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Let's Get to the Bottom of This (Ocean Floor)

Developed by: Rachael Phillips

Subject Area: Earth Science

Grade Level: 5th Grade

Lesson Objective: Students examine movie posters about the ocean and discuss how these images are depicted with their group. They will define different oceanic landforms, compare them with continental landforms, and label a drawing.

Duration: 1 class period, 60 minutes

Grouping: whole class, small groups of 4-5, pairs

Standards Correlation:

Grade: 5th grade Earth Science: Landforms and Oceans

Standard 5-3: The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans.

Indicators:

5-3.3 Compare continental and oceanic landforms

Content connections

- Social Studies Literacy Skills-identify multiple points of view or biases and ask questions that clarify those opinions
- ELA SL5.1 Engage effectively in a range of collaborative discussions.
- ELA RI.5.6 Analyze multiple accounts of the same topic, noting important similarities and differences in the point of view they represent.

Materials:

- pictures of ocean movies for each group
- chart paper/markers for each group and teacher
- landform cards with descriptions, vocabulary, pictures
- PowerPoint/computer
- ocean floor worksheet with labels

5E Model

Engage	Engage students by placing two movie posters at each table-one of a horror/scary movie and one of mythical/animated. Elicit prior knowledge-students will complete a placemat consensus of what they know to be true about the ocean floor in their groups. Each person will complete their section of the frame (2 minutes) and the group will compile their data (3 minutes). The teacher will create a large chart for the class, getting ideas from each group (5 minutes).
Explore	Students will examine the two movie posters they have. Students will create a Venn diagram based on the posters they see and the brief descriptions of the movie. Groups will share out with the class.
Explain	Teacher will explain that one of the reasons for all the mystery is that we know many of the features of the ocean floor, but all of it has not been explored (teacher Power Point). Teacher will explain that just as there are landforms with names on continents (like mountains, canyons) similar features exist on the ocean floor.
Elaborate	Class will review some continental landforms and describe their characteristics (teacher power point). In pairs, students will be given written definitions and a picture of oceanic landforms and asked to work together to pair them up with their land counterpart (example-canyon-deep valley with steep sides-trench). Pairs will form quads to check their answers. As a class, the teacher will create a chart of the landforms that the students will include in their science journals.
Evaluate	Students will cut out the names of landforms and place them in the correct spots on the ocean floor worksheet, using the chart/their notes as a reference. Ticket out the door: Name one ocean landform. Describe it. Tell a way the continents and ocean floor are alike. Why are people so creative when it comes to the ocean floor? Lesson extensions: • Group research projects to learn more about each ocean landform (jigsaw method) • Students create their own movie poster and description about the ocean floor

What do you know about ocean landforms?

Developed by: Rachael Phillips

Subject Area: ELA, Science ***Grade Level:*** 5th Grade

Lesson Objective: Students will research an oceanic landform and information from various sources. Groups will create a slide(s) for a class Power Point presentation and publish a brochure about their topic.

Duration: introductory lesson 30 minutes; 15-20 minutes each day for students to research/work; final presentations 30 minutes

Grouping: whole class (introductory lesson); small groups for research

Standards Correlation:

Standard: 5-3 The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans.

Indicators: 5.L.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

5.W.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

5.RI.7 Draw on information from multiple or print sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

5.RI.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

Science 5-3.2 Illustrate the geologic landforms of the ocean floor (including the continental shelf and slope, the mid-ocean ridge, rift zone, trench, and the ocean basin).

5-3.3 Compare continental and oceanic landforms.

Materials: *The Magic School Bus on the Ocean Floor* by Joanna Cole
Computers with Internet access, Power Point, and a publishing program
Collection of science informational texts
Chart for research groups
Numbered tickets
Group research sheet
Rubric for grading

5E Model

Engage	Students will select a ticket from a basket. Each ticket will have a number on it (1-24 or number of students in class). Teacher will explain they will be researching an area of the ocean and they will be allowed to choose their topic. (Teacher will have a chart premade with the ocean landforms and numbered spots underneath-see resources below.) Teacher will call numbers and allow students to sign up for their topic. Each group will then designate a leader for their group.
Explore	Students will research their ocean floor landform using The Magic School Bus on the Ocean Floor (previously read in class), other science resource books, and Internet sources. Students will complete their group organizer to include a definition, drawing, and interesting facts.
Explain	Teacher will explain how students will take their information to create a Power Point slide(s) and brochure about their research topic. Teacher will go over the rubric with the students.
Elaborate	Teacher will work with groups who are ready and help them incorporate more advanced features in their presentation (video embedding, actions, etc.).
Evaluate	Student final projects will be graded based on the rubric for each part (slides and brochure). All members of the group will receive the same grade. Teacher (or a group of students) will put all of the slides together to create the class presentation. Students will also grade each other on the group collaboration. Each student will receive their own grade for participation.

Chart for group sign-up

Continental slope	Continental shelf	Rift	Trench	Seamount	Mid-ocean ridge	Abyssal plains
1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.
3.	3.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.	4.

Group Research sheet Names: _____

Landform: _____

Definition: _____

_____

Interesting facts:

- _____
- _____
- _____
- _____

Create a drawing or diagram in the box below.

Sources: _____

_____

Ocean research project rubric

Power Point slide(s)	Brochure
_____ (5 points) Heading _____ (15 points) Picture/graphic/diagram _____(20 points)Information about landform is accurate _____(5 points) Correct grammar, capitalization, punctuation; information paraphrased in students' own words _____ (5 points) Sources cited	_____(5 points) Title _____(15 points) Picture/graphic/diagram _____(20 points) Information about landform is accurate _____(5 points) Correct grammar, capitalization, punctuation; information paraphrased in students' own words _____(5 points) Sources cited

Group collaboration rubric

Name: _____

1=none of the time 2=some of the time 3=most of the time 4=all of the time

	works hard	Listens, works with others	Effort (tries best)	respect
*self-evaluation				
#1				
#2				
#3				
#4				
Teacher				

Group ocean research projects

We recently completed group research projects in class and created Power Point slides and a brochure to "teach" our classmates about what we learned. Each group had a rubric with the information they were to provide on their research sheet, slide, and their brochure. The grade for the group is listed below. I have the projects in the classroom if you would like to stop by and see their work.

Working together is a very important "life" skill and we established ideal working conditions for the groups. Students came up with a list of things they thought should/shouldn't happen and they knew their classmates would be grading them as well. Attached you will find a chart with your child's scores. They were asked to grade themselves and then the other students in their group assigned scores as well. I totaled the scores and took the average to calculate their participation grade. If you have any questions or concerns, please feel free to contact me.

Group project grade: _____
(counts in project category-30%)

Participation grade: _____
(counts as a daily grade-20%)
4=100 3.9=97 3.8=94 3.7=91
3.6=88 3.5=85 3.4=82 3.3=79
3.2 or less=76

Making an Ocean Floor Model

Developed by: Rachael Phillips

Subject Area: Earth Science

Grade Level: 5th Grade

Lesson Objective: Students create a model of the ocean floor and label the features.

Duration: 1 class period, 60 minutes

Grouping: whole class, table groups, pairs

Standards Correlation:

Grade: 5th grade Earth Science: Landforms and Oceans

Standard 5-3: The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans.

Indicators:

5-3.2 Illustrate the geologic landforms of the ocean floor (including the continental shelf and slope, the mid-ocean ridge, rift zone, trench, and the ocean basin).

Content connections

- Art-using clay/Play Do to make ocean landforms; idea of making a model
- Technology-students will take pictures of their projects (camera or iPad) and place them in shared folder so teacher can upload pictures to the class webpage

Materials:

- Cardboard cutouts (or other sturdy material) approximately 12 x 18
- Clay or Play Dough (could also create using paper maiche)
- Toothpicks
- Index cards (use as labels for landforms)
- Materials box for exploration (these should all be models/representations-examples would be map, globe, model car or airplane, replica of a famous place like a souvenir or snow globe, etc). These materials can vary per table.
- Access to computers and cameras/iPads
- Ocean vocabulary note cards (pre-made by students: one side has word, other side has some type of visual and a description)

5E Model

Engage	Engage students and elicit prior knowledge by playing "Flash" to review the landforms of the ocean floor. Students will get out their set of ocean note cards (these are index cards-one side has the landform word only, the other side has a drawing and a short description) and place them all with the words facing up. The teacher will "flash" a diagram, picture, or short description onto the Promethean screen. The screen will stay up for 5 seconds, in which time the students should put their finger on the card they think is the answer. Teacher and students will discuss each answer after it flashes off the screen.
Explore	Each table will receive a materials box. Students will take out the materials they have and discuss with their table how they think all of these materials are alike/what they have in common. (they are all models)
Explain	Teacher will explain that all of these are models or representations of something else-usually something that is too large for us to see. Teacher will have a class discussion about why we need models and how people might use them. (can bring up examples of prototypes companies use before building the actual product) Teacher will explain that students will be making their own models of the ocean floor, making sure they have the landforms from their note cards and stress that these should resemble the landform (go over rubric with students).
Elaborate	Students will get into pairs and get materials. Teacher will instruct groups to sketch out a plan for their model and will circulate to assist and approve as needed. Teacher will have students share some ideas they have about how to make certain landforms. Students will be given time to construct their models. Teacher will circulate and assist.
Evaluate	Students will grade their model based on the rubric. Teacher will also grade project based on rubric. If time allows, students could do a gallery walk of all the projects, leaving comments on post-it notes or a graffiti board. Lesson extensions: • Ocean World-students could create catchy or theme names for each of the landforms (ex. Sports Ocean-touchdown trench, etc.) and create a travel/vacation ad/poster/brochure trying to persuade tourists to visit there. • Out of school project-students could be assigned to create a representation of the ocean floor (poster or model) using materials from home

Names: _____

Ocean Floor Model Rubric

Student score	Teacher score
Circle the number of points for each. (check your note cards to make sure each is formed correctly) Continental shelf • Labeled 0 1 • Correct formation 0 1 2 Continental slope • Labeled 0 1 • Correct formation 0 1 2 Mid-ocean ridge • Labeled 0 1 • Correct formation 0 1 2 Rift zone • Labeled 0 1 • Correct formation 0 1 2 Trench • Labeled 0 1 • Correct formation 0 1 2 Ocean basin • Labeled 0 1 • Correct formation 0 1 2 Seamount • Labeled 0 1 • Correct formation 0 1 2 Overall neatness/design 0 1 2 Total score: _____	Continental shelf • Labeled 0 1 • Correct formation 0 1 2 Continental slope • Labeled 0 1 • Correct formation 0 1 2 Mid-ocean ridge • Labeled 0 1 • Correct formation 0 1 2 Rift zone • Labeled 0 1 • Correct formation 0 1 2 Trench • Labeled 0 1 • Correct formation 0 1 2 Ocean basin • Labeled 0 1 • Correct formation 0 1 2 Seamount • Labeled 0 1 • Correct formation 0 1 2 Overall neatness/design 0 1 2 Student score: _____ Teacher score: _____ Final score: _____

Should we stay, or should we go?

Developed by: Rachael Phillips

Subject Area: ELA (Writing); Earth Science

Grade Level: 5th Grade

Lesson Objective: Students form an opinion about ocean exploration and convey their opinion through writing.

Duration: 2 class period, 45 minutes

Grouping: whole class, small groups of 4-5, pairs

Standards Correlation:

Grade: 5th grade ELA: Writing and Speaking

Standard 5-W5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Indicators:

5-W5.1a Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose.

Science connections

Standard 5-3: The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans.

Indicators:

5-3.2 Compare continental and oceanic landforms.

Content connections

- Social Studies 5-5.2 Summarize the social, cultural, and economic developments that took place in the United States during the Cold War, including consumerism, mass media, the growth of suburbs, expanding educational opportunities, new technologies, the expanding job market and service industries, and changing opportunities for women in the workforce.

Materials:

- Materials bucket-pictures of moon, examples of items that came about because of space exploration
- chart paper/markers for group T charts (pros, cons)
- PowerPoint/computer

5E Model

Engage	Engage students by allowing students to investigate their materials buckets. Elicit prior knowledge by asking the following questions: 1. Why did the US and other countries explore space? 2. What were some of the results of this exploration?
Explore	Students will examine a timeline of space exploration as well as a cause/effect chart of space exploration. Students will also look at a table of the cost associated with the space program. Students will discuss in their table groups as they are looking at these materials. Students are to take Post-It notes and jot down any "a-ha" moments or questions they have. Teacher will gather these and bring the class discussion back to whole group. The teacher will lead the students in creating a class T chart with the pros and cons of space exploration.
Explain	Teacher will explain that the US has ended its shuttle program. Teacher will place check marks on the chart made by the students of the factors that went into this decision and add any more that the students may not have thought of. Teacher will provide the students with the following scenario. *Congressmen Marion Trench has proposed that the government spend 25 million dollars on the exploration of the ocean floor. Do you support his idea or would you vote against him?* (Students will be asked to move to one of three areas in the room-Yes, No, Undecided. Once students are in these areas, they will form pairs to complete the RAFT. Teacher may assign partners, allow students to choose, etc.) **RAFT Strategy (**Role Audience Format Topic)-Student pairs will be given a set of cards for the RAFT activity. Roles: teacher, marine biologist, doctor, farmer, ocean animal (you choose animal), CEO of a scuba company, etc. Audience: government, Kindergarten classroom, environmentalist group, group of rich business people, "Mother Nature", etc. Format: letter, ad/commercial, play, song, etc.
Elaborate	Student partners will make their selections and brainstorm. Students will draft this to share with the class.
Evaluate	Students will share their drafts with the class. *After sharing, students will conduct peer conferences and have a teacher conference about their RAFT. The group will revise and edit the piece for publishing in a class book.

Searching for Buried Treasure

Developed by: Rachael Phillips

Subject Area: Math/Earth Science

Grade Level: 5th Grade

Lesson Objective: Students compare numbers of different ocean depths and determine what landform this depth could represent. Students use a coordinate grid system to create a map of the ocean floor.

Duration: 1 class period, 60 minutes

Grouping: whole class, small groups of 4-5

Standards Correlation:

Grade: 5th grade Math

Standard

5-G Graph points on the coordinate plane to solve real world and mathematical problems

Indicators:

5-G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

5-G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Content connections

- Science 5-3.2 Illustrate the geologic landforms of the ocean floor (including the continental shelf and slope, the mid-ocean ridge, rift zone, trench, and the ocean basin).

Materials:

- Remote control car
- Bar magnet
- Small iron washers camouflaged to match floor or working surface
- Coordinate grid paper to match simulations

5E Model

Engage	Engage students by showing a short video clip about Titanic (show footage from the shipwreck). Mark on the classroom map where this is in the ocean, depth, and what landform this would be. Elicit prior knowledge by asking focus questions: 1. How do you think this shipwreck was discovered? 2. What method/strategy could be used to locate every shipwreck in the ocean?
Explore	Students will explore idea of a remote operated vehicle by watching NASA footage of Mars rover and the data it collects. Students will look at and discuss a diagram of a remote operated vehicle (ROV) and read a brief article. Teacher will show students their ROV. (remote control car with a bar magnet attached to the bottom). Teacher will also show students their area to explore (floor or paper marked off as a grid-no labels, washers already in place and camouflaged). Teacher will have groups take turns looking for the "treasure" using the ROV. As they find treasure, they are to mark where it was found on their group sheet (coordinate grid).
Explain	Teacher will bring class together for discussion. Teacher will mix up students so they are in a quad (each member from a different group). These students will share the experiences their team had. Students will then rejoin their own group. Teacher will ask groups to describe where they found treasure. Teacher will ask groups how could they be sure that they found all of it? If needed, teacher will guide students that labeling the grid (coordinates) and searching in a pattern would help.
Elaborate	Teacher will have students label their simulation/work space grids as well as their papers. The washers will again be placed on the grid (without students looking-they could turn their backs as the teacher placed them, or students from a different group could be allowed to place them). Students will conduct another search and compare the results.
Evaluate	Group sheets showing coordinate points Group reflection form: Describe your search pattern. What is another pattern you could've tried? What makes a search pattern effective? Student worksheet on coordinate points (plotting and naming)-completed independently as a daily assignment

	Lesson extensions: • Students create a pro/con list of using robots instead of humans • Students imagine their ROV discovered an undersea wonder (city, monster, etc) and they write a narrative about it