalis m.
platysma m.
sternocleidomastoid m.
deltoid m.
coracobrachialis m.
latissimus dorsi m.
triceps brachii muscle
long head
medial head
lateral head
biceps brachii m.
brachialis m.
bicipital aponeurosis
biceps brachii t.
supinator m.
brachioradialis m.
extensor carpi radialis longus m.
pronator teres m.
flexor carpi radialis m.
palmaris longus m.
flexor carpi ulnaris m.
abductor pollicis longus m.
flexor pollicis longus m.
pronator quadratus m.
flexor retinaculum
palmar aponeurosis
flexor digitorum superficialis m.
gluteus medius m.
tensor fasciae latae m.
sartorius m.
pectineus m.
adductor muscles
brevis
longus
magnus
vastus lateralis m.
iliotibial tract
rectus femoris m.
gastrocnemius m.
tibialis anterior m.
extensor digitorum longus m.
peroneus longus m.
soleus m.
peroneus brevis m.
extensor hallucis longus m.
superior extensor retinaculum
extensor digitorum longus tt.
peroneus tertius t.
Key
1 subclavius m.
2 external intercostal mm.
3 pectoralis minor m.
4 serratus anterior m.
5 pectoralis major m.
6 rectus sheath (anterior layer)
7 rectus abdominis m.
8 external abdominal oblique m.
9 internal abdominal oblique m.