

GROW YOUR PALS PROGRAM GUIDE



THE NATIONAL FFA MENTORING PROGRAM

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LESSON 1.31

What is That? Using a Microscope

Unit:
**MATHEMATICAL
APPLICATIONS**

PRECEPTS

- J. Mental Growth
 - J1. Think critically
 - J5. Commit to life-long learning
- P. Technical and Functional



Lesson Type:
Small Group

NATIONAL STANDARDS

- NM-MEA.PK-2.2 Apply Appropriate Techniques, Tools and Formulas to Determine Measurements
- NS.K-4.3 Life Science
- NS.K-4.4 Earth and Space Science

STUDENT LEARNING OBJECTIVES

As a result of this lesson, the student will ...

- Explain the purpose of a *microscope*.
- Identify the main parts of a compound *microscope*.
- Properly set up and adjust a compound *microscope*.
- Describe what common items look like under a *microscope*.





TIME

Instruction time for this lesson: **50 minutes.**



RESOURCES

Any biology book would provide information on microscopes and how they work.
National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.



TOOLS, EQUIPMENT AND SUPPLIES



Compound Light Microscopes -
One for every three students (at least)

Note: Dissecting Microscopes would work just as well if not better. This lesson is designed for compound light microscopes, but the transition could be easily made.



Prepared Slides – These are pre-made slides with various items to view. One per microscope.



PALS1.31.SG.TM.A - Either printed or on overhead



PALS1.31.SG.TM.B - Either printed or on overhead



PALS1.31.SG.TM.C - Either printed or on overhead



PALS1.31.SG.TM.D - Either printed or on overhead



PALS1.31.SG.TM.E - Either printed or on overhead



PALS1.31.SG.TM.F - Either printed or on overhead



PALS1.31.SG.AS.A - one per student



PALS1.31.SG.AS.B - one per student



PALS1.31.SG.ASSESS.A - one per student



KEY TERMS

The following terms are presented in this lesson and appear in ***bold italics***:

Microscope

Eyepiece

Focus Knob

Stage

Light



CONTENT OUTLINE

- I. What is a microscope and how does it work?
 - A. Compound **microscope**:
 - 1. A tool used to magnify the image of anything so we can see it better
 - 2. It uses light and a number of lenses to make images bigger
 - B. Five major parts:
 - 1. Eyepiece – what we look through
 - 2. Focus knobs – how we focus the image
 - 3. Lenses – Different levels of magnification
 - 4. Stage – Where the specimen is placed
 - 5. Light – a light source to illuminate the image
- II. Viewing various items under a **microscope**
 - A. Steps to view things under a **microscope**:
 - 1. Place item on the plate.
 - 2. Turn on the light.
 - 3. Choose the proper lens.
 - 4. Look through the eyepiece.
 - 5. Turn the focus knobs until image is clear.

INTEREST APPROACH

Before the lesson begins, have the four magnified pictures of the snowflake, leaf, insect, shirt and pencil either printed or prepared on an overhead projector.



Hello everyone! Today we are going to study a whole new world that we can't see, but it is always out there. Let us start with some questions. Remember to raise your hands, and I will call on you. What is the biggest thing you can think of?

Allow students to answer and share their ideas.



Wow, those things are really big and really easy to see. Who will raise their hand and share the smallest thing they can think of?

Allow students to share.



Those were some really small things! You may not believe it, but there are things even smaller than all of the things you just mentioned. So small that we can't even see them with our own eyes. Let's look at some of those things.

Who in here likes to play games? Great. We're going to play a game called, "What is that?" I will show you a picture, and you have to raise your hand and guess what the picture is. Are you ready? Here is the first picture. Remember to raise your hand.

Show the picture of the magnified insect and call on the first student to raise their hand. Continue to allow guesses until a student either gets the answer correct or nobody knows.



This picture looks awfully weird. It is an insect. Who knew they looked like that? Let's do another one.

Show the picture of the pencil and call on students.



Great job! It is the end of a pencil...you are getting good at this. Let's do some harder ones. What is this?

Show the picture of the woven cloth of a shirt. Take answers from students.



Believe it or not, this is what your shirt looks like if you look at it really close. Next, here you go. What is this?

Show the picture of the leaf and take student answers.



This is a leaf. Good guesses! One more – it is my favorite. What is this?

Take student answers after you show them the snowflake.



Exactly! This is what a snowflake looks like if it is made really big so we can see it.

Does anyone know how we look at things really close so we can see them better?

Take answers and then pull out a microscope.



Cool ideas. Does anyone know what this is? It is a **microscope**. Tell your neighbor what this is. A **microscope**. This cool science tool helps us see things our eyes can't always see. It opens a new exciting world.



Today we are going to learn how to use this special tool, and then we are going to look at a few items to see things we can't see with our own eyes! If you think that is cool, give a thumbs up! Me too. Let's get started!

SUMMARY OF CONTENT AND TEACHING STRATEGIES

OBJECTIVE 1 & 2. | Explain the purpose of a *microscope*.



Identify the main parts of a compound *microscope*.

Now, what is this thing called again?

Have students respond.



That's right, it is a *microscope*. Before we can start looking at different things under the *microscope*, we have to learn how to use it. Everyone move closer and get around the table where the *microscope* is.

There are five major parts of the *microscope* that we have to know so that we can use it the right way.

*As you discuss each of the parts, use the **microscope** to show them and then help them fill in their worksheet (PALS1.31.SG.TM.F) with the proper word. You might have the words drawn on large strips of paper so the students can see how to spell the different parts.*



First is the *eyepiece*. This is where we put our eye to see what we are looking at. Write eyepiece in this space on your paper.

Show them with your example sheet and help them fill in the proper word. You'll do this each time you identify a part.



Second, are the *focus knobs*. These are what we turn to make the picture clearer. Who wants to try turning the knobs? Great – now add these words to your paper. Next is the *lens*. When we change these, it makes the picture bigger or smaller. See how you switch them? Each time you change this, you can see a different picture of what you're looking at. Write that on your paper. The next thing is the *stage*. This is where we will put the item we want to look at. Let's all write down *stage*. The last thing is the *light*. We can turn the light on or off. The light helps us see better the item we chose. It is important to choose something that the light can pass through for this *microscope* to work.

Show examples of things that **light** shines through and things it does not. Keep in mind it will be difficult to see things with a compound **microscope** if **light** cannot pass through it.



That was a lot of information, but you all listened carefully so now we know how to use this tool. Let's start looking at some things under the microscope! Remember that **microscopes** are really important and expensive tools. It is really important we don't treat them like toys, but that we are very careful with them.

OBJECTIVE 3 & 4. | Properly set up and adjust a compound **microscope**.



Describe what common items look like under a **microscope**.

This portion of the curriculum should be very inquiry based, which means students should be encouraged to “play” academically as they try many different things with your guidance. There is no exact path to follow, but you as an instructor should guide students in answering their own questions. If you can get the science teacher to loan you some prepared slides for the students to use first, it would be best. Then allow students to choose what they look at.

*Have a number of **microscopes** around the room with a slide already in it and focused on the item. The number depends on the number of students. Try to have no more than three students per group.*



Who is excited to look at some things under a **microscope**? Cool. We will all do the first one together so you can practice. In just a minute, when you hear the word MICROSCOPE, we will go to a **microscope** and look into it. There is already a cool item in the microscope to see. I will help you choose a station with your partners. When you get to the **microscope**, your job is to just look into the eyepiece like this (*demonstrate with one **microscope***). All of the slides are already focused, so there is no need to adjust the **focus knobs**.

MICROSCOPE!

Help guide the students to a station dividing them as you see appropriate. It is crucial that you make rounds to the students to help them see the first item.



If what you saw was cool, say COOL! What did you see?

Have students share.

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I am jealous – that sounds really neat. Every time we see something, we are going to draw what we saw on our paper that I am handing out.

Give each student PALS1.31.SG.AS.A.



Draw the first item you saw.

Next, you will change the lens like this.

*Demonstrate how you can change the **lens**.*



Everyone switch your **lens**.

*Check each group to make sure they have changed the **lens**.*



Thank you. Now, turn the **focus knobs** to see the item better like this.

Demonstrate on your microscope.



When I say TURN, slowly turn the little knob until you can see the item clear. I will help each of you.

At this point, this will be difficult for this grade level. You need to move to each group and help them focus the microscope. Before you move on remember to collect each prepared slide when they are finished as they are fragile and glass.

TURN



You all did so well! Now you are going to look at some things you want to see up close. In this container, there are 10 different things to look at under the microscope. In just a minute, when you hear the word EXPLORE, choose one item and then try to see it under your microscope. Let me show you how you will do this.

First, pick an item and put it on the **stage** like this.

Demonstrate.



Second, look in the **eyepiece** and turn the **focus knobs** to try to make it look very clear.

Demonstrate.



Third, draw what you see on your paper like this.

Demonstrate.



I will move around the room helping you. Raise your hand if you need help. Remember to be careful with the **microscopes**.

EXPLORE



At this point, students are exploring different items, and you are supporting them. Allow them to explore as much as time permits.



Wow, you all saw some very neat things up close thanks to the **microscope**.



REVIEW / SUMMARY

Give your neighbor a high five for your awesome science exploration. The **microscope** is important because it helps scientists see things that we can't see with our own eyes.

Quickly show your neighbors the pictures of what you saw and tell them what it was.

Just like a scientist, we saw items magnified because of the **microscope**. Today you learned the purpose of the **microscope**, the parts of the **microscope** and how to use the **microscope** to see things up close.

APPLICATION



Large Group Idea

Follow the same format. You can also give the students specific jobs. For example, one student chooses the item, the other focuses the microscope, the next draws the item, and they switch each time. As a large group, you may need to invite some others to help coach and lead each group of students.



One-on-One Idea

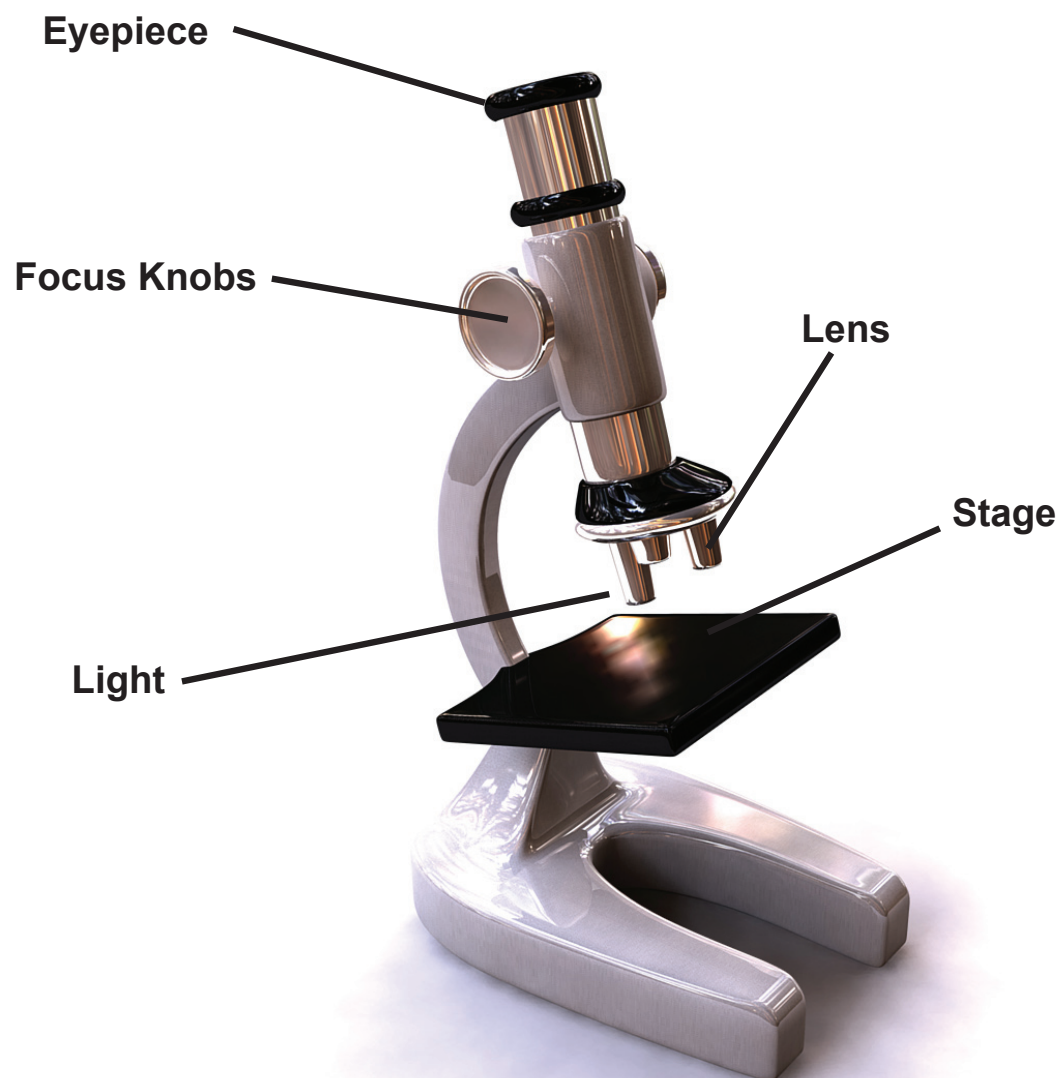
This lesson is very well suited to a one-on-one situation. Follow the same basic lesson plan, but take the student on a hunt to find things to look at. This could include going on a quick walk outside, around the classroom or in the school collecting items. Let the student's curiosity drive the lesson. Support curiosity and use of the microscope.

PALS1.31.SG.ASSESS.A | EVALUATION ANSWER KEY

Use students' activity sheet to check understanding.

1. Focus knobs
2. Stage
3. Eyepiece
4. Light
5. Lens

PALS1.31.SG.TM.F



PALS1.31.SG.TM.A



PALS1.31.SG.TM.B



PALS1.31.SG.TM.C



PALS1.31.SG.TM.D



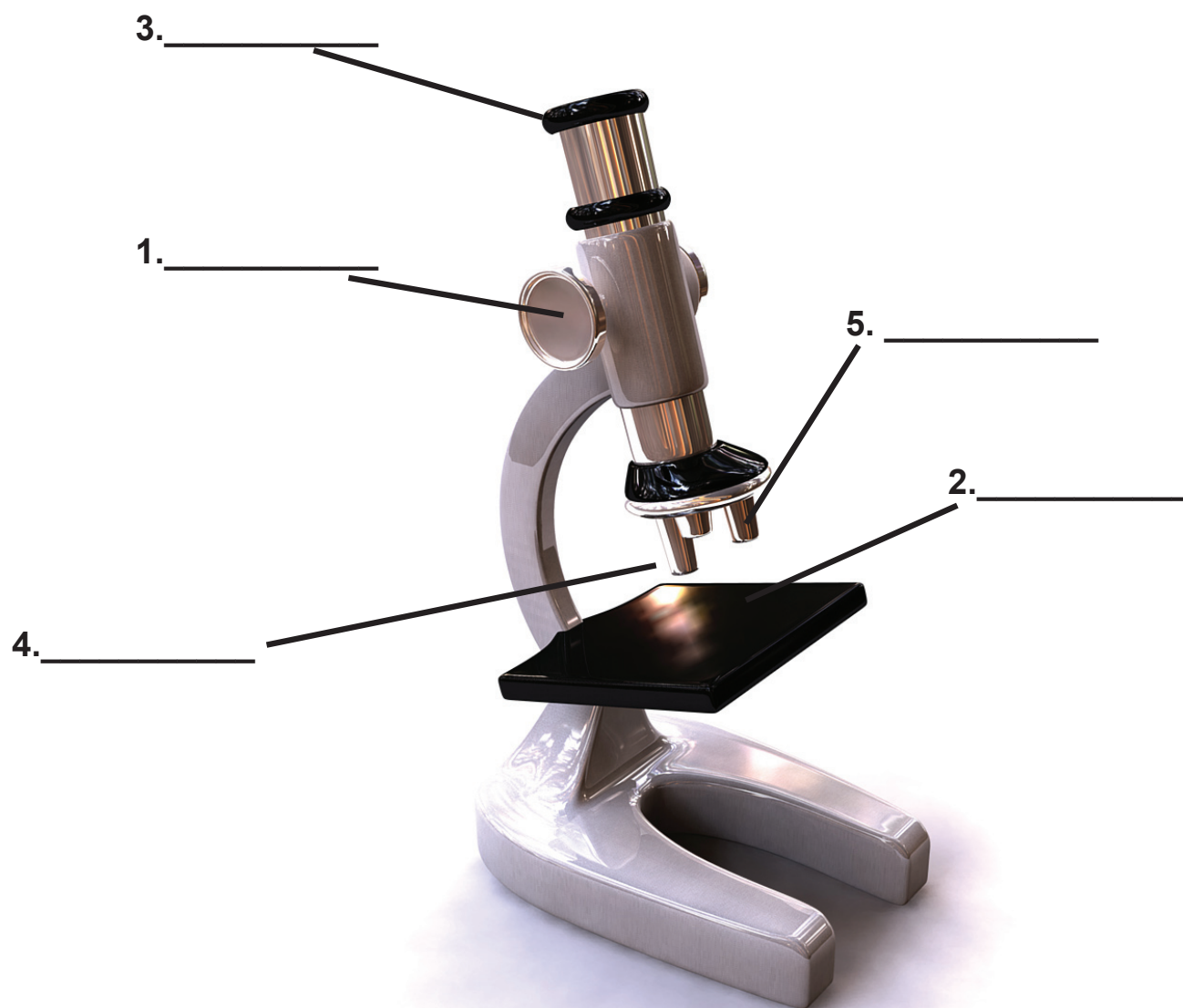
PALS1.31.SG.TM.E



PALS1.31.SG.ASSESS.A

Name _____

Label the parts of the microscope.



PALS1.31.SG.AS.A

